Agadir Green City Action Plan

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مدينة أكادير
VILLE D'AGADIR

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Contents


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Glossary

Acronym	Definition
ABHSM	Agence du Bassin Hydraulique de Souss-Massa (Hydraulic Basin Agency)
AESVT	Association des Enseignants des Sciences de la Vie et de la Terre (Association of Life and Earth Science Teachers)
ANDA	Agence Nationale pour le Développement de l'Aquaculture (National Aquaculture Development Agency)
BHNS	Bus à Haut Niveau de Service (Bus Rapid Transit)
BRT	Bus Rapid Transit
CAP	Communal Action Plan
CAPEX	Capital Expenditure - expenditure on acquisitions of or improvements to fixed assets
Collectivités territoriales	Collectivités territoriales are local authorities. In Morocco, these are the regions, prefectures, provinces and municipalities. They are legal entities under public law, which manage their affairs democratically. Morocco has 12 regions, 75 prefectures and provinces and 1503 municipalities, which are all 'Collectivités territoriales'.
DGI	Direction Générale des Impôts (General Revenue Office)
EBRD	European Bank for Reconstruction and Development
GCAP	Green City Action Plan
GDP	Gross Domestic Product
Green City Action Plan	Assessing and prioritising environmental challenges and urban vulnerabilities based on specific indicators and developing an action plan to tackle the challenges and vulnerabilities through policy intervention and sustainable infrastructure investments
Green city actions	Defined investment, policy and other initiatives that are principally focused on environmental outcomes and address Green City challenges, which may result in resilience or socio-economic benefits
Green city baseline	The current status of a city's environment and influencing conditions including exposure to risks and vulnerabilities, and socio-economic frameworks
Green city challenges	Specific issues affecting a city's environment with respect to the quality of the environment or ecosystem services, infrastructure operations, policy responses, risks and vulnerabilities, or socio-economic pressures
IWRM	Integrated Water Resource Management
Metropolitan area of Agadir	The area includes the urban neighbourhoods located in the municipalities of Agadir, Inzegane, Ait Melloul, Drarga and Dcheira El Jihadia, which together form a functional urban area.
Ministère de la transition énergétique et du développement durable	Ministry of Energy Transition and Sustainable Development
Ministère de la transition numérique	Ministry of Digital Transformation
MIS	Management Information System
Municipal Equipment Fund	Public institution dedicated to lending funds to municipalities (Fonds d'Equipement Communal).

Municipalities	One of the levels of territorial organisation in the Kingdom of Morocco. It is a local authority governed by public law, with legal personality and administrative and financial autonomy. It is the smaller territorial administrative level
Municipality of Agadir	It includes only the extent of the municipality, as defined by the official administrative boundaries set by the Kingdom.
NGO	Non-Governmental Organisation
ONEE	Office National de l'Electricité et de l'Eau Potable (National Office of Electricity and Drinking Water)
OPEX	Operating Expenditure - expenses related to carrying out normal business activities.
Oued	Mostly intermittent watercourse in dry regions, fed almost entirely by runoff, generally ending in a closed depression or disappearing through exhaustion.
Plan de Déplacement Urbain	Plan de Déplacement Urbain (Urban Travel Plans) are mobility planning tools, usually drawn for a municipality of metropolitan area.
PLU	Plan Local d'Urbanisme (Local Urban Plan)
Pressure-state-response (PSR) framework	Developed by the OECD, the PSR framework categorises various, specific indicators to illustrate the causal linkages between environmental pressures, the resulting state of the environment, and associated responses by the government, residents and the private sector
Priority environmental challenges	Thematic areas stemming from the categories of GCAP state indicators that a city selects to describe the aggregate environmental challenges to address
PV	Photovoltaic
RAMSA	Régie Autonome Multi Services d'Agadir (Multi-Services Autonomous Authority of Agadir). As of October 2024, SRM SM has taken over RAMSA's functions.
SDL	Société de Développement Local (Local Development Company)
SEDA	Société d'Eau Dessalée d'Agadir (Agadir Desalinised Water Company)
SMEs	Small and Medium Enterprises
SNTRO	Société Nouvelle des Travaux Routiers et Ouvrages (New Agency for Roadworks and Highway Infrastructure)
SRM SM	Société Régionale Multiservices Souss-Massa
TGR	Trésorerie Générale du Royaume (Kingdom General Treasury)
Traffic light screening	A simple method of assessing and comparing a city's environmental performance indicators with established benchmarks, whereby a green light indicates good performance in line with international standards; an amber light indicates insufficient performance and cause for concern; and a red light indicates low performance and need for critical attention.
UDP	Urban Development Programme (Programme de Développement Urbain)
VAT	Value Added Tax

Foreword

In 2022, Agadir became the first city in Morocco to join the EBRD Green Cities programme (European Bank for Reconstruction and Development). This commitment reflects a clear vision: to establish Agadir as a model of sustainability and resilience, offering its residents a high-quality living environment and providing visitors with a unique experience.

Agadir is a city in continuous transformation, shaped by history, yet resolutely looking to the future. Rebuilt after the 1960 earthquake, it has become a hub of dynamic development, driven by the ambitious vision of His Majesty King Mohammed VI and a strong collective commitment.

With its strategic position at the heart of the Kingdom, Agadir—Capital of Amazigh culture, future host city of the 2030 FIFA World Cup, and recipient of the Shanghai 2024 Prize for Sustainability—embodies a balanced development model, that integrates economic growth, environmental preservation, and cultural heritage promotion.

However, our city faces major challenges: growing water stress, accelerating urbanisation, and increased vulnerability to climate change. To tackle these issues, we have adopted an ambitious and participatory approach, integrating sustainable solutions to ensure a better quality of life for our citizens.

In this spirit, we have developed the Green City Action Plan (GCAP), reinforcing our 2022-2027 Municipal Action Plan. This strategic framework outlines concrete measures to improve water resource management, enhance green infrastructure, promote sustainable mobility, and optimise energy efficiency in buildings.

I would like to extend my sincere thanks to the EBRD and its partners, as well as to all those who have contributed to the success of this initiative—local institutions, experts, civil society, and the citizens of Agadir.

Today, we have both the opportunity and the responsibility to make Agadir a green and prosperous city, aligned with the Kingdom's aspirations and global sustainability challenges.

Together, let's build a future where progress goes hand in hand with environmental responsibility and collective well-being!

Aziz Akhannouch

President of the Municipality of Agadir

Executive summary

Agadir

Agadir is a dynamic city of 505,000 inhabitants on the Moroccan Atlantic coast. Its unique geographical location, climate and cultural heritage make it an important centre for the sub-region and the economic and administrative centre of the Souss-Massa region. Agriculture, fishery and tourism are the three main economic sectors of Souss-Massa which together represent 22% of national GDP. Agadir is the world capital of Amazigh culture, and a significant proportion of the population is trilingual in Arabic, Amazigh and French. Agadir is a connected city, with strong links to Europe and the rest of the world through visitors and an important diaspora of Gadiris (residents of Agadir). Building on this status, Agadir should be one of the host cities for the 2030 FIFA World Cup.

The urbanisation rate in Morocco has increased significantly from 29.1% in 2004 to 62.8% in 2024. Agadir has followed this trend, and its urban area now extends into neighbouring municipalities. This rapid urbanisation combined with increasing climate change pressures have increased the city's vulnerabilities to environmental shocks and stresses.

EBRD Green Cities

For more than 30 years, the EBRD Green Cities has been committed to furthering the exchange of knowledge and innovation across Central and Eastern Europe, Central Asia, North Africa, and the Middle East. Many cities in this region are particularly vulnerable to the impacts of climate change and the EBRD Green Cities programme was established with the aim of helping cities mitigate and adapt to the risks of climate change while ensuring the environmental policies contribute to the social and economic well-being of residents.

Through the Green Cities programme, cities assess the environmental challenges they face and develop a GCAP to tackle the most pressing environmental threats. The action plan has the role of guiding sustainable infrastructure investments and stimulating public and private green investment to improve the city's resilience to climate change using its resources sustainably and preserving the quality of its environment across sectors: water and wastewater, transport and mobility, energy, energy efficiency in buildings, solid waste and land use, supported by digital solutions and efficient governance.

Agadir Green City Action Plan

Agadir is **the first city in Morocco** to have joined the Green Cities programme in 2022, and to issue a municipal bond with the backing of EBRD. Alongside an ambitious royal project for Agadir, the Urban Development Programme, initiated by His Majesty, King Mohammed VI in February 2020 for a duration of four years, the municipality published a **Communal Action Plan 2022-2027 with a vision for a sustainable Agadir**, based on four pillars: modern infrastructure, an attractive territory, a smart and sustainable transition and an open assembly of citizens. The GCAP builds on these pillars, supporting the city towards becoming a sustainable and inclusive metropolis which puts the quality of life of its citizens at the heart of its actions.

The development of the Agadir GCAP follows a three-step process, shared across all EBRD Green Cities.

UNDERSTAND

Create a **green city baseline** and understand **environmental challenges** through the gathering of sectoral and environmental indicators, using a state-pressure-response framework and resulting in the identification of priority environmental challenges, risks and vulnerabilities.

PLAN

Collaboratively draft **a 15-year vision** and associated **strategic goals** which will guide investment and actions in Agadir, followed by the development of **green city actions** which will guide private and public **sustainable investments into green interventions** designed to address the environmental challenges, and help the city fulfil its strategic goals and vision. The actions are organised around six main sectors: water, solid waste, land use, transport, energy and buildings, digital, and cross-cutting initiatives supporting awareness, capacity building and inclusion.

IMPLEMENT AND MONITOR

Implement the green city actions over a period of five years following publication of the action plan, through **financing and delivery of interventions, capacity building** and **collection of data**, while **monitoring** the implementation of the actions through environmental and social indicators to **measure impacts** of the Green City Action Plan.

This action plan presents the outcome of the work of stages 1 and 2, and provides guidance for implementation and monitoring.

Stakeholder engagement

The development process of the GCAP was highly collaborative, with four engagement events held between December 2023 and September 2024. The kick-off event gathered 82 participants from the Municipality of Agadir and civil society, and explained the overall structure of the GCAP, inviting stakeholders to participate in the drafting process. Three workshops were held over a period of eight months, involving most departments of the Municipality of Agadir, as well as civil society organisations, non-governmental organisations (NGOs) and university staff and students. The workshops were instrumental in co-creating the vision, the strategic goals and develop the green city actions, in addition to gathering feedback from 129 stakeholders from local government, agencies, NGOs, private sector, academia and wider civil society, creating a shared way forward for the development of the GCAP (Table 1).

ENGAGEMENT	DATE	PARTICIPANTS	SUMMARY
Kick-off event	13th December 2023	82 participants in person	• Public kick off of the GCAP including a presentation of the GCAP programme and introduction to the main stakeholders. • Presentation of the GCAP methodology and process to the stakeholders and of the expected workshops and inputs required from them. • Thematic deep-dive on adaptation.
Prioritisation of challenges Creation of first long list of actions	14th May 2024	17 participants in person	• Presentation of the results of the baseline stage and of the state-pressure-response framework. • Generation of a long list of environmental challenges • Prioritisation of the environmental challenges by participants through individual assessment, group discussions and in-between group discussions. • Creation of a first long list of actions to address the identified environmental challenges.
Vision, objectives and action long list	15th July 2024	23 participants in person	• Presentation of draft vision and objectives components. Discussion on vision and agreement over vision and objectives. Review of action longlist by stakeholders, including scope, location and implementation measures, the exercise included the suggestion of additional actions. • Shortlisting of actions by participants, based on their alignment with vision, objectives, and potential to address priority challenges. • Thematic deep-dive on digitalisation.
Action validation and shortlisting	11th September 2024	24 participants in person	• Presentation of shortlist of actions and discussion to refine the short list of actions with stakeholders on scope, location, GESI measures and potential missing actions.

Table 1
Summary of stakeholder engagement sessions

Environmental challenges

Agadir is vulnerable to natural and man-made shocks and stresses, across the following environmental challenges: water scarcity, extreme heat, earthquakes, lack of green spaces and biodiversity, as well as damages to its coastal zone. Climate change has exacerbated natural phenomena such as droughts and extreme heat events, such as the heat wave which hit the city in 2023. Water scarcity and the current high level of water exploitation is a significant concern and has already prompted investment in desalination infrastructure. It is likely that flash flooding events will become more frequent as rainfall reaches more extreme patterns, increasing the risk of erosion and potential landslides. This natural risk is further aggravated by the current location of the landfill leachate storage which poses a pollution threat to the city and its coastal habitats. The bathing water quality has slightly decreased in recent years due to flash floods carrying waste into Agadir bay.

In 1960, an earthquake destroyed the old city of Agadir, causing significant loss of lives and infrastructure. Earthquakes remain a major environmental threat, despite not having caused significant damage in recent years. Air quality is generally low in Agadir, due to construction dusts, the proximity to the desert, an old vehicle fleet and low annual rainfall. Soil quality could not be assessed due to a lack of publicly available data.

Green space per inhabitant in Agadir is low (3.5sqm per inhabitant), below other Moroccan cities such as Rabat (20sqm) or Marrakesh (8sqm). Biodiversity across the city is decreasing, due to a loss of quantity and quality of habitats, although the lack of data makes biodiversity loss difficult to monitor. There is an increasing need for municipal intervention to ensure that competing uses for coastal spaces such as natural habitats protection, fisheries and tourism are regulated and contributing a sustainable blue economy for Agadir.

Through the baselining process, priority environmental challenges and impacts were identified (Figure 1). They are split by sectors according to the EBRD's Pressure-State-Response Framework and were validated during the workshops, interviews, as well as through desktop research.

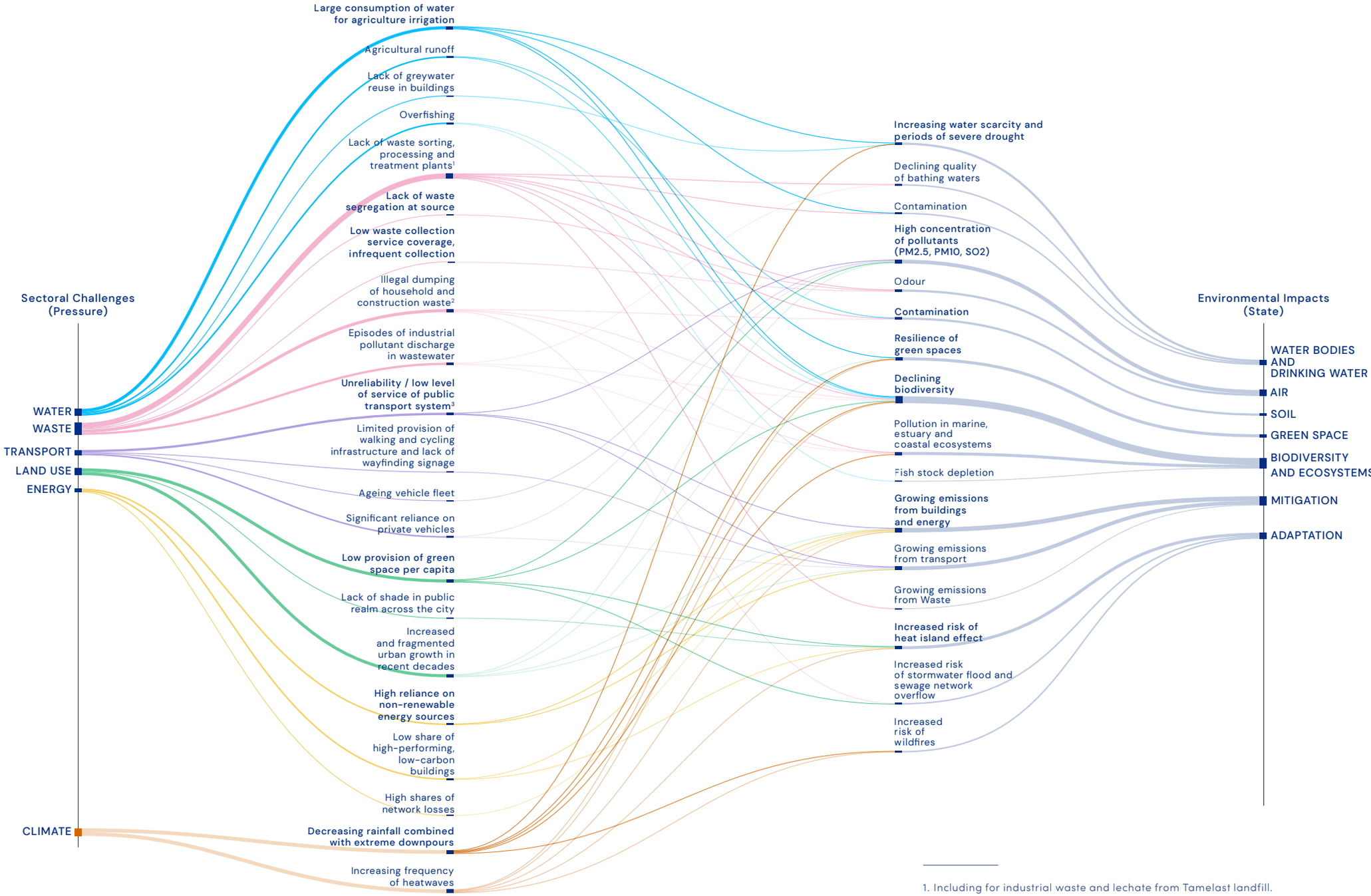

Figure 1
Sectoral challenges and environmental impacts in Agadir. Elements in bold denote the most severe ones.

1. Including for industrial waste and lechate from Tamelast landfill.
2. Taking place in dry wadis and empty plots across the city.
3. Under-equipped, peripheral neighbourhoods are particularly affected.

A sustainable, inclusive and thriving metropolis that smartly manages its resources for the benefit of all.

By proactively safeguarding its environment, integrating blue-green infrastructure, promoting active mobility, fostering awareness and education among its citizens, and leveraging its human capital, Agadir will become a model for integrated resilient urban development in Morocco.

AGADIR'S STRATEGIC GOALS

This vision for a green Agadir was developed in collaboration with the Municipality of Agadir and through workshops with stakeholders. The vision is underpinned by **seven strategic goals** which will give focus to different dimensions of the action plan.

SG1
Protect and enhance its environment

SG2
Design for a fair and inclusive society

SG3
Optimise the use of its resources

SG4
Promote sustainable mobility

SG5
Enable a healthy lifestyle for all

SG6
Protect and capitalise on its blue economy

SG7
Harness the potential of digital

The strategic goals put Agadir residents and their quality of life at the centre of the GCAP, building on the Communal Action Plan pillars to ensure that the GCAP actions deliver cross-benefits for Agadir residents and their environment, beyond targeted reductions in GHG. The strategic goals will help integrate the GCAP actions with the on-going investment programmes in the city.

Actions

There are 31 actions in this GCAP, representing the activities the city should prioritise to achieve the vision of a resilient and inclusive Agadir (Figure 2). These build on the different dimensions and pillars of the Communal Action Plan 2022 – 2027 to ensure a coordinated approach to infrastructure investment in the city. The GCAP includes a transformative programme for the city's oueds and abandoned quarries, integrating blue and green infrastructure solutions to mitigate the risk of drought and flooding while reducing the impact of extreme heat events.

The GCAP also includes an ambitious package of interventions to improve the public realm throughout the city, deliver active travel infrastructure and contribute to the decarbonisation of transport through a better modal integration and introduction of electric fleets. Waste management is another area of focus for the proposed actions, which will drive the development of a comprehensive sorting and recycling system. Digital solutions underpin all infrastructure projects, encompassing real-time monitoring and diagnostics, and management ultimately coordinated by an integrated operations centre (see DA-07 Integrated operations centre). Actions are designed to support gender and social inclusion, and are complemented by the delivery of a city-wide sustainability awareness campaign.

This ambitious GCAP equals a total potential CAPEX investment of an estimated MAD 6.3 billion (EUR 582 million)[4]. It is estimated that the OPEX of the actions combined will reach MAD 1.4 billion (EUR 135 million) over the next five years.[5] The estimates of costs presented in the document are intended to show the potential scale of investment which could be deployed in each sector and for each of the actions. It is estimated that more than 5,800[6] new direct and indirect jobs will be created within the local economy, and the actions represent a significant opportunity to nurture innovation, supporting local start-ups as well as involving local craftsmanship.

Agadir's emissions are projected to grow from around 2 $MtCO_{2eq}$ per capita in 2019 to 2.2 $MtCO_{2eq}$ per capita in 2050 under a business-as-usual emissions scenario. Based on its GHG emissions and national income status in 2019, Agadir was assigned the Paris-aligned 'late peak' trajectory, which involves a 2% reduction from baseline emissions by 2030 before full decarbonisation in 2050. GCAP actions are expected to save around 196,655 tCO_{2eq}[7]per annum assuming they are all implemented in full, which represents 34% of the required emissions reductions between business-as-usual and Paris alignment pathways.

4. All financial figures in this document have been converted using the exchange rate of 1 EUR = 10.85020 MAD.
5. To estimate the costs of specific actions, the consultant utilised internal benchmarks, along with publicly available documentation from international financial institutions, tenders, strategic documents from the City of Agadir, annual reports of Agadir municipal companies, information from the Agadir state level, various ministries, and scientific articles. Additionally, a portion of the information was directly estimated by sectoral experts. Cost benchmarks have been considered at the level of (and if they were not available, it moved to the next level); 1. Agadir; 2. Morocco; 3. North Africa; 4. Middle East and North Africa (MENA); 5. Europe; 6. Rest of the World.
6. The estimate for the number of new jobs created is based on a World Bank study that analysed the relationship between infrastructure investment (in USD billion) and direct job creation across ten different sectors for oil-importing countries in the MENA region (World Bank, Infrastructure and Employment Creation in the Middle East and North Africa). For the digital sector, it was based on the European Commission publication "Job creation and destruction in the digital age: Assessing heterogeneous effects across EU countries', which compares the level of investment in the ICT sector for job creation. For some actions, where no reference was available, a value was estimated by an expert.
7. CO2 reductions have been estimated using the best available information, scientific articles, as well as national and international benchmarks from completed investments.

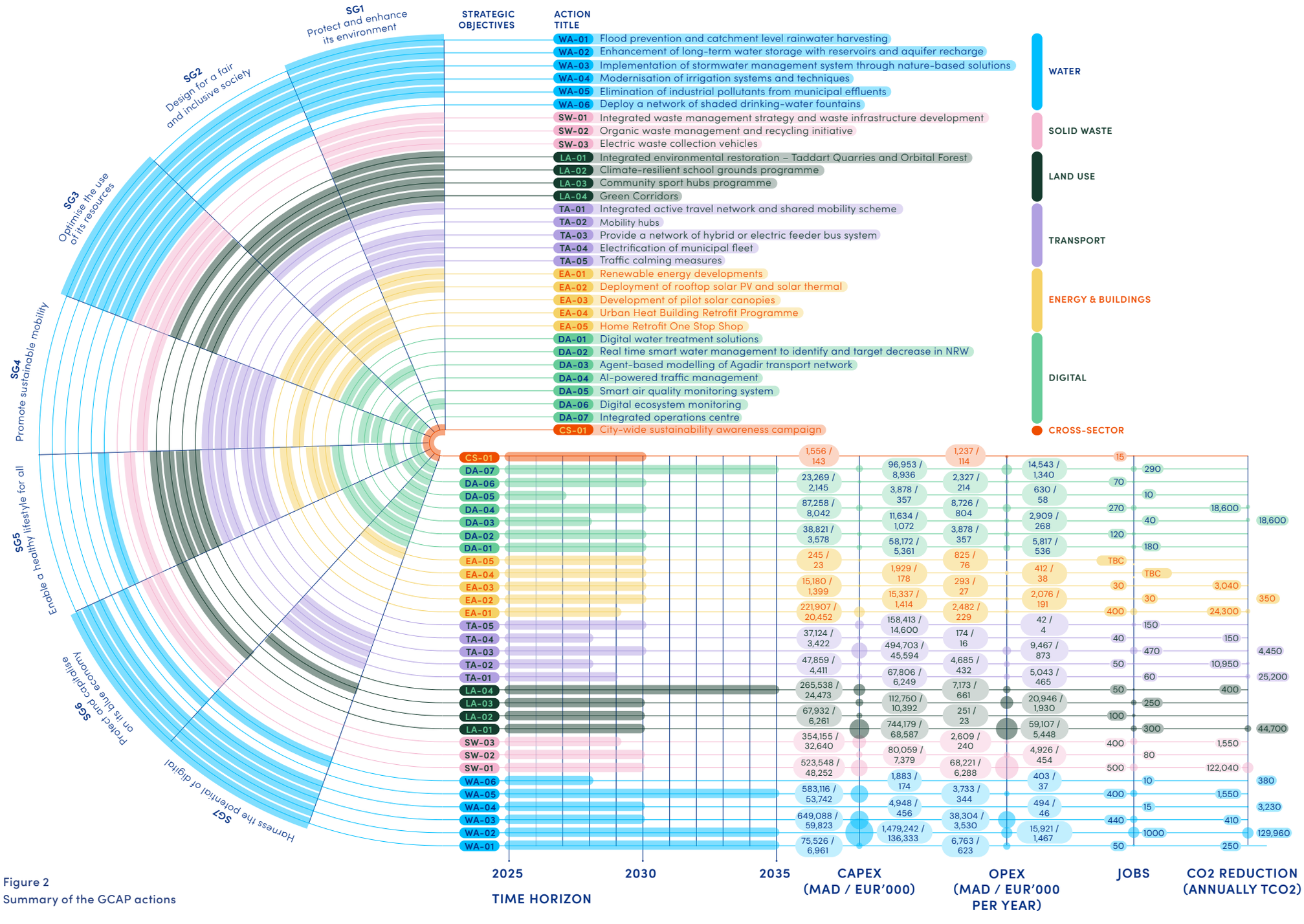

Figure 2
Summary of the GCAP actions

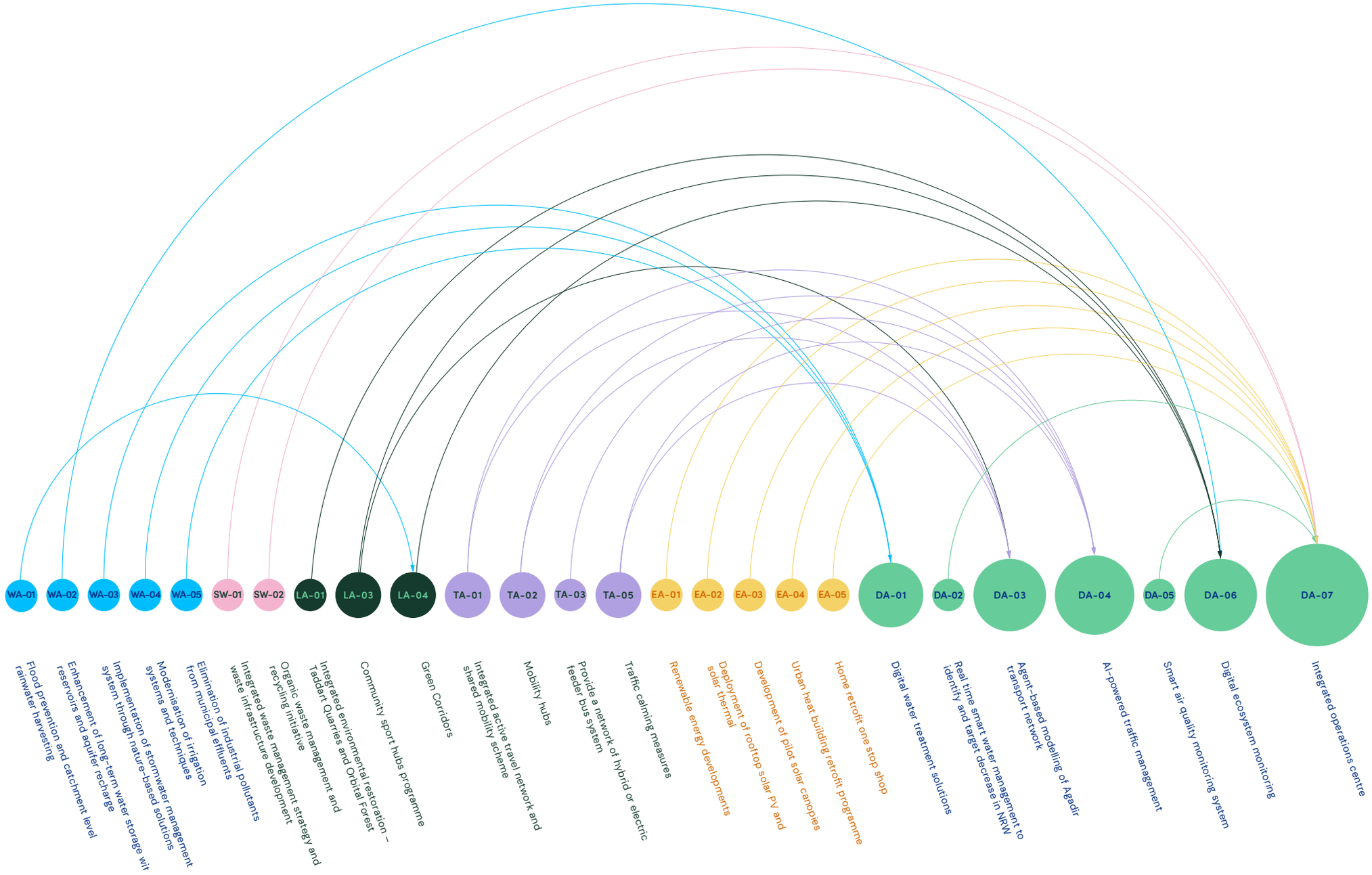

Figure 3
Illustrative data flow between GCAP actions

1

Introduction

The EBRD Green Cities programme

Figure 4
Green City Action Plan steps

The EBRD Green Cities programme aims at helping cities become more resilient through mitigation and adaptation to climate change. GCAPs are one of the main pillars of the Green Cities programme. The purpose of GCAPs is to help cities preserve and improve the quality of their environmental assets by using their resources sustainably. By mitigating and adapting to the risks of climate change, cities are improving the resilience of their infrastructure, services, operations and communities against shocks and stresses. The Green City Action Plan programme also ensures that environmental policies contribute to socio-economic wellbeing of residents in an inclusive way.

The Municipality of Agadir joined the EBRD Green Cities programme in 2022. It is the first city in Morocco to have joined this network of over 50 cities. It is also the first City to have issued a municipal bond in Morocco, a 1bn MAD bond of which EBRD invested 400m MAD. Following the successful launch of the municipal bond, Agadir embarked on a Financial and Operational Performance Improvement Plan (FoPIP) in partnership with EBRD. At the time of writing, that project was almost completed. In 2023, Agadir joined the Green City Action Plan programme.

The Municipality of Agadir launched an ambitious Communal Action Plan (CAP) in 2022, driven by the vision of making Agadir an attractive, modern metropolis open to its citizens and a model of sustainable and intelligent transition. The GCAP will play an instrumental role in supporting the achievement of the CAP vision, while setting objectives that will guide the city's sustainable growth over the next 15 years. This vision and strategic goals of this GCAP complement the vision of the CAP 2022-2027 to comprehensively guide sustainable investment in Agadir.

The GCAP was prepared in accordance with the standard methodology developed by EBRD for the Green Cities network. The document was prepared with the technical support of EBRD experts and funded by the Netherlands through the High-Impact Partnership on Climate Action (HIPCA – also supported by Austria, Canada, Finland, South Korea, Spain, Switzerland, the TaiwanICDF, the United Kingdom and the United States of America).

Following the methodology set out by EBRD, GCAPs have three main stages (Figure 4).

Baseline

Stakeholder engagement plan

The GCAP was officially launched in December 2023 at an event in Agadir which was attended by 82 participants, including representatives from the municipality, NGOs, public sector agencies and private sector actors. The event introduced the EBRD Green Cities Programme to the stakeholders and highlighted the different engagement points during which feedback from stakeholders would be gathered. Following the event, a plan for stakeholder engagements throughout the development of the GCAP was created.

Four engagement workshops with stakeholders were undertaken in the presence of the Municipality of Agadir. Stakeholders included representatives from the Municipality of Agadir's departments, third sector organisations, universities and professional institutions. Different exercises were undertaken during the stakeholder engagement workshops, which reflected the different steps of the GCAP production process (Table 2).

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Action validation and shortlisting	11th September 2024	24 participants in person	• Presentation of shortlist of actions and discussion to refine the short list of actions with stakeholders on scope, location, GESI measures and potential missing actions.

Table 2
Summary of stakeholder engagement sessions

Policy review

A review of existing policies and plans at the national, regional, sub-regional and municipal level was conducted, to ensure that the GCAP actions complement and build on existing commitments. This included:

- Communal Action Plan 2022-2027 of Agadir City (CAP)
- The Urban Development Programme for the city of Agadir (UDP)
- Regional Development Plan of Souss-Massa
- Sustainable Energy Action Plan (PAED)
- Territorial Plan to Fight Against Global Warming
- National Strategy for Sustainable Development (SNDD)
- Climate Change Policy in Morocco (PCCM)
- The National Climate Plan

A review of the socio-economic context, governance arrangements, responsibilities and financial capacity across various sectors in Agadir was undertaken to provide a comprehensive understanding of the policy context for the GCAP. The results of this exercise are summarised in chapter 2.

Pressure-state-response framework

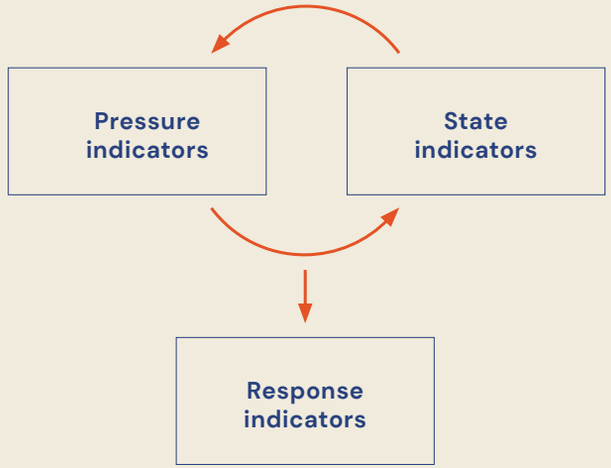


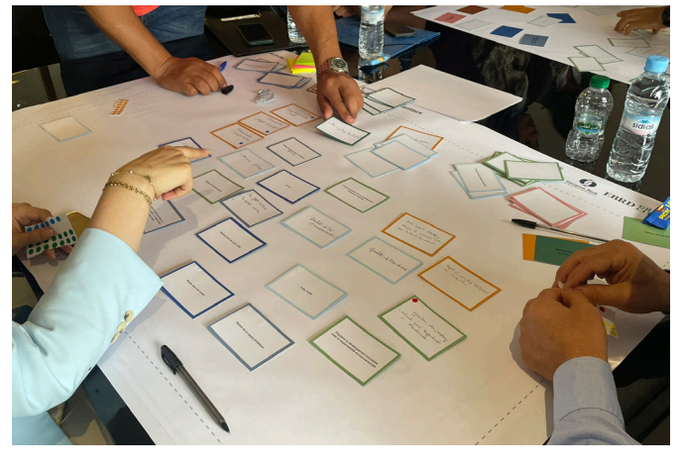
Figure 5
Pressure-state-response framework

As well as reviewing policies and plans, the baselining phase of the GCAP included gathering data and indicators across the different states of the pressure-state-response analysis framework (Figure 5). The assessment of the city's current State includes indicators related to: air, water bodies, drinking water and water use, soil, green space, biodiversity and ecosystems, GHG emissions and adaptation to natural disaster risks. The data collected also sought to describe the performance of the different urban systems across key sectors (pressure), including energy, water, solid waste, transport, land use, buildings and industry. The indicators collected were graded using a traffic light system of red, amber, green against ranges provided by EBRD and which are common across all GCAP cities. The traffic light system allows for comparison of trends across time where available, indicating whether the situation is worsening or improving for each state, pressure and response indicator.

Dedicated assessments were undertaken for cross-cutting themes such as: risk and vulnerability, gender and social inclusion, smart maturity. Qualitative evidence collected during workshops and 1:1 interviews with local department leads complemented the information gathered through secondary sources, and allowed to create a comprehensive picture of the environmental challenges Agadir is facing.

Identify and prioritise environmental challenges

Following the technical assessment of the indicators and policy landscape of Agadir, a list of environmental challenges was identified, and presented during a stakeholder engagement workshop where participants had the opportunity to prioritise the list and identify new challenges. Participants were asked to identify challenges by picking the ones they thought most relevant for Agadir and to prioritise them by sector. Deep-dive interviews were undertaken with stakeholders in key sectors such as water (RAMSA) and transport (SDL Mobilité) to complement the workshop and to better understand the operations and challenges facing each sector.



Vision and objectives

A vision and strategic objectives for the GCAP were drafted and developed in partnership with the city representatives and validated with the stakeholders. The vision and strategic objectives for the GCAP build on, and complement the Agadir Communal Action Plan 2022-2027 vision and objectives.

The GCAP vision has a 15-year horizon and states the long-term ambitions of the municipality and its citizens for the city. To plan for the vision, the strategic objectives, with a timeframe of 10-15 years, focus on the sectors that need to be improved or developed to achieve the vision.

Develop green city actions

A list of actions was developed to underpin the GCAP vision and strategic objectives. Actions were primarily generated from 1) a review of the actions in the Communal Action Plan which could be augmented and enhanced through the GCAP, 2) interviews with sectoral experts from EBRD, Arup and the municipality, 3) stakeholder engagement with municipality officers, officials, NGOs, private sector, academia and civil society. Having multiple sources of actions gave a wide range of scales, sectors and type of actions such as capital, operational or policy interventions.

The actions were refined, including definition of potential components, spatial extent, owners and delivery partners. The refined actions were discussed, validated and prioritised with stakeholders in Agadir, and provided an opportunity to identify new actions. The prioritised actions were further developed by sectoral experts, taking also into account: gender and social inclusion measures, opportunities for economic development and upskilling, digital potential. Job creation potential and GHG emission reduction were quantified, together with a description of climate adaptation benefits. Lastly, capital and operational costs were estimated for each action, indicating potential sources of funding and finance.

Implement and monitor

Implementation of the actions will be led by the Municipality of Agadir and other local actors such as Société Régionale Multiservices Souss-Massa (SRM SM) (see Table 3). The implementation of the actions will mostly take place during the first five years of the Green City Action Plan. Collaboration with government agencies, local providers, SMEs and civil society will be crucial to ensure that the actions deliver the best environmental, social and economic outcomes.

The monitoring and evaluation of the GCAP is critical to understand the impact delivered by the GCAP actions towards reducing greenhouse gas emission and climate change adaptation in Agadir. Two types of monitoring will be undertaken:

1. Monitoring of the implementation process, which will focus on how the actions are implemented against the timeframe, budget and components of each of the actions. The aim of the implementation monitoring is to ensure that the actions are delivered in keeping with the original aim of each action, that the right data is collected to ensure further monitoring and that lessons learnt are shared between actions.
2. Monitoring of the results, evaluating whether the implemented actions are bringing the expected benefits. This will be done through the analysis of quantitative and qualitative data collected during and post implementation of the action, and compared with the baseline analysis presented in this GCAP.

2

City baseline

Geography

Agadir is located in the Souss-Massa region of Morocco. It is geographically constrained by the Atlantic ocean to the west, and the Atlas mountain range to the north and east, and Oued Souss to the south. The Souss plain extends to the south-east of the city.

The Municipality of Agadir covers an area of 110 km2 which ranges from the urban neighbourhoods of Agadir, Anza and Taddart/Haut-Anza to the north to the southern neighbourhoods of Tikiouine to the south east and Aghroud to the south west (Figure 7). The metropolitan area of Agadir extends beyond the boundary of the municipality, into the neighbouring municipalities of Inezgane (5.27 km2), Ait Melloul (20.26 km2), Dcheira El Jihadia (4.52 km2) and Drargua (118.2 km2). The metropolitan area of Agadir is therefore under the control of several municipalities.

Figure 6
Administrative map of the provinces of Agadir-Ida Outanane, Inezgane-Ait Melloul and Chtouka-Ait Baha

Figure 7
Municipalities of Agadir, Inezgane, at Melloul, Dcheira El Jhadia and Drargua

Governance and powers

Local government

The municipal council of Agadir is made up of 61 elected members, 11 of whom are part of the municipal cabinet. The current municipal council was elected in 2022 and will remain in power until 2027. The municipality administers services related to civil registry, land use licences, sports and cultural, public spaces and collection of solid waste. The municipality also has direct control over the road network within the municipality. Other services are managed by conglomerates of municipalities or by the region. The newly created Société Régionale Multiservices Souss-Massa (SRM SM) is in charge of wastewater, water distribution and electricity distribution, at a regional scale, which includes Agadir.

Transport and solid waste are administered through two distinct administrative groupings at the metropolitan scale. Public transport is managed by a group gathering 12 municipalities[8] and the region of Souss-Massa, and was created to administer transport at the scale of the metropolis. This "Groupement de collectivités territoriales" is funded partially by the region and partially by proportional contribution of the 12 municipalities. For solid waste, a different group, gathering 10 municipalities[9], is in charge of management of the metropolitan landfill. These groups gather municipalities belonging to different "préfectures" or "provinces" (Figure 6 and Figure 7). For further information on powers, see Table 3.

Main urban development plans and programmes

Three urban development programmes are currently being implemented in Agadir :

1. The Communal Action Plan 2022-2027 (CAP), adopted by the Municipality of Agadir, presents a diagnosis of the current situation of the city, a vision and goals for the development of the city and actions to address the challenges of the city and achieve its goals. It is the guiding document for investment and actions within the municipality. The goals and actions are organised in four dimensions: Attractive territory, Sustainable and Smart City, Open Assembly and Modern Infrastructure. These four dimensions are then sub-divided into 12 axis and 48 components (Figure 8). The CAP is guiding investment and policy-making in the city and is being implemented by the municipal council, for a total budget of 2.7 billion dirhams (250 million euros).

2. The Urban Development Programme (2020-2024) for the Municipality of Agadir was launched by His Majesty King Mohamed VI, directly managed by the Ministry of Interior in collaboration with the municipality. Investment, worth over 7 billion dirhams, is being directed towards the creation of a Bus Rapid Transit System, new roads and the creation and regeneration of public spaces and parks. The Municipality of Agadir is contributing to the UDP's budget by a third.

3. The Regional Development Plan (2022-2027) articulates the vision of the Regional Council around 7 pillars of development for the region of Souss-Massa. This includes the Port of Agadir, the potential development of a rail line with Marrakech and the sustainable management of resources across the region.

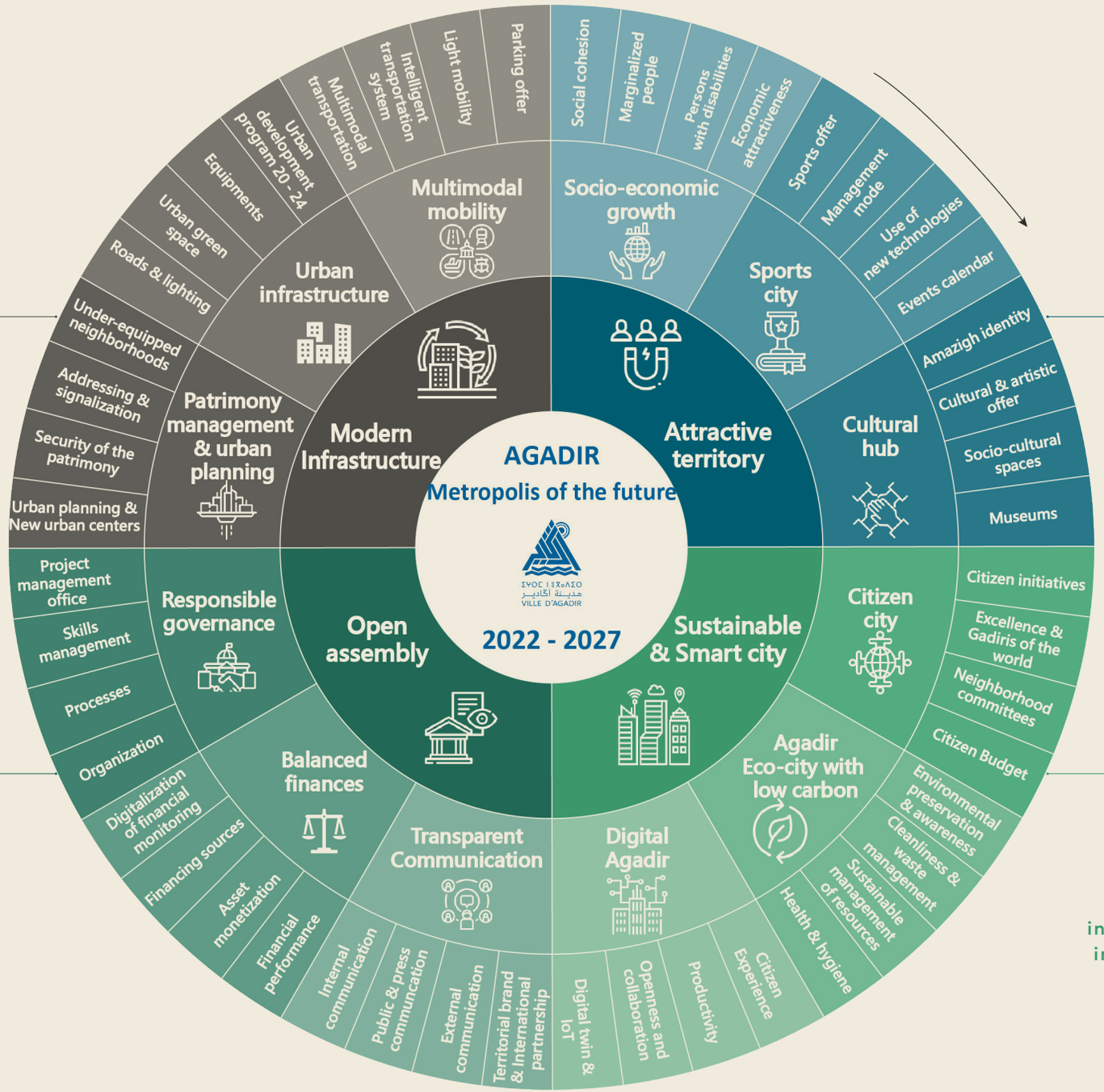
The GCAP for Agadir is complementary of the CAP and sits within the "Agadir eco-city with low carbon" pillar of the plan. The actions identified through the GCAP will also help address cross-sectoral objectives, particularly in the "Modern Infrastructure" dimension of the CAP. Significant investment and infrastructure development is already on-going in Agadir, through the Urban Development Programme. The GCAP actions seek to integrate with and build upon the on-going investment and CAP actions to ensure that the GCAP provides an ambitious roadmap to a low carbon future for Agadir, while fostering the aims and objectives of the municipality, as set out in the CAP and the Regional Development Plan.

8. Agadir, Drarga, Aourir, Taghazout, Ait Melloul, Inzegane, Dcheira, Laqliaa, Temsia, Oulad Teima, Biougra and Ait Baha.

9. Agadir, Drarga, Aourir, Taghazout, Ait Melloul, Inzegane, Dcheira, Laqliaa, Temsia, Oulad Teima

Make Agadir a modern metropolis and a model in Africa and in the Mediterranean basin

Increase the attractiveness of the territory of Agadir, especially in terms of quality of life



Strengthen the democratic model and inclusive management through citizen-centered open governance

Make Agadir a model of citizen, sustainable and intelligent city in Africa and in the Mediterranean basin in the respect of SDGs

Figure 8
Dimensions and components of the Agadir Communal Action Plan 2022-2027

Sectoral powers

The degree of power over different sectors of the Municipality of Agadir is shown in Table 3.

Table 3
Power matrix of the Municipality of Agadir by sector

Sector	Own and operate	Set and enforce policies	Budgetary and revenue control	Set vision	DETAILS OF SECTORAL POWERS
FINANCE	Strong	Strong	Strong	Strong	The taxation in Agadir can be divided into two different types of taxes: indirectly collected taxes and directly collected taxes. Directly collected taxes refer to taxes which the municipality collects itself and which directly feeds municipal budgets. This includes taxes on unbuilt land, visitor's tax and drinking establishment tax. Although not a tax, the municipality also collects the profits from paid-for municipal services such as bulky waste collection, fees from the coach station, and rents on its private assets such as buildings, markets, and the pound. Additionally, it generates revenue from bulky waste collection services and rent from cafés and restaurants that use public spaces. Indirectly collected taxes are collected by the Kingdom General Treasury (TGR – Trésorerie Générale du Royaume) and the General Directorate of Taxes (DGI - Direction Générale des impôts) and passed down to the municipality through the TGR. These include professional taxes, local taxes for municipality services, and residential taxes. VAT is collected by the national treasury and given back to municipalities following an allocation formula. Special grants called "autorisations spéciales", which are granted by central government on an occasional basis, can also be used by the municipality to access funds.
ECONOMIC DEVELOPMENT	Partial	Partial	Partial	Partial	The Souss-Massa region is responsible for economic development and employment. The municipality controls economic activities through their use of land and has power to redevelop local markets and set policies for the use of public spaces by cafés terraces. The rent from these activities is also directly collected by the municipality. The Souss-Massa region is in charge of economic planning, however most industries are privately owned.
ENERGY SUPPLY AND DISTRIBUTION (CITY NETWORK)	Not applicable	Not applicable	Not applicable	Not applicable	Since October 2024, the Société Régionale Multiservices Souss-Massa (SRM SM) is responsible for the distribution and the management of public services related to electricity. Prior to the launch of this new agency, the ONEE (National Office of Electricity and Drinking Water) was the national entity responsible for the production, transmission and distribution of energy. ONEE remains in charge of energy production and also plays a significant role in promoting renewable energy and energy efficiency projects.
ENERGY PRODUCTION (MUNICIPAL BUILDINGS)	Strong	Strong	Strong	Strong	The Municipality of Agadir controls street lighting and is responsible for its installation and maintenance. Local energy generation for use on site is possible within the municipality.
PRIVATE BUILDINGS	Not applicable	Limited	Strong	Limited	Building permits are issued by the city which is in charge of raising notices in cases where the construction breaches their permit. The municipality controls the grant of licences and permits for certain types of activities such as retail or leisure.
PUBLIC BUILDINGS	Strong	Strong	Strong	Strong	The municipality has full control over the municipal buildings that it owns. Education and health are two sectors where private-public partnerships are very common in Morocco. These buildings are in the power of their respective ministries (Ministère de l'Éducation nationale, du Préscolaire et des Sports, and Ministère de la Santé) and the relevant private companies.

Legend

Strong powers | Partial[10] powers | Limited[10] powers | Not applicable

Sector	Own and operate	Set and enforce policies	Budgetary and revenue control	Set vision	DETAILS OF SECTORAL POWERS
PUBLIC TRANSPORT	Partial	Partial	Partial	Partial	Public transport is managed at the metropolitan scale by a conglomerate of 12 municipalities in collaboration with the Souss-Massa region (see Revenue, p. 31). They are responsible for the development of the Plan de Déplacement Urbain. Along with the other municipalities, the Municipality of Agadir sits on the board of directors of the Local Development Company (SDL), who have overseen the construction of the new Bus Rapid Transit (BRT), opening in late 2024. The Agadir Mobilité SDL is responsible for the installation of the bus infrastructure as well as the development of cycle lanes, green spaces, bus stops and cycle parking which will complement the BRT. The operational aspect of the whole public transport network is sub-contracted to a private company.
ROAD INFRASTRUCTURE	Strong	Strong	Strong	Strong	Roads within the Municipality of Agadir are under the sole responsibility of the municipality.
URBAN LAND USE	Not applicable	Limited	Strong	Limited	The PLU, Plan Local d'Urbanisme (Local Development Plan) is prepared at the Agadir metropolitan scale by the Agence Urbaine, an administrative entity which sits under the Ministry for Planning (Ministère de l'Aménagement du Territoire National, de l'Urbanisme, de l'Habitat et de la Politique de la Ville). The Municipality of Agadir will be consulted on the PLU and will be able to influence the content of the plan. However, the Agence d'Urbanisme is ultimately responsible for the production of the plan.
SOLID WASTE	Strong	Strong	Strong	Strong	Solid waste collection is under the sole responsibility of the Municipality of Agadir. Waste treatment is the responsibility of a "Groupement de collectivités territoriales" comprising 10 municipalities around the Agadir urban area and the Souss-Massa region. The municipalities of Agadir, Aït Melloul, Inezgane, Dcheira, Drarga, Laqliâa and Aourir through a "Collectivité territoriale" (are responsible for the management of the landfill which is currently sub-contracted to a private company.
WATER PRODUCTION	Not applicable	Not applicable	Not applicable	Not applicable	Potable water is the responsibility of the national agency ONEE. The desalinisation plant of Chtouka, south of Agadir, is a Public Private Partnership and as such, managed by a delegated body, SEDA (Société d'Eau Dessalée d'Agadir). The monitoring of rivers, dams and water bodies from an environmental perspective is under the responsibility of Hydraulic Basin Agency (ABHSM).
WATER DISTRIBUTION	Partial	Partial	Partial	Partial	Water distribution used to be under the responsibility of a metropolitan-wide service provider, RAMSA (Régie Autonome Multi Services d'Agadir), Multi-Services Autonomous Authority of Agadir, which controlled the distribution network of drinking water, including from the desalinisation plant, the wastewater network, and the reused water network. RAMSA was owned by a conglomerate of municipalities, covering the Agadir urban area. As of October 2024, these competencies have now been transferred to the Société Régionale Multiservices Souss-Massa (SRM SM) for the Souss-Massa region. The SRM SM is owned at 25% by the Moroccan state, at 40% by a conglomerate of local 'Collectivités territoriales', at 25% by the ONEE and at 10% by the Souss-Massa region. The main stakeholders involved in water distribution and management in Agadir are the Hydraulic Basin Agency (ABHSM), the National Office of Electricity and Drinking Water (ONEE), and the Société Régionale Multiservices Souss-Massa (SRM SM).
WASTEWATER	Partial	Partial	Partial	Partial	Wastewater collection and treatment used to be under the responsibility of a metropolitan-wide service provider, RAMSA which controlled the distribution network of drinking water, including from the desalinisation plant, the wastewater network, and the reused water network. RAMSA was owned by a conglomerate of municipalities, covering the Agadir urban area. As of October 2024, these competencies have now been transferred to SRM SM for the Souss-Massa region. The SRM SM is owned at 25% by the Moroccan state, at 40% by a conglomerate of local 'Collectivités territoriales', at 25% by the ONEE and at 10% by the Souss-Massa region.

Legend

Strong powers | Partial[10] powers | Limited[10] powers | Not applicable

10. Limited power: the municipality has influence through soft power such as advocacy. Partial power: the municipality can influence through statutory means, or official consultations.

Municipal finance

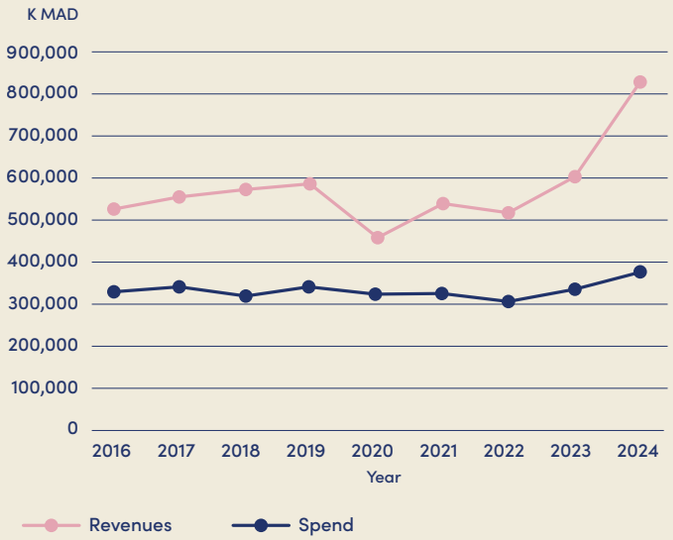


Figure 9
Revenue and spend of the Municipality of Agadir 2016 to 2024

The Municipality of Agadir functions with two different budgets: an operating budget and an investment budget. The capital-expenditure budget for a given year will be equal to the revenues minus the operating budget expenditures. The municipality budgets by making three-year budget plans which are then adjusted year on year. Budgets are voted at full council in October for the following fiscal year (January to December).

Revenue has been superior to spend (operating budget) for the period 2016-2024, with a decrease in revenues during 2020, which can be attributed to the COVID-19 pandemic (Figure 9). The difference between revenues and spend of any year makes the maximum capital expenditure budget for that year.

The municipality does not have its own account and any spend and revenue goes through the Kingdom General Treasury (TGR – Trésorerie Générale du Royaume), a central state agency which runs the accounts of all municipalities in Morocco. Procurement contracts also have to be agreed with the TGR.

Revenue

The Municipality of Agadir gets most of its revenue through taxes. These can be divided into two categories: direct taxes which are collected directly by the municipality itself and indirect taxes which are collected on the territory of the municipality by state agencies such as the General Revenue Office (DGI - Direction Générale des Impôts) and the Kingdom General Treasury (TGR – Trésorerie Générale du Royaume) and then redistributed to the municipality.

In partnership with the EBRD, the municipality has launched an improvement programme on its revenue collection in 2022, the Financial and Operational Performance Improvement Plan (FOPIP). The early results can be seen in years 2023 and 2024, where the direct municipal revenues have increased (Figure 10).

Debt

The municipality is able to take on debt and has a total debt of MAD 1 billion in 2024 (equivalent to 93.8 million euros). This is debt which was contracted through the issue of a municipal bond via a project with the EBRD. To date (end of 2024), Agadir is the only territorial collective (‘Collectivité territoriale’) in Morocco to have raised debt through a bond loan. The municipality had taken out a loan from the FEC (Fond d'équipement communal) which has now been fully paid off.

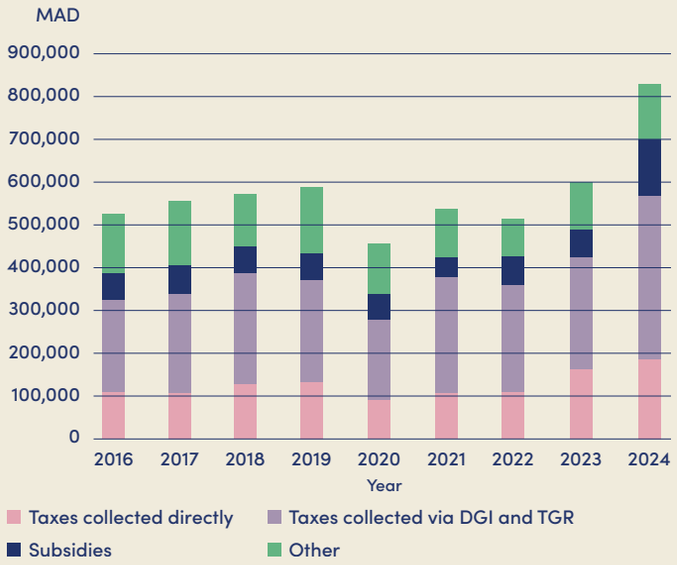


Figure 10
Type of revenues of the Municipality of Agadir 2016-2024

Expenditures

Staff is the main expenditure of the operational expenditures of the municipality between 2016-2024 (Figure 11). Any operating costs for the sectoral entities which looks after water distribution and treatment (SMR SM), transport (SDL Mobilité), and building of road and public space works (SDL SASMA) do not appear on the operating expenses of the municipality as these entities have prerogative on these sectors and administer their own finances. Conventions are established with each sectoral entity which detail the scope of services to be provided and the budget to be allocated. This budget is then considered a capital expenditure for the purpose of the accounts. Contributions to these SDLs and sectoral entities was the second largest capital expenditure of the municipality in 2023, after general administration expenditures (Figure 12). General administration covers the budgets for major maintenance and construction programmes.

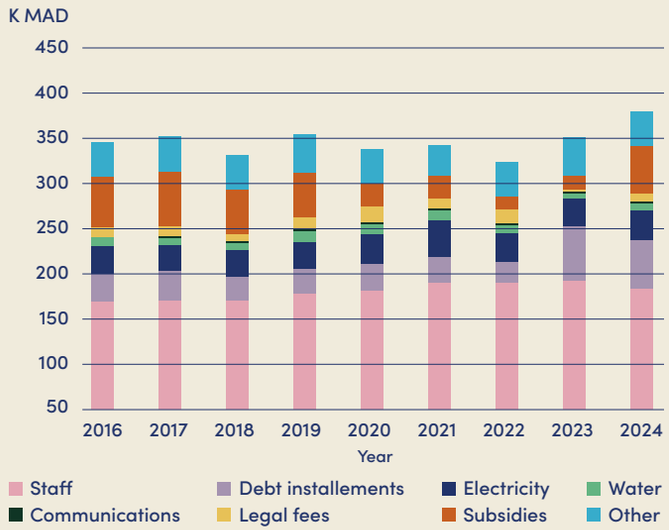


Figure 11
Type of expenses of the Municipality of Agadir 2016-2024

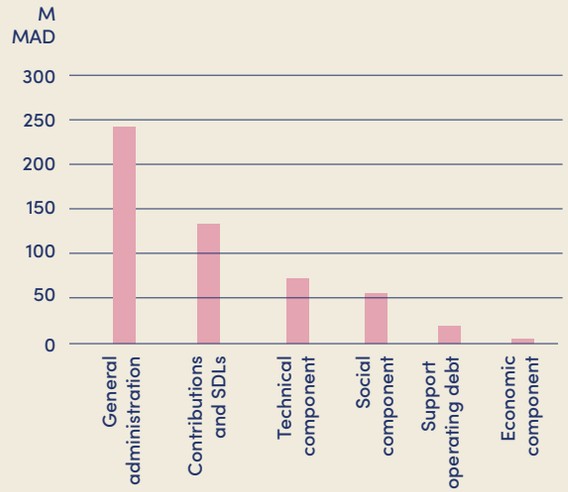


Figure 12
Capital expenditures of the Municipality of Agadir, 2023

People

Population

In the 2024 census, the Municipality of Agadir had 505,000 inhabitants, Inezgane has a population of 138,000, Ait Melloul a population of 211,000, Dcheira El Jihadia a population of 113,000. Overall, the metropolitan area of Agadir had 1,086,000 inhabitants[11].

The two "préfectures" of Agadir- Ida Outanane and Inezgane – Ait Melloul represent 68% of the urban population of the Souss-Massa region. The metropolitan area of Agadir has grown by 33% between 2014 and 2024, representing a population increase of 267,175. The municipality of Agadir has been growing at a faster pace than the national average, with a population increase of 19% between 2014 and 2024, against 9% at the national level. This could be due to immigration from more rural areas, as the share of urban population in the Souss-Massa region has increased from 56.3% to 60.1% over the same period. The Municipality of Agadir has the highest population density within the region, at 5,888 inhabitants per km^2.

Age and families

On average, population in Agadir became older between 2004 and 2024, with the largest relative increases recorded in the age range of 55-64, with an increase of 5 percentage point, from 5% to 10% (Figure 13). Conversely, the share of younger population (0-24 years old) was high but still below national average (38.7% versus 42.0% of the national population). Population aging is also being recorded at national levels, with the 60+ segment growing at a faster pace than overall population (2.8% versus 1.7% in 2022), and projected to represent nearly a quarter (23.2%) of Moroccan population by 2050. The average household size has been decreasing slower in Agadir than at the national level, with a decrease from 3.9 in 2014 to 3.8 in 2024 in Agadir, compared with a decrease from 4.6 in 2014 to 3.9 in 2024 at the national level.

A longer life expectancy may pose additional challenges to women, which currently make up the majority (50.5%) of residents in Agadir. Women in Morocco are more likely than men to be widowed at 60, also due to a younger average marriage age and a lower likelihood of remarrying. This may in turn affect their economic conditions. Only 15.8% of older women benefits from a pension, against 41.1% of men, due to a lower participation rate and higher rate of informal household work. Research partly explains this trend by the high price of childcare in Morocco, hindering the potential for women to stay in work.

Youth participation in local public life is a key area of development for Morocco as a whole, with 42% of the national population below the age of 25 years old in 2024. Current public policies have the opportunity to integrate this group into decision making, both at the local and at the national level. A new national law stipulates that 30 of the 395 positions at the Moroccan parliament should be occupied by members aged 40 years old or less, giving a new visibility to the Moroccan youth. Despite recent efforts, marginalisation and unemployment remain key issues for young citizens and regional and local institutions and encouraged to develop youth programme to better integrate younger populations to civil society.

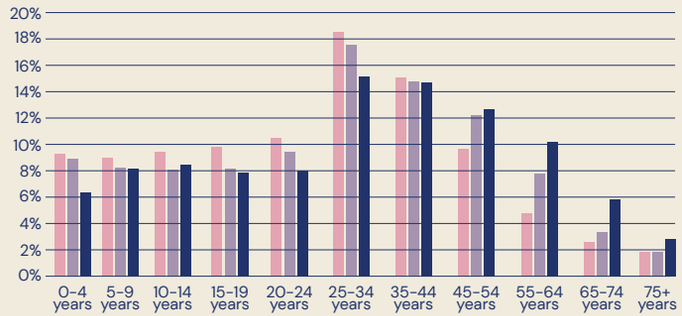


Figure 13
Evolution of the age of the population of Agadir between the 2004, 2014 and 2024 censuses, in percentage.

11. Municipalities of Agadir, Amskroud, Idmine, Drargua, Inezgane, Ait Melloul and Dcheira El Jihadia

Education

Illiteracy in Agadir is lower than at the national level, with 14.3% illiteracy amongst 15+ year old compared with 27.9% at the national level in 2024. In Agadir, this is a sharp decreased from 28% illiteracy of the total population in 2004. However, a wide gap between genders remains, with a fifth of women over the age of 15 who cannot read or write (20.3%) as opposed to 8.1% among men. This gender disparity is not specific to Agadir and is even more pronounced at the national level, where 36.2% of women were illiterate as opposed to 19.3% of men, a 16.9 percentage point difference.

In Agadir, the proportion of children aged 6 to 11 enrolled in school is 96.8% in 2024 and the levels were equal between boys and girls. This is above the national average of 95.8%. However, only 31.9% of girls complete secondary school (collegiate or qualifying) in Agadir, against 38.7% for boys (Figure 14) At the regional level, women are three times more likely to not be in employment, education or training in 2022. Trends worldwide show that women and girls are disproportionately negatively impacted by climate events, being more likely to miss school or be married to support their family in times of scarce household resources. As climate change accelerates, the impact on women and girls' education is likely to worsen.

In 2024, 4.8% of the Moroccan population, and 3.2% of the Agadir population lived with a disability. There was no significant disparity between gender. In 2014, almost 9 out of 10 people with disability was economically inactive (86.6%) and 66.5% of people with a disability did not have a qualification, against 35.3% amongst people without disabilities. This rate is higher for women with a disability (79.5%) than for men with a disability (53.4%). 60% of people with a disability had issues accessing public health services and two thirds of them did not have any social protection.

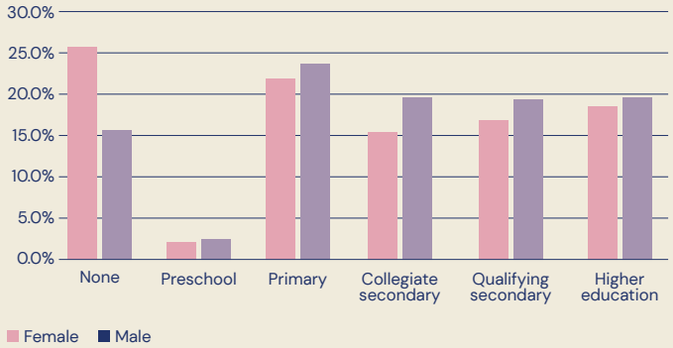


Figure 14
Agadir educational attainment by gender in 2024

Economy

Economic sectors

Souss-Massa is an important economic region in Morocco. The main economic sectors in the Souss-Massa region are agriculture, fisheries and tourism, which together represent 22% of national GDP. As the main urban centre of the Souss-Massa region, and due to its coastal location, Agadir makes the largest contribution to these sectors, as well as to the tertiary (service) sector, which represents 48.5% of jobs in the Souss-Massa region in 2023 and 51.2% of its GDP (in 2018).

Agriculture is centred in the Souss plain, to the south-east of Agadir, occupying an area of 5,371 hectares, 158 of which are irrigated lands. Agriculture, forestry and fishing represented 24.9% of the Souss-Massa employed labour force. The region is the main exporter of citrus fruits and vegetables in Morocco and its production represents 9% of the national GDP. Argan trees, endemic to the Souss-Massa region, are also one of the pillars of the agricultural output of the region, employing mostly women organised in cooperatives[12]. Argan-related production represents 7,2% of Souss-Massa's GDP.

Most of the fishery and fish processing activities in the region are centred on the port of Agadir. The local sector makes up 30% of the fisheries GDP of Morocco and 6% of the total GDP of the country. It employs more than 14,000 people and the 180 km of coastline is home to 83 factories which process fish and seafood for export. In recent years, in response to the decrease in fishing output, 400 million dirhams have been invested by the National Aquaculture Development Agency (ANDA) to develop the aquaculture sector, with 60 production units ultimately creating 620 direct jobs.

Agadir is the main tourism destination in the Souss-Massa region, together with the resorts of Taghazout, Imourane and Imsouane. The coast north of Agadir is a world-renowned surfing spot and hosts international competitions. Combined with seaside resorts, cultural and outdoor assets in the inland areas of the region make Souss-Massa an attractive destination. Prior to the Covid-19 pandemic, Souss-Massa welcomed one million tourists per annum, with a revenue of 20 billion dirhams. In 2018, 43% of visitors were domestic, most foreign visitors came from France (21%), Germany (14.5%) and England (12%). The tourism sector represents 7% of the regional GDP and an estimated 120,000 direct and indirect jobs.

Manufacturing has strong linkages to the agricultural and fishery sectors, with a dominance of the agrochemical and agri-food industries. The regional industrialisation strategy 2014-2020 aimed to increase the share of industry in the GDP of the region from 14% to 23% by the beginning of 2020. The strategy focused on the current assets of the region such as the agro-chemistry sector and its potential to growth towards organic chemistry and green chemistry or the ship-building industry.

Handicraft is also an important part of the industrial sector in the Souss-Massa region, with exports worth MAD 15 million in 2018. There are more than 120 handicrafts cooperative in the region, across leather, babouche, textile, wool, jewellery and other traditional crafts production. In 2019, 77 of the 436 apprentices in handicrafts across the region were located in Agadir.

The continued urban expansion of Agadir has also driven growth in the construction sector, which represented 15% of all employment in the region in 2023.

12. 'Souss-Massa Region | Land of Excellence'. Accessed 25 June 2024. Https://www.soussmassa.ma/en.

Employment

In Agadir in 2024, more than half of the active population was employed in the private sector (50.7%). A further 17.9% was employed in the public sector. Independent professions accounted for a fifth of the active population (21.2%) while employers (4.9%), associates (2.5%), family care workers (0.7%), apprentices (0.6%) and others (1.6%) accounted for the remaining 10.3%.

The metropolitan area experienced overall increasing wealth in recent years, with the proportion of population living in poverty falling from 8.9% in 2004 to 2.4% in 2014 in Agadir and from 9.6% to 2.2% in Inezgane – Ait Melloul over the same period.[13]

Unemployment rates in Agadir are slightly below the national level in 2024 (20.0% versus 21.3%). Unemployment rate is higher for women (26.9%) than for men (17.2%). Several factors contribute to the higher unemployment rate amongst women, including a disparity in education and literacy, as well as a more vulnerable and unstable form of employment which is less resilient to economic downturn.

In 2024 in Agadir, only 26.2% of women were economically active as opposed to 66.6% of male population, while at a national level these shares are respectively 16.8% and 67.1%. This is due to the large proportion of housewives doing informal household tasks and who are classified as economically inactive. This gender difference in the participation rate in the formal economy is more pronounced in the urban area of Agadir than it is in the rural areas of the Souss-Massa region due to the high participation rate of women in agricultural activities, both as labour force and as owner-operator.[14] However, female workers in the Souss-Massa region have been particularly impacted by the Covid-19 pandemic, with a total loss of 32,000 jobs which were occupied by women between 2017 and 2020, as well as by the frequent droughts that have impacted agriculture since 2022, forcing many, and in particular women, to exit the labour force.

The urban participation rate of the Souss-Massa region has been relatively stable over the last 6 years (Figure 15). The urban centres of Souss-Massa, including the metropolitan area of Agadir, have been outperforming and diverging from rural areas in terms of percentage of active population. In the former, participation rates decreased from 41.8% to 40.7% between 2017 and 2023 while in the latter it decreased from 45.7% to 35.8% over the same period. Overall participation rate has slightly decreased between 2014 and 2024, both in Agadir (50.8% to 45.9%) and at the national level (47.6% to 41.6%). The very positive trend of increase in women participation over the period 2004 – 2014 in Agadir (11.5% to 28%) has slowed down and participation rates have slightly decreased between 2014 and 2024 (28% to 26.2%). This is in line with national trends, where women's participation has decreased from 20.4% in 2014 to 16.8% in 2024.

In terms of youth employment (15 to 25 years old), Souss-Massa present a high level of young people not in education, employment or training (NEETs) in 2022, representing 25.8% of this age group. In 2022, 84.7% of that age group was economically inactive, 5.3% was unemployed and 10% was economically active. Part of the young people classed as economically inactive are still in academia, with 64.3% of 15 to 25 year olds in education or training. Young people in urban areas of Souss-Massa, mostly in Agadir, have better access to further education but are more impacted by difficulties in accessing their first job. Female are more represented amongst NEETs than male, making up 75% of NEETs. However, this has improved since 2017 when the proportion was 79% due to a higher education enrolment for girls.

In 2015, almost 9 out of 10 people with disability was economically inactive in Morocco (86.6%) and 66.5% of people with disability did not have a qualification, against 35.3% amongst people without disability. This rate is higher for women with disability (79.5%) than for men with disability (53.4%).

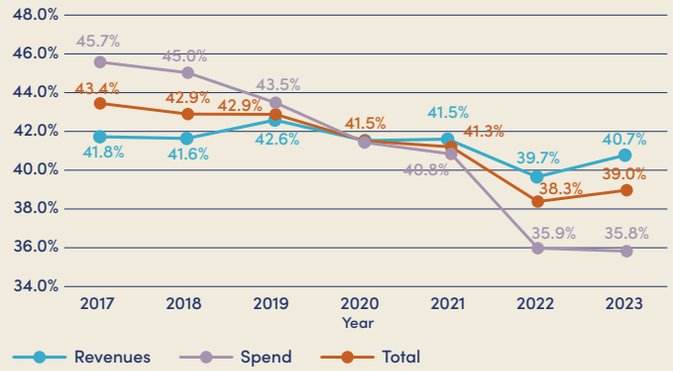


Figure 15
Evolution of the participation rate between 2017 and 2023 in the Souss-Massa region, in percentage

13. Data from the 2024 census on poverty and wealth was not yet published at the date of writing.

14. Haut-Commissariat au Plan. 'Région Souss-Massa Femmes et Marché du Travail', January 2022.

Environment

The state of the environment in Agadir

AIR

ID	INDICATOR	LATEST YEAR AVAILABLE	VALUE IN LATEST YEAR AVAILABLE	TREND	EBRD-GCAP BENCHMARKS	UNITS
1	Average annual concentration of PM2.5	2016	35.45	N/A	< 10 ; 10 – 20 ; > 20	µg/m3
1.1	Average annual concentration of PM10	2020	49.00	↘ Decreasing	< 20 ; 20 – 50 ; > 50	µg/m3
1.2	Average daily concentration of SO2	2020	68.00	↗ Increasing	< 20 ; 20 – 50 ; > 50	µg/m3
1.3	Average daily concentration of NOx	2020	103.66	↘ Decreasing	< 40 ; 40 – 80 ; > 80	µg/m3

Air quality is a challenge for Agadir, particularly with particulate matter due to construction, proximity to the desert, and an aging vehicle stock.

Daily concentrations of PM10 in Agadir decreased between 81.37µg/m3 in 2016 to 49.00 µg/m3 in 2020, just below the acceptable average of 50 µg/m3 which is also the Moroccan standard for health protection. Daily concentrations of SO2 appear to have significantly increased over the same period, from 25 to 68µg/m3, well above acceptable levels of 50µg/m3. Concentration of PM2.5 was also at critical levels in 2016 (35.45µg/m3), as well as the average concentrations of NOx. While these data indicate severe levels of air pollution, they are an average concentration calculated from one air station and they do not represent an average across the city. The city currently lacks a distributed air quality system, which in 2020 relied on 5 stations whose data are not publicly available.

The number of construction sites around Agadir and its neighbouring municipalities is a primary cause of air quality issues. This is made more severe by the city's rapid expansion, combined with the lack of waste and debris removal at construction sites. Dust from these sites, especially when carried by the wind, blankets the city and contributes to the increase of pollution levels. The situation is worsened by the region's minimal rainfall, allowing dust to persist.

Furthermore, Agadir's geographic placement with proximity to the desert also increases its exposure to particulate matter (mineral dust from the Sahara), with the highest concentrations of PM10 in Agadir found towards the south-east. Agadir's geographical location, nestled between the Atlantic Ocean and mountains, hinders the effective dispersion of pollution from urban sources like traffic and industries.

Pollution from vehicles also impacts Agadir's air quality, as demonstrated by the high concentration of NOx found in Agadir. Despite legislation a few years ago that compelled the taxi fleet to be upgraded, specific programmes on older vehicle scrappage and electric vehicle subsidies are not well documented, indicating a lack of specific incentives in place for private vehicles. Citizens still perceive this as a problem and that older vehicles continue to emit high levels of pollutants, contributing to poor air quality. The ongoing presence of these vehicles is linked to a lack of incentives for owners to upgrade their vehicles.

Addressing air quality issues is a priority to create a more liveable city and enhance health outcomes for Agadir residents. This can be supported by the development of green spaces, a transition towards sustainable transport modes and the installation of air quality monitoring sensor.

WATER BODIES

ID	INDICATOR	LATEST YEAR AVAILABLE	VALUE IN LATEST YEAR AVAILABLE	TREND	EBRD-GCAP BENCHMARKS	UNITS
2.2	Bathing waters meeting minimum standards	2023	82.36%	↘ Decreasing	> 95 ; 95 - 70 ; < 70	%

Water bodies in Agadir are under increasing stress, driven by rising pollution levels and exacerbated by limited and variable rainfall, frequent droughts, and pollution from agricultural runoff and untreated industrial effluents.

The percentage of bathing waters meeting minimum standards has been declining in recent years, dropping from 100% in 2021 to 88.24% in 2022, and further to 82.36% in 2023. Additionally, the city is experiencing a deterioration in groundwater quality due to marine intrusion, particularly in the estuary of Oued Souss, just south of the city of Agadir. The oueds which cross the city are dry for most of the year and monitoring their water quality would only be possible during rainfall episodes, a few days a year. The absence of monitoring of water quality indicators, such as Biochemical Oxygen Demand (BOD) and ammonium (NH4) poses a challenge to creating an accurate picture of the state of ocean and groundwater.

The causes of water pollution in Agadir include agricultural runoff, characterised by pesticide use from modern farming practices in the Souss plain, and untreated industrial effluents. Several water bodies in Agadir, including Oued Souss and Agadir Bay, are significantly affected by pollution. Solid waste is illegally dumped in the dry oueds and eventually washed into the sea, polluting the marine environment. The pollution of these water bodies poses a threat to both biodiversity and human health, with the bay and beach areas particularly at risk, which may in turn represent a threat to the attractiveness of the city as a tourist destination.

Addressing pollution of watercourses, the ocean and groundwater is a pressing priority for Agadir due to the increasing water scarcity in the region. The quality and availability of water in Agadir should be enhanced and optimised for the benefits of ecosystems, residents and the economy.

DRINKING WATER/WATER USE

ID	INDICATOR	LATEST YEAR AVAILABLE	VALUE IN LATEST YEAR AVAILABLE	EBRD-GCAP BENCHMARKS	UNITS
3	Water samples complying with national potable water quality standards	2021	100%	> 97 ; 97 - 90 ; < 90	%
5	Water Exploitation Index	2022	≥100	< 20 ; 20 - 40 ; > 40	%

Water availability is a pressing issue for the city of Agadir, as it is highly prone to water scarcity, affecting the quantity and quality of its groundwater resources.

Water in Agadir is chlorinated and generally considered safe to drink, however surrounding rural areas are affected by salt-water intrusion bringing chemical values above normal. Whilst drinking water quality is less of an issue, the availability of drinking water is expected to decrease over time.

The city has experienced increasingly severe droughts for the past 2 to 3 years, reflecting a wider trend of worsening water scarcity in the region, also influenced by climate change. The Souss-Massa basin receives 1,023 million m^3 of water annually, with 668 million m^3 from surface water and 425 million m^3 from groundwater. It uses 425 million m^3 of surface water and 696 million m^3 of groundwater each year, causing a 271 million m3 water shortage annually, alongside a Water Exploitation Index of 100% or more within the Souss-Massa region. Drought is increasingly likely to become structural, especially considering Agadir experiences on average 360 sunny days per annum.

In 2022 Agadir had a water storage capacity of 137,800 m^3 which is not sufficient in periods of drought and can lead to shortage of water resources. Additionally, the lack of rainfall and over-reliance on groundwater have significantly impacted water availability, highlighting the need for sustainable water management solutions. There has been over-exploitation of groundwater reserves, with average depletion of non-renewable reserves, necessitating alternative supplies such as desalination water to restore deficits and preserve this resource as a strategic reserve. This has led to punctual water cuts in the last few years.

The network for distributing reuse water remains currently serves open spaces, urban forests, parks and golf parks in Agadir, and is currently being expanded. From the current 30,000 cubic meters of treated wastewater per day, the aim is to double this capacity to 60,000 cubic meters daily, with the potential to allocate the additional capacity for agricultural purposes, tourism and citizens.

Furthermore, there are several awareness raising programmes which aim to rationalise and educate on water use, some of which include changing of taps to ensure there is no dripping or leakage, public educational displays on water use, a charter for the rationalisation of water and more. There are currently restrictions for using drinking water for golf courses by law, however, there are no restrictions for using water for irrigation for agriculture.

Agadir also has a Greater Agadir Water Sanitation Master Plan. Initially approved in 1995 based on studies by RAMSA and updated in 2006 through periodic revisions, this plan includes two major phases: an emergency phase (1998-2007) costing 828 million MAD, now completed, and a second phase (2008-2024) with a budget of 1,899 million MAD. The second phase aims to depollute the northern zone, improve beach water quality to support tourism, utilise purified wastewater for irrigation, and extend sanitation services to outlying districts like Tagadirt, Dar Boubker, Tadouart, and Tamait in Drarga.

Water scarcity is a significant priority in Agadir and is already the object of ongoing investment. Building on these, the deployment of instruments to accurately monitor consumption, such as smart sensors, could help reduce water exploitation and optimise existing infrastructure.

SOIL

Agadir's landfill site has a major leachate problem, caused by the decomposition of buried waste reacting with water.

Soil composition and pollution is monitored by authorities, but the data remains confidential. To support this assessment, qualitative information and interviews were gathered to provide additional insights.

Tamlaste is the only operational and regulated landfill in Souss-Massa and serves the urban area of Agadir. The landfill does not currently have leachate treatment facilities and the leachate is stored in eight lakes to the south of the landfill. These lakes are uphill of a dry riverbed/valley, also known as an oued to the north-west of the site. These two characteristics pose a major environmental risk: in the event of a landslide, the leachate lakes and landfill would slide into the oued and contaminate the riverbed, significant areas of the city and the sea downstream. Leachate can pose significant environmental and health risks if not properly managed. It can contaminate soil and groundwater, which may affect drinking water sources and harm ecosystems.

Addressing the current lack of monitoring data and improving operations at the landfill is a priority as it is currently a major environmental, health and economic risk for Agadir. This would support sustainable economic development and employment creation.

GREEN SPACE

ID	INDICATOR	LATEST YEAR AVAILABLE	VALUE IN LATEST YEAR AVAILABLE	TREND	EBRD-GCAP BENCHMARKS	UNITS
6	Open green space area per capita	2024	3.70	N/A	> 10 ; 10 - 7 ; < 7	m^2
6.1	Share of green space areas within urban limits	2024	> 50	N/A	> 50 ; 50 - 30 ; < 30	%

Despite the recent efforts in creating and upgrading green spaces across the city (such as the redevelopment of the Urban Park Ibn Zaidoun), the average provision of green space per citizen remains sub-standard, which has negative impacts on urban health and quality of life for its residents.

The area of green space per person in Agadir currently stands at an average of 3.7m^2, below values of 10m^2 per capita as recommended by the EBRD. Green spaces are essential for mitigating urban heat, improving air quality, replenishing of groundwater, stormwater management, and providing aesthetic and recreational value, as well as improving the health and overall liveability of the city for its residents. Deficiencies in green areas contribute to increased urban heat island effects and decreased air quality, exacerbating health issues among populations.

The Communal Action Plan for 2022 to 2027 has the ambitious objective to increase green spaces to 8m^2 per capita over a five period. Beyond these five years, efforts will be pursued to increase the amount of green spaces per capita above the best practice standard of 10 m^2 per capita. The Urban Development Programme (UDP), started in 2020, includes the upgrade of parks, the creation of two new parks, and the consolidation and refurbishment of over 20 proximity sports fields.

The watering of the current and proposed green spaces for parks, gardens, and green lanes will be at least 75% watered by treated wastewater as a part of the REUSE project. The green spaces will include several tree varieties, innovative quality furniture, and an intelligent irrigation system adapted to drought conditions.

Addressing the current lack of green spaces per capita is one of the priorities of the Municipality and benefits from several accelerator programmes. The Africa Cup of Nations in 2025 and the World Cup in 2030 also presents significant opportunity to integrate the new green spaces into the fabric of the city, creating new multifunctional blue and green infrastructure.

BIODIVERSITY AND ECOSYSTEMS

ID	INDICATOR	LATEST YEAR AVAILABLE	VALUE IN LATEST YEAR AVAILABLE	TREND	EBRD-GCAP BENCHMARKS	UNITS
7	Abundance of bird species (Northern Bald Ibis in Souss-Massa)	2018	4	↗ Slowly increasing following near extinction	> 0 ; 0 – (-2) ; < (-2)	Annual % change

Loss of biodiversity and ecosystems has been reported as an issue throughout the city and at a regional scale, with the loss of species and pollution of the flora and fauna on land and in the sea.

Endangered species in Agadir are mostly mammal and bird species. Whilst indicator data for the city of Agadir was not found, according to two different international conventions there are 62 (CITES) or 240 (CMS) threatened bird species and 44 (CITES) to 47 (CMS) threatened mammal species in the Souss-Massa region.

Despite the natural resilience of some species to the region's aridity, recent climate change and intense anthropogenic pressures heavily threaten the regional flora and fauna. Using the year 2000 as a reference, the biodiversity loss rate at the national level is estimated at 24%, and evidence suggest that the Agadir region is susceptible to this trend. Data on biodiversity change and spread of species is not widely available in Morocco despite around 40 animal species being classified as Critically Endangered nationally. Local data on the abundance of bird species and other species in Agadir is therefore limited.

Data on specific species is available for the Agadir region, such as the North Bald Ibis. The wider region of Souss-Massa is now the only habitat in the world for the Northern Bald Ibis, which was classified as Critically Endangered in the 1990s. The number of Northern Bald Ibis is slowly increasing again but most colonies are now located in the Souss National Park, away from the urbanisation influences of Agadir. Qualitative data suggests that the endemic Barbary Ground Squirrel had disappeared from the city, due to a loss of habitat for this species. The declining rainfall episodes and increasing droughts in Agadir will also have an increasingly negative impact on flora such as small wild flowers and plants, and argan trees, and on fauna such as small organisms, which rely on periodic rainfall for survival.

High levels of coastal erosion are negatively impacting the coastal ecosystems of Agadir. Agadir's coast shows a significant erosion trend along the 8.3km stretch of coastline, with 92% of the transects showing erosion rates, between 1 and 13.5 m/year over 46 years. A small part of Agadir Bay has seen accretion of 2 to 7.2m/year. The erosion and subsequent changes in the coastal landscape have significant implications for the local biodiversity and ecosystems. The degradation of the dune systems and the coastal fringe due to erosion reduces the natural habitat available for various species, thus impacting the local biodiversity. Much of the land covering in Agadir is classed as oasis and argan ecosystems, which are experiencing a decline. At a national level approximately 3 million date palm trees have been lost and around 30% of the argan tree density has been degraded. Over the decades, the city has planted eucalyptus trees and other plant types to minimise erosion, especially south of Oued Souss.

Fishing sustains Agadir's coastal communities but faces challenges related to overfishing and environmental degradation. Additionally, industrial activities associated with the port impact marine ecosystem, including flora and fauna, posing risks to long-term sustainability of ecosystems. Balancing economic needs with conservation efforts will be essential to ensure a sustainable future to the fishing industry and to other economic sectors reliant on the coast, such as tourism.

There are plans for the redevelopment of biodiversity and ecologically important areas of the city and the improvement of current green areas, which can be expected to increase the abundance of species in Agadir. These include Taddart green lane designed to support local flora and fauna, an innovative blend of urban forest and green lane in Hay Mohammadi, providing a natural habitat within the city and enhancing urban biodiversity, Najah urban park providing a multifunctional green space aimed at recreation, community activities, and biodiversity conservation, green lane Al Wafa Rja Fellah Al Fiddia promoting connectivity between different urban areas and supporting ecological resilience, and restoration and enhancement of Oued Tilila and Tilila to improve their ecological function and recreational value.

Addressing the decline in biodiversity of the city presents the opportunity to design and plan an extended network of green and blue spaces, which will deliver benefits for flora and fauna as well as improved health outcomes for Agadir residents. The monitoring of biodiversity and ecosystems status will help improve knowledge and develop best practice in biodiversity conservation.

MITIGATION GHG EMISSIONS

ID	INDICATOR	LATEST YEAR AVAILABLE	VALUE IN LATEST YEAR AVAILABLE	TREND	EBRD-GCAP BENCHMARKS	UNITS
8	Annual CO2 equivalent emissions per capita	2015	1.95	N/A	< 5 ; 5 – 10 ; < 10	Tonne / year / capita
8.1	Annual CO2 emissions per unit of GDP	2015	0.65	N/A	< 0.35 ; 0.35 – 0.8 ; > 0.8	Tonne / USD of GDP

Agadir's greenhouse gas (GHG) emissions currently demonstrate good performance well below the 5TCO2 per capita, but emissions are likely to increase in the coming years as the city develops.

In 2015, Agadir's GHG emissions were 806,090 metric tonnes of CO_2 equivalent per year (TCO_2eq/year), amounting to 1.95 TCO_2eq per inhabitant, which is well below the national average. Despite this good performance, additional city-level GHG emissions data for other years is limited. However, the annual CO2 emissions per unit of GDP was at approximately 0.65 tonnes per USD of GDP in 2015, just below critical levels, and this value is expected to have significantly increased with socio-economic development in the region in recent years. With no significant mitigation action, emissions per inhabitant are likely to grow, potentially reaching 4.14 TCO_2eq per inhabitant by 2030 for the Souss-Massa region.

Public transport, residential and commercial buildings were the main sources of emissions in Agadir in 2015 (respectively, 23%, 21% and 21% of the total). Smaller, but still significant sources of emissions included: freight (11%), fisheries (6%) and industrial activities (6%). Overall, road transport is a significant contributor to GHG emissions in the city, accounting for more than 45% of the emissions generated by the energy sector. In the agriculture, forestry, and other land use (AFAT) sector, over 50% of GHG emissions are due to indirect N2O emissions from managed lands. Additionally, solid waste is responsible for approximately 62% of emissions within the wider waste sector.

Agadir has been taking action to reduce emissions. The Sustainable Energy Action Plan (PAED), developed by the Municipality of Agadir in 2015 under the Covenant of Mayors, outlines several actions for sustainable energy transformation. These include modernising public lighting management, adopting the ISO 50 001 standard, implementing solar pumping for irrigation stations, replacing traditional lighting with high-performance LED floodlights, establishing a training platform for energy efficiency technologies, and developing a rapid bus transit system.

Actions under PAED are also featured in the Urban Development Programme (UDP) and the Territorial Plan to Combat Global Warming (PTRC). Agadir is also part of Morocco's broader initiative to increase renewable energy capacity, which includes the Noor solar power project near Ouarzazate. In 2015, Agadir also held a four-day training for over 120 women cooperatives, promoting solar solutions and sustainable production. From 2021 to 2023, the "Agadir Women Committed to Energy Transition" initiative supported 20 women technicians in solar equipment manufacturing, benefiting 15 women's agricultural and fisheries cooperatives by integrating renewable energy with traditional knowledge.

Agadir stands at a crossroad where it has the potential to influence its GHG emission path for decades to come. Building on its started diagnostics and actions, Agadir can develop a comprehensive package of actions to address GHG emissions, starting from the largest emitters such as public transport.

ADAPTATION RESILIENCE TO NATURAL DISASTER RISKS

ID	INDICATOR	LATEST YEAR AVAILABLE	VALUE IN LATEST YEAR AVAILABLE	TREND	EBRD-GCAP BENCHMARKS	UNITS
9	Estimated economic damage from natural disasters as a share of GDP	2024	0	→ Constant	< 0.5 ; 0.5 – 1 ; > 1	%

Agadir is facing increasing natural disaster risks due to natural hazards and climate change, requiring robust adaptation and resilience strategies.

Whilst data on the risk of public infrastructure and housing at risk is unavailable, qualitative data collected during interviews indicates that in the years 2015 – 2024, no significant economic damage had been caused by natural disasters in Agadir. The city's history includes significant events like the devastating 1960 earthquake which caused significant loss of lives and economic damage. A recent earthquake in 2023 in Al Haouz, approximately 200km away from Agadir, was felt in the city with moderate shaking causing infrastructure and building damage in the some of the remote douars of the Agadir Ida Outanane préfecture.

In 2009 and 2010, floods caused severe economic impacts, disrupting livelihoods and infrastructure in the wider region around Agadir, where approximately 143 homes were affected. The increasing frequency and severity of natural disasters such as floods can be attributed to climate change, characterised by more extreme weather patterns and environmental stresses. Although there has been no recent instance of natural disasters, Agadir remains at risk due to its location and climate.

To address disaster risk, several measures have been implemented by the municipality. The National Flood Protection Plan (PNI), developed by the Department of Water in 2002 and updated in 2017, outlines comprehensive flood risk management strategies. This plan involves close consultation with all relevant departments and partners to mitigate the impacts of extreme weather events. Additionally, the city has taken steps to develop local disaster risk reduction strategies in line with national standards, such as the ORSEC emergency response plans and earthquake mitigation projects.

Similarly, the municipality has implemented several measures to address climate risks. Agadir's adaptation efforts include enhancing urban infrastructure resilience, implementing early warning systems, and promoting community awareness and preparedness. Furthermore, the city collaborates with various stakeholders, including the Souss-Massa Regional Council and national government agencies, to strengthen its disaster response capabilities and integrate climate change measures into urban planning.

Agadir's environment and climate are key economic drivers but also represent increasing risks due to climate change. By designing and implementing a multifaceted approach for strengthening infrastructure resilience, integrating disaster risk management and managing disaster risks, Agadir will protect its environment, its livelihood and the wellbeing of its residents for future generations.

Infrastructure and the built stock: environmental pressure

TRANSPORT

ID	INDICATOR		LATEST YEAR AVAILABLE	VALUE IN LATEST AVAILABLE YEAR	TREND	EBRD-GCAP BENCHMARKS	UNITS
10	Average age of car fleet total and by type		2016	> 12	N/A	< 6 ; 6 - 12 ; > 12	Years
10.1	Percentage of diesel cars in total vehicle fleet		2015	20.10	N/A	< 20 ; 20 – 30 ; > 30	%
10.2	Fuel standards for light passenger and commercial vehicles		2024	6	↗ Increasing	6 ; 5 ; 4	EURO
10.3	Share of total passenger car fleet run by alternative energy		2022	< 1	N/A	> 3 ; 3 - 1 ; < 1	%
11	Private transport in transport modal share in commuting		2016	36.60	N/A	< 30 ; 30 – 50 ; > 50	Private transport %
11.1	Transport modal share in total trips	Active modes (mostly walking)	2013	**52.00 (walking 48% and cycling 4%)**	N/A	N/A	% of journeys
		Private car	2013	31.00	N/A	Private transport < 30 ; 30 – 50 ; > 50	% of motorised journeys
		Grand taxi	2013	16.00	N/A	Private transport < 30 ; 30 – 50 ; > 50	% of motorised journeys
		Petit taxis	2013	13.50	N/A	Private transport < 30 ; 30 – 50 ; > 500	% of motorised journeys
		Bus	2013	**10.00**	N/A	N/A	% of motorised journeys
11.2	Motorisation rate		2021	0.114	↗ Increasing	< 0.3 ; 30 – 50 ; > 0.4	Number of vehicles per capita
11.3	Average number of vehicles cars and motorbikes per household		2020	0.32	N/A	< 0.5 ; 0.5 - 1 ; > 1	Number of vehicles per household
11.4	Kilometres of road for public transit per 100000 population		2024	< 10	→ Constant	> 40 ; 40 - 10 ; < 10	km
11.5	Kilometres of dedicated bicycle path per 100000 population		2024	< 15	→ Constant	> 25 ; 25 – 15 ; < 15	km
11.6	Share of population having access to public transport within 15min		2024	92	↗ Increasing	> 80 ; 80 - 60 ; < 60	%
12	Average travel speed on primary thoroughfares during peak hour		2024	14	N/A	> 30 ; 30 - 15 ; < 15	km/h
12.1	Travel speed of bus service on major thoroughfares (daily average)		2024	27	N/A	> 25 ; 25 – 15 ; < 15	km/h

Despite the recent investments (i.e. BRT), transport in Agadir is under stress, manifesting in a heavy reliance on private vehicles, a sub-optimal level of service of public transport, and the absence of a train connection.

In 2013, over half of all journeys made in Agadir were made walking or cycling. However, this is expected to have reduced with the economic development of the city and today, Agadir's transportation modal split reflects a heavier reliance on private vehicles. By 2020, the share of private transport accounted for 36.6%, highlighting a growing dependency on personal vehicles due to the public transport system's unreliability and limited coverage. Additionally, the percentage of diesel cars in the vehicle fleet was 20.1% in 2015, just above the acceptable level of 20%, further contributing to air pollution. However, this data was collected only amongst municipal employees and it is assumed that the proportion of diesel cars in the total vehicle fleet in Agadir may be higher.

The public transport system in Agadir is currently limited to a bus network operated by ALSA. ALSA is a private enterprise which operates the bus network on behalf of a group of Municipalities around the urban area of Agadir, through the SDL Mobilité. The bus network covered only 11% of the city's area in 2013, primarily serving central regions, while peripheral areas like Lqliâa, Drarga, Taghazout, Aourir, and parts of the seaside sector and Hay Mohammadi are not served. However, public transport access is likely to have increased as in 2024, it is noted that around 92% of the territory is covered by a public transport stop within 15 minutes walking distance. The daily average travel speed for bus services on major thoroughfares is 32km/h during normal periods and 22km/h in summer period, averaging to around 27 km/h, suggesting efficient bus service operations on major thoroughfares. However, average speeds drop to 14 km/h at peak hours, indicating significant traffic congestion and delays.
In 2014, Agadir was also severely underequipped in terms of bicycle infrastructure, with a total 2.54km of dedicated paths per 100,000 population (acceptable values are above 15km). Despite the recent completion of new segregated lanes, it is likely there is to date an insufficient provision of infrastructure.

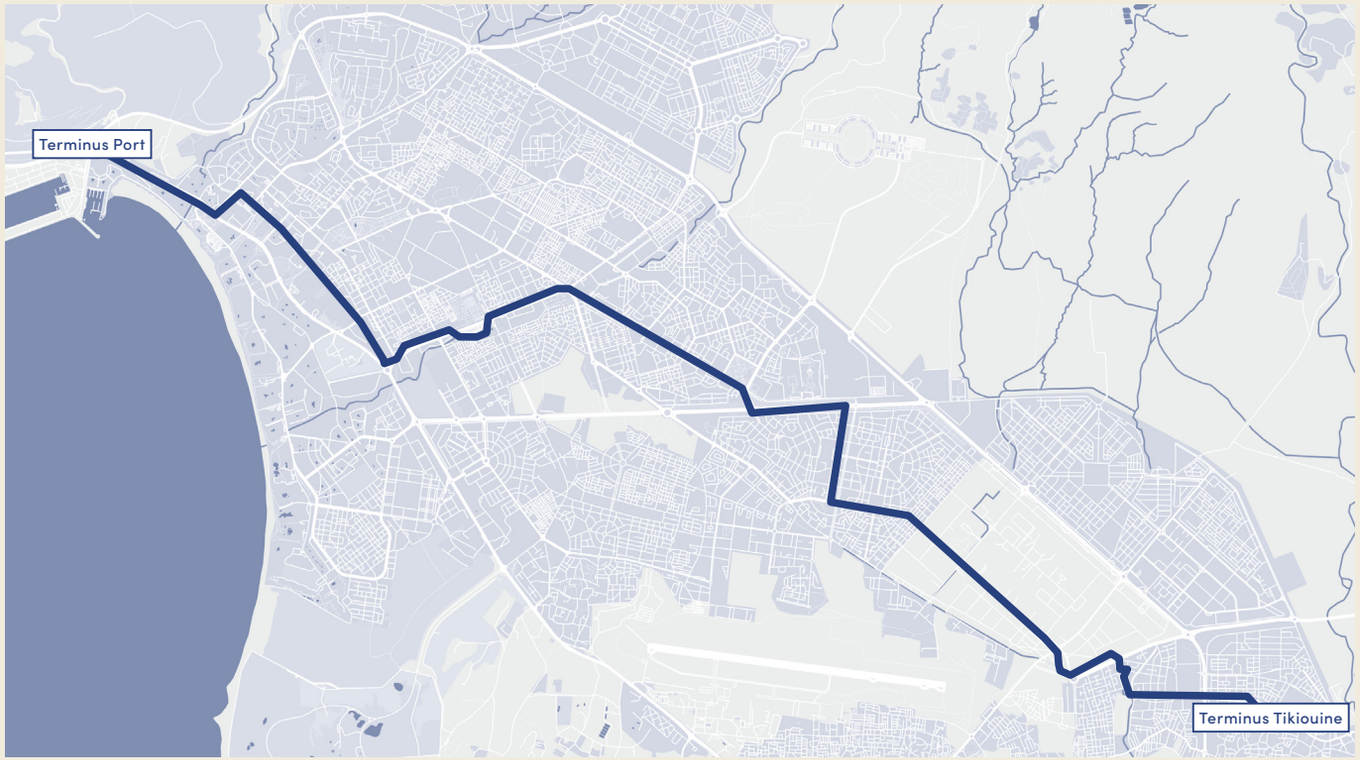


Figure 16
Route of the new Bus Rapid Transit across Agadir

Efforts to improve transport infrastructure include the development of a Bus Rapid Transit (BRT) system, known locally as BHNS (Bus à Haut Niveau de Service), which aims to provide a reliable, regular, and frequent bus service. The first BHNS line, scheduled to be operational by the end of 2024, will cover 15 km and connect critical areas, serving approximately 60,000 passengers daily. This project aims to enhance the reliability and coverage of public transport in Agadir.

Agadir is currently not served by train lines, although there are plans to complete a new rail line to Marrakech by 2030. This project aims to enhance regional connectivity and reduce travel times, further alleviating pressure on road transport. The Municipality of Agadir is focusing on improving road transport infrastructure and expanding parking facilities to better manage the demand for private vehicle use. The Urban Mobility Plan (UMP) outlines plans to increase the city's parking capacity to 73,000 spaces. However, it is worth noting that this approach could potentially contribute to increased car usage rather than promoting a shift to more sustainable transportation alternatives. To mitigate this, complementary measures such as enhancing public transportation, promoting cycling and walking, and implementing policies to encourage the use of sustainable modes of transport should be prioritised.

Addressing the need for a more reliable public transport system in Agadir should be a priority to curb the increasing reliance on private cars. Investment in cycling and walking infrastructure and facilities could support a shift towards active travel and deliver long term benefits in public health and wellbeing. The imminent launch of the BRT presents an opportunity for a new multimodal transport system, with the BRT at its heart.

ENERGY

ID	INDICATOR	LATEST YEAR AVAILABLE	VALUE IN LATEST AVAILABLE YEAR	TREND	EBRD-GCAP BENCHMARKS	UNITS
14	Share of population with an authorised connection to electricity	2018	99.64	↗ Increasing	> 90 ; 90 - 70 ; < 70	%
14.1	Electrical interruptions	2024	< 10	→ Constant	< 10 ; 10 - 13 ; > 13	# / year / customer
14.2	Percentage of network line losses	2019	18.00	↗ Increasing	< 5 ; 5 - 10 ; > 10	%
15.1	Share of households connected to district cooling	2024	0%	→ Constant	> 50 ; 50 - 25 ; < 25	%
15.2	Share of district cooling from carbon intensive sources	2024	Not applicable	Not applicable	< 10 ; 10 - 30 ; > 30	%
15.3	Share of district cooling from less intensive carbon sources	2024	Not applicable	Not applicable	> 75 ; 40 - 75 ; < 40	%
15.4	Share of district cooling from renewable sources	2024	Not applicable	Not applicable	> 50 ; 50 - 10 ; < 10	%
16	Share of renewable in total energy consumption	2021	19.5%	↗ Increasing	> 20 ; 20 - 10 ; < 10	%
17	Power outages by climate extremes	2024	0	N/A	< 10 ; 10 - 25 ; > 25	%

Energy provision does not pose particular challenges in Agadir, despite a potential need to upgrade the network. While still largely reliant on non-renewables, the city has been piloting various initiatives to decarbonise energy and reduce consumptions, focusing on municipal assets such as public lighting.

In 2013, the energy sector in Agadir relied heavily on non-renewable sources, with the region consuming 1,476 KTOe, primarily from oil products and coal with the share of renewable energy in total energy consumption remaining low at 10%. This had increased to 19.5% in 2021, just short of acceptable levels.

The share of population with access to electricity steadily increased between 2000 and 2018, growing from 45% to 99.6%. This was mostly through authorised connection and with only a few households that do not comply with the regulations and who are not authorised to connect. This was mostly in the foothills neighbourhoods, but action is under way to regularise the situation.

Electrical interruptions are not a major concern in Agadir, and whilst there is no exact data on the number of power outages due to extreme weather events, these occurrences are very rare for the city; the last outage was due to an earthquake. Conversely, there is evidence of some level of obsolescence of the distribution infrastructure, with line losses increasing from 15% in 2015 to 18% in 2019.

The municipality has set ambitious targets for renewable energy expansion. Agadir benefits from high solar potential estimated between 5 and 5.3 kWh/m², providing a strong foundation for sustainable energy projects, such as solar panels on the roof of city buildings. Additionally, refurbishing and reusing old steel lamp posts avoided 30 tonnes of CO2 emissions. The city is also exploring biomass from municipal waste and agricultural residues as a renewable energy source, which helps reduce landfill use. The city's ambition to achieve the 100% renewable energy target is mainly driven by its effort to reduce the Municipal energy bill (approximately 10% of its annual budget), reduce dependency on imported fossil fuels, improve air quality and attract investment.

The municipality has also implemented energy efficiency improvements to reduce electricity consumption of the city infrastructure. Specifically, it has implemented high-performance LED street lighting, reducing energy consumption by over 50% and CO2 emissions by 7.3% for public lighting. Furthermore, the implementation of energy-efficient public lighting systems has reduced annual energy consumption by at least 60% across 10 municipalities in Greater Agadir.

Agadir has shown a strong commitment to proactive energy planning and sustainability. In 2013, Agadir

joined the Jiha Tinou process. The Jiha Tinou process is a territorial strategy for renewable energies and energy efficiency in Morocco, launched in 2012. It aims to promote local initiatives and integrate the national energy strategy into municipal and regional planning, supporting local stakeholders through training, communication, and matchmaking between donors and local governments. Key measures include pilot projects in cities like Oujda, Agadir, and Chefchaouen, with Agadir and Chefchaouen receiving the "European Energy Award" for their efforts in energy efficiency and climate action. Agadir became one of three pilot cities in the energy planning and certification process. Following this pilot phase, Agadir incorporated its Jiha Tinou priority action plan into its Communal Development Plan, delivering several projects, including setting up an energy accounting tool (TBGE), developing an administrative mobility plan, hosting an outdoor exhibition on LED public lighting, and installing photovoltaic panels on its city hall roof.

Despite the lack of available data on thermal comfort indicators, the Sustainable Energy Action Plan (PAED) for Agadir addresses thermal comfort by emphasising the application of thermal regulations, promoting energy-efficient construction and renovation techniques, and implementing pilot projects to showcase best practices.

Agadir has a significant solar potential and an ambitious programme to transform the energy supply of the Municipality. Although actions to transition the energy supply of private building towards renewable energy is more difficult due to the centralised nature of energy production, encouraging better building designs and practices to cool houses and decrease energy consumption should be pursued. This has the potential to help Agadir transition more holistically towards a sustainable energy future, enhancing the quality of life for its residents and contributing to broader climate mitigation efforts.

BUILDINGS

ID	INDICATOR	LATEST YEAR AVAILABLE	VALUE IN LATEST AVAILABLE YEAR	TREND	EBRD-GCAP BENCHMARKS	UNITS
18	Electricity consumption in residential buildings	2013	13.76	↗ Increasing	< 47 ; 47 - 75 ; > 75	kWh / m2
19.1	Fossil fuels consumption for heating and cooling in residential buildings	2015	31.20	N/A	< 96 ; 96 - 126 ; > 126	kWh / m2
19.4	Share of new buildings with green certification	2024	<25	→ Constant	> 50 ; 50 - 25 ; < 25	%
19.5	Share of buildings with energy performance certificates (EPC)	2024	<25	→ Constant	< 40 ; 40 – 80 ; > 80	%

Buildings in Agadir do not exhibit high energy consumption, due to by mild winter which do not require the use of heating and some air condition requirements in the summer during time-bound heatwaves. However, gathered qualitative evidence suggests that the use of air conditioning is significantly increasing in the city, driven by economic growth and more frequent heatwaves.

In 2015, residential buildings represented 20% of the total energy consumption in Agadir, while other buildings represented 13% of the energy consumption. Municipal buildings represent a marginal amount of the city's energy consumption, below 1%. The total energy consumption of buildings is 33% of the total energy consumption of the city.

The first source of energy in residential buildings is liquefied petroleum gas (LPG), used for cooking, followed by electricity. Fossil fuel consumption for heating and cooling in residential building remains very low, at 31.20 kWh/ m2 in 2015, driven by the mild winters which do not require the use of heating. However, this represent a significant increase of 34% in absolute terms between the period 2010 to 2015, due to the rapid urbanisation of the city and the rising use of air conditioning. However, air conditioning remains periodic in use and the total energy consumption of residential buildings well below acceptable levels.

Whilst exact data on electricity consumption in commercial and public building is not available, the sale of electricity by building type is available by the ONEE who has the monopoly on electricity distribution in the region. From this it can be deduced that public buildings electricity consumption has significantly increased between 2010 and 2015, rising by 24% from 56,752 to 70,373 MWh. Commercial buildings also exhibited significant electricity usage, with an increase of 33%. This trend could be attributed to population growth, increased visitor numbers, and the subsequent development of new public institutions (schools, universities, hospitals, etc.) and tourist facilities (hotels, inns, etc.). Lighting and air conditioning account for more than 50% of total energy consumption in commercial buildings.

Agadir's climate is characterized by mild winters and hot summers, with an average annual temperature of 18.6°C. This contributes to this high cooling demand with an estimated average cooling load of 77.97 kWh/m²/year in 2018. Conversely, the average heating load of 23.23 kWh/m²/year reflects a low demand for heating, typical of Agadir's mild winters in a temperate climate. Agadir is amongst the Moroccan city with the lowest annual thermal energy demand, at 38.61 kWh/m2/year, compared with high extremes of 169.35 kWh/m2/year in Ifrane for instance.

While specific data on fossil fuel consumption for heating and cooling is not readily available, it is understood that fossil fuels play a significant role in meeting these energy needs. Furthermore, the application green building certifications and energy performance certificates (EPC) is still nascent in Agadir, reflecting trends at a national level. The average building age in Agadir is relatively young in comparison to other Moroccan cities due to the destructive 1960 earthquake, which caused reconstruction of most of the building stock. This relatively younger building stock could be retrofitted more easily, making it feasible to upgrade these buildings to meet higher energy performance standards, thus reducing fossil fuel consumption and enhancing overall energy efficiency.

The Municipality of Agadir implemented several building-related initiatives as part of its Sustainable Energy Action Plan (SEAP). These initiatives focused on promoting high-performance buildings, ensuring that all new constructions comply with the new local thermal regulations. Efforts include the renovation of 50% of existing municipal buildings, incorporating energy-efficient measures such as improved insulation, roofing, and glazing, as well as upgrading lighting and heating systems. Some pilot projects integrate energy-efficient measures and solar installations. Additionally, the municipality aims to ensure that 100% of new municipal buildings adhere to the Code of Energy Efficiency in Buildings (CEEB), developing internal directives to enforce compliance. The municipality also encourages the self-production of energy, targeting 10% of the energy consumption of municipal buildings to be generated through solar energy installations.

The city has an opportunity to develop green building guidelines to improve energy efficiency and quality of life, deploying a retrofit programme to upgrade ageing building and promote passive cooling in architectural practices. Ongoing interventions by the Municipality in on public buildings is setting an example for wider investment.

INDUSTRIES

ID	INDICATOR	LATEST YEAR AVAILABLE	VALUE IN LATEST AVAILABLE YEAR	TREND	EBRD-GCAP BENCHMARKS	UNITS
23	Share of industrial waste recycled as a share of total industrial waste produced	2024	N/A	N/A	> 95 (90) ; 95 (90) - 80 ; < 80	%
24	Percentage of industrial wastewater that is treated according to applicable national standards	2024	100%	N/A	> 60 ; 60 - 40 ; < 40	%

The manufacturing and industrial sector is a major component of the city's and regional economy, and it is poised to grow thanks to ongoing infrastructure investment. Industry is a major contributor to energy consumption and environmental challenges such as greenhouse gas emissions and pollution.

Significant industries like agricultural processing, fish processing, textiles and garments, handicrafts and local product manufacturing, and the growing pharmaceuticals sector, are substantial consumers of electricity and fossil fuels, leading to increased greenhouse gas emissions and environmental impacts.

Electricity consumption in Agadir's industries is closely monitored, with efforts to improve efficiency underway. For instance, the agri-food sector, which represents over 85% of total industrial electricity consumption, showcases the highest energy demands of the industrial sector.[15] Similarly, fossil fuel consumption for heating and cooling in industrial facilities remains high, contributing to the carbon footprint of the city. Data on other indicators related to heat and fossil fuel consumption is currently unavailable.

Total industrial waste produced reached 84,200 tonnes in 2023. It is understood that most is currently not recycled, due to the lack of sorting and recycling facilities at the landfill site. Some industries and tourism facilities such as hotel have put in place their own sorting and recycling of waste. There are also some documented initiatives to cut waste production at source, with the reuse of by-products, in the fishing industry located at the port for instance.

The volume of industrial wastewater was 7,900 cubic metres per day, and in 2019, around 30% of the 300 industrial units of Agadir were identified as discharging pollutants in wastewater. Wastewater is currently treated in the M'Zar treatment plant to national standards of quality, alongside domestic wastewater. The intensive fishery industrial processes create significant issues for the wastewater network, including a high salinity which corrodes pipes and has the potential to impact the good functioning of the pre-treatment plant prior to the M'Zar treatment plant.

The creation of industrial zones in the south-east of Agadir, particularly along the road to Marrakech, aims to boost economic activity while integrating solutions that mitigate environmental impact. The initiative is designed to attract investment, generate employment, and enhance the city's industrial capacity. Although limited information was collected on compliance with environmental standards, it is understood these may include implementing renewable energy solutions and green hydrogen, and developing waste management and industrial symbiosis infrastructure to foster a circular economy.

The city is also addressing environmental challenges in its industries through various measures, with the ambition to start industrial waste recycling as part of efforts to promote a circular economy. Agadir is also focusing on improving the treatment of industrial wastewater through pre-processing prior to the wastewater arriving at the M'Zar treatment plant to ensure that the re-used wastewater can be treated to a higher than quality than national standards, thus reducing pollution and protecting water resources.

Industry development in Agadir is being planned with consideration, through the development of spatial land use zones, equipped with infrastructure which will help reduce pollution and enhance waste management. However, further investment into existing industries in energy-efficient technologies and renewable energy sources would help reduce industry reliance on fossil fuels. The promotion of waste recycling could also significantly contribute to mitigate the environmental impact of industry development in the region.

15. Municipality of Agadir. (n.d.)

WATER

ID	INDICATOR	LATEST YEAR AVAILABLE	VALUE IN LATEST AVAILABLE YEAR	TREND	EBRD-GCAP BENCHMARKS	UNITS
25	Domestic water consumption per capita	2024	100.00	N/A	120 - 200 ; 80 - 120, 200 - 250 ; < 80, >250	L / day / capita
25.1	Non revenue water	2024	22.00	↗ Increasing	< 30 ; 30 - 45 ; > 45	%
25.2	Annual average of daily number of hours of continuous water supply per household	2024	24.00	N/A	> 20 ; 20 - 12 ; < 12	h/day
25.4	Potable water storage	2024	1.00	N/A	> 1 ; 1 - 1/2 ; < 1/2	Days
25.5	Water consumption per unit of city GDP	2021	0.015	N/A	< 0.022 ; 0.022 - 0.055 ; > 0.055	L / day / USD
25.6	Share of Industrial water consumption	2024	3.00	N/A	< 17 ; 17 - 50 ; > 50	%
26	Percentage of residential and commercial wastewater that is treated according to applicable national standards	2024	100.00	N/A	> 60 ; 60 - 40 ; < 40	%
26.1	Percentage of buildings non industrial equipped to reuse grey water	2024	0.0	N/A	> 80 ; 80 - 60 ; < 80, < 60	%
27	Sewer Network Integrity (Pipe break)	2024	0.04	N/A	< 2 ; 2 - 10 ; > 10	Break/km/ year
27.1	Energy used for wastewater collection and treatment	2024	0.38	N/A	< 0.75 ; 0.75 - 1.0 ; > 1.0	kWh/m3
27.2	Sludge safely treated disposed of or safely used	2024	100.00	N/A	> 80 ; 80 - 50 ; > 50	%
28	Percentage of dwellings damaged by the most intense flooding in the last 10 years	2024	0.00	→ Constant	< 0.5 ; 0.5 - 3 ; > 3	%
28.1	Annual number of storm water or sewerage overflows per 100km of network length	2021	4.00	N/A	< 20 ; 20 - 50 ; >50	Number of events per year

The water sector in Agadir faces increasing issues, predominantly connected with water scarcity, pollution, and urban development. These challenges are exacerbated by limited and variable rainfall, frequent droughts, and competing needs of urban development, natural ecosystems and fisheries and agriculture.

Water consumption per capita in Agadir stands at 100 litres per day, at a level consistent with those of other water scarce cities in countries such as Egypt, Jordan, Turkey and Tunisia. The efficiency of water supply networks is at 78% for Agadir, resulting in a 22% of non-revenue, water, which represents the difference between the amount of water distributed and the amount billed. Within this 22% loss, there is typically a 'commercial loss' of about 5% and refers to water that is distributed but not billed due to discrepancies in water meter readings. Despite a generally reliable 24-hour continuous water supply for household, the Agadir water system is under significant pressure. There are some shortages of water supply in the summer due to droughts and the potable water storage capacity is limited to just one day, underscoring the need for enhanced storage solutions to buffer against supply disruptions. The share of industrial water consumption remains relatively low at 3%, yet this sector's demand is poised to grow, necessitating proactive measures to manage future industrial water needs.

Agadir has made notable strides in wastewater management. All residential and commercial wastewater is treated according to applicable national standards, ensuring a high level of sanitation and public health

protection. The energy efficiency of these treatments is also noteworthy, with only 0.38 kWh/m³ used for wastewater collection and treatment. Additionally, 100% of sludge is safely treated and either disposed of or reused, reflecting a robust system for managing wastewater by-products. However, ongoing efforts are crucial to maintain and upgrade these facilities to handle increasing wastewater volumes and to expand treatment capacities as the population grows.

Water scarcity is a growing concern for Agadir, with dam filling rate of the Souss-Massa region is falling at an unprecedented rate, decreasing by a total of 83.46% between 2010 and 2020, largely attributed to decreased ground and surface water resources, likely to be exacerbated in the coming years. 93% of the Souss basin water resources are exploited for agricultural purposes while only 7% is available for drinking water and industrial use. Agricultural yield and surface of agricultural land have been impacted by droughts in recent years, which has led to reduction in water available for irrigation. Most of the agriculture of the Souss-Massa region is concentrated within the Souss Plain, to the south-east of Agadir, and outside of the Municipality. One of the ways in which the region is tacking water scarcity is via irrigation of land water saving processes such as drip irrigation and the use of treated water for golf courses and green spaces irrigation. Drip irrigation processes have increased by over 100% from 2010 to 2013 alone.

Pollution from agricultural runoff and untreated industrial effluents remains a significant challenge. The decontamination of the northern zone of Agadir, particularly with the construction of a purification system for the northern zone (Anza) and discharge via an outfall, aims to mitigate this issue. The extension of primary and secondary treatment facilities and the development of reuse infrastructure for treated wastewater, especially for watering golf courses and green spaces, are vital steps in reducing environmental pollution and promoting sustainable water use. The on-going expansion of the M'Zar treatment plant, reinforcement of collection and pumping, in the south of Agadir, along with the completion of works to equip and connect peripheral neighbourhoods, highlights ongoing efforts to address these infrastructure challenges.

There are four events of stormwater or sewerage overflows per 100 km of network length annually in Agadir, well below acceptable standards, yet still leaving room for improvement to mitigate vulnerabilities in the existing system. To address this, improvements and upgrades to the structural networks and lifting mechanisms are necessary. The separation and transfer of predominantly industrial water from Ait Melloul to the M'zar site, along with the treatment of collected water using advanced processes, further illustrate the city's commitment to enhancing its water infrastructure and resilience against floods.

In 2008, the Moroccan Agency for Energy Efficiency (AMEE) and the Multi-services Autonomous Authority of Agadir (RAMSA) developed an action plan for sustainable water management to improve water consumption patterns, water management operations and improve service to customers. RAMSA has also been proactive in initiating strategic projects to bolster Agadir's water infrastructure. The redevelopment of the Chtouka desalination plant, designed to provide 400,000 m³/day of combined drinking and irrigation water, is a pivotal initiative aimed at ensuring long-term water availability. The implementation of smart water meters to monitor consumption and detect anomalies supports efficient water management and reduces losses. An updated liquid sanitation master plan, launched at the end of 2019, underscores the importance of continuous assessment and improvement of water management strategies.

Water scarcity is a significant challenge for Agadir, and investment should continue to support the on-going efforts to reduce water consumption, expand water reuse to all green spaces within the city, and create segregated industrial wastewater treatment. Enhancing storage capacity and investing in monitoring technologies to reduce remaining inefficiencies should be prioritised to ensure a sustainable drinking water supply to the city.

SOLID WASTE

ID	INDICATOR	LATEST YEAR AVAILABLE	VALUE IN LATEST AVAILABLE YEAR	TREND	EBRD-GCAP BENCHMARKS	UNITS
29	Total municipal solid waste generation per capita	2017	294.00	N/A	< 300 ; 300 - 500 ; < 500	kg / capita /year
30	Waste collection service coverage rate	2024	>90%	↗ Increasing	> 90 ; 90 - 80 ; < 80	%
	Proportion of dry recyclables (not segregated)	2024	15%	N/A	> 35 ; 35 - 15 ; < 15	%
	Proportion of organic waste (not segregated)	2024	70%	N/A	> 20 ; 20 - 5 ; < 5	%
31	Municipal solid waste treated in sorting, processing and treatment plants	2024	0%	→ Constant	> 75 ; 75 - 25 ; < 25	%
31.1	Municipal solid waste disposed in open dumps	2024	100%	→ Constant	< 10 ; 10 - 20 ; > 20	%
31.2	Municipal solid waste disposed in EU-compliant/equivalent sanitary landfills	2024	0%	→ Constant	> 90 ; 90 - 80 ; < 80	%
32	Remaining life of current landfills	2024	10	↘ Decreasing	> 8 ; 8 - 5 ; < 5	Years

Solid waste management in Agadir has benefited from significant investment and improvements over the last 20 years, including the opening of new landfill. However, significant challenges remain within the city including a lack of waste sorting and recycling, and a significant pollution risk posed by leachate ponds at the Tamelast landfill.

A national study suggests that municipal solid waste (MSW) generation per capita in Agadir has remained stable, at approximately 294 kg/capita/year in the years that data was available (2012, 2014 and 2017), which is below the acceptable standard of <300 kg/capita/year. Waste collection covers the whole city, despite some challenges in accessing some of the under-equipped neighbourhoods. There are some challenges with the frequency of waste collection, which the municipality is seeking to address through a new bin monitoring system. The proportion of dry recyclables and organic waste is in line with national level data, standing at approximately 10 to 15% of dry recyclables and 70% organic waste. Current source segregation is minimal and therefore estimated to fall above the acceptable critical level for both dry recyclables and organic waste.

In Agadir, the only formal waste disposal infrastructure is a landfill, with a lack of sorting or processing facilities. All of the collected waste is disposed of in the controlled landfill. The landfill is not compliant with EU sanitary landfill standards but compliant with Morrocco national norms. The controlled Tamelast landfill is located 6km northeast (Figure 17). It has been operational since April 2010, coinciding with the closure of the uncontrolled Bikarane landfill, which had been Agadir's primary waste management solution since 1978. The engineered Tamelast landfill was designed with a capacity of 2.4 million tonnes with a lifespan of over 10 years to serve Agadir and surrounding urban centres with two main landfill development phases, with areas of 5ha and 6ha respectively.

The landfill has a design life of 25 years, though the tonnage received as of 2017 was 2.5 million tonnes, which corresponds to its 10-year design capacity within seven years. It is understood that the Tamelast landfill continues to operate, though the current amount of landfill void capacity is not known. Tamelast landfill is currently the only controlled landfill serving Agadir. However, at least four illegal dump sites have been identified in the city.

The MSW in the Tamelast landfill comprises approximately 35% putrescible material, 30% fines (<30mm), 11% plastics and 9% paper and cardboard. The remaining 15% consists of hygienic waste, textiles, other combustible waste, glass, metals, other non-combustible waste, waste electrical and electronic equipment (WEEE), and hazardous waste. Overall, approximately 77% of the solid waste at the Tamelast landfill is organic.

Each landfill cell is equipped with a drainage and leachate collection system comprising of 160mm diameter high-density polyethylene (HDPE) pipes arranged in a herringbone pattern and connected to a central 200mm diameter HDPE gathering collection pipe connected to the leachate ponds.

The high organic content of the solid waste at the Tamelast landfill contributes significantly to its

substantial leachate generation, with a daily flow of 80-100 m³ and a total storage capacity of approximately 200,000m³ across eight watertight leachate ponds as of 2024. Leachate treatment comprises of natural evaporation and recirculation. This large volume of leachate indicates continuous generation and accumulation, posing a persistent threat to the environment.

As for leachate quality, the leachate has been found to contain high levels of both organic and inorganic pollutants. Notably, concentrations of heavy metals such as iron (240 mg/l), silver (1.49 mg/l), nickel (2.6 mg/l), and manganese (9.7 mg/l) significantly exceed the standard limits recommended by the environment authorities, which are fixed at 3mg/L, 1mg/L, 0.5 mg/L, and 1mg/L. These elevated levels highlight the leachate's potential to cause contamination of soil and water resources, impacting ecosystems and human health. Furthermore, the leachate exhibits high electrical conductivity, ranging from 15.9 to 129.9 mS/cm, reflecting a significant mineralisation activity, indicating a substantial presence of dissolved salts and minerals. Such high mineral content further complicates the leachate management and treatment processes, necessitating advanced and effective treatment solutions to mitigate its environmental impact. The maximum measured values of BOD5 and COD were 43,251mgO_2/l and 90,240mgO_2/l, respectively, indicating high biodegradable and non-biodegradable organic pollutant load.

The biogas capture system for each landfill cell consists of 14 wells drilled into the waste, with depths varying between 15m and 25m. Perforated HDPE vertical pipes surrounded by a layer of pebbles, horizontal pipes connecting14 to the regulation station, a main pipe connecting the regulation station to the flare and a 2,000 Nm3/h capacity flare.

Currently (2024), a tender is being prepared for an acquisition of adjoining land for expansion of the landfill and development of waste treatment infrastructure. These works will include the construction of a mixed waste recovery facility for 1,000 tonnes per day, a biogas-to-electricity conversion unit, a leachate treatment unit and a composting plant. The capital investment of the leachate treatment project is approximately $15 million, which is in development, aiming to treat up to 200-300m3 of leachate per day. The current landfill has a remaining life of 10 years, but with the planned extension, its lifespan will increase by over 30 years.

Agadir Municipality has devised a number of initiatives to improve waste management. The city plans to implement an intelligent waste collection system that aims to improve the efficiency of waste collection, provide waste treatment infrastructure to recycle up to 40% of the waste. This system will utilise ICT to optimise collection routes and monitor bin fill rates in real-time, thereby improving efficiency and reducing overflow incidents. The Communal Action Plan (CAP) 2022-2027 outlines additional measures, such as eliminating dump sites, improving public awareness, enhancing working conditions for waste management staff, and reinforcing regulatory enforcement. Investments are also planned for new equipment like sweepers, loaders, and bin washers to support these initiatives. Agadir's approach includes significant environmental and technological measures, such as the planned establishment of a waste recovery facility to boost recycling efforts and reduce the amount of waste ending up in landfills.

The solid waste sector in Agadir represents a significant environmental challenge for the city. The risk posed by the leachate storage at the Tamelast landfill is being addressed through improvements to the facility. Alongside these infrastructure investments, developing a waste recovery and recycling programme and improving public awareness and participation in waste and litter reduction efforts will play a key role in the reduction of waste-related hazards for the city.

Figure 17
Tamelast landfill location (blue pin)
Maps data: Google Earth, © 2025 Airbus

LAND USE

ID	INDICATOR	LATEST YEAR AVAILABLE	VALUE IN LATEST AVAILABLE YEAR	TREND	EBRD-GCAP BENCHMARKS	UNITS
33	Population density on urban land	2024	5,888	Increasing	4000 - 7000 ; 2500 - 4000, 7000-12000 ; < 2500, > 12000	Residents/ km2
33.2	Average commuting time	2015	22.50	N/A	< 30 ; 30 - 60 ; > 60	Min
33.1	Average commuting distance	2015	7.50	N/A	< 5 ; 5 - 10 ; > 10	km
34	Average annual growth rate of built-up areas	2023	2.44	Increasing	< 3 ; 3 - 5 ; > 5	%
35.1	Vacancy rates of residential buildings	2014	15.9	N/A	< 6 ; 6 - 10 ; > 10	%

Agadir has experienced a 24% increase in population density over the last ten years, growing to ca. 9,000 inhabitants per km² in 2024. This growth has put pressure on existing infrastructure and services.

Agadir's recent urban growth has been uneven, leaving undeveloped areas in-between built blocks. This fragmentation has led to inefficiencies in urban governance and service delivery. The city's urban planning efforts, such as the Strategic Development Plan (SDAU), have struggled to keep pace with urban growth, resulting in fragmented urban development. The growth of the city has also led to the absorption of former foothills villages into the urban fabric, which remain under-equipped neighbourhoods compared with the rest of the city. However, satellite imagery suggests the average annual growth rate of the built-up areas has slowed down in recent years and is well below acceptable levels.

Residential vacancy rate for urban areas in Morocco stood at 15.9% in 2014, which is above acceptable averages. In a context of under-supply of the urban housing market in Morocco, this is relatively high in absolute terms.

Urban form, together with transport provision, has an impact on commuting time, which stood in 2015 at 22.5 minutes, with an average distance of 7.5 km, above optimal levels but not yet reaching critical levels. Recent infrastructure projects, such as the introduction of the BRT and the construction of new roadways, aim to address accessibility issues. However, challenges persist in balancing the increasing trends in motorization with the promotion of public transportation.

Brownfield development is a key strategy in Agadir's urban planning, aiming to utilise previously developed land for new projects. Urban renewal initiatives, such as the redevelopment of the green corridor of Taddart-Anza and the creation of urban parks in Bensergao and Hay Mohammadi, are pivotal in improving air quality, providing recreational spaces, and enhancing public health by integrating innovative irrigation systems, including the use of treated grey water.

Modernising proximity markets, or "marché de proximité," is another essential aspect of Agadir's land use strategy. By building new facilities, refurbishing existing ones, and improving management, these markets support local traders, reduce food waste, and provide better shopping spaces. These upgrades are crucial for boosting local commerce and supporting the informal economy, benefiting both traders and residents. However, monitoring of urban space, including vacancy rates of commercial and residential buildings, the share of brownfield development, and the growth rate of built-up areas, is currently insufficient. Improving data collection and monitoring will provide better insights into urban dynamics, enabling more informed decision-making and effective urban management.

The rapid and sometimes uneven urban expansion of Agadir has contributed to adding pressure on the local environment and infrastructure. Brownfield redevelopment, consolidation of the urban fabric and introducing green-blue infrastructure across the existing fabric of the city could help achieve multiple benefits, contributing to urban and climate resilience.

Emerging challenges and their interdependency with environmental impacts.

Agadir is facing a number of inter-connected challenges which exacerbate impacts on its environment (Figure 18). These can be grouped by sector and therefore inform the development of priority actions and investment.

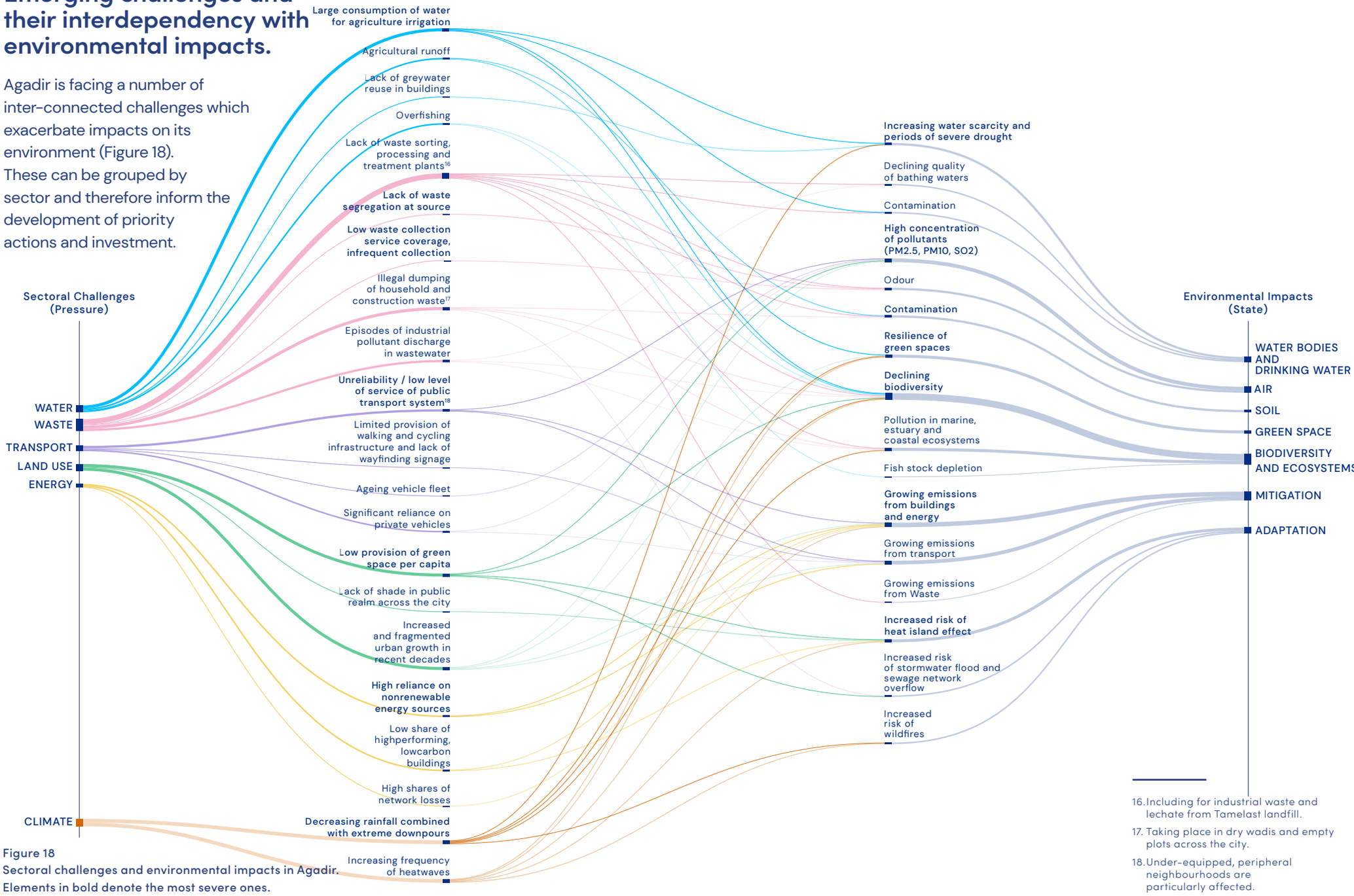


Figure 18
Sectoral challenges and environmental impacts in Agadir. Elements in bold denote the most severe ones.

16. Including for industrial waste and lechate from Tamelast landfill.
17. Taking place in dry wadis and empty plots across the city.
18. Under-equipped, peripheral neighbourhoods are particularly affected.

Digital maturity

Agadir has embarked on an ambitious journey with the "Digital Agadir" programme, a key initiative within its Communal Action Plan. This programme seeks to transform the city into a digitally advanced, sustainable hub, enhancing citizen services and modernising infrastructure.

The development of Agadir's smart city relies on strong political support and a clear strategic vision. However, it faces significant obstacles in execution. The city benefits from comprehensive 4G connectivity but lacks 5G infrastructure, and its municipal IT systems require considerable improvements and standardization to address growing needs.

While Agadir has integrated several national e-service platforms, there are plans to expand local e-services to enhance the citizen experience. The city's data strategy, which includes the development of an open data portal and a "Hyperviseur" platform for cross-sector data integration, is central to improving decision-making and fostering innovation.

Digital projects are underway in various sectors, addressing key urban challenges like land use management, waste collection, water quality monitoring, transport optimization, energy efficiency, and governance. However, progress has been slowed by complex procurement processes, a shortage of technical expertise, and a lack of robust data management and cybersecurity framework.

In order to better understand the digital maturity of the city, different components of digital maturity were assessed and plotted against a scale of maturity: initiating, enabling, integrating, optimising and pioneering.

GOVERNANCE

The city of Agadir has a very ambitious Smart City Programme that covers different technological aspects of the city's mission. Leadership has been identified as key pillar of the Agadir Smart City Programme since its inception. A commission was created for the governance and implementation of the smart city programme, demonstrating a strong commitment to digital leadership. However, digital transformation and technological innovation are still perceived as new and creating room for risks. Some challenges remain in the, particularly around procurement of technological innovation and governance of these solutions. In terms of procurement, Agadir is pioneering digital innovation for cities in Morocco and procurement rules for digital services are currently slowing down the purchasing and bidding process. The city also lacks the operational resources to manage technological solutions within its IT department. For this reason, the city is still considered to be at an "enabling" stage in terms of governance and leadership.

STAKEHOLDER

The municipality has conducted stakeholder engagement initiatives with respect to digital, including involvement with most of the sectors which deliver services across the city, as well as academia and other public institutions. However, engagement with the private sector needs to be strengthened and engagement is yet to produce concrete and ongoing results. For this reason, the city is still considered to be at an "enabling" stage in terms of stakeholder engagement with smart infrastructure and digital transformation.

POLICY

Agadir has launched its Digital Agadir initiative under the national strategy "Digital Morocco 2030". Digital Agadir is a comprehensive urban development and digital transformation project aimed at modernising the city. It is a forward-looking initiative that aims to transform Agadir into a modern, smart city with enhanced digital capabilities, improved citizen services, and sustainable infrastructure. 40M MAD have been allocated by the municipality to the programme, a new organisational structure has been put in place and several GIS projects and a first digital twin solution have been put in place, with an important impact on the increase of revenues. Conversations with national government on financial and technical support are on-going and a MoU should be signed before mid-2025. Overall, Agadir is considered to be at an "integrating" stage in terms of digital policy.

OTHER FOUNDATIONAL COMPONENTS

Other foundational components than policy play a role in the digital maturity of a city. In particular connectivity, digital skills and cyber security, and resilience.

Connectivity is good and affordable in Agadir, however there is a need to move to 5G and faster connections for internet of things (IoT) use cases and smarter data sharing. Recommendations through other programmes such as the Management Information System (MIS) have been made to improve digital skills of the municipality staff through a formal training framework, which should also include cybersecurity awareness training in order to improve the position of the municipality on this risk. Overall, Agadir is at an “initiating” stage in terms of training and cybersecurity and at a more advanced “enabling stage” in terms of connectivity.

Overall, Agadir's smart city maturity is currently classified as "Opportunistic" indicating that while key initiatives have been identified, their implementation is still limited. Nevertheless, Agadir has the potential for rapid advancement if it successfully overcomes these challenges and executes its planned initiatives.

To accelerate its smart city transformation, Agadir should:

- **Establish a dedicated governance structure**, either within the municipality or via an external public company (SDL), to streamline procurement and efficiently manage the smart city transition.
- **Develop technical expertise** by investing in training and capacity building to ensure systems are maintained and continuously improved.
- **Translate the Digital Agadir vision into a detailed, phased action plan** to guide implementation and provide clear financial estimates.
- **Secure national government support** simplify the procurement of innovative digital solutions, particularly cloud-based services, potentially through a task force to address procurement challenges.
- **Foster an ecosystem of start-ups, SMEs, experts, and academics** to help define programme priorities, monitor progress, and ensure effective implementation.
- **Support technological development** throughout the different sectors which deliver services in the city, such as the SDL mobilié for transport and the SRM SM for other services such as water distribution.
- **Enhance cybersecurity and resilience frameworks** to protect the city's digital infrastructure.

The GCAP has a key role to play in integrating the digital transformation of Agadir across different sectors and harnessing the power of digital to catalyse change:

- By encouraging data collection related to the different environments and sectors of the city, which will create a base for monitoring change
- By using smart solutions to manage resources efficiently.
- By centralising data through the municipality to ensure integration of interventions and public policies across sectors.
- By using digital solutions to enhance customer experience and catalyse behavioural changes to foster better outcomes for Gadiris.

The Digital Agadir programme should align with the GCAP initiatives such as electric vehicle tracking, real-time water quality monitoring, and smart waste collection. This alignment will not only drive technological advancement but also propel Agadir toward its goal of becoming a sustainable, smart city.

3
Green city vision and strategic goals

City vision

The green city vision reflects the aspirations and ambitions of the Municipality of Agadir and Gadiris for their city. With a time horizon of 10 to 15 years, the vision will guide actions and investment beyond the current strategic goals and actions. The drafting of the vision was based on the identified environmental challenges for Agadir, the existing city vision of the CAP and discussions with city officials on the environmental, economic and social aspirations of the city. The vision complements the CAP by adding a stronger environmental dimension to the CAP vision which is to “make Agadir an attractive, modern metropolis open to its citizens and a model of sustainable and intelligent transition”. The first draft of the vision was refined and agreed with stakeholders during a workshop.

A sustainable, inclusive and thriving metropolis that smartly manages its resources for the benefit of all.

By proactively safeguarding its environment, integrating blue-green infrastructure, promoting active mobility, fostering awareness and education among its citizens, and leveraging its human capital, Agadir will become a model for integrated resilient urban development in Morocco.

Strategic goals of Green City Action Plan

Following prioritisation of challenges and definition of a vision for Agadir, the strategic goals were derived to help address the environmental challenges and help the city achieve its vision. The goals have a 10-year time horizon and will guide investment into the actions, monitoring and review of progress on the actions towards achieving the vision of a sustainable, attractive and thriving Agadir.

GOAL ID / GOAL NAME	GOAL DESCRIPTION
 **SG1** Protect and enhance its environment	Protecting and enhancing its environment means that Agadir will act across multiple sectors to better the state of the environment in the city and fight the impacts of climate change. This includes the quantity and quality of its natural habitats, and the quality of its water, air and soil. To adapt and mitigate the impacts of climate change on the environment of Agadir, the GCAP is proposing actions across several sectors which aim at reducing pollution of air, water and soil, create new habitats and help the city transition towards greener energy sources.
 **SG2** Design for a fair and inclusive society	Mitigation and adaptation to climate change risks achieved through the GCAP need to benefit Agadir residents in a fair and inclusive way. Some of the GCAP actions are directly focused on more at-risk or vulnerable groups, such as children and youth. Others have been designed with special inclusivity measures. Ensuring that these measures are implemented as part of the actions will be crucial in ensuring that the actions deliver benefits equitably to Agadir residents.
 **SG3** Optimise the use of its resources	Agadir has a wide range of natural resources benefits but the development of the city and its surrounding region over the last decades has put pressure on the city's natural resources. Through careful planning, monitoring and management, the GCAP will help Agadir optimise the use of its resources to ensure a sustainable future for its residents.
 **SG4** Promote sustainable mobility	Due its ongoing growth, Agadir is anticipated to see an increase in its GHG emissions, in which increased private car usage plays a significant role. This will bring health and environmental risks to residents. The GCAP has the unique opportunity to help develop alternative means of transport which are safe, inclusive and reliable, thereby shifting public choices towards more sustainable transport modes. The GCAP will enhance the means and opportunities for Agadir residents to use sustainable transport modes, through the provision active travel options and an enhance public transport network.
 **SG5** Enable a healthy lifestyle for all	Environmental pressures can have significant impact on health outcomes of residents. In Agadir, the GCAP will ensure that the actions proposed will have a positive impact on residents' health outcomes, providing integrated solutions which will reduce environmental risks and increase resilience through better health and wellbeing.
 **SG6** Protect and capitalise on its blue economy	Economic activities and land uses in Agadir reflect the privileged position of the city at the foothills of the Atlas and along the Atlantic coast. The GCAP presents the opportunity to protect and develop blue infrastructure, linking it with the existing and forthcoming green infrastructure of the city and creating a comprehensive network of natural environments around Agadir which will support the needs of ecosystems and residents.
 **SG7** Harness the potential of digital	The use of digital solutions can help monitor and act on environmental states and challenges with efficiency and efficacy. The GCAP will use digital solutions where appropriate to help with the collection of data, monitoring of systems and implementation of rapid and efficient response to system changes. The collection of data will also help monitor and evaluate the outcomes and impacts of the GCAP actions, helping to better tailor policy and projects to an ever-evolving environment.

4
Green city actions

Overview

There are 31 actions in this GCAP, representing the activities the city should prioritise to achieve the vision of a resilient and inclusive Agadir (Figure 19). These build on the different dimensions and pillars of the Communal Action Plan 2022 – 2027 to ensure a coordinated approach to infrastructure investment in the city. The GCAP includes a transformative programme for the city's oueds and abandoned quarries, integrating blue and green infrastructure solutions to mitigate the risk of drought and flooding while reducing the impact of extreme heat events.

The GCAP also includes an ambitious package of interventions to improve the public realm throughout the city, deliver active travel infrastructure and contribute to the decarbonisation of transport through a better modal integration and introduction of electric fleets. Waste management is another area of focus for the proposed actions, which will drive the development of a comprehensive sorting and recycling system. Digital solutions underpin all infrastructure projects, encompassing real-time monitoring and diagnostics, and management ultimately coordinated by an integrated operations centre (see DA-07 Integrated operations centre). Actions are designed to support gender and social inclusion, and are complemented by the delivery of a city-wide sustainability awareness campaign.

This ambitious GCAP equals a total potential CAPEX investment of an estimated MAD 6.3 billion (EUR 582 million)[19]. It is estimated that the OPEX of the actions combined will reach MAD 1.4 billion (EUR 135 million) over the next five years.[20] The estimates of costs presented in the document are intended to show the potential scale of investment which could be deployed in each sector and for each of the actions. It is estimated that more than 5,800[21] new direct and indirect jobs will be created within the local economy, and the actions represent a significant opportunity to nurture innovation, supporting local start-ups as well as involving local craftsmanship.

Agadir's emissions are projected to grow from around 2 $MtCO_{2eq}$ per capita in 2019 to 2.2 $MtCO_{2eq}$ per capita in 2050 under a business-as-usual emissions scenario. Based on its GHG emissions and national income status in 2019, Agadir was assigned the Paris-aligned 'late peak' trajectory, which involves a 2% reduction from baseline emissions by 2030 before full decarbonisation in 2050. GCAP actions are expected to save around 196,655 tCO_{2eq}[22] per annum assuming they are all implemented in full, which represents 34% of the required emissions reductions between business-as-usual and Paris alignment pathways.

19. All financial figures in this document have been converted using the exchange rate of 1 EUR = 10.85020 MAD.

20. To estimate the costs of specific actions, a consultant utilised internal benchmarks, along with publicly available documentation from international financial institutions, tenders, strategic documents from the City of Agadir, annual reports of Agadir municipal companies, information from the Agadir state level, various ministries, and scientific articles. Additionally, a portion of the information was directly estimated by sectoral experts. Cost benchmarks have been considered at the level of (and if they were not available, it moved to the next level); 1. Agadir; 2. Morocco; 3. North Africa; 4. Middle East and North Africa (MENA); 5. Europe; 6. Rest of the World.

21. The estimate for the number of new jobs created is based on a World Bank study that analysed the relationship between infrastructure investment (in USD billion) and direct job creation across ten different sectors for oil-importing countries in the MENA region (World Bank, Infrastructure and Employment Creation in the Middle East and North Africa). For the digital sector, it was based on the European Commission publication "Job creation and destruction in the digital age: Assessing heterogeneous effects across EU countries', which compares the level of investment in the ICT sector for job creation. For some actions, where no reference was available, a value was estimated by an expert.

22. CO2 reductions have been estimated using the best available information, scientific articles, as well as national and international benchmarks from completed investments.

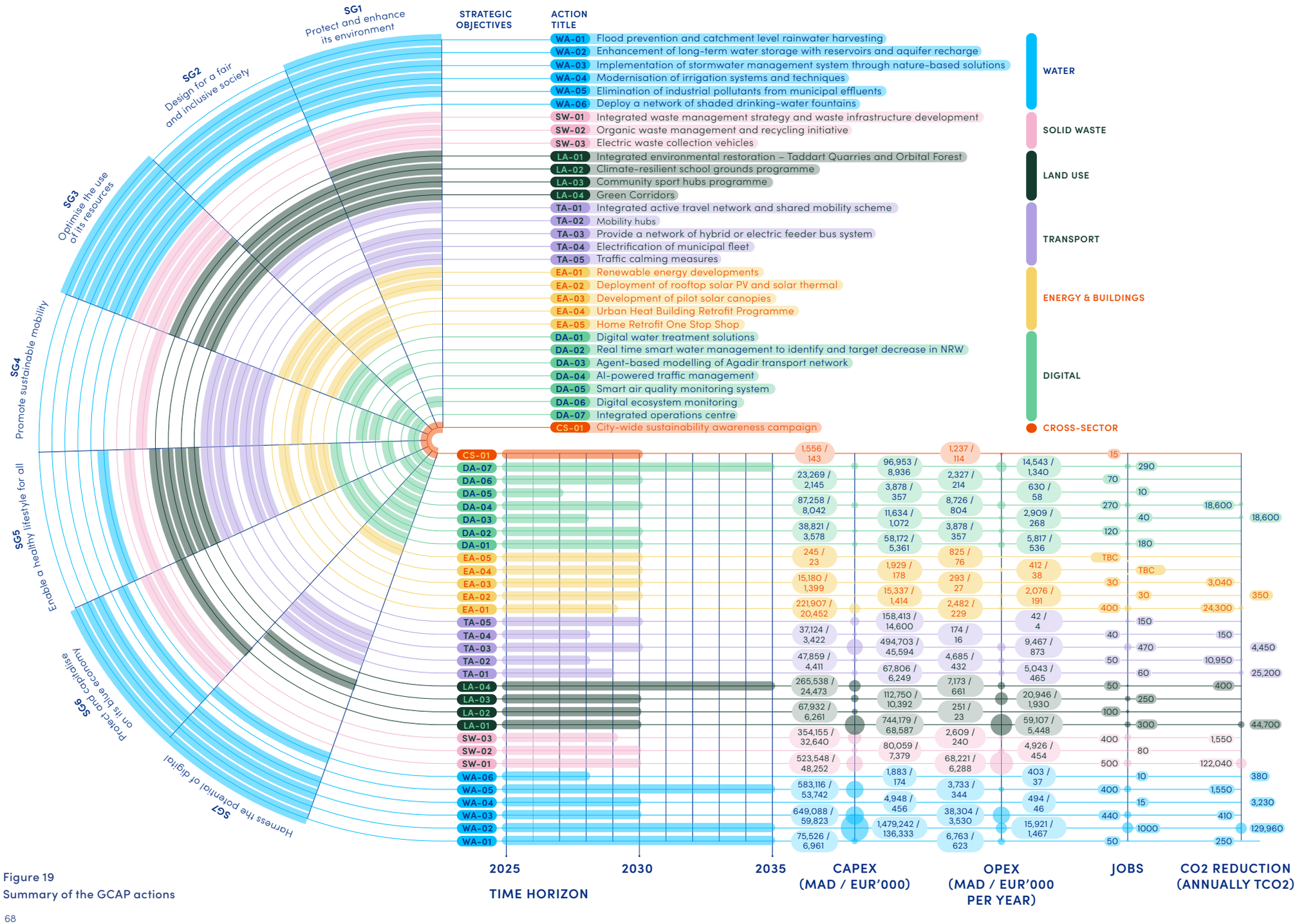


Figure 19
Summary of the GCAP actions

Water

WA-01
Flood prevention and catchment level rainwater harvesting

WA-02
Enhancement of long-term water storage with reservoirs and aquifer recharge

WA-03
Implementation of stormwater management system through nature-based solutions

WA-04
Modernisation of irrigation systems and techniques

WA-05
Elimination of industrial pollutants from municipal effluents

WA-06
Deploy a network of shaded drinking-water fountains

Water

Since RAMSA was created in 1982 to oversee water distribution in Agadir, with an increased mandate for wastewater in 1992, it has developed a comprehensive network of water distribution, wastewater treatment and grey water reuse for a large proportion of green spaces and all golf courses, across several municipalities of the urban area of Agadir. Since 15 October 2024, activities previously undertaken by RAMSA and the water supply side of ONEE have been given to a new state company, the Société Régionale Multiservices Souss-Massa (SRM SM). SRM SM will continue to invest in water infrastructure, conscious of the challenges brought by water scarcity in the region. Ongoing investment includes:

- An upgrade to the M'Zar treatment plant which was originally opened in 2010. The ongoing upgrade will increase the production of re-use water from 11 million cubic metres annually to 24 million in 2026, using predominantly household grey water from the urban area of Agadir.
- SRM SM is currently conducting pre-feasibility studies to develop a new industrial wastewater sewer from the industrial zones in the east of Agadir, along the N8, to a separate industrial pre-wastewater treatment works.
- The expansion of the reuse water network, in operation since 2010, to the north-east of the city, with a new 7,000 m^3 reservoir being built and a new pumping station.

Challenges faced by the water sector in Agadir have been recognised by the Integrated Water Resource Management agencies of the region and by the Municipality of Agadir. The CAP 2022-2027 stresses the important of resource management, including water, for Agadir, and has the aim of deploying grey water reuse irrigation to all green spaces in the city (Dimension 2, axis 19).

The new actions proposed in this GCAP build on the current on-going initiative, the CAP aims and the challenges and risks facing the water sector, with:

- The **development and upgrade of dams and riverbed** solutions for rainwater infiltration, replenishment of aquifers, and flood alleviation, for volumes of up to 1.9 million m^3 **WA-01**,
- This will be supported by the transformation of two quarries in Taddart to **surface storage reservoirs** **WA-02**,
- A feasibility study and implementation of **stormwater management system through nature-based solutions** that capture and infiltrate stormwater, delivering total of 500,000 m2 of SUDS and 160km of new or improved primary stormwater network, and which will support rainwater infiltration infrastructure and aquifer replenishment **WA-03**,
- The implementation of **water-efficient irrigation system**s to reduce water use across 42 hectares of green spaces and on-going monitoring **WA-04**,
- New regulations and **treatment plants for industrial wastewater** management and water reuse which will enhance the grey reused water produced for irrigation **WA-05**,
- The design and installation of **64 shaded drinking-water fountains** in key locations across the city to raise awareness of water challenges and improving the public realm **WA-06**.

With a total investment of MAD 2.793 billion (EUR 257 million) these actions will collectively generate 1,915 jobs and help future-proof the city against challenges of water scarcity, storage and pollution, and be more resilient to flood risk while creating new spaces for social interaction across the city.

WA-01

Flood prevention and catchment level rainwater harvesting

AT A GLANCE

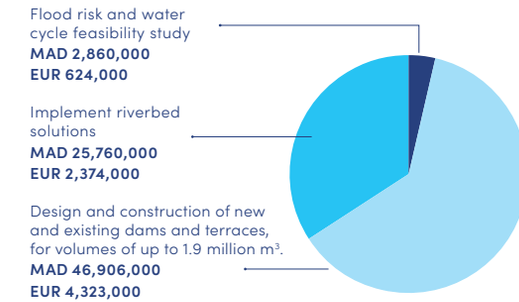
Development and upgrade of dams and riverbed solutions for rainwater infiltration, replenishment of aquifers, and flood alleviation, for volumes of up to 1.9 million m3. It includes undertaking a flood risk and water cycle feasibility study, design of new and upgrade of existing dams and development of a monitoring system.

TYPE OF ACTION
Capital project and monitoring/ data collection

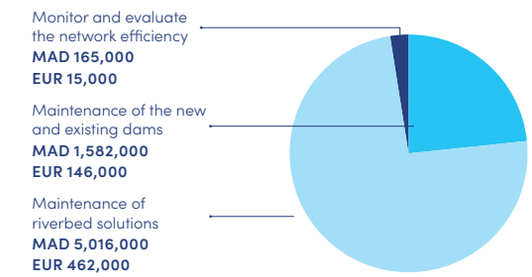
TIME HORIZON
2025-2035

SPATIAL EXTENT
To be defined in coordination with IWRM Agencies and local landowners

CAPEX
MAD 75,526,000
EUR 6,961,000



OPEX
MAD 6,763,000 / year
EUR 623,000 / year



ACTION DESCRIPTION

OVERVIEW

Flooding in Agadir poses a significant risk to human health and contributes to environmental pollution . The city is currently safeguarded by a system of dams along the Oueds that flow into it. However, due to climate change resulting in more extreme weather events, it is necessary to reassess the adequacy and efficiency of this dam network. New infiltration dams or terracing will reduce the sediment transport and improve the capacity of existing dams to store flood waters and reduce risk to the city from storms.

This action involves constructing an interconnected system of infiltration check dams and/or terracing to capture rainwater runoff that may lead to flooding. This approach facilitates water infiltration, thereby replenishing the aquifer beneath the city. The objective is to mitigate water scarcity while simultaneously providing flood relief.

COMPONENT DESCRIPTION

FLOOD RISK AND WATER CYCLE FEASIBILITY STUDY

The approach will be guided by a flood risk and water cycle feasibility study, which will identify the optimal locations for the development and upgrading of the dams and terracing. This may include development of hydrological and hydraulic models, or improvement of existing ones, to establish the optimal design of the system.

In absence of such models, based on the assumption that 50% of the rain will be absorbed or retained in the local environment or accommodated in the existing dams, the initial high-level estimate for diversion of flood volumes across three Oued is 1.2 million m3 for a 1:30 storm, and 1.9 million m3 for a

1:100 storm. The storage requirements for the check dams would depend on the geological conditions and the corresponding infiltration rates. The hydrological models in flood studies will enable better quantification.

DESIGN AND CONSTRUCTION OF NEW AND IMPROVEMENT OF EXISTING DAMS

More detailed hydrological and hydraulic modelling supported by the feasibility study will be needed to quantify the impact and optimise the design and location of any interventions. The check dams will be made using local material and designed to be simple to construct and maintain. Existing dams may also need to be upgraded or adapted to operate in conjunction with new infiltration check dams.

MONITOR AND EVALUATE THE NETWORK EFFICIENCY

A comprehensive monitoring system will track the performance of the infiltration check dams and terracing, assessing their impact on flood mitigation and water storage. Regular data collection and analysis will inform any necessary adjustments and improvements, ensuring the network remains resilient to changing weather patterns and continues to protect Agadir from flooding.

SCHEDULE OF IMPLEMENTATION

Action components	2025	2026	2027	2028	2029	2030+
Flood risk and water cycle feasibility study						
Design and construction of new and existing dams and terraces, for volumes of up to 1.9 million m^3.						
Monitor and evaluate the network efficiency						

STRATEGIC GOALS

SG1 Protect and enhance its environment

SG2 Design for a fair and inclusive society

SG3 Optimise the use of its resources

SG6 Protect and capitalise on its blue economy

SG7 Harness the potential of digital

RELATED GCAP ACTIONS

LA-01 DA-06 DA-07

CAP ALIGNMENT

Axis 5: Agadir eco-city with low carbon

Axis 11: Urban infrastructure

SOCIAL AND GENDER

Assess how flooding disproportionately affects women and address these vulnerabilities in the strategy.

Involve community members in the assessment process to ensure a comprehensive understanding of flood impact.

ECONOMIC DEVELOPMENT

50 FTE

DIGITAL

Sensor-based monitoring system tracking the performance of the infiltration check dams and terracing.

(DA-06 Digital ecosystem monitoring)

Potential development of hydrological catchment models and any other modelling to be made available to DA-07 Integrated Operation Centre.

CLIMATE MITIGATION

250 tCO2/year

CLIMATE ADAPTATION

Flood/landslide

Drought

Infrastructure failure/ obsolescence

IMPACT INDICATORS

25.4: Potable water storage – more than 1 day

28: Percentage of dwellings damaged by the most intense flooding in the last 10 years – less than 0.5%

28.1: Annual number of storm water or sewerage overflows per 100km of network length – less than 20 events per year

ACTION OWNER

Municipality of Agadir (Municipal Assets Division, Environment and Quality of Life Division and Public Works Division)

DELIVERY PARTNERS

- SRM SM
- Souss-Massa Region
- Watershed agency (Agence du Bassin Hydraulique de Souss-Massa)
- ONEE

WA-02

Enhancement of long-term water storage with reservoirs and aquifer recharge

AT A GLANCE

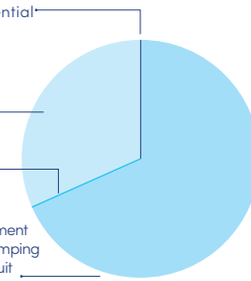
Transformation of two quarries in Taddart to surface storage reservoirs, through a scoping study, the construction of an on-site tertiary treatment system, a pumping station and water pipe, and a solar photovoltaic (PV) system to offset energy costs of the water pumping system.

TYPE OF ACTION
Capital project

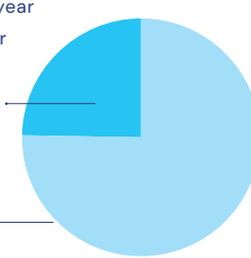
TIME HORIZON
2025-2035

SPATIAL EXTENT
To be defined in collaboration with SRM SM, and landowners

CAPEX
MAD 1,479,242,000
EUR 136,333,000



OPEX
MAD 15,921,000 / year
EUR 1,467,000 / year



ACTION DESCRIPTION

OVERVIEW

Water storage and/or infiltration reservoirs are crucial for ensuring long-term water security, especially in regions prone to drought. They help capture and store excess water resources (such as rainwater and treated sewage effluent), which can be used during dry periods, thus maintaining a steady water supply. These reservoirs aid in groundwater recharge, improving the sustainability of local water resources, and can provide local habitat to improve the local ecosystem services.

This action focuses on the utilisation of two Taddart quarries as surface storage reservoirs, which will also serve as infiltration basin or for well injection system for storage of treated effluent from M'Zar municipal treatment plan or any new industrial wastewater treatment plants (after tertiary treatment). The aim is to store this water long-term in the local aquifer and maximising the utilisation of freshwater and desalinated water for future use.

COMPONENT DESCRIPTION

SCOPING STUDY

A scoping study will identify the hydrologically and hydro-geologically feasibility of the two identified quarries in Taddart to act as water storage and infiltration reservoirs.

CONSTRUCTION OF ON-SITE TERTIARY TREATMENT SYSTEM OR LINED STORAGE RESERVOIR, PUMPING STATION AND WATER CONVEYANCE CONDUIT

If identified as suitable for infiltration in scoping study, an on-site tertiary treatment system (including RO) and disinfection will be constructed, for further polishing of influent treated effluent to remove pathogens, pollutants and endocrine chemicals. Alternatively, if issues with pollution are identified in scoping study, creating a lines storage reservoir in these quarries for medium term storage and to prevent infiltration and mitigate pollution risks.

Construction of a pumping station and 4km long water pipe will convey treated effluent from M'Zar to the two identified quarries for medium to long term storage reservoirs.

CONSTRUCTION OF SOLAR PV SYSTEM

This scoping study will include the assessment of the potential of floating solar PV on the reservoirs, and the corresponding infrastructure needed for electric grid connection or on-site renewable energy production. The energy produced by the floating solar PV can offset the energy costs associated with pumping water to the storage reservoirs and/or for injection into the ground. The floating PV can reduce the evaporation rates from the reservoir, and in return, the water can keep the solar PV cooler, increasing its performance.

SCHEDULE OF IMPLEMENTATION

STRATEGIC GOALS

SG1 Protect and enhance its environment

SG2 Design for a fair and inclusive society

SG3 Optimise the use of its resources

SG6 Protect and capitalise on its blue economy

SG7 Harness the potential of digital

RELATED GCAP ACTIONS

LA-01 DA-06

CAP ALIGNMENT

Axis 5: Agadir eco-city with low carbon

SOCIAL AND GENDER

Provide training programmes for women and local community members on water management practices, including the operation and maintenance of the treatment systems and reservoirs. This can empower women with technical skills and enhance their participation in water-related projects.

Facilitate access to the stored water for women farmers, particularly those engaged in agriculture or gardening. This could involve creating a system where women can easily access treated water for irrigation, thus enhancing food security and income generation.

ECONOMIC DEVELOPMENT

1,000 FTE

DIGITAL

A real-time monitoring and management system to monitor water levels, quality, and flow rates in the reservoirs and pipelines will provide actionable insights and alerts to optimise water storage, treatment processes, and energy usage, ensuring efficient and sustainable operation.

[DA-06, Digital ecosystem monitoring]

CLIMATE MITIGATION

129,960 tCO2/year

CLIMATE ADAPTATION

Drought

Extreme temperatures

IMPACT INDICATORS

16: Share of renewable in total energy consumption – more than 20%

25.4: Potable water storage – more than 1 day

27.1: Energy used for wastewater collection and treatment – less than 0.75 kWh/m^3

ACTION OWNER

Municipality of Agadir (Urban Planning Division, Environment and Quality of Life Division and Public Works Division)

DELIVERY PARTNERS

To be defined in collaboration with SRM SM, and landowners

WA-03

Implementation of stormwater management system through nature-based solutions

AT A GLANCE

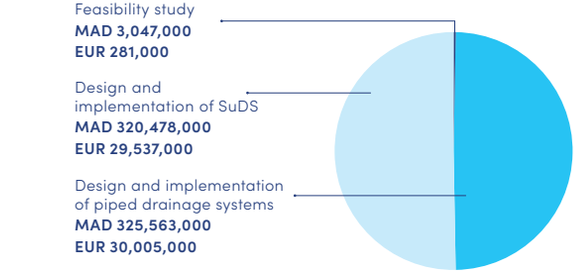
Feasibility study and stormwater management solutions that capture and infiltrate stormwater, leading to the implementation of a total of 500,000 m^2 of SuDS and 160km of new or improved primary stormwater network.

TYPE OF ACTION
Capital project

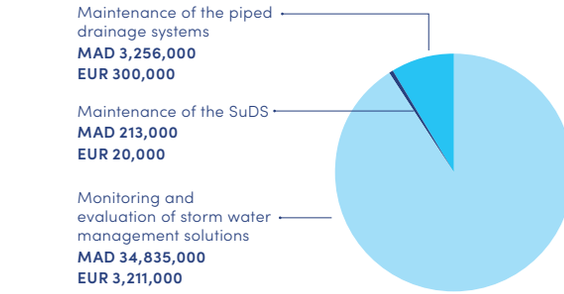
TIME HORIZON
2025-2030

SPATIAL EXTENT
Municipality of Agadir

CAPEX
MAD 649,088,000
EUR 58,823,000



OPEX
MAD 38,304,000 / year
EUR 3,530,000 / year



ACTION DESCRIPTION

OVERVIEW

Storm water management in cities has become increasingly vital due to climate change, which intensifies rainfall and increases the risk of severe flooding. This can lead to significant property damage and disrupt daily life, making effective management essential for urban resilience.

This action will design and deliver storm water management solutions tailored to the local climate and weather conditions. These solutions will include both surface drainage and piped drainage systems, integrated with sustainable drainage solutions (SuDS), to capture and infiltrate storm water and rainwater into the ground or underground storage tanks. The use of nature-based solutions for stormwater management can lower risks from surface water flooding, mitigate water pollution, support sustainable development by maintaining healthy ecosystems, and replenishing groundwater resources. Use of SUDS measures can also help optimise the network size and reduce cost of the piped storm drainage network and bring multiple benefits.

COMPONENT DESCRIPTION

FEASIBILITY STUDY

Prior to implementation, a study will assess the feasibility, suitability, and necessity of constructing stormwater management solutions around the city, recognising that despite its near year-round sunny weather, such infrastructure could prevent recurring issues faced in the past.

DESIGN AND IMPLEMENTATION OF SUDS

The bio-swale SuDS features will be primarily focussed on the diversion of runoff from the road surfaces. Based on the global averages of road surface area for similarly dense cities, the road surfaces account for 20 - 25% of city's area. Based on the climate, a conversion of 5% (or 500,000 m^2) of the road and pedestrian areas can be considered as reasonable, however it will need to be evaluated in more detail through a modelling and feasibility study.

A bio-swale would normally have an area of 3 m^2, meaning construction of approximately 166,000 bio-swales could be achieved. Many of these could be conversion of existing planting areas to function for storm attenuation purposes.

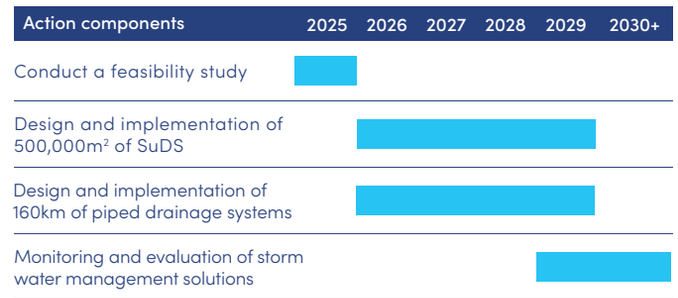
DESIGN AND IMPLEMENTATION OF PIPED DRAINAGE SYSTEMS

In addition to use of SuDS and nature-based solutions, the implementation of new or improvement of existing stormwater piped network will be critical in management of more intense rainfall events and diversion of flows to Oueds and reduction in surface water flooding. Based on Agadir's urban area, 160km of new or improved primary stormwater network is recommended

MONITORING AND EVALUATION OF STORM WATER MANAGEMENT SOLUTIONS

The SuDS and piped systems will be monitored through regular inspections and data collection to ensure the effectiveness and efficiency of the storm water management solutions, allowing for adjustments and improvements as necessary.

SCHEDULE OF IMPLEMENTATION



STRATEGIC GOALS

SG1 Protect and enhance its environment

SG2 Design for a fair and inclusive society

SG3 Optimise the use of its resources

SG6 Protect and capitalise on its blue economy

SG7 Harness the potential of digital

RELATED GCAP ACTIONS

LA-03 DA-01

CAP ALIGNMENT

Axis 5: Agadir eco-city with low carbon

Axis 11: Urban infrastructure

SOCIAL AND GENDER

Potential to create targeted employment opportunities for women. Women could be trained and employed in construction, maintenance and monitoring of SuDS and stormwater infrastructure, offering more stable employment.

ECONOMIC DEVELOPMENT

440 FTE

DIGITAL

Integration of real-time monitoring and early warning systems, which can enhance the effectiveness of stormwater management solutions by providing timely data and predictive analytics to optimise the performance of both surface and piped drainage systems.

DA-01 Digital water treatment solutions

CLIMATE MITIGATION

410 tCO2/year

CLIMATE ADAPTATION

Flood/Landslide

Drought

Infrastructure failure/ obsolescence

IMPACT INDICATORS

28.1: Annual number of storm water or sewerage overflows per 100km of network length – less than 20 events per year

ACTION OWNER

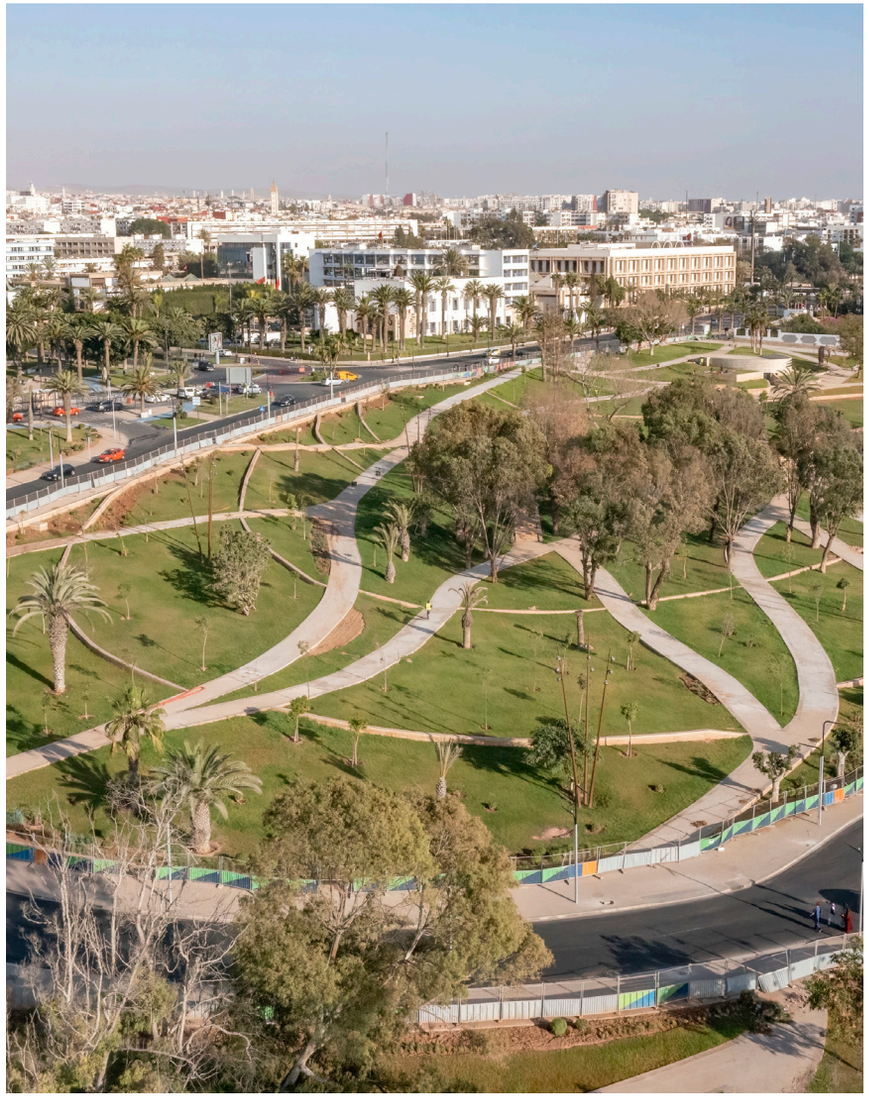
Municipality of Agadir

DELIVERY PARTNERS

- SRM SM
- Watershed Agency (Agence du Bassin Hydraulique de Souss-Massa)

WA-04

Modernisation of irrigation systems and techniques



AT A GLANCE

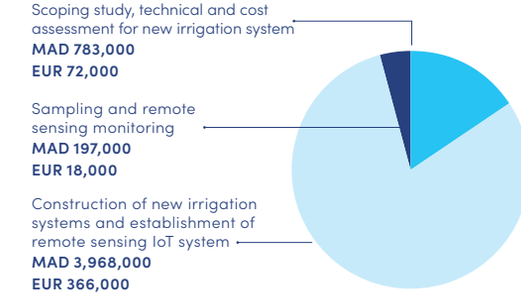
Implementation of water-efficient irrigation systems to reduce water use across 42 hectares of green spaces through a scoping study, technical and cost assessment of modern interventions and on-going sampling and remote sensing monitoring.

TYPE OF ACTION
Capital project and monitoring or data collection

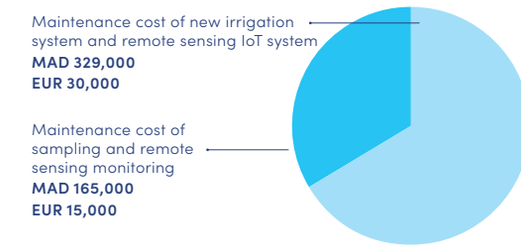
TIME HORIZON
2025-2030

SPATIAL EXTENT
To be defined in collaboration with Integrated Water Resource Management agencies and landowners.

CAPEX
MAD 4,948,000
EUR 456,000



OPEX
MAD 494,000 / year
EUR 46,000 / year



ACTION DESCRIPTION

OVERVIEW

Water resources in Agadir are under critical stress due to limited and variable rainfall, frequent droughts, and pollution from agricultural runoff and untreated industrial effluents. Currently, irrigation of green spaces is done inefficiently, leading to excessive use of water, a valuable resource. Implementing modern technology would help reduce water usage, while improving green spaces and ensuring irrigation occurs only when needed, while reducing maintenance and management costs of green spaces.

This action is the construction and implementation of modern water efficient irrigation systems and techniques to decrease water consumption for the approximately 42 hectares of municipal green spaces and parks using measures such as drip irrigation systems with timers, coupled with soil moisture sensors. This action would increase the sustainability of the water resources, improve the quality of green spaces, and have positive impact on the environment.

COMPONENT DESCRIPTION

SCOPING STUDY FOR NEW IRRIGATION SYSTEM

The action includes a scoping study to map the spatial extent of green spaces and corresponding water use. This study will also

identify areas and types of planting with the highest water consumption and potential for efficiency improvements, ensuring targeted and effective implementation of the new irrigation systems.

TECHNICAL AND COST ASSESSMENT OF SUITABLE MODERN INTERVENTIONS

A technical assessment of suitable modern irrigation interventions, such as drip irrigation, will be conducted. This assessment will also include a detailed cost analysis to determine the most cost-effective solutions. Additionally, the assessment will consider the long-term maintenance requirements and potential return on investment to ensure its implementation.

CONSTRUCTION OF NEW IRRIGATION SYSTEMS AND ESTABLISHMENT OF REMOTE SENSING IOT SYSTEM

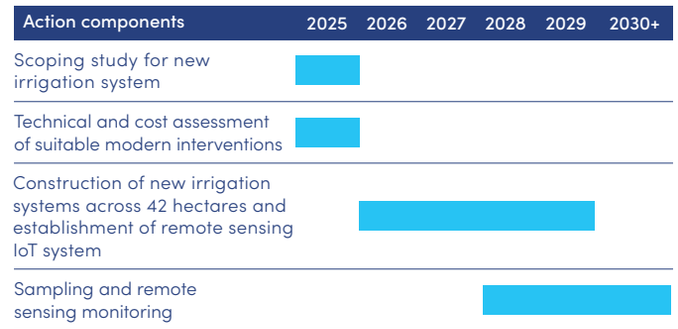
The construction of modern irrigation systems across the municipality's green spaces will be carried out, along with the provision of an IoT system formed of soil moisture sensors and irrigation control system. The control of the operation of drip irrigation system can be improved with the use soil moisture sensors that correlate to plant water demands in each of green spaces. This way, the irrigation will only occur based on the real time need of water by the plants and grassed verges.

The soil moisture sensing will be undertaken locally using in-site wireless soil moister sensors. Their data can be augmented with system to monitor larger area soil moisture data using sensors using COSMOS (Cosmic-ray Soil Moisture Observing System) sensors or external satellite-based soil moisture sensing data (from SMAP (NASA) and Copernicus (EU)).

SAMPLING AND REMOTE SENSING MONITORING

Ongoing sampling and remote sensing monitoring measures for water quality monitoring will also be implemented. This will include regular data collection to track water usage, ensuring the irrigation systems are functioning optimally (DA-01).

SCHEDULE OF IMPLEMENTATION



STRATEGIC GOALS

SG1 Protect and enhance its environment

SG2 Design for a fair and inclusive society

SG3 Optimise the use of its resources

SG6 Protect and capitalise on its blue economy

SG7 Harness the potential of digital

RELATED GCAP ACTIONS

LA-03 DA-01

CAP ALIGNMENT

Axis 11: Urban infrastructure

SOCIAL AND GENDER

N/A

ECONOMIC DEVELOPMENT

15 FTE

Capacity building for new jobs for the operation and maintenance of modern equipment.

DIGITAL

Advanced remote sensing technologies will provide real-time insights, allowing for adjustments and maintenance to maximise efficiency of the new irrigation systems.

(DA-01 Digital water treatment solutions)

CLIMATE MITIGATION

3,230 tCO2/year

CLIMATE ADAPTATION

Drought

IMPACT INDICATORS

25.5: Water consumption per unit of city GDP – less than 0.022 L/day/USD

ACTION OWNER

Municipality of Agadir (Environment and Quality of Life Division)

DELIVERY PARTNERS

- SRM SM
- Watershed Agency (Agence du Bassin Hydraulique de Souss-Massa)

WA-05

Elimination of industrial pollutants from municipal effluents

AT A GLANCE

New regulations achieved through the establishment of discharge limits and a monitoring regime, the implementation of reporting mechanisms for water quality and compliance levels. A scoping study will define the location and capacity of the common industrial effluent treatment plant. Industrial units outside of industrial zones will be supported to implement site level industrial effluent treatment plants.

TYPE OF ACTION
Capital project, policy or regulations and monitoring or data collection

TIME HORIZON
2025-2035

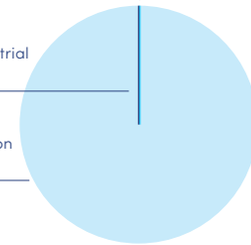
SPATIAL EXTENT
To be defined in collaboration with SRM SM

CAPEX
MAD 583,116,000
EUR 53,742,000

Establish discharge limits and a monitoring regime
MAD 485,000
EUR 45,000

Scoping study of common industrial effluent treatment plant (CIETP)
MAD 912,000
EUR 84,000

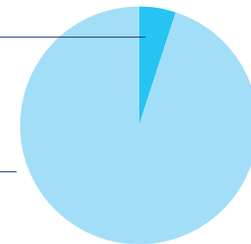
Technical design and construction of common industrial effluent treatment plant
MAD 581,719,000
EUR 53,614,000



OPEX
MAD 3,733,000 / year
EUR 344,000 / year

Reporting mechanism for water quality data and compliance levels
MAD 194,000
EUR 18,000

Maintenance cost of a new common industrial effluent treatment plant
MAD 3,539,000
EUR 326,000



ACTION DESCRIPTION

OVERVIEW

Industrial water use in Agadir accounts for 3% (or 9000 m³/day) of the total water use within the city. Pollutants from the industries have negative impact on the operational performance of the M'Zar wastewater treatment and limit the potential uses of the reclaimed water (TSE).

By reducing the toxicity of industrial effluents at source, this action aims to extend the lifespan of sewerage infrastructure and improve the quality of re-used water from the M'Zar plant, which irrigates green spaces and golf courses.

COMPONENT DESCRIPTION

ESTABLISH DISCHARGE LIMITS AND A MONITORING REGIME

This action will first involve developing regulations, policies, and standards for industries to pre-treat their wastewater before discharging it into the public sewer system and inflows into the M'Zar plant.

REPORTING MECHANISM FOR WATER QUALITY DATA AND COMPLIANCE LEVELS

The reporting mechanism for water quality data and compliance levels will involve regular submission of water quality reports by industries, detailing the levels of pollutants and compliance with established discharge limits. These reports will be reviewed by regulatory authorities to ensure adherence to standards and to identify any necessary corrective actions.

SCOPING STUDY OF COMMON INDUSTRIAL EFFLUENT TREATMENT PLANT (CIETP)

A scoping study will determine the location and capacity of the common industrial effluent

treatment plant. If necessary, a separate sewer network for industrial wastewater in designated zones is proposed, with local reuse in relevant industries. At this stage, the most problematic pollutants and relevant interventions, such as the conversion to fluorine-free firefighting systems to reduce persistent organic pollutants (POPs) contamination of wastewater, will be identified and integrated into the concept design for the CIETP.

A pre-feasibility study has been conducted, a business case established, and indicative funding secured for design (and possibly construction) of CIETP (which could include treated effluent supplied to industrial owners at a cost).

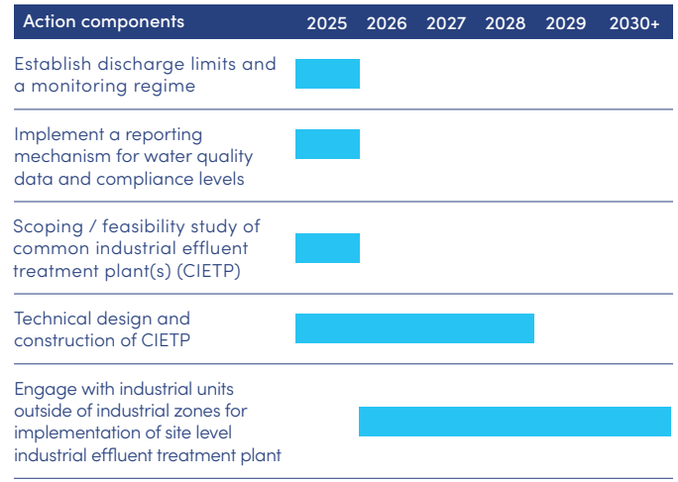
TECHNICAL DESIGN AND CONSTRUCTION OF COMMON INDUSTRIAL EFFLUENT TREATMENT PLANT

Technical design will establish the detailed performance characteristics, development of detailed cost estimates, leveraging and / or securing funding, followed by procurement and construction of the CIETP. The technical design and construction could be procured under single design and build contract, or design stage followed by procurement of construction. The quantity and nature of available funding is likely to influence this choice.

ENGAGE WITH INDUSTRIAL UNITS OUTSIDE OF INDUSTRIAL ZONES FOR IMPLEMENTATION OF SITE LEVEL INDUSTRIAL EFFLUENT TREATMENT PLANT

For sites not in industrial zones or industrial zones where common treatment plants are not feasible, the industrial wastewater will need to be collected onsite at the source for treatment, preferably for onsite or offsite reuse with rest discharged into municipal sewer system. This action is particularly relevant for industrial sites not in designated zones or where mixed wastewater complicates pollutant management, with potential for a charging scheme for reclaimed water supply. The site level treatment plants could be funded through co-sponsored loans if industrial units are unable to provide upfront capital, and the loan serviced through payments by the industrial units.

SCHEDULE OF IMPLEMENTATION



STRATEGIC GOALS

SG1
Protect and enhance its environment

SG5
Enable a healthy lifestyle for all

SG3
Optimise the use of its resources

RELATED GCAP ACTIONS

DA-01

CAP ALIGNMENT

Axis 11: Urban infrastructure

SOCIAL AND GENDER

The development of new regulations and standards for industrial wastewater management should include the active participation of women in decision-making processes. This could be facilitated through consultations with women's groups, NGOs, or women representatives from industrial sectors.

ECONOMIC DEVELOPMENT

400 FTE

Capacity building for new jobs for the operation and maintenance of modern equipment.

DIGITAL

DA-01 Digital water treatment solutions has elements of water quality monitoring. These recommendations could be built further to evaluate the inclusion of specific compliance requirements of WA-05 once these are set.

Data about the operation of system and services should be made available to DA-07 Integrated Operation Centre.

CLIMATE MITIGATION

1,550 tCO2/year

CLIMATE ADAPTATION

Drought

IMPACT INDICATORS

25.4: Portable water storage – more than 1 day

27.1: Energy used for wastewater collection and treatment – less than 0.75 kWh/m^3

27.2: Sludge safely treated disposed of or safely used – more than 80%

ACTION OWNER

SRM SM

DELIVERY PARTNERS

- The Ministry of Equipment, Transport, Logistics and Water; Industrial Units owners' operators
- Souss-Massa Region
- Municipality of Agadir

WA-06

Deploy a network of shaded drinking-water fountains

AT A GLANCE

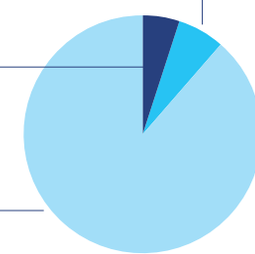
Design and installation of 64 shaded drinking-water fountains, supported by an assessment and identification of target areas and stakeholder engagement with residents and site users.

TYPE OF ACTION
Capital project and awareness raising

TIME HORIZON
2025-2028

SPATIAL EXTENT
La Corniche, Jardin Ibn Zaidoun and annex, and Parc Al Inbiaat including the skate park, Anza Beach

CAPEX
MAD 1,883,000
EUR 174,000



OPEX
MAD 403,000 / year
EUR 37,000 / year

Maintenance cost of a water fountains

ACTION DESCRIPTION

OVERVIEW

Public fountains, especially in dry and arid climates, serve as essential sources of water. They help mitigate the effects of extreme heat, offering a cooling respite and reducing the risk of heat-related illnesses. Additionally, these fountains can enhance the aesthetic appeal of urban areas, promoting social interaction and community well-being.

The action is to deploy a network of 64 shaded drinking water fountains across the city. This will help reduce plastic bottle consumption and will raise awareness of the water challenges that Agadir faces through permanent educational posters on the fountain. The fountains will provide shaded canopies, offering much-needed relief from the sun and creating comfortable 'cool spots' for the public. These canopies will enhance the usability of public spaces, encouraging people to spend more time outdoors even during hot weather.

COMPONENT DESCRIPTION

ASSESSMENT AND IDENTIFICATION OF LOCATIONS INCLUDING TARGET AREAS

The fountains will contribute to making the public realm more inclusive and accessible, and to increase the resilience of the city in times of extreme heat. An initial assessment and identification of specific locations within

three target areas will maximise accessibility and use.

The location of public fountains take into consideration population density, public spaces, heat islands, lack of shading, as well as equity consideration to ensure they are distributed across different neighbourhoods to promote inclusivity. The target areas for installation have been identified, and include:

- La Corniche (the sea front) and Anza beach with 34 water fountains provided at the 29 accessible entrances to the beach and 5 in the Belvedere Garden
- Jardin Ibn Zaidoun with 20 water fountains, one at each entrance and several disseminated in the park, including near the skate park and football pitches along rue du 18 November
- Parc Al Inbiaat with 8 water fountains around the main sports facilities.

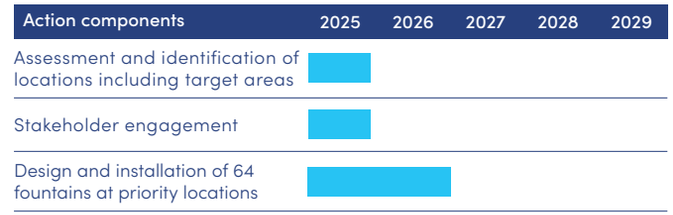
STAKEHOLDER ENGAGEMENT

Engaging with local stakeholders, including community groups, will ensure the fountains meet the needs and expectations of residents and site users of the target areas.

DESIGN AND INSTALLATION AT PRIORITY LOCATIONS

The fountains will be equipped with technology to prevent the water from being used for personal household purposes. Usage monitor sensors will ensure water is not stagnant in the pipe network, reducing the risk of bacterial and pathogen growth which could pose risks to public health. Filters will be integrated to improve the taste of tap water, addressing a common barrier to reducing bottled water consumption.

SCHEDULE OF IMPLEMENTATION



STRATEGIC GOALS

SG2
Design for a fair and inclusive society

SG5
Enable a healthy lifestyle for all

RELATED GCAP ACTIONS

N/A

CAP ALIGNMENT

Axis 2: City of Sports

Axis 5: Agadir Eco-city with low carbon

Axis 10: Patrimony management and urban planning

Axis 11: Urban Infrastructure

SOCIAL AND GENDER

Water fountains will be placed at a height which will make it accessible to disabled citizens, children, and parents with prams.

Water fountains will be placed near the entrances to the beach and park, making it easy for all citizens to reach from the disabled paths.

Employment opportunities for local women, particularly in areas such as landscaping, artisanal design, construction of shaded canopies or in the creation of educational posters.

The public fountains and shaded canopies should be located in safe, well-lit areas to encourage women and girls to use them without fear of harassment.

ECONOMIC DEVELOPMENT

5 FTE

The design of the fountains and shaded canopies will incorporate artisanal craftsmanship, providing a series of unique designs representative of the local heritage, creating job opportunities for local artists, fostering economic growth within the community.

DIGITAL

Implementation of usage monitor sensors will ensure water is not stagnant, and reduce the risk of bacterial and pathogen growth which could pose risks to public health.

CLIMATE MITIGATION

380 tCO2/year

CLIMATE ADAPTATION

Drought

Extreme temperatures

IMPACT INDICATORS

11.1: Transport modal share in total trips (active travel) – less than 30% of private motorised journeys

29: Total municipal solid waste generation per capita – less than 300 kg/capita/year

ACTION OWNER

Municipality of Agadir (Urban Planning Division, Environment and Quality of Life Division, Public Works Division)

DELIVERY PARTNERS

- SRM SM
- Local Development Company for public works (SDL Agadir Souss-Massa aménagement)

Solid waste

SW-01
Integrated waste management strategy and waste infrastructure development

SW-02
Organic waste management and recycling initiative

SW-03
Electric waste collection vehicles

Solid waste

Solid waste management in Agadir has significantly improved over the last 20 years, with the opening of the Tamelast landfill and the remediation of the old Birrakane waste dump site, which has been in operation since 1978, and which now forms an urban forest of Argan trees near the Adrar stadium.

The landfill was opened in 2010 with a planned lifespan of 10 years. This has already been extended and it is understood that there are plans to extend the landfill further, increasing its lifespan by 30 years. Since the opening of the landfill, additional leachate ponds have been built to accommodate the leachate emanating from the landfill activities. However, there is currently no leachate treatment system in place. A World Bank-funded project is currently being procured to address these challenges. It is understood that the project will include the construction of a waste recovery facility, a biogas-to-electricity conversion unit, a leachate treatment unit and a composting plant. The project, under the remit of the Ministry of Interior in partnership with the Souss-Massa region, is planned to treat the stored leachate and any new leachate generated from the landfill activities. The development of a waste recovery facility at the landfill gives the opportunity to operate a city-scale sorting collection system in Agadir, which would include the separation of waste at source including organic waste and mixed residual waste.

The Environmental Division of the Municipality of Agadir, in charge of waste collection, is currently (2024) conducting an audit of their collection vehicle fleet. This is to inform delivery of the Communal Action Plan aims related to waste, which includes:

- the elimination of dump sites across the city;
- an awareness raising campaign on littering and waste separation;
- increasing frequency of waste collection in sensitive locations with the help of digital sensors to measure the bin filling rates with the aim to reduce odour nuisance;
- a wider roll out of a waste separation scheme;
- the acquisition of new waste collection and street cleaning equipment. .

The actions which are proposed through this GCAP seek to build on the ongoing projects at the Tamelast landfill as well as integrate and augment some of the CAP actions, and include:

- the development of a **city-wide integrated waste management strategy and system**, including an organic waste treatment facility (e.g. in-vessel composting or anaerobic digestion) and a dirty materials recovery facility for mixed residual waste **SW-01** ;
- the installation of o**rganic waste bins** across the city and **roll-out of two-bin waste collection system**, supported by a large-scale awareness-raising campaign. This builds on the waste management strategy and the organic waste treatment facility **SW-02** ;
- The introduction of a new and expanded fleet of **128 waste collection vehicles** to support the increased complexity of the sorted waste collection, and the CAP action to increase frequency of collection **SW-03** .

With a total investment of MAD 957 million (EUR 88 million), these actions will collectively generate 980 jobs and will set Agadir on a new path of waste sorting, recycling and repurposing, harnessing the potential of digital solutions to mitigate environmental risks, and making the city more attractive for residents and visitors.

SW-01

Integrated waste management strategy and waste infrastructure development

AT A GLANCE

Development of a city-wide integrated waste management strategy and system, including the construction of an organic waste treatment facility and a dirty materials recovery facility.

TYPE OF ACTION
Capital project and policy or regulations

TIME HORIZON
2025-2030

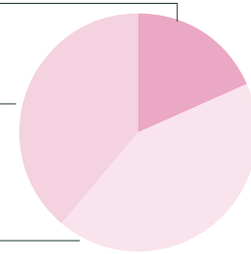
SPATIAL EXTENT
Municipality of Agadir

CAPEX
MAD 523,548,000
EUR 48,252,000

Integrated waste management strategy
MAD 96,953,000
EUR 8,936,000

Dirty materials recovery facility (MRF)
MAD 203,602,000
EUR 8,765,000

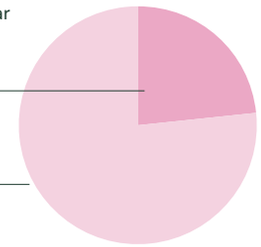
Organic waste treatment facility
MAD 222,993,000
EUR 20,552,000



OPEX
MAD 68,221,000 / year
EUR 6,288,000 / year

Maintenance cost of an organic waste treatment facility
MAD 15,997,000
EUR 1,474,000

Maintenance cost of a dirty materials recovery facility
MAD 52,224,000
EUR 4,813,000



ACTION DESCRIPTION

OVERVIEW

Agadir faces challenges with low waste collection rates, poor waste segregation at source, and a lack of sustainable waste treatment methods.

This action covers the development of a city-wide integrated municipal solid waste management strategy, with a strong emphasis on circular economy principles and sustainable practices. The strategy will deliver a roadmap, outlining the necessary steps to meet legislative objectives and targets. The strategy will be supported by the construction of two new treatment facilities for organic waste treatment to produce an organic fertiliser, and a dirty materials recovery facility for sorting of waste to extract recyclables.

COMPONENT DESCRIPTION

INTEGRATED WASTE MANAGEMENT STRATEGY

Carrying out an analysis and assessment of the city's current and project waste management needs (waste production and management capacity) will be the starting point to deliver a strategic roadmap that will include:

- Establishing a standardised approach to collect, analyse, report, and monitor data on solid waste at the city scale.

- Producing a quantitative assessment of the waste management needs of the city.
- Establishing a vision, objectives and targets for sustainable waste management.
- A comprehensive public engagement and education campaign: educating residents on waste reduction, recycling practices, and responsible disposal.

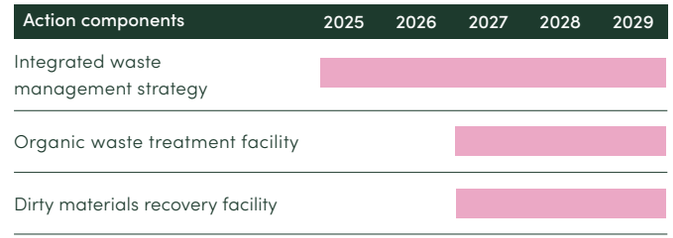
ORGANIC WASTE TREATMENT FACILITY

Establishment of an organic waste treatment facility (e.g. in-vessel composting or anaerobic digestion) dedicated to processing segregated organic waste, primarily food and agricultural waste. The facility will be required to manage the significant amount of organic waste produced by the city. Based on available data, Agadir generates approximately 320 tonnes of household waste per day, with around 70% being organic. If waste collection rates increase to over 90%, the plant would need to have a minimum capacity of 200 tonnes per day (excluding agricultural waste). The potential to co-locate this facility with the landfill site is to be considered in a feasibility study to ensure efficiencies and reduce double handling.

DIRTY MATERIALS RECOVERY FACILITY (MRF)

The dirty MRF will process mixed residual waste collected from residential and commercial sources, reducing the amount of waste going to landfill and supporting circular economy efforts by preparing recyclable materials for marketing and end-users. The facility's capacity to handle construction and demolition waste will also be assessed to account for future city expansion and increased construction. The feasibility study will consider co-locating this facility with the landfill site to ensure efficiencies and reduce double handling.

SCHEDULE OF IMPLEMENTATION



STRATEGIC GOALS

SG1
Protect and enhance its environment

SG3
Optimise the use of its resources

RELATED GCAP ACTIONS

SW-02 DA-07

CAP ALIGNMENT

Axis 5:
Agadir eco-city with low carbon

SOCIAL AND GENDER

Tailor communication materials to be accessible to diverse groups, accounting for literacy, language, and cultural norms.

Design training and educational programmes specifically for women to increase participation in circular economy practices, such as composting and up-cycling.

ECONOMIC DEVELOPMENT

500 FTE

DIGITAL

Collection of robust waste management data is essential for planning waste collection, transport, treatment and disposal infrastructure, and to ensure that waste facility operators comply with their permits. Waste data acquisition should be mandated by the Government and be collated by the Ministry of Energy, Mines, and Sustainable Development. The data sets should include the quantity and types of waste generated and their fate from source to final destination (e.g. Landfill) as well as the capacity of existing waste treatment and disposal facilities. The collection and storage of this data should be incorporated with DA-07 Integrated operations centre.

CLIMATE MITIGATION

122,040 tCO2/year

CLIMATE ADAPTATION

Flood/landslide

Infrastructure failure/ obsolescence

IMPACT INDICATORS

30.2: Proportion of organic waste sourced segregated – more than 20%

31: Municipal solid waste treated in sorting, processing and treatment plants – more than 75%

31.1: Municipal solid waste disposed in open dumps – less than 10%

ACTION OWNER

Municipality of Agadir (Environment and Quality of Life Division, Public work Division)

DELIVERY PARTNERS

- Landfill Operator (currently SNTRO - Société nouvelle des travaux routiers et ouvrages)
- Souss-Massa Region

SW-02

Organic waste management and recycling initiative

AT A GLANCE

Installation of organic waste bins across the city and roll-out of two-bin waste collection system, supported by an education and awareness-raising campaign.

TYPE OF ACTION
Capital project and awareness raising

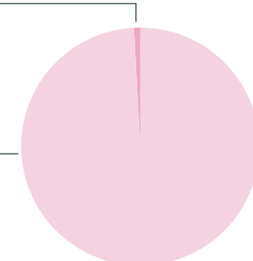
TIME HORIZON
2025-2030

SPATIAL EXTENT
Municipality of Agadir

CAPEX
MAD 80,059,000
EUR 7,379,000

Education and awareness campaign
MAD 600,000
EUR 55,000

Installation of organic waste collection bins and two-bin waste collection system
MAD 79,459,000
EUR 7,323,000



OPEX
MAD 4,926,000 / year
EUR 454,000 / year

Maintenance cost of a new collection system

ACTION DESCRIPTION

OVERVIEW

Currently, Agadir does not offer waste sorting facilities for either residents or businesses, despite approximately 77% of municipal waste being organic. Littering and illegal dumping has been identified as a relevant environmental issue in the city.

This action involves installing organic waste collection bins across the city, with regular scheduled collections. A two-bin waste collection system will also be rolled out across households, public spaces, and public buildings for separate collection of organic and household waste streams, supported by a large-scale awareness-raising campaign targeting residents and schools to promote waste sorting and recycling. Emphasising the role of personal and community action in waste management to change public behaviour, will ensure the success of the new systems, and discourage littering and illegal dumping. Implementing this action will improve waste management, reduce environmental pollution, and ultimately enhance public health.

COMPONENT DESCRIPTION

INSTALLATION OF ORGANIC WASTE COLLECTION BINS

The action involves the installation of organic waste collection bins at neighbourhood markets, hotels, restaurants, cafés and food manufacturing businesses. Markets and

businesses will be equipped with appropriately sized storage capacity and bins to ensure that any negative side effects are minimised (i.e. Odour during the hot season) and to increase public compliance. Waste will be collected at an appropriate frequency (i.e. Daily or twice weekly) dependant on generation rates and seasonal variations. The action will be integrated with several of the Communal Action Plan actions aiming to expand their reach and overall impact.

TWO-BIN WASTE COLLECTION SYSTEM

The action also includes the roll-out of a two-bin waste collection system across the city's households, public spaces and public buildings, allowing for the separate collection of organic and non-organic household waste streams.

The practice of waste segregation at the household level is still emerging in many African cities, there are ongoing efforts to improve it through education, storage and collection infrastructure, and community involvement.

The separate collection of wet organic waste and non-organic waste will improve the quality of both the organic waste and the recyclables (e.g. Plastic packaging, paper and cardboard, textiles and metals). This will ensure that the quality of the end products such as organic fertiliser (compost) and recyclables is high, which is unlocking the value of waste.

EDUCATION AND AWARENESS CAMPAIGN

A large-scale awareness-raising campaign will focus on education around solid waste sorting and recycling (CS-01), targeting residents, schools, universities and higher education. By leveraging digital solutions such as an informative platform/website and gamification, the campaign can engage and educate residents more effectively.

SCHEDULE OF IMPLEMENTATION

Action components	2025	2026	2027	2028	2029
Installation of organic waste bins			■	■	
Two-bin waste collection system			■	■	
Education and awareness campaign	■	■	■	■	■

STRATEGIC GOALS

SG1
Protect and enhance its environment

SG3
Optimise the use of its resources

RELATED GCAP ACTIONS

SW-01 CS-01

CAP ALIGNMENT

Axis 5:
Agadir eco-city with low carbon

SOCIAL AND GENDER

Ensure that the awareness-raising campaign on waste sorting and recycling is designed to reach all demographics, including women, men, youth and marginalised gender groups, as well as different income levels.

Use diverse communication channels (social media, community events, local radio, etc) to ensure that women, who may have less access to certain forms of media, are equally informed.

Women, especially in households, are often responsible for managing waste. Target women as key participants in the behaviour change campaigns to increase adoption of waste sorting practices at home.

Provide training to women-led and youth-led businesses, such as food stalls in markets, to facilitate their compliance with new organic waste collection systems.

Ensure that waste collection points at markets and public spaces are safe, well-lit, and easily accessible, especially for women who frequent these spaces as vendors or customers.

Include gender-sensitive design elements, such as clearly visible signage and conveniently located facilities that cater to women with children or elderly people.

ECONOMIC DEVELOPMENT

81 FTE

DIGITAL

Refer to digital section in SW-01 for approach to data collection of waste generated and collected.

CLIMATE MITIGATION

N/A

CLIMATE ADAPTATION

Flood/Landslide

Infrastructure failure/ obsolescence

IMPACT INDICATORS

30: Waste collection service coverage rate – more than 90%

31.1: Municipal solid waste disposed in open dumps – less than 10%

30.2: Proportion of organic waste sourced segregated – more than 20%

ACTION OWNER

Municipality of Agadir (Environment and Quality of Life Division, Public work Division)

DELIVERY PARTNERS

- Landfill Operator (currently SNTRO - Société nouvelle des travaux routiers et ouvrages)
- Food markets, tourism and hospitality sector

SW-03

Electric waste collection vehicles

AT A GLANCE

Audit of the current waste collection fleet and expansion to a fleet of 128 electric vehicles.

TYPE OF ACTION
Capital project

TIME HORIZON
2025-2028

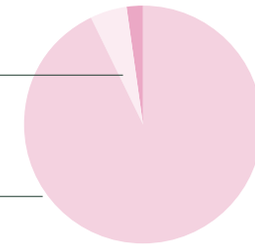
SPATIAL EXTENT
Municipality of Agadir

CAPEX
MAD 354,155,000
EUR 32,640,000

Installation of photovoltaic panels on vehicle depot
MAD 7,756,000
EUR 715,000

Installation of electric vehicle fast chargers
MAD 17,534,000
EUR 1,616,000

Audit of current waste collection vehicle fleet and deploy new waste collection electric vehicle fleet
MAD 328,865,000
EUR 30,310,000

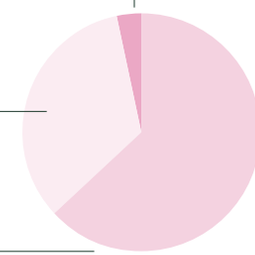


OPEX
MAD 2,609,000 / year
EUR 240,000 / year

Maintenance cost of a of photovoltaic panels on vehicle depot and Energy Management System
MAD 84,000
EUR 8,000

Maintenance cost of an electric vehicle fast chargers
MAD 877
EUR 81

Maintenance cost of a new electric vehicles and fleet management software
MAD 1,648,000
EUR 152,000



ACTION DESCRIPTION

OVERVIEW

Improved waste segregation at source and waste collection across the city must be supported by a larger and more sustainable waste collection vehicle fleet, that can cope with the expected increase in waste collection across both public and private sectors.

The action will build on the current on-going review of the waste collection vehicle fleet, which currently comprises 64 vehicles (2023). A larger fleet of 128 low-emission waste collection vehicles will be introduced to increase the waste collection rate while reducing both fuel consumption and emissions from collection activities. The new fleet will split with regards to the types of waste collected i.e. Organic waste and non-organic household waste streams.

COMPONENT DESCRIPTION

AUDIT OF CURRENT WASTE COLLECTION VEHICLE FLEET

The audit of the current vehicle fleet will involve assessing the condition, efficiency, and emissions of the existing 64 waste collection vehicles, as well as the increased capacity requirements for the roll-out of organic waste collection (SW-01 and SW-02).

DEPLOY NEW WASTE COLLECTION ELECTRIC VEHICLE FLEET

The initiative will start with a hybrid fleet and gradually roll out fully electric vehicles (EV), in collaboration with the municipal fleet electrification action (TA-04). It is estimated that the fleet must be doubled (128 vehicles) to ensure it meets the additional waste collection needs (SW-01 and SW-02). Additionally, solar panels will be installed at the collection vehicle depot, which will be connected to the charging stations for the new electric vehicle fleet, ensuring sustainable energy supply.

SCHEDULE OF IMPLEMENTATION

Action components	2025	2026	2027	2028	2029	2030
Audit of current vehicle fleet						
Deploy 128 new electric vehicles						

STRATEGIC GOALS

SG1
Protect and enhance its environment

SG3
Optimise the use of its resources

RELATED GCAP ACTIONS

TA-04

CAP ALIGNMENT

Axis 5:
Agadir eco-city with low carbon

SOCIAL AND GENDER

Promote gender equality in employment by encouraging women to apply for roles in operating and maintaining the new electric waste collection fleet.

Promote access to new employment created to youth through access programmes and specialist training.

Use the opportunity to promote sustainable practises among residents, particularly among women, who often manage household waste. This can be done through educational initiatives related to waste management.

ECONOMIC DEVELOPMENT

400 FTE

DIGITAL

N/A

CLIMATE MITIGATION

1,550 tCO2/year

CLIMATE ADAPTATION

Infrastructure failure/ obsolescence

IMPACT INDICATORS

10.1: Percentage of diesel cars in total vehicle fleet – less than 20%

30: Waste collection service coverage rate – more than 90%

30.2: Proportion of organic waste sourced segregated – more than 20%

ACTION OWNER

Municipality of Agadir
(Environment and Quality of Life Division, Municipal Assets Division)

DELIVERY PARTNERS

ONEE

Land use

LA-01
Integrated environmental restoration – Taddart quarries and orbital forest

LA-02
Climate-resilient school grounds programme

LA-03
Community sport hubs programme

LA-04
Green corridors

Land use

The urban area of Agadir has grown by 64% between 2000 and 2024. Urbanisation has not been fully matched by the development of green and blue infrastructure, which have left some part of the city deprived from quality open spaces and more vulnerable to the impacts of climate change.

The Municipality has already embarked on a programme of upgrade and expansion of its green spaces. The Communal Action Plan and the Urban Development Programme include several green infrastructure upgrade projects, some of which have been delivered or are currently in progress. This includes the re-design of the Ibn Zaidoun gardens and of the Al Inbiaat park. This GCAP complements the existing initiatives through:

- The **rehabilitation of the two quarries** north of Agadir, with the creation of a **visitor centre** and the planting of **an orbital forest around Agadir**. This will be supported by the creation of **a new local tree nursery**, greening and restoring over 440 hectares LA-01 ;
- The creation of the nursery will also support the **redesign of 24 school grounds** to enhance climate adaptation through greening, permeable surfaces, and rainwater harvesting LA-02 ;
- The network of green and blue infrastructure started with the orbital forest will be strengthened through the **transformation of over 19km of four Oueds into green corridors** to improve flood resilience, biodiversity, and provide new public green spaces for community use LA-03 ;
- Further green spaces for community uses will be provided through **the co-design and construction of 20 new and retrofitted sport hubs** that incorporate nature-based solutions and climate-resilient features LA-04 .

Together, these actions represent MAD 1.190 billion (EUR 109 million) of investment and are likely to generate 700 jobs. These interventions build on currently underused assets of the city, will helping to mitigate climate change risks such as floods and urban heat and providing a more inclusive, safe and healthy environment for Agadir's residents.

LA-01

Integrated environmental restoration – Taddart quarries and orbital forest

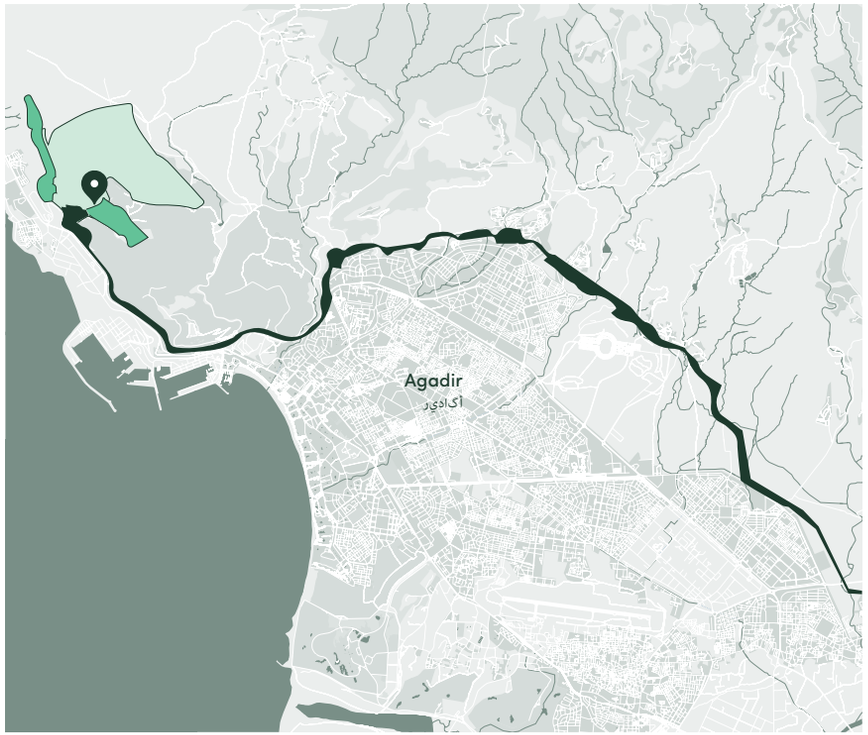


Figure 20
Location of orbital forest and rehabilitated quarries

AT A GLANCE

Greening and restoring over 440 hectares across the city, including the two Taddart quarries, an orbital forest around Taddart and Agadir, supported by a new local tree nursery and a visitor centre.

TYPE OF ACTION
Capital project

TIME HORIZON
2025-2030

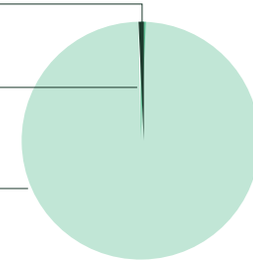
SPATIAL EXTENT
Quarries south and west of Taddart/Haut Anza, and along parts of the N1 and the north-eastern boundary of Agadir, from Taddart/Haut-Anza to Adrar Stadium

CAPEX
MAD 744,179,000
EUR 68,587,000

Agadir tree nursery
MAD 3,372,000
EUR 68,587,000

Rehabilitated northern and southern quarries in Taddart and visitor centre
MAD 3,334,000
EUR 307,000

Taddart and Agadir orbital forest
MAD 737,473,000
EUR 67,969,000

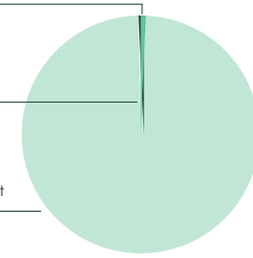


OPEX
MAD 59,107,000 / year
EUR 5,448,000 / year

Maintenance cost of the Agadir tree nursery
MAD 180,000
EUR 17,000

Maintenance cost of a northern and southern quarries in Taddart and visitor centre
MAD 92,000
EUR 8,000

Maintenance cost of the Taddart and Agadir orbital forest
MAD 58,835,000
EUR 5,422,000



ACTION DESCRIPTION

OVERVIEW

Agadir faces interconnected environmental challenges, including biodiversity loss, water scarcity, and limited access to green spaces for many communities. The city's rapid urbanisation, coupled with desertification, has led to the degradation of natural habitats and increased pressure on water resources.

The action will green over 440 hectares of Agadir by rehabilitating the two Taddart quarries and connecting them through an orbital forest encircling the city, extending from Taddart/Haut-Anza to Hay Zaytoune. This integrated action addresses several environmental challenges, including biodiversity loss, and water scarcity, while enhancing green infrastructure and increasing access to green space for communities located furthest away from the sea front. By incorporating nature-based solutions, such as native tree planting and the creation of green corridors, the action will also improve air quality, mitigate urban heat island effects, and support local biodiversity.

A phased approach would commence with the development of a tree nursery, supporting the first phase of the orbital planting around Taddart (85ha). The second phase would rehabilitate the smaller quarry (45ha) and visitor centre. The third phase would rehabilitate the larger quarry (45ha) and plant the larger section of the orbital forest, connecting to the Hay Zaytoun (265ha).

COMPONENT DESCRIPTION

AGADIR TREE NURSERY

Recognising the need for substantial tree stock, this action includes the establishment of a tree nursery to support the development of all land use actions. Growing trees and plants locally in Agadir involves a higher initial investment but offers lower long-term costs. This approach also provides training opportunities and creates jobs for local people, while reducing the cost and emissions associated with transport of a large number of trees.

TADDART AND AGADIR ORBITAL FOREST

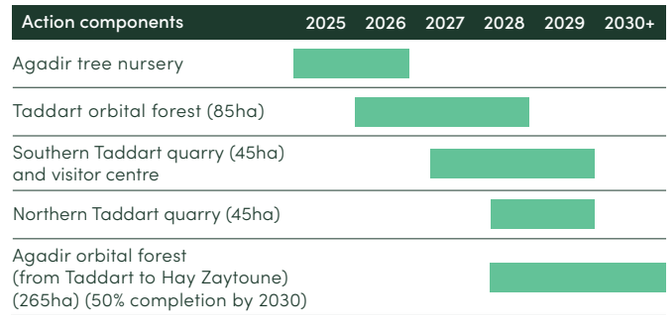
The orbital forest will be connected to the quarries spatially and via a unified wayfinding strategy, and will include planting up to 600,000 trees, recreational areas, walking and cycling paths, and community gardens, providing essential green spaces for under-equipped neighbourhoods. Its integration with the rehabilitated quarries will create a continuous green and biodiverse corridor, enhancing habitat connectivity and supporting wildlife. Native trees and vegetation will mitigate urban heat island effects and improve air quality. Local communities will be involved in the planting and maintenance of the forest, fostering a sense of ownership and stewardship.

REHABILITATED NORTHERN AND SOUTHERN QUARRIES IN TADDART AND VISITOR CENTRE

The reforestation of the area surrounding the quarries and the creation of water reservoirs for rainwater harvesting, will transform the quarries from dusty, ecologically barren and inaccessible areas into green, people friendly spaces that contribute to the resilience of the city. The reservoirs could further accommodate treated effluent water from the M'Zar wastewater treatment plant and any new Common Industrial Effluent Treatment Plants constructed in the city (WA-02). The recharge of groundwater through check dams will have a positive impact on local vegetation and new planting, enhancing the synergy between the two initiatives. This is because the increased groundwater levels will provide a consistent water supply for the planting, improving establishment rates and more resilient vegetation.

The reservoirs will increase Agadir's resilience to drought, provide valuable habitats for wildlife, whilst creating opportunities for water-based recreation. By capturing and storing excess rainwater, the reservoirs will also help to minimise the risk of floods and landslides. The action includes the development of a visitor and education centre that will facilitate events on environmental restoration.

SCHEDULE OF IMPLEMENTATION



STRATEGIC GOALS

SG1
Protect and enhance its environment

SG5
Enable a healthy lifestyle for all

SG3
Optimise the use of its resources

SG6
Protect and capitalise on its blue economy

RELATED GCAP ACTIONS

WA-01 WA-02 LA-04 DA-06

CAP ALIGNMENT

Axis 5:
Agadir eco-city with low carbon

SOCIAL AND GENDER

Ensure that all areas of the rehabilitated quarries are accessible to people of all genders, ages, and abilities. This includes providing ramps, wide pathways, tactile paving, accessible restrooms, shaded rest areas and seating

Ensure that job opportunities at the visitor centre are accessible to all, with a focus on hiring women and individuals from marginalized communities.

Implement security measures such as well-lit pathways, and visible security personnel to ensure the safety of all visitors, particularly women and children.

ECONOMIC DEVELOPMENT

300 FTE

DIGITAL

Biodiversity and restoration monitoring of the orbital forest and rehabilitated quarries, to quantify the action's impact and provide insights on its success and areas for improvement. A variety of data capture solution could be deployed ranging from on-site measurement, use of drones and satellite imagery.

(DA-06 Digital Ecosystem monitoring)

CLIMATE MITIGATION

44,700 tCO2/year

CLIMATE ADAPTATION

Flood/landslide
Drought
Extreme temperatures

IMPACT INDICATORS

6: Open green space area per capita – more than 10m^2

6.1: Share of green space areas within urban limits – more than 50%

7: Abundance of bird species – more than 0% annual change

ACTION OWNER

Municipality of Agadir (Urban Planning Division, Environment and Quality of Life Division and Public Works Division)

DELIVERY PARTNERS

Local Development Company for public works (SDL Agadir Souss-Massa aménagement)

LA-02

Climate-resilient school grounds programme

Figure 21
Location of identified pilot schools

AT A GLANCE

A programme comprised of school audits, co-design sessions with students and the implementation of climate adaptation measures at 12 pilot schools. Monitoring and measuring of pilot schools would support the ultimate deployment of the programme across all schools in the city.

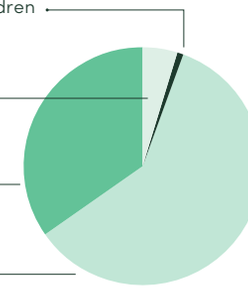
TYPE OF ACTION
Capital project and awareness raising

TIME HORIZON
2025-2030

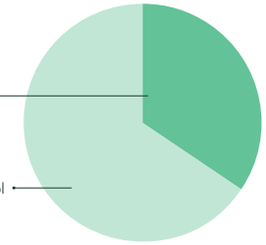
SPATIAL EXTENT
Potential schools identified:

- Middle School Abdel Ali Benchekroun
- Ecole Primaire Hay Mohammadi
- Collège Saad Ben Abi Waqas
- College Ibn Khaldoun Anza
- École Abdel Moumen Ben Ali
- College Ahmed Chaouki
- École Chaiir El Hamraa
- Lycée Youssef Ben Tachfine
- Denis Diderot
- Complexe Scolaire AlQalam
- Ecole Al Hanane
- Lycée Français International d'Agadir

CAPEX
MAD 67,932,000
EUR 6,261,000



OPEX
MAD 251,000 / year
EUR 23,000 / year



ACTION DESCRIPTION

OVERVIEW

Schools need to become spaces of respite to protect students and staff from severe weather conditions exacerbated by climate change, such as overheating, drought, and flooding. By redesigning Agadir's school grounds with climate adaptation measures, safer and healthier environments can be created that support both learning and wellbeing.

The action focuses on redesigning twelve school grounds to enhance their climate adaptation capacity through greening, permeable surfaces, rainwater harvesting and shelter, while providing opportunities for nature-based play and outdoor learning. Ultimately, this action will help lower heat island effects and flood risks at a city scale, improve air quality, enhance biodiversity, improve learning outcomes and the safety, health and wellbeing of the school community.

COMPONENT DESCRIPTION

SCHOOL AUDITS AND RECOMMENDED MEASURES

To develop this programme, an audit of the school grounds must be developed, assessing and identifying key climate change challenges faced by each site. This audit will provide a list of recommended measures to combat the identified challenges specific to each school including physical measures to address urban heat, flood, water scarcity and others. Measures can include planting native plants, provision of

shade, permeable paving and others. The school-specific measures will be identified implemented once the audits are completed.

CO-DESIGN WITH SCHOOL CHILDREN

Children will be actively involved in the design process, ensuring that their ideas and needs are incorporated into the final designs. This participatory approach will not only make the designs more relevant and engaging for the students, but also foster a sense of ownership and responsibility towards their school grounds and the wider local environment.

IMPLEMENTATION OF ADAPTATION MEASURES

The measures identified, together with the co-design outcomes, will be implemented across all pilot schools over 2 years. Beyond the measures, the redesigned school grounds will feature pedagogical spaces, such as food growing areas, which will serve as outdoor classrooms where students can learn about the importance of biodiversity, water conservation, or climate resilience.

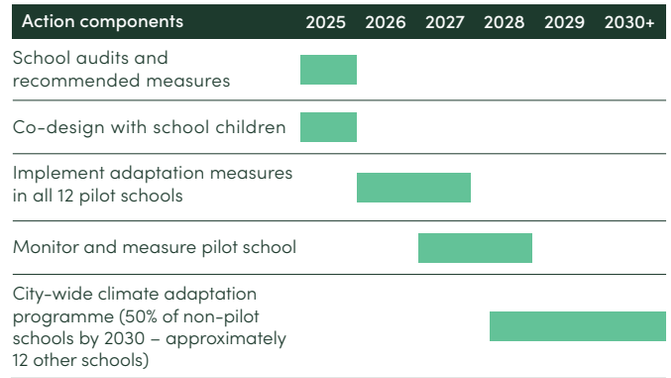
MONITOR AND MEASURE PILOT SCHOOL

The twelve schools will serve as a pilot, to be monitored and assessed for lessons learnt, prior to launching a city-wide climate adaptation programme for all schools.

CITY-WIDE CLIMATE ADAPTATION PROGRAMME

Launch city-wide programme following the same process as above, commencing with school audits and defining recommended measures for all schools in Agadir in 2028, to be followed by co-design and implementation of measures in 2029 (50% of non-pilot schools to be completed by 2030).

SCHEDULE OF IMPLEMENTATION



STRATEGIC GOALS

SG1
Protect and enhance its environment

SG5
Enable a healthy lifestyle for all

RELATED GCAP ACTIONS

TA-05 CS-01 EA-04

CAP ALIGNMENT

Axis 5:
Agadir eco-city with low carbon

SOCIAL AND GENDER

Ensure that playgrounds are accessible to children of all abilities by incorporating universal design principles. This includes wheelchair-accessible paths, play equipment designed for various abilities, and sensory play areas for children with sensory processing issues.

Design shaded areas and cooling stations where children can take breaks, especially those who are more vulnerable to heat stress, such as younger children and those with certain health conditions.

Provide a variety of play equipment that appeals to all genders. This ensures that both boys and girls find activities they enjoy and that foster physical, social, and cognitive development.

Implement features that address specific safety concerns of girls, such as well-lit areas, visibility from classrooms and administrative offices, and the presence of supervisors.

Create job opportunities in the redesign and maintenance of playgrounds, with a focus on hiring women and marginalised community members. Offer training programmes to equip them with the necessary skills.

ECONOMIC DEVELOPMENT

100 FTE

DIGITAL

N/A

CLIMATE MITIGATION

N/A

CLIMATE ADAPTATION

Flood/landslide
Drought
Extreme temperatures

IMPACT INDICATORS

6.1: Share of green space areas within urban limits – more than 10m^2

7: Abundance of bird species – more than 0% annual change

28.1: Annual number of storm water or sewerage overflows per 100km of network length – less than 20 events per year

ACTION OWNER

Municipality of Agadir (Public Works Division, Environment and Quality of life Division and Public Works Division)

DELIVERY PARTNERS

- Department for Education (Ministère de l'Éducation nationale, du Préscolaire et des Sports)
- Pilot Schools
- Local Voluntary organisations such as AESVT Maroc

LA-03

Community sport hubs programme

Figure 22
Location of identified sport hubs

AT A GLANCE

Co-design, programming strategy and construction of 20 new and retrofitted sport hubs that incorporate nature-based solutions and climate-resilient features, including a park around Adrar Stadium.

TYPE OF ACTION
Capital project

TIME HORIZON
2025-2030

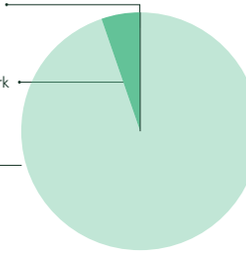
SPATIAL EXTENT
Various locations around the city including the park around the Adrar Stadium, empty plots and existing sport parks

CAPEX
MAD 112,750,000
EUR 10,392,000

Launch co-design programme
MAD 500,000
EUR 46,000

Construction of Adrar Stadium park
MAD 40,000,000
EUR 3,687,000

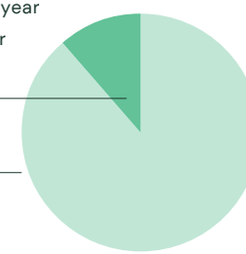
Design and delivery of sports hubs
MAD 722,520,000
EUR 6,659,000



OPEX
MAD 20,946,000 / year
EUR 1,930,000 / year

Maintenance cost of the Adrar Stadium park
MAD 2,375,000
EUR 219,000

Maintenance cost of a new sports hubs
MAD 18,571,000
EUR 1,720,000



ACTION DESCRIPTION

OVERVIEW

Sports hold significant importance for the city of Agadir, serving as essential spaces for social interaction, and physical exercise. Currently, these sport hubs are predominantly hardscaped. By co-designing new and retrofitted sport hubs with nature-based solutions, Agadir can develop more resilient, green sports hubs that enhance community well-being and support the city in adapting to climate change.

The action is to co-design twenty new and retrofitted sport hubs together with the local community, including a park around the Adrar Stadium. The sport hubs will incorporate nature-based solutions (e.g. Flood mitigation through dry swales, permeable surfaces, increase tree planting for shade and improved air quality) and biodiversity in their design. By leveraging the upcoming African and World Cups, Agadir can showcase its innovative, green sports hubs to a global audience, attracting tourism and investment while promoting sustainable urban development.

COMPONENT DESCRIPTION

LAUNCH CO-DESIGN PROGRAMME

This co-design approach will address the specific needs of each community and foster a sense of ownership, reducing vandalism incidents. These sport hubs will focus on providing climate-resilient spaces for sports and recreation. The hubs will cater to all age groups, abilities and genders.

DEVELOP PROGRAMMING STRATEGY FOR SPORT HUBS

A site-specific programming strategy will be developed for each sport hub, supported by multi-functional spaces for events, to encourage their use by all members of the community.

DESIGN AND DELIVERY OF SPORTS HUBS

The design will have an emphasis on reducing paved surfaced and increasing permeable

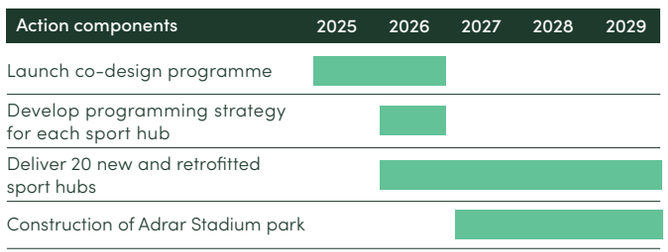
surfaces, providing shelter and comfortable amenities, such as restrooms and rest/picnic areas and on selecting plants resilient to climate change. The sports hubs will be designed to minimise water demand by exploring opportunities for using reused treated wastewater for their maintenance. Buildings within the sports hubs will benefit from the cooling effects of increased tree shade and the risk reduction from flooding through SuDS, enhancing their energy efficiency and resilience.

Inclusive design principles will be embedded into the design of the sport hubs to ensure they are accessible and welcoming to a broad spectrum of society, including women, children and people with disabilities. The co-design programme will include participants from diverse groups, ensuring the hubs are welcoming, safe, and accessible for all to participate and enjoy, while promoting physical activity and wellbeing.

CONSTRUCTION OF ADRAR STADIUM PARK

The action will include the development of a park around Adrar Stadium, with small attractions to understand the biology, physics and chemistry involved in the performance of the human body. The park will be the start of the Oued Lahwar green corridor, which is to run alongside the Oued, connecting the city through a network of green spaces, which will include walking and cycling routes.

SCHEDULE OF IMPLEMENTATION



STRATEGIC GOALS

SG1
Protect and enhance its environment

SG5
Enable a healthy lifestyle for all

SG3
Optimise the use of its resources

RELATED GCAP ACTIONS

WA-03 WA-04

CAP ALIGNMENT

Axis 2: City of Sports
Axis 11: Urban Infrastructure

SOCIAL AND GENDER

Women's safety should be considered during the design and planning stages. Make sure the sport hubs are well lit, avoid planting in a way that would create secluded areas - this would help to reduce GBVH incidents. Make sure there are available amenities for women and children - accessible bathrooms with changing areas, in visible areas and well lit.

Design sports facilities that provide equal opportunities for participation, including women-friendly amenities such as changing rooms.

Ensure that co-design programme actively includes women, youth, and marginalised groups in discussion and decision-making. Conduct specific outreach to gather their input.

Develop inclusive programming that caters to various age groups and abilities, ensuring that they have equal opportunities to participate in sports and recreational activities.

Encourage local women to participate in the development and management of the sport hubs, creating job opportunities in maintenance, programming or small business (e.g., Food vendors or retail spaces).

ECONOMIC DEVELOPMENT

250 FTE

The hubs will also help create jobs through the incorporation of small retail facilities.

DIGITAL

DA-03 Agent-based modelling of Agadir transport network. The modelling of travel patterns around designed areas can inform location choices, identify impact of future use and recommend potential connectivity improvement they might be needed. It would also prove useful to support the planning and management of big events such as the World cup.

DA-06 Digital ecosystem monitoring will help inform the positioning of SuDS in order to improve land surface permeability and allow to monitor their effectiveness over time.

CLIMATE MITIGATION

N/A

CLIMATE ADAPTATION

Flood/landslide
Extreme temperatures
Infrastructure failure/ obsolescence

IMPACT INDICATORS

6: Open green space area per capita – more than 10m^2

6.1: Share of green space areas within urban limits – more than 50%

7: Abundance of bird species – more than 0% annual change

ACTION OWNER

Municipality of Agadir (Social, Cultural and Sports Affair Division, Public Works Division, Environment and Quality of life Division)

DELIVERY PARTNERS

- Local Community Organisations
- Local Development Company for public works (SDL Agadir Souss-Massa Aménagement)

LA-04

Green corridors

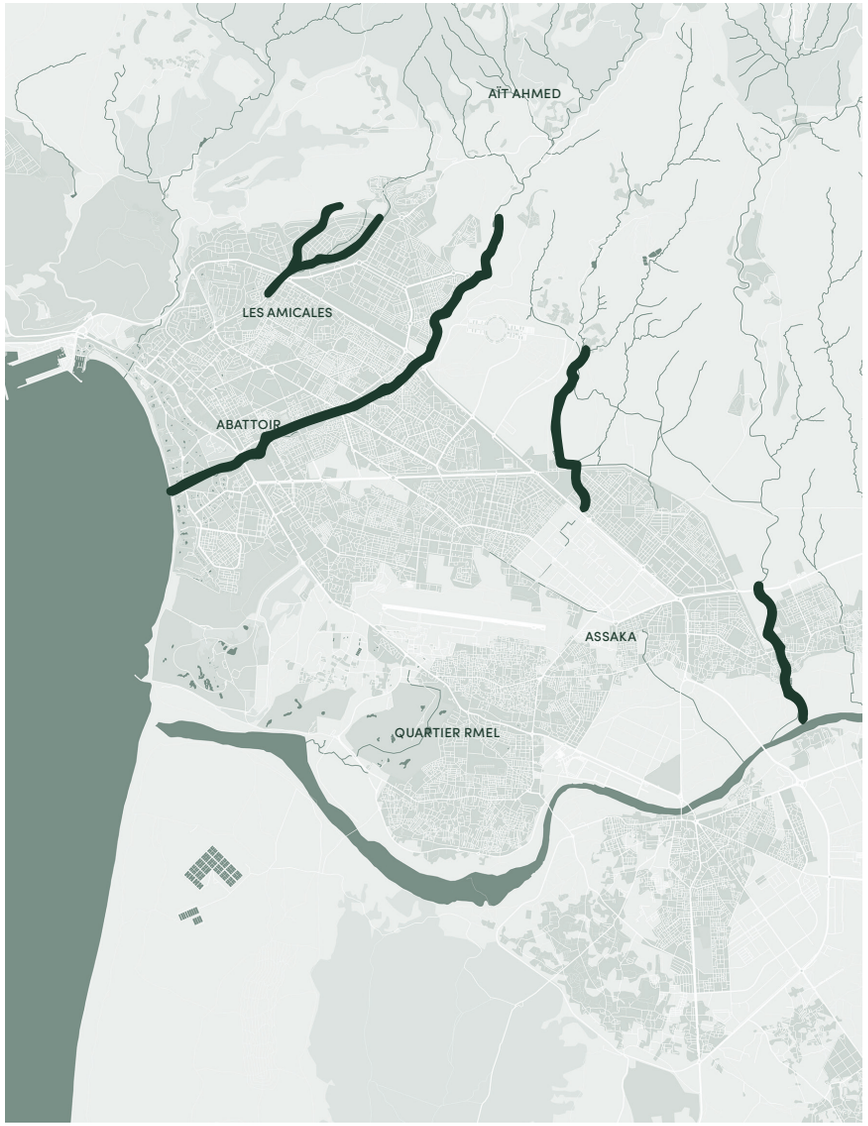


Figure 23
Location of identified Green Corridors

AT A GLANCE

Transformation of over 19km of four Oueds into green corridors to improve flood resilience, biodiversity, and provide new public green spaces for community use, supported by a hydrology study and a biodiversity and ecology strategy for each Oued.

TYPE OF ACTION
Capital project

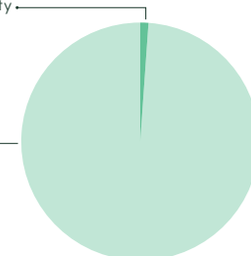
TIME HORIZON
2025-2035

SPATIAL EXTENT
Oued Lahwar, Oued Tamelast, Oued Taoukt and the Oued east of Hay Zaytoune

CAPEX
MAD 265,538,000
EUR 24,473,000

Hydrology study and biodiversity and ecology strategy
MAD 3,397,000
EUR 313,000

Design and construction of green corridors
MAD 262,141,000
EUR 24,160,000



OPEX
MAD 7,173,000 / year
EUR 661,000 / year

Maintenance of a green corridors

ACTION DESCRIPTION

OVERVIEW

The oueds across Agadir have been mostly culverted, failing to capitalise on their biodiversity and flood mitigation potential. Additionally, the oueds have become sites for illegal waste dumping, and during heavy rain events, the oueds may thus contribute to sea water pollution. By regenerating and de-culverting these watercourses, green corridors ('Coulée Vertes') can be created, that address social and environmental challenges, such as biodiversity loss, flooding, and lack of access to public green spaces.

This action will regenerate and de-culvert over 19 km of Oued Lahwar, Oued Taoukt, the oueds surrounding Cite Al Mohammadi and the oued east of Hay Zaytoune. Ultimately, the project will help reduce illegal dumping and decrease environmental pollution in the oueds and the sea during rain events, as the green corridors become valued spaces for community use. The green corridors will also improve air quality by increasing vegetation, enhance connectivity for biodiversity by creating continuous habitats, and mitigate urban heat island effects by providing shaded, cooler areas. Furthermore, the green corridors will manage local storm water and flood risks more sustainably by reducing runoff and enhancing the performance of existing culverts, thereby improving the entire system's ability to cope with more intense storm events.

COMPONENT DESCRIPTION

HYDROLOGY STUDY AND BIODIVERSITY AND ECOLOGY STRATEGY

A hydrology study will ensure the designs do not worsen existing conditions, and if needed hydrodynamic modelling to support it. A biodiversity and ecology strategy for the Oueds will ensure the planting design is fit for purpose and resilient to climate change.

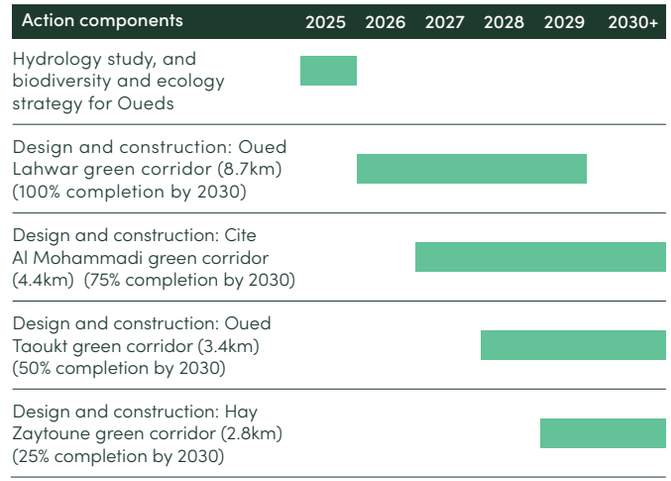
DESIGN AND CONSTRUCTION OF GREEN CORRIDORS

The green corridors will also provide a range of amenities for residents, including trails, sports pitches, and cycling paths, linking neighbourhoods currently lacking open spaces to the city centre, the university, the Adrar Stadium and the seafront via green, safe and cool corridors. The action will implement nature-based solutions, such as rain gardens and natural flood management, building flood resilience by slowing down the flow of water during heavy rain events, while enhancing biodiversity and creating spaces for wildlife.

The character and uses of the four Oueds will reflect their context, with Oued Hay Zaytoune designed in a more natural approach, reflecting its less urban context and Oued Lahwar, being the most urban, as it runs from the Adrar Stadium to the seafront. The project will ensure inclusive and accessible design for all community members, including women, children, the elderly, and people with disabilities. It will engage underrepresented groups in planning and decision-making through community engagement in the design process, and ensure the green corridors are designed to be safe and welcoming with adequate lighting, clear signage, and accessible pathways.

The green corridors have the potential to connect to the orbital forest (LA-01), further expanding the network of green spaces in Agadir, and the wider cycling network being developed through TA-01.

SCHEDULE OF IMPLEMENTATION



STRATEGIC GOALS

SG1
Protect and enhance its environment

SG5
Enable a healthy lifestyle for all

SG3
Optimise the use of its resources

RELATED GCAP ACTIONS

LA-04 WA-01 TA-01 DA-06

CAP ALIGNMENT

Axis 2: Sports City

Axis 5: Agadir eco-city with low carbon

Axis 12: Multimodal mobility

SOCIAL AND GENDER

Ensure that all pathways, amenities, and recreational areas are accessible to people of all genders, ages, and abilities. This includes installing ramps, wide pathways, tactile paving, and accessible restrooms.

Implement well-shaded walkways to provide comfort and safety, particularly for vulnerable groups such as the elderly, children, and pregnant women.

Install sufficient lighting throughout the Oueds to ensure safety for all users, especially during early morning and evening hours.

Include amenities such as playgrounds, picnic areas, and family restrooms to support families and caregivers.

ECONOMIC DEVELOPMENT

50 FTE

DIGITAL

Hydrology study data to be made available to relevant other initiatives such as DA-06 Digital ecosystem monitoring.

CLIMATE MITIGATION

400 tCO2/year

CLIMATE ADAPTATION

Flood/landslide

Extreme temperatures

IMPACT INDICATORS

6: Open green space area per capita – more than 10m^2

28: Percentage of dwellings damaged by the most intense flooding in the last 10 years – less than 0.5%

28.1: Annual number of storm water or sewerage overflows per 100km of network length – less than 20 events per year

ACTION OWNER

Municipality of Agadir (Urban Planning Division, Environment and Quality of life Division, Public Works Division)

DELIVERY PARTNERS

- SRM SM
- Local Development Company for public works (SDL Agadir Souss-Massa aménagement)
- Local Development Company for mobility (SDL mobilité)

Transport

TA-01
Integrated active travel network and shared mobility scheme

TA-02
Mobility hubs

TA-03
Provide a network of hybrid or electric feeder bus system

TA-04
Electrification of municipal fleet

TA-05
Traffic calming measures

Transport

Agadir is transforming its public transport network, with the new BRT line 1 set to open in early 2025. This was funded by the Urban Development Programme 2020 -2024 and will provide a strong backbone to the public transport network, creating opportunities for better integration with other transport modes. Segregated cycling lanes have been developed alongside the BRT route, which significantly increased the provision of cycling infrastructure across the city. Lines 2 and 3 of the BRT have been proposed and pre-feasibility studies are currently being conducted on the proposed alignments of the routes. The SDL Mobilité, a fully publicly owned company, has responsibility for the public transport network and the construction of the BRT line. SDL Mobilité subcontracts the operations of the transport system and will be releasing a new tender prior to the launch of the BRT line, creating the opportunity to upgrade the bus fleet.

The Communal Action Plan 2022-2027 recognises the need for a more integrated approach to public transport and active modes of transport and Axis 12 of the plan details the Municipality ambitions for multi-modal mobility across the city. This includes a study on restructuring the bus network following the opening of the BRT line to ensure complementarity between the different services. This will also provide the opportunity to expand the network to more neighbourhoods. The CAP also aims to deploy digital solutions to improve access to information and level of service across the network. The GCAP will integrate these interventions with:

- The **expansion of the existing cycling network** through construction of 100km of new cycling lanes and roll-out of a bike-sharing scheme, including electric cycles and e-scooters with 3,000 racks and 300 stations; **TA-01**
- The uptake of cycling and walking amongst residents will be encouraged through the **introduction of traffic calming measures**, including road alignment changes, pavement widening, and increased pedestrian spaces around 12 schools. **TA-05**
- **Multi-modal journeys** will become more attractive through the development of multi-modal transport with real-time bus schedules, through equipping 201 buses with GPS trackers and 50 new digital information displays, as well as the deployment of a mobile app and integrated travel fees. **TA-02**
- Safety and experience of public transport will be enhanced through the pilot **electrification of the bus fleet**, including charging infrastructure, with a total of 66 new buses, which will also contribute to the reduction in GHG emissions from the transport sector. **TA-03**
- To help with reduction in GHG emissions and air quality pollution, **270 municipal scooters and 30 street cleaning vehicles** will be converted to electric models. **TA-04**

Through investment of MAD 805 million (EUR 74 million), actions in the transport sector have the potential to create 770 jobs and transform the way Gadiris move around their city, providing an inclusive, reliable and legible public transport network which will help reduce GHG emissions and reduce air pollution.

TA-01

Integrated active travel network and shared mobility scheme

AT A GLANCE

Expansion of the existing cycling network through construction of 100 km of new cycling lanes and the development of guidelines for the roll-out of a bike-sharing scheme, which includes electric cycles and e-scooters, with up to 3,000 racks and 300 stations.

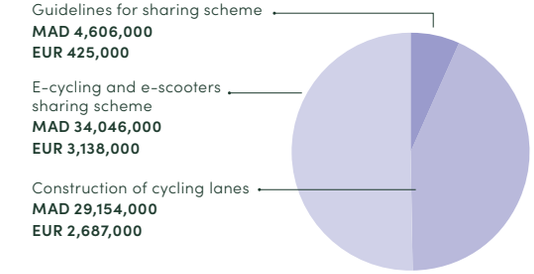
TYPE OF ACTION
Capital project and service development

TIME HORIZON
2025-2029

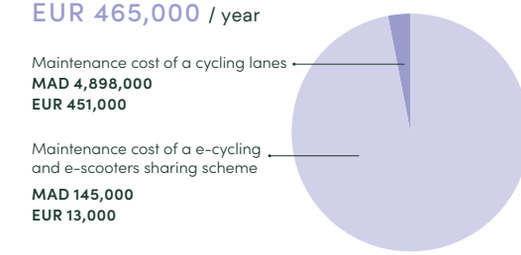
SPATIAL EXTENT
Municipality of Agadir as complementary and in conjunction with other development projects - these are to be included into already planned road modifications in Communal Action Plan (CAP):

- Mohammed V Avenue
- East-West bar
- Anza Al Oulia region - Taddart - Anza Green Corridor
- Tilila/Adrar
- Hay Mohammadi and green belt

CAPEX
MAD 67,806,000
EUR 6,249,000



OPEX
MAD 5,043,000 / year
EUR 465,000 / year



ACTION DESCRIPTION

OVERVIEW

Agadir experiences high private car usage, making personal mobility one of the primary contributors to greenhouse gas (GHG) emissions and air pollution in the city. As a result, reducing road traffic and promoting sustainable transport options are critical to addressing these environmental challenges. The development of active mobility options like cycling and e-scooter usage presents an opportunity to shift away from car dependence. However, to encourage this shift, it is essential to improve the connectivity and safety of cycling infrastructure and provide convenient, cost-effective mobility solutions.

The action will develop the existing cycling network further, by increasing its connectivity and improving wayfinding along various routes and rolling out a shared mobility scheme. Ensuring that cycling network paths are safe by design, along with raising awareness about personal safety equipment and educating drivers, will be crucial to making cycling attractive and safe for all users.

Overall, this action will help the shift from private cars to sustainable modes in both using cycling as a standalone and/or feeder mode. The benefits will include reductions in GHG emissions, improving air quality, increased public health, and wider economic benefits.

COMPONENT DESCRIPTION

GUIDELINES FOR SHARING SCHEME

Preparation of guidelines and rulebooks for e-cycling and e-scooters systems will be essential to ensure the smooth operation and safety of the e-cycling and e-scooter sharing scheme. These guidelines will cover aspects such as user responsibilities, maintenance protocols, and integration with existing transport infrastructure, thereby promoting a reliable and user-friendly system.

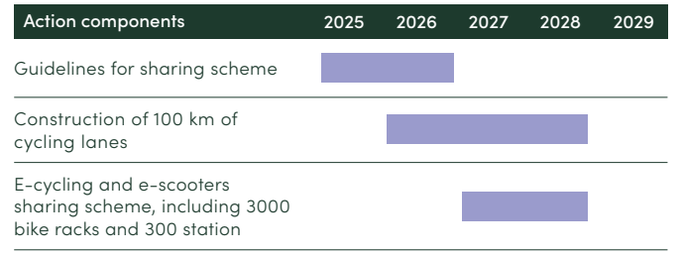
CONSTRUCTION OF CYCLING LANES

100 km of new cycle lanes, and the racks and sharing stations will integrate with the broader development of the Green Corridors (LA-04), the Bus Rapid Transit (BRT) routes and the various travel hubs, key to developing multi-modal transport hubs across the city. The aim is to create safe, easy and sustainable travel journeys by bicycle and e-scooter.

E-CYCLING AND E-SCOOTERS SHARING SCHEME

The scheme will make alternative modes of transport more accessible to residents. The scheme will attract interest from private companies, and will help address barriers to mobility, such as purchase cost, storage, and ease of use. The proposed scheme's scale includes 3,000 racks and 300 stations. This is based on the ITDP The Bike-Sharing Planning Guide, which suggests an ideal station density of between 10 and 16 stations per km^2.

SCHEDULE OF IMPLEMENTATION



STRATEGIC GOALS

SG1
Protect and enhance its environment

SG5
Enable a healthy lifestyle for all

SG4
Promote sustainable mobility

RELATED GCAP ACTIONS

LA-01 TA-02 DA-03

CAP ALIGNMENT

Axis 12: Multimodal mobility

SOCIAL AND GENDER

- Implement safety features such as well-lit docking stations and security measures.
- Develop targeted safety campaigns addressing women's specific safety concerns and ensure that infrastructure (e.g., Bike lanes) is well-lit and safe.
- Implement discounted or subsidised rates for low-income individuals.
- Engage women in the planning process to ensure their needs and preferences are incorporates (e.g., Contact local women NGOs to gather data and insight to gain perspective on gender specific needs).

ECONOMIC DEVELOPMENT

60 FTE

DIGITAL

Agent based models are used to simulate the behaviour of individual agents with a view to assessing their effects on a system. The model proposed in DA-03 can be used to simulate different scenarios under several circumstances at an individual level. Since these models are more granular, flexible, integrated and responsive, the model proposed in DA-03 can be used to optimize the location selection for the cycling network.

Micro-mobility incentive schemes, potentially supported by digital technology, could be designed to encourage more residents to adopt these sustainable transport options.

CLIMATE MITIGATION

25,200 tCO2/year

CLIMATE ADAPTATION

Infrastructure failure/ obsolescence

IMPACT INDICATORS

11: Private transport in transport modal share in commuting – less than 30%

11.1: Transport modal share in total trips – less than 30% private transport motorised journeys

11.5: Kilometres of dedicated bicycle path per 100000 population – more than 25km

ACTION OWNER

Municipality of Agadir
(Environment and Quality of Life Division, Public Works Division)

DELIVERY PARTNERS

Local Development Company for mobility (SDL mobilité)

TA-02

Mobility hubs

AT A GLANCE

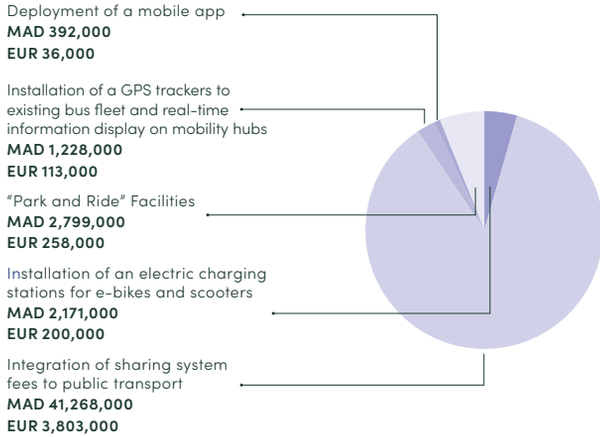
Development of multi-modal transport hubs, through the installation of electric charging stations for e-bikes and scooters, equipping 201 buses with GPS trackers and providing 50 new digital information displays, further supported by a new mobile app and integrated travel fees.

TYPE OF ACTION
Capital project and service development

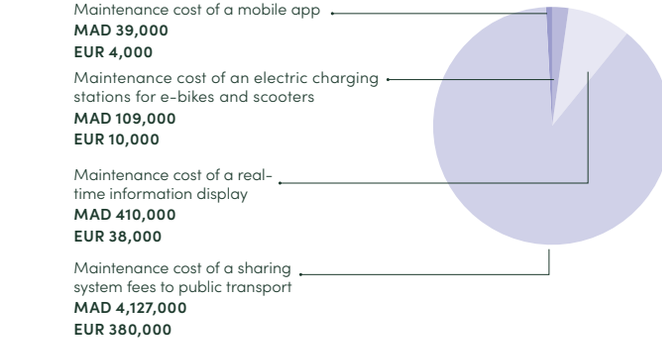
TIME HORIZON
2025-2028

SPATIAL EXTENT
- 35 BRT stations
- 15 new parking lots - mentioned in CAP

CAPEX
MAD 47,859,000
EUR 4,411,000



OPEX
MAD 4,685,000 / year
EUR 432,000 / year



ACTION DESCRIPTION

OVERVIEW

Agadir's transportation modal split reflects a heavy reliance on private vehicles and due to unreliable service and limited coverage, public transport usage is quite low. To encourage more sustainable modes, enhancements on public transport service quality and accessibility is of great importance Mobility hubs will facilitate multi-modal journeys, reducing road traffic, and lowering greenhouse gas emissions, contributing to a more sustainable urban environment in Agadir.

The action will develop multi-modal transport hubs across the city to encourage the use of public transport and active travel. By integrating various modes of transport, frequency and providing essential amenities, this action will make public transport, cycling, and walking more convenient and reliable.

Additional electric buses (TA-03) will increase frequency and availability of transport options at the mobility hubs. These hubs will be strategically distributed along the high-frequency routes of the public transport routes, such as the Bus Rapid Transit (BRT) lines.

COMPONENT DESCRIPTION

INSTALLATION OF ELECTRIC CHARGING STATIONS FOR E-BIKES AND SCOOTERS

Providing access to shared electric bicycles and e-scooters will facilitate short-distance travel and last-mile connectivity. Establishing well-designed links to the city's cycling and walking networks will ensure safety and ease of navigation for pedestrians and cyclists.

INSTALLATION OF REAL-TIME INFORMATION DISPLAYS ON MOBILITY HUBS, INFRASTRUCTURE AND GPS TRACKERS TO EXISTING BUS FLEET

Equipping the bus fleet (201 buses) with GPS trackers will allow real-time timetable information to be displayed on digital information displays (50 displays) and through a mobile application, enhancing the user experience. In this way, passengers will be aware of real-time travel information buses which differs from unreliable static timetable departure information. Integration of data taken from other types of vehicles and a route planning feature should be included for further development.

INTEGRATION OF SHARING SYSTEM FEES TO PUBLIC TRANSPORT

Implementing a unified fee structure across different transport modes and parking facilities will simplify payments and make alternative transport options more attractive and cost-effective, allowing seamless transitions between different modes of transport with a single ticket.

DEPLOYMENT OF A MOBILE APP

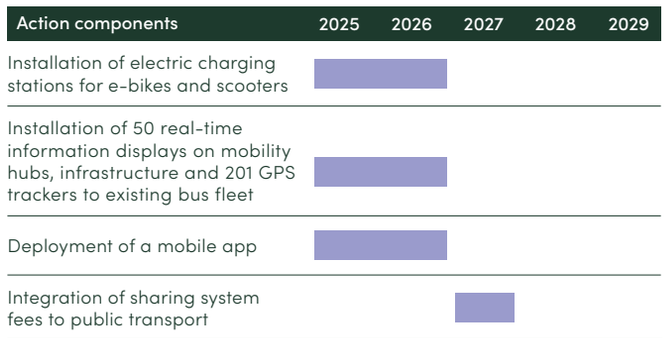
Developing a mobile application will provide real-time information on bus operations throughout the city

which are also be displayed on digital information displays to be installed at 50 locations. Transforming this initiative to a MaaS (Mobility as a Service) application as a further development would integrate information from various transport options, including walking, cycling, public transport, and taxis as well as payments system.

"PARK AND RIDE" (P&R) FACILITIES

Providing car parking spaces at hubs situated at the ends of lines will encourage commuters to park their cars and use public transport for the remainder of their journey. These P&R facilities are already planned in the Communal Action Plan and are mentioned here to align with the city's plans; but are not included in the implementation timeline or investment cost.

SCHEDULE OF IMPLEMENTATION



STRATEGIC GOALS

SG4
Promote sustainable mobility

SG7
Harness the potential of digital

RELATED GCAP ACTIONS

TA-01 TA-03 EA-03 DA-03 DA-04

CAP ALIGNMENT

Axis 12: Multimodal mobility

SOCIAL AND GENDER

Ensure that the transport hubs are designed to be accessible to people of all genders, ages, and abilities. This includes features such as ramps, wide pathways, elevators, and tactile paving for the visually impaired.

Implement safety features such as well-lit areas, CCTV cameras, emergency call buttons, and visible security personnel to enhance the safety of women and other vulnerable groups.

Offer discounted or subsidized fees for low-income women and other marginalised groups to ensure affordability.

Ensure that the cycling and walking routes connected to the hubs are safe, well-lit, and clearly signposted.

Design car parking spaces with accessible, family-friendly features, such as wider bays for parents with young children and designated parking for pregnant women or people with disabilities close to the hub entrances.

Design the app with a user-friendly interface that accommodates people of all ages and abilities, including those with visual, auditory, or cognitive impairments. Features like voice commands, text-to-speech, and high-contrast visuals can enhance accessibility. Provide multilingual support in the app to cater to diverse linguistic backgrounds within the community.

Incorporate safety alerts and notifications for users traveling alone, particularly for women and vulnerable groups. This can include real-time notifications about safe routes and alerts about any incidents or delays. Offer route suggestions that consider the safety and comfort of users, particularly women and elderly individuals. For example, highlight well-lit and populated routes.

Include options for users to receive assistance or information about facilities like accessible restrooms and waiting areas, which are particularly useful for parents with young children or people with disabilities.

Provide information about available discounts or subsidies for low-income users and students, ensuring that these are easily accessible within the app.

Integrate information about fare structures and payment options for various modes of transport to ensure transparency and ease of use.

ECONOMIC DEVELOPMENT

Collaboration with local app designers to develop the mobile app.

43 FTE

DIGITAL

Developing a mobile application will provide real-time information on various transport options, including walking, cycling, public transport, and taxis.

DA-03 Agent based modelling of Agadir transport network

DA-04 AI-powered traffic management

CLIMATE MITIGATION

10,950 tCO2/year

CLIMATE ADAPTATION

Infrastructure failure/ obsolescence

IMPACT INDICATORS

11: Private transport in transport modal share in commuting – less than 30%

11.1: Transport modal share in total trips – less than 30% private transport motorised journeys

11.6: Share of population having access to public transport within 15min – more than 80%

ACTION OWNER

Municipality of Agadir (Environment and Quality of Life Division, Public Works Division)

DELIVERY PARTNERS

- Local Development Company for mobility (SDL mobilité)
- Local Development Company for public works (SDL Agadir Souss-Massa aménagement)
- Private sector partner for app development

TA-03

Provide a network of electric feeder bus system

AT A GLANCE

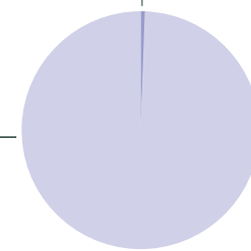
Procurement of 66 electric buses, supported by the construction of a new depot area with electric charging infrastructure and solar PV.

TYPE OF ACTION
Capital project

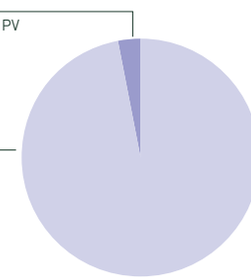
TIME HORIZON
2025-2028

SPATIAL EXTENT
Municipality of Agadir

CAPEX
MAD 494,703,000
EUR 45,594,000



OPEX
MAD 9,467,000 / year
EUR 873,000 / year



ACTION DESCRIPTION

OVERVIEW

Currently, Agadir's bus fleet—operated by a sub-contractor of SLD Mobility—is entirely diesel-powered which contributes to air pollution and increased GHG emissions throughout the city.

This action aims to initiate the transition to low-carbon solutions for public transport bus fleet. To realise this, procurement of 66 new electric buses including the provision of appropriate charging infrastructure throughout the city are proposed in this action.

By electrifying the bus fleet and implementing the necessary charging infrastructure, this action seeks to reduce greenhouse gas (GHG) emissions and improve air quality in Agadir. Moreover, the new electric buses will enhance passenger comfort, providing a more pleasant journey and encouraging citizens to use public transport.

COMPONENT DESCRIPTION

CONSTRUCTION OF A NEW DEPOT AREA WITH ELECTRIC CHARGING INFRASTRUCTURE AND SOLAR PV

For the successful operation of electric buses, the current depot will need to be modified to accommodate charging infrastructure to support electric bus operations. Moreover, this action will be coupled and enhanced by

also will eliminate those at the well-to-tank level. Additionally, energy management systems will benefit the daily operations of the new fleet by tracking charging demand forecasts and optimizing charging schedules.

PROCUREMENT OF NEW ELECTRIC BUSES

Following the modifications to the depot area, the initial procurement of 33 electric buses will serve as a pilot project, prior to procuring a new entire bus fleet. These figures are in alignment with the BRT proposal, with 30 buses in operation, and 3 buses as maintenance back-up.

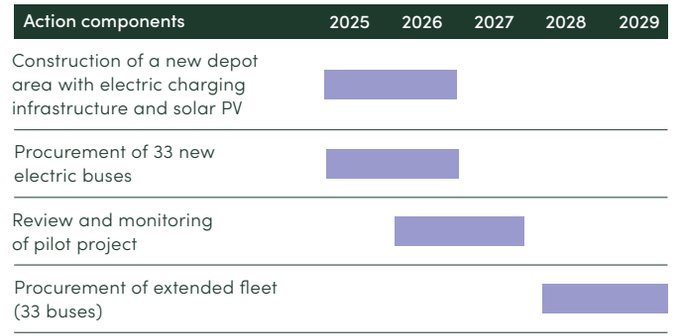
REVIEW AND MONITORING OF PILOT PROJECT

The pilot project will be closely reviewed and monitored to assess the performance, efficiency, and impact of the electric buses on reducing emissions and improving air quality. This evaluation will inform any necessary adjustments and improvements.

PROCUREMENT OF EXTENDED FLEET

Based on the outcomes of the pilot project, 33 additional electric buses will be procured to further expand the low-carbon public transport options across Agadir, enhancing the city's overall sustainability and reducing its carbon footprint.

SCHEDULE OF IMPLEMENTATION



STRATEGIC GOALS

SG1
Protect and enhance its environment

SG4
Promote sustainable mobility

RELATED GCAP ACTIONS

TA-02 DA-04

CAP ALIGNMENT

Axis 12: Multimodal mobility

SOCIAL AND GENDER

Ensure that new hybrid and electric buses are fully accessible to people with disabilities, including features such as low floors for easy boarding, dedicated spaces for wheelchairs, and audio-visual announcements for stops.

Provide comfortable and supportive seating, including spaces for individuals with disabilities, elderly passengers, and parents with young children.

Install security features on buses such as surveillance cameras and emergency communication systems to ensure passenger safety, particularly for women and vulnerable groups.

Ensure buses are designed with safety in mind, including well-lit interiors, secure handrails, and anti-slip flooring to prevent accidents.

Ensure that the procurement process includes provisions for hiring women in various roles, from driving to maintenance and management.

ECONOMIC DEVELOPMENT

470 FTE

DIGITAL

DA-04 AI-powered traffic management

DA-04 would help to initiate the introduction of bus priority intersections which can be further developed to bus priority lanes. Operating new e-buses on those locations will improve the efficiency of the public transport operations.

CLIMATE MITIGATION

4,450 tCO2/year

CLIMATE ADAPTATION

Infrastructure failure/ obsolescence

IMPACT INDICATORS

8: Annual CO2 equivalent emissions per capita – less than 5 tonnes/year/capita

10: Average age of car fleet total and by type – less than 6 years

10.1: Percentage of diesel cars in total vehicle fleet – less than 20%

ACTION OWNER

Local Development Company for mobility (SDL mobilité)

DELIVERY PARTNERS

Municipalities of Agadir, Inezgane, Dcheira El Jihada and Ait Melloul.

TA-04

Electrification of municipal fleet

AT A GLANCE

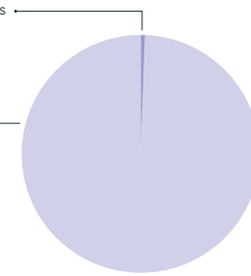
Conversion of 270 municipal scooters and 30 street cleaning vehicles to electric models.

TYPE OF ACTION
Capital project

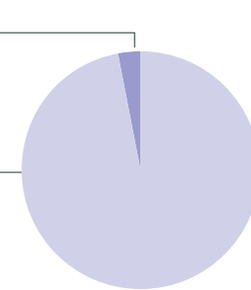
TIME HORIZON
2025-2030

SPATIAL EXTENT
Municipality of Agadir

CAPEX
MAD 37,124,000
EUR 3,422,000



OPEX
MAD 174,000 / year
EUR 16,000 / year



ACTION DESCRIPTION

OVERVIEW

The current municipal fleet contributes significantly to GHG emissions, comparable to those from waste collection vehicles, which are also scheduled for electrification. The Municipality of Agadir is committed to replacing its fleet with clean vehicles as part of its vision to create a low-carbon, eco-friendly city.

This action focuses on electrifying Agadir's municipal vehicle fleet to reduce greenhouse gas (GHG) emissions within the municipality's direct control. By transitioning to electric vehicles, the municipality seeks not only to lower GHG emissions but also to improve air quality in the city. This action will serve as an exemplary case, encouraging the transformation of private vehicles into electric and low-carbon alternatives.

COMPONENT DESCRIPTION

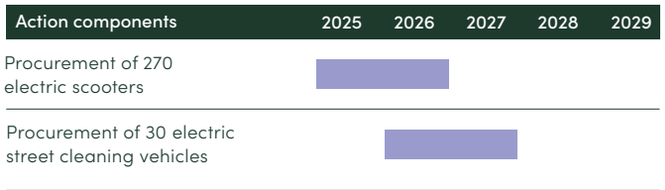
PROCUREMENT OF ELECTRIC SCOOTERS

The initial focus will be on converting all 270 municipal scooters to electric models, facilitated by the new mobility hubs proposed in other actions (TA-02). Currently, the scooters are used by various municipal divisions, with over 100 scooters being more than 16 years old. Replacing these outdated vehicles with electric scooters will be an effective step towards modernising the fleet and reducing emissions.

PROCUREMENT OF ELECTRIC STREET CLEANING VEHICLES

Once the motorcycles have been piloted, the action will also replace a total of 30 street cleaning vehicles with electric models. Subsequently, other vehicles such as cars will also be electrified.

SCHEDULE OF IMPLEMENTATION



STRATEGIC GOALS

SG1
Protect and enhance its environment

SG5
Enable a healthy lifestyle for all

SG4
Promote sustainable mobility

RELATED GCAP ACTIONS

TA-02

CAP ALIGNMENT

Axis 12: Multimodal mobility

SOCIAL AND GENDER

Promote gender equity by encouraging women to apply for roles in the management, operation, and maintenance of the electric fleet, including scooters and other vehicles.

Offer targeted training programmes for women, especially in areas like vehicle maintenance, fleet logistics, and electric vehicle charging infrastructure, which may traditionally be male dominated.

ECONOMIC DEVELOPMENT

470 FTE

DIGITAL

N/A

CLIMATE MITIGATION

150 tCO2/year

CLIMATE ADAPTATION

Infrastructure failure/ obsolescence

IMPACT INDICATORS

10: Average age of car fleet total and by type – less than 6 years

10.1: Percentage of diesel cars in total vehicle fleet – less than 20%

ACTION OWNER

Municipality of Agadir (Environment and Quality of Life Division, Municipal Assets Division)

DELIVERY PARTNERS

- Local Development Company for mobility (SDL mobilité)
- Alsa (network operator)

TA-05

Traffic calming measures

AT A GLANCE

Feasibility study and implementation of 60km of traffic calming measures, including road alignment changes, pavement widening, and increased pedestrian spaces, around 12 schools.

TYPE OF ACTION
Capital project

TIME HORIZON
2025-2035

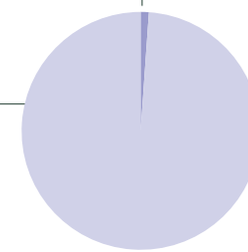
SPATIAL EXTENT
School areas as pilot implementation - together with climate resilient school programme:

- Middle School Abdel Ali Benchekroun
- Ecole primaire Hay Mohammadi
- Collège Saad Ben Abi Waqas
- College Ibn Khaldoun Anza
- École Abdel Moumen Ben Ali
- College Ahmed Chaouki
- École Chaiir El Hamraa
- Lycée Youssef Ben Tachfine
- Denis Diderot
- Complexe Scolaire AlQalam
- Ecole Al Hanane
- Lycée Français International d'Agadir

CAPEX
MAD 158,413,000
EUR 14,600,000

Feasibility study
MAD 2,170,000
EUR 200,000

Design and construction of traffic calming measure around 12 schools
MAD 156,243,000
EUR 14,400,000



OPEX
MAD 42,000 / year
EUR 4,000 / year

Maintenance cost of a traffic calming measures

ACTION DESCRIPTION

OVERVIEW

Being highly dependent on private vehicle usage and having non-reliable public transport services are amongst the most outstanding challenges of transport sector is facing in Agadir. These challenges coupled with citizens' transport choice behaviour and the lack of active travel planning is creating pressure on road safety in urban areas.

This action aims to reduce car dependency in urban areas and enhance the liveability of Agadir for all demographic and socio-economic groups. To achieve this, a combination of traffic calming measures will be implemented to control traffic volume and speed. Traffic calming measures are often associated with increased health and safety benefits, by promoting active mobility, and decreasing the likelihood of accidents. They also improve accessibility for older people, people with disabilities and prams. Additionally, they reduce crime rates by creating more vibrant and secure public spaces.

The measures proposed include:

- Changing road alignment and geometry;
- Pavement widening;
- Narrowing vehicle lanes to create level pedestrian crossings.
- Reducing vehicle speeds at pedestrian crossings; and
- Reallocating on-street parking space for pedestrians, planting or public transport stops.

COMPONENT DESCRIPTION

FEASIBILITY STUDY

The feasibility study will assess the current traffic conditions, identify high-risk areas, and evaluate the potential impact of various traffic calming measures. This study will also include consultations with local stakeholders to ensure the proposed measures align with community needs and preferences, providing a comprehensive plan for implementation.

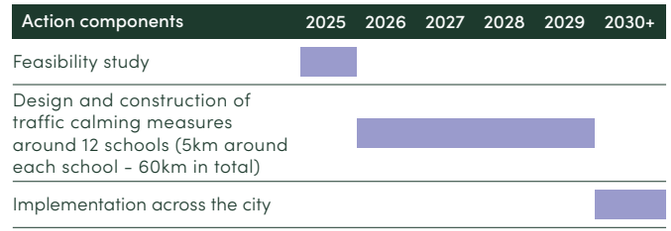
DESIGN AND CONSTRUCTION OF TRAFFIC CALMING MEASURE AROUND 12 SCHOOLS

The implementation of this action will begin around 12 school areas to ensure the safety of children and encourage walking and cycling to school. By focusing on these sensitive zones, the project aims to create safe environments for the most vulnerable road users. These measures next to schools will not only protect students but also raise awareness among drivers about the importance of road safety in educational areas. Approximately 5km of roads around each school will be rearranged.

IMPLEMENTATION ACROSS THE CITY

Following the initial implementation near schools, the traffic calming measures will eventually be expanded to other parts of the city. This phased approach allows for community engagement and adjustment based on feedback, ensuring the measures effectively meet the needs of Agadir's residents. Extending the scheme to the whole city will establish connections between the different traffic calming zones creating pedestrian and cyclist prioritised corridors for citizens, thereby increasing overall road safety through the network effect.

SCHEDULE OF IMPLEMENTATION



STRATEGIC GOALS

SG1
Protect and enhance its environment

SG5
Enable a healthy lifestyle for all

SG4
Promote sustainable mobility

RELATED GCAP ACTIONS

LA-02 DA-03

CAP ALIGNMENT

Axis 1: Socio-economic growth
Axis 12: Multimodal mobility

SOCIAL AND GENDER

Ensure that well-lit pedestrian crossings and walkways are part of the design, as women are more likely to experience safety concerns, particularly in the evening or in less trafficked areas.

Ensure that widened pavements and pedestrian zones accommodate women with prams, elderly individuals, and people with disabilities.

In collaboration with local women's organisations, create routes with extra safety measures (lighting, signage, security) for women traveling at night and children going to school. This could include marked paths or designated safe pedestrian crossings.

In the spaces created by reducing on-street parking, designate specific zones for women-led businesses, street vendors, and markets. Provide support in terms of safety, sanitation, and access to customers.

Ensure that women are included in job opportunities created by these infrastructure changes, such as in landscaping, maintenance, or traffic management roles.

ECONOMIC DEVELOPMENT

150 FTE

DIGITAL

DA-03 Agent based modelling of Agadir transport network

Agent based models are used to simulate the behaviour of individual agents with a view to assessing their effects on a system. The model proposed in DA-03 can be used to simulate different scenarios under several circumstances at an individual level. Since these models are more granular, flexible, integrated and responsive, the model proposed in DA-03 can be used to optimize the further location selection for the expansion of traffic calming interventions throughout the city as well as testing the effects of different interventions at the selected locations.

CLIMATE MITIGATION

N/A

CLIMATE ADAPTATION

Infrastructure failure/ obsolescence

IMPACT INDICATORS

11.1: Transport modal share in total trips – less than 30% private transport motorised journeys

12: Average travel speed on primary thoroughfares during peak hour – more than 30km/h

ACTION OWNER

Municipality of Agadir (Environment and Quality of Life Division, Public Works Division)

DELIVERY PARTNERS

- Local Development Company for public works (SDL Agadir Souss-Massa aménagement)
- Local Development Company for mobility (SDL mobilité)

Energy & buildings

EA-01
Renewable energy developments

EA-02
Deployment of rooftop solar PV and solar thermal

EA-03
Development of pilot solar canopies

EA-04
Urban heat building retrofit programme

EA-05
Home retrofit one stop shop

Energy and buildings

Agadir has promoted the use renewable energy sources for almost a decade, through projects aiming at transforming the energy supply of municipal buildings and the reduction in energy consumption of public infrastructure. The city has also implemented a SolarCity programme between 2017 and 2022 which promoted solar energy production and use in public buildings, including pumping stations, which are now under the mandate of the Société Régionale Multiservices Souss-Massa (SRM SM). The aim of the SolarCity programme is to mainstream the use of solar power in both waste distribution and wastewater treatment. Through these schemes, Souk El Had and the main municipal hall have had solar panels installed, while street lighting along major avenue has been replaced for new LED streetlights with integrated solar PVs and high luminous efficiency. These lights are also intelligently controlled centrally, allowing for significant savings in energy consumption due to a remote management system.

Significant efforts have deployed to fit solar public buildings, however, due to the governance system of the city, solar development for private buildings has been slower. The buildings stock of Agadir is relatively recent due to the relocation and reconstruction of the city which followed the 1960 earthquake, providing a good basis for the development of solar energy production. The GCAP will help to further reduce the city GHG emissions and reliance on fossil fuel energy through:

- An ambitious solar and wind energy development with a technical feasibility and route to market study, to support the construction of **two 2.5MWp solar PV sites and two 5MWp wind power sites**, that supply buildings through private wire connections or power purchase agreements (PPA) EA-01 ;
- The support of the solar energy adoption for private buildings, through a desktop study to assess the technical and market potential for **rooftop solar PV and solar thermal systems** in Agadir. These systems will then be deployed across public and private buildings, supported by promoting solar PV in private buildings through market engagement and collaboration with building owners EA-02 .
- Climate mitigation will also be enhanced by the provision of shaded areas across the city through a technical and feasibility study for the installation of 2.95 hectares of **solar PV canopies with EV charging stations** EA-03 .
- The city will also actively promote the implementation of **urban heat building retrofit programme** EA-04 through the review of building codes and the delivery of a cool roofs and sharing demonstrator in schools and municipal buildings across the city.
- Homeowners and occupiers across the city will be supported in reducing energy consumption and adopting lower-carbon, heat-resilient solutions thanks to the creation of a **home retrofit one stop shop** EA-05 , providing technical guidance and know-how both online and in physical locations distributed across Agadir neighbourhoods.

The development of alternative energy sources to fossil fuels in Agadir will require collaboration and awareness raising amongst stakeholders. With a total potential investment of MAD 254 million (EUR 23 million) and the potential creation of 478 jobs, the development of solar energy in Agadir, together with the upgrade of its building stock to reduce the impact of heat, could bring significant benefits for the local economy while creating infrastructure which will support the city's transition to a more sustainable future.

EA-01

Renewable energy developments

AT A GLANCE

Technical feasibility and route to market study, to support the construction of two 2.5MWp solar PV sites and two 5MWp wind power sites, that supply buildings through private wire connections or power purchase agreements (PPA).

TYPE OF ACTION
Capital project

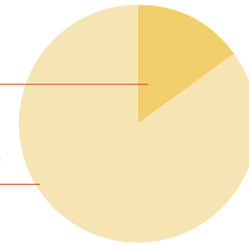
TIME HORIZON
2025-2030

SPATIAL EXTENT
Agadir and surrounding areas

CAPEX
MAD 221,907,000
EUR 20,452,000

Technical feasibility and route to market study
MAD 33,850,000
EUR 3,120,000

Procurement and construction of solar PV and wind power sites
MAD 188,057,000
EUR 17,332,000



OPEX
MAD 2,482,000 / year
EUR 229,000 / year

Maintenance cost of a solar PV and wind power sites

ACTION DESCRIPTION

OVERVIEW

Agadir is highly suitable for wind and solar developments with its position on the coast and high solar irradiance. Renewable energy helps deliver local energy independence and resilience, regional economic benefits and GHG emissions reductions.

This action will develop ground-mounted solar PV and wind power developments which can supply building loads through a private wire connection or power purchase agreement (PPA).

COMPONENT DESCRIPTION

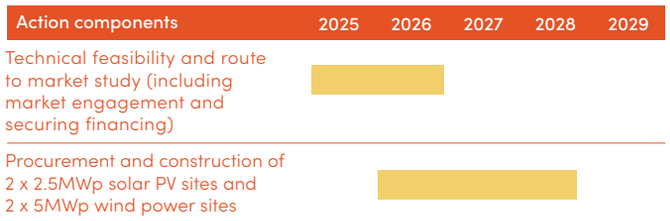
TECHNICAL FEASIBILITY AND ROUTE TO MARKET STUDY

Initial desktop mapping indicates that the municipality has multiple sites which might be suitable for renewable energy developments. Developing these would involve selection and technical assessment of a longlist of sites, leading to selection of a shortlist and development of concept designs and assessment of the route to market (i.e. Commercial delivery and financing). Depending on the solution, the municipality will take forward the shortlisted sites for either scheme design and contractor procurement or procurement of a development partner and agreement of a PPA.

PROCUREMENT AND CONSTRUCTION OF SOLAR PV AND WIND POWER SITES

Action costing at this early stage is based on the above longlisting and shortlisting plus capital development of four provisional sites: 2 x 2.5MWp ground-mounted solar PV sites and 2 x 5MWp wind power sites, to supply the electricity demand of nearby cluster of public buildings.

SCHEDULE OF IMPLEMENTATION



STRATEGIC GOALS

SG1
Protect and enhance its environment

SG3
Optimise the use of its resources

RELATED GCAP ACTIONS

DA-07

CAP ALIGNMENT

Axis 5:
Agadir eco-city with low carbon

SOCIAL AND GENDER

Provide training and upskilling opportunities specifically for women in technical roles related to the design, installation, and maintenance of solar PV and wind power infrastructure. Renewable energy sectors are often male-dominated, and targeted recruitment can help bridge the gender gap.

Create a youth access programme for jobs in solar PVs

ECONOMIC DEVELOPMENT

400 FTE

DIGITAL

A smart monitoring system could use advanced metering infrastructure (AMI) to track real-time performance of solar PV installations, including energy production, consumption, and efficiency. Automated operation and maintenance (O&M) solutions could ensure optimal performance and timely maintenance. These systems would be connected to the integrated operation centre (DA-07) for centralised monitoring and management of buildings owned by the municipality, enabling quick issue identification, optimised energy output, and long-term reliability of the PV systems.

CLIMATE MITIGATION

24,300 tCO2/year

CLIMATE ADAPTATION

Infrastructure failure/ obsolescence

IMPACT INDICATORS

08: Annual CO2 equivalent emissions per capita – less than 5 tonnes/year/capita

16: Share of renewable in total energy consumption – more than 20%

19.1: Fossil fuels consumption for heating and cooling in residential buildings – less than 96 kWh/m^2

ACTION OWNER

Municipality of Agadir
(Urban Planning Division and Municipal Assets Division)

DELIVERY PARTNERS

- ONEE and SRM SM

EA-02

Deployment of rooftop solar PV and solar thermal

AT A GLANCE

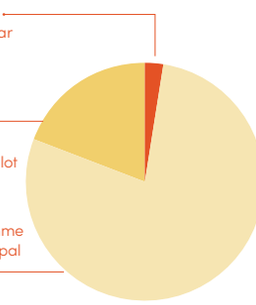
Desktop study to assess the technical and market potential for rooftop solar PV and solar thermal systems in Agadir. These systems will then be deployed across public and private buildings, supported by promoting solar PV in private buildings through market engagement and collaboration with building owners. Engagement with international financial institutions (IFIs) and private funds will help launch a solar thermal development fund.

TYPE OF ACTION
Capital project

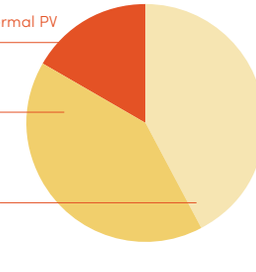
TIME HORIZON
2025-2030

SPATIAL EXTENT
Municipality of Agadir

CAPEX
MAD 15,337,000
EUR 1,414,000



OPEX
MAD 2,076,000 / year
EUR 191,000 / year



ACTION DESCRIPTION

OVERVIEW

Agadir experiences high solar irradiance and has a relatively mild climate year-round. This makes it highly suitable for solar energy technologies, which provide local economic, air quality and climate change mitigation benefits. In the region, solar PV is a more mature market, while solar thermal is not in wide use and may need additional support to stimulate the local market and supply chains.

This action aims to deploy solar PV and solar thermal technologies on rooftops across the city. Solar PV can be directly connected "behind the meter" to deliver energy and cost savings to building owners, while solar thermal can be connected to water heating systems to provide a very low cost and sustainable means of providing domestic hot water to homes and offices. By diversifying the city's energy supply and increasing the output from local renewables, Agadir's energy system will become more resilient, relying less on imported combustible fuels. This action also aims to increase access to reliable and sustainable green energy.

COMPONENT DESCRIPTION

DESKTOP STUDY OF TECHNICAL AND MARKET POTENTIAL FOR ROOFTOP SOLAR PV AND SOLAR THERMAL SYSTEMS

The two technologies have distinctly different technical challenges and tend to have separate supply chains. Following an initial desktop technical and market study of both technologies, they would be delivered through distinct programmes. The desktop study could leverage satellite imagery to identify suitable rooftops. The study would assess roof space across the city to quantify total technical potential, typical costs, and savings & benefits per property; and prepare as identify supply chain capacity and current and recommended future routes to market for each technology.

ESTABLISH A DEVELOPMENT FUND FOR SOLAR PV AND THERMAL ON MUNICIPAL AND PUBLIC BUILDINGS

The Municipal and Public Buildings Programme will take the form of a development fund which will identify a pipeline of building-level projects and procure packages of solar PV and thermal installations in a manner designed to attract market interest and achieve acceptable payback for the investment, including engagement with International Financial Institutions (IFI) and/or private funds.

PROCURE AND DELIVER THE PROGRAMME OF ROOFTOP SOLAR PV ACROSS MUNICIPAL AND PUBLIC BUILDINGS

The delivery phase will include site assessments, structural evaluations, and the integration of solar PV systems with existing electrical infrastructure. Some sites may explore the integration of battery energy storage systems alongside these installations. The city could monitor the performance of all public PVs through the operation centre (DA-07).

ESTABLISH AND PROMOTE PRIVATE BUILDINGS SOLAR PV THROUGH MARKET AND BUILDING OWNER ENGAGEMENT

The Private Buildings Programme will focus on promotion of the market and the role the city can plan in stimulating and enabling private building owner procurement of solar PV installations. This will include a market assessment which identifies the technical potential in the city and quantifies market capacity to meet this technical potential. The municipality will also evaluate the feasibility of a market making or collective procurement approach to provide a more efficient route to market, bring suppliers and customers together.

Solar thermal

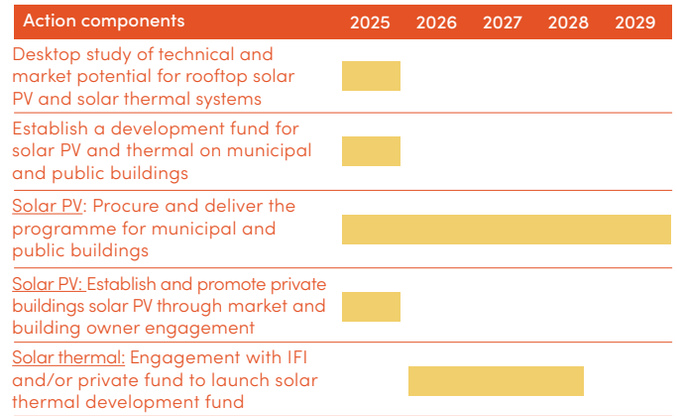
LAUNCH SOLAR THERMAL NEIGHBOURHOOD PILOT FOR PRIVATE HOMES AND MUNICIPAL BUILDING PILOT

The solar thermal initiative will comprise a neighbourhood pilot for private homes and a city municipal building pilot to demonstrate and advertise a range of successful use cases.

ENGAGEMENT WITH IFI AND/OR PRIVATE FUND TO LAUNCH SOLAR THERMAL DEVELOPMENT FUND

Furthermore, there will be engagement with IFIs and/or private funds to launch a solar thermal development fund.

SCHEDULE OF IMPLEMENTATION



STRATEGIC GOALS

SG1
Protect and enhance its environment

SG3
Optimise the use of its resources

SG5
Enable a healthy lifestyle for all

RELATED GCAP ACTIONS

EA-04

CAP ALIGNMENT

Axis 5: Agadir eco-city with low carbon

SOCIAL AND GENDER

Provide training and upskilling opportunities specifically for women in technical roles related to the design, installation, and maintenance of solar PV and solar thermal. Renewable energy sectors are often male-dominated, and targeted recruitment can help bridge the gender gap.

ECONOMIC DEVELOPMENT

30 FTE

Capacity building for new jobs for the operation and maintenance of modern equipment.

DIGITAL

Implementation of smart metering.

Monitoring of the performance of all public PVs through the Integrated Operation Centre (DA-07).

CLIMATE MITIGATION

350 tCO2/year

CLIMATE ADAPTATION

Infrastructure failure/ obsolescence

IMPACT INDICATORS

08: Annual CO2 equivalent emissions per capita – less than 5 tonnes/year/capita

16: Share of renewable in total energy consumption – more than 20%

19.1: Fossil fuels consumption for heating and cooling in residential buildings – less than 96 kWh/m^2

ACTION OWNER

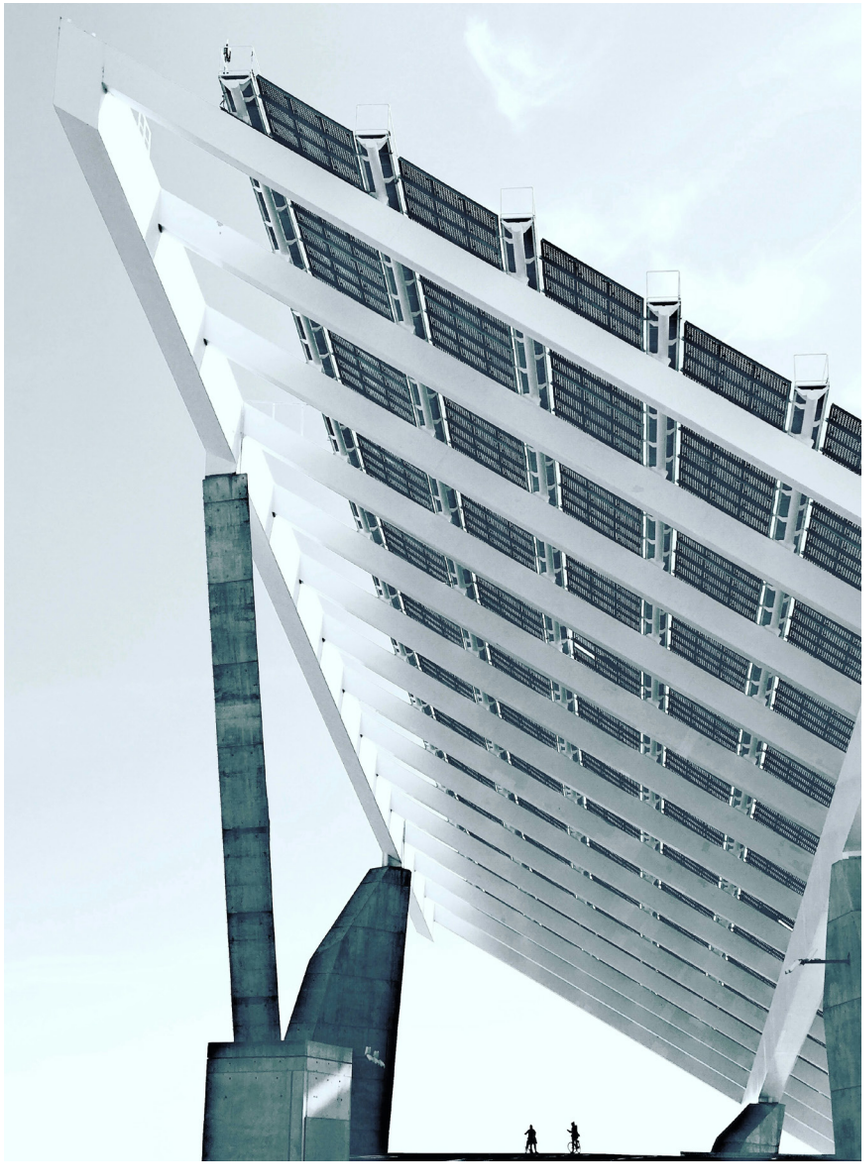
Municipality of Agadir
(Urban Planning Division and Municipal Assets Division)

DELIVERY PARTNERS

- The Ministry of Equipment, Transport, Logistics and Water
- Industrial Units owners' operators

EA-03

Development of pilot solar canopies



AT A GLANCE

Technical and feasibility study for the installation of 2.95 hectares of solar PV canopies with EV charging stations, supported by monitoring and evaluation post-construction.

TYPE OF ACTION
Capital project

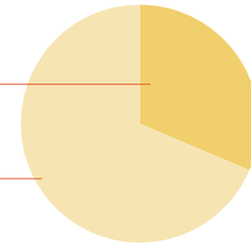
TIME HORIZON
2025-2030

SPATIAL EXTENT
To be determined. Examples of potential sites include:
- Amalway BHNS Station
- Parking Jardin Olhao
- Grand parking Souk El Had

CAPEX
MAD 15,180,000
EUR 1,399,000

Technical feasibility and economic study
MAD 4,633,000
EUR 427,000

Design and construction of canopies
MAD 10,062,000
EUR 927,000



OPEX
MAD 293,000 / year
EUR 27,000 / year

Monitor and evaluate outcomes

ACTION DESCRIPTION

OVERVIEW

Agadir experiences high solar irradiance but can also experience periodic heat waves. This makes it highly suitable for solar PV technology installation but also means that shade provision is an essential part of enhancing city resilience.

This action puts these two ideas together to propose solar PV canopies at key locations across the Municipality of Agadir, including mobility hubs, railway stations, and public car parks. These solar carports will serve a dual purpose: providing shelter for people and vehicles whilst generating renewable electricity, over 2.95 hectares. The canopies will be integrated with EV charging stations, enabling vehicles parked beneath to charge directly from solar power. By increasing the availability of public EV charging points, this initiative will help accelerate the transition away from fossil fuel vehicles. Additionally, by supplying renewable energy directly to EVs, it reduces the carbon emissions associated with grid electricity.

This initiative supports the ongoing Sustainable Mobility with Renewable Energies in Morocco project, led by Deutsche Gesellschaft für Internationale Zusammenarbeit, which promotes electric mobility throughout the municipality area.

COMPONENT DESCRIPTION

TECHNICAL FEASIBILITY AND ECONOMIC STUDY

Solar canopy feasibility study will identify potential locations for the solar canopies. This desktop study will evaluate the kilowatt potential (kWp) of each site and assess the economic feasibility of integrating the carports with EV charging stations. It will also identify the appropriate funding and procurement route for the project.

DESIGN AND CONSTRUCTION OF CANOPIES

The solar canopies have the potential to become attractive architectural features of Agadir, with innovative designs, providing lighting at night and shade during the day.

MONITOR AND EVALUATE OUTCOMES

Monitoring of the canopies' performance, including energy generation and usage data, as well as the effectiveness of the EV charging stations will inform future improvements and expansions of the project. Regular evaluations will be conducted to assess the impact on local air quality, carbon emissions, and user satisfaction.

SCHEDULE OF IMPLEMENTATION

Action components	2025	2026	2027	2028	2029
Technical feasibility and economic study					
Design and construction of three canopies (2.95 ha)					
Monitoring and evaluation					

STRATEGIC GOALS

SG3
Optimise the use of its resources

SG4
Promote sustainable mobility

RELATED GCAP ACTIONS

TA-02

CAP ALIGNMENT

Axis 5:
Agadir eco-city with low carbon

SOCIAL AND GENDER

Design the solar canopies with features that address women's safety and accessibility needs, such as well-lit areas and secure EV charging stations. Ensure that canopies are located in areas where women, including those with children, and people with disabilities, can easily access them.

Offer training and capacity-building programmes for women and youth in the community to equip them with skills related to design, installation and maintenance of solar technologies. This can create job opportunities and promote women's and youth's involvement in the sector.

ECONOMIC DEVELOPMENT

30 FTE

The design of the canopies will be subject to an architecture competition, which will raise awareness of innovative technologies and energy efficiency with local practitioners.

DIGITAL

N/A

CLIMATE MITIGATION

3,040 tCO2/year

CLIMATE ADAPTATION

Extreme temperatures

IMPACT INDICATORS

10.3: Share of total passenger car fleet run by alternative energy – more than 3%

16: Share of renewable in total energy consumption – more than 20%

ACTION OWNER

Municipality of Agadir
(Urban Planning Division and Municipal Assets Division)

DELIVERY PARTNERS

- ONEE
- SRM SM
- Local Development Company for public works (SDL Agadir Souss-Massa aménagement)

EA-04

Urban heat building retrofit programme

AT A GLANCE

Programme to support the adaptation of Agadir buildings to urban heat. The programme includes a policy package to encourage the uptake of passive design solutions, the implementation of a demonstrator project in twelve schools and three municipal buildings, and a monitoring phase to track the effectiveness of the interventions.

TYPE OF ACTION
Capital project and policy or regulations

TIME HORIZON
2025-2030

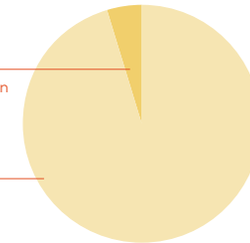
SPATIAL EXTENT
Potential schools identified:

- Middle School Abdel Ali Benchekroun
- Ecole Primaire Hay Mohammadi
- Collège Saad Ben Abi Waqas
- College Ibn Khaldoun Anza
- École Abdel Moumen Ben Ali
- College Ahmed Chaouki
- École Chaiir El Hamraa
- Lycée Youssef Ben Tachfine
- Denis Diderot
- Complexe Scolaire AlQalam
- Ecole Al Hanane
- Lycée Français International d'Agadir

Potential municipal buildings identified:

- City Hall
- Technical division new headquarters
- Kheir Eddine Cultural Centre

CAPEX
MAD 1,929,000
EUR 178,000



OPEX
MAD 412,000 / year
EUR 38,000 / year
Monitoring

ACTION DESCRIPTION

OVERVIEW

This action focuses on implementing a programme which aims to mitigate the impact of heat on public and private buildings across the city. This will be enabled by a review of local building codes favouring heat-sensitive solutions and design both at a building and block level. The interventions will include the roll out of retrofit solutions such as cool roofs and shading components such as brise-soleil. These will be piloted in a selection of schools and municipal buildings across Agadir, and subsequently monitored to evaluate their impact and effectiveness. The programme will also create opportunities for heat risk awareness in schools and support local craft through the creation of design competitions for shading components.

COMPONENT DESCRIPTION

HEAT-SENSITIVE BUILDING CODES AND COOL ROOFS PRIORITISATION PLAN

To support the adaptation of the city's built stock to heat, the programme will develop codes and regulations that will promote urban form, block design and massing solutions that minimise solar gain and enhance natural ventilation. At a building scale, the new guidance will encourage the retrofit of buildings with cool roofs, the use of windows with low g-value, and the application of brise-soleil to increase shading both in existing and new buildings.

The action will also include a diagnostic study with the aim to quantify the overall potential of applying cool roofs across the city, and the identification of neighbourhoods with the highest exposure and vulnerability to heat. This will require the comparison of GIS maps of the built stock, satellite information to identify where heat island effect in most present and a survey of blocks with the highest density of vulnerable people (i.e. Children and elderly people over the age of 65).

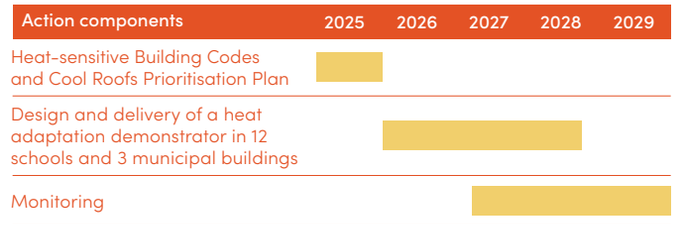
DESIGN AND DELIVERY OF A HEAT ADAPTATION DEMONSTRATOR IN SCHOOLS AND MUNICIPAL BUILDINGS

A heat adaptation demonstrator project will be implemented in a selection of schools and municipal buildings across the city. Supported by a technical feasibility study, the action will install cool roofs and shading components to 12 schools, 8 of which public, and some of the largest municipal buildings such as the City Hall and the Kheir Eddine Cultural Centre. The initiative will be complementing action LA-02 (Climate-resilient school grounds programme), and EA-02 (Deployment of rooftop solar PV and solar thermal), and be the opportunity to create an awareness campaign on the risks of heat with school pupils. Alongside the feasibility study, a call for ideas will be launched in partnership with the Agadir National School of Architecture to crowdsource architectural solutions for brise-soleil and other shading components that combine functional performance with a contemporary interpretation of the local architectural heritage and decorative patterns.

MONITORING

To evaluate the effectiveness of the heat adaptation measures, a monitoring system will be established to track indoor and external surface temperatures in buildings before and after the interventions. This will include occupier wellbeing surveys as well as sensors connected with DA-07.

SCHEDULE OF IMPLEMENTATION



STRATEGIC GOALS

SG2
Design for a fair and inclusive society

SG5
Enable a healthy lifestyle for all

RELATED GCAP ACTIONS

LA-02 EA-02 DA-07 CS-01

CAP ALIGNMENT

Axis 5:
Agadir eco-city with low carbon

SOCIAL AND GENDER

Offer training and capacity-building programmes specifically targeted at women and youth to equip them with skills related to the design, installation, and maintenance of heat adaptation measures. This can create job opportunities and promote gender equality in the workforce.

Ensure that design competitions for shading components actively encourage participation from women and underrepresented groups in the architecture and design fields. Provide mentorship and support to help them succeed.

ECONOMIC DEVELOPMENT

Involving local designers, students, and artisans in the design competition for shading components can foster innovation and supporting local craftsmanship.

DIGITAL

Tracking data from sensors installed in the pilot schools and municipal buildings, providing real-time insights into the effectiveness of heat adaptation measures through the Integrated Operation Centre (DA-07).

CLIMATE MITIGATION

N/A

CLIMATE ADAPTATION

Extreme temperatures

IMPACT INDICATORS

19.5: Share of buildings with energy performance certificates (EPC)

ACTION OWNER

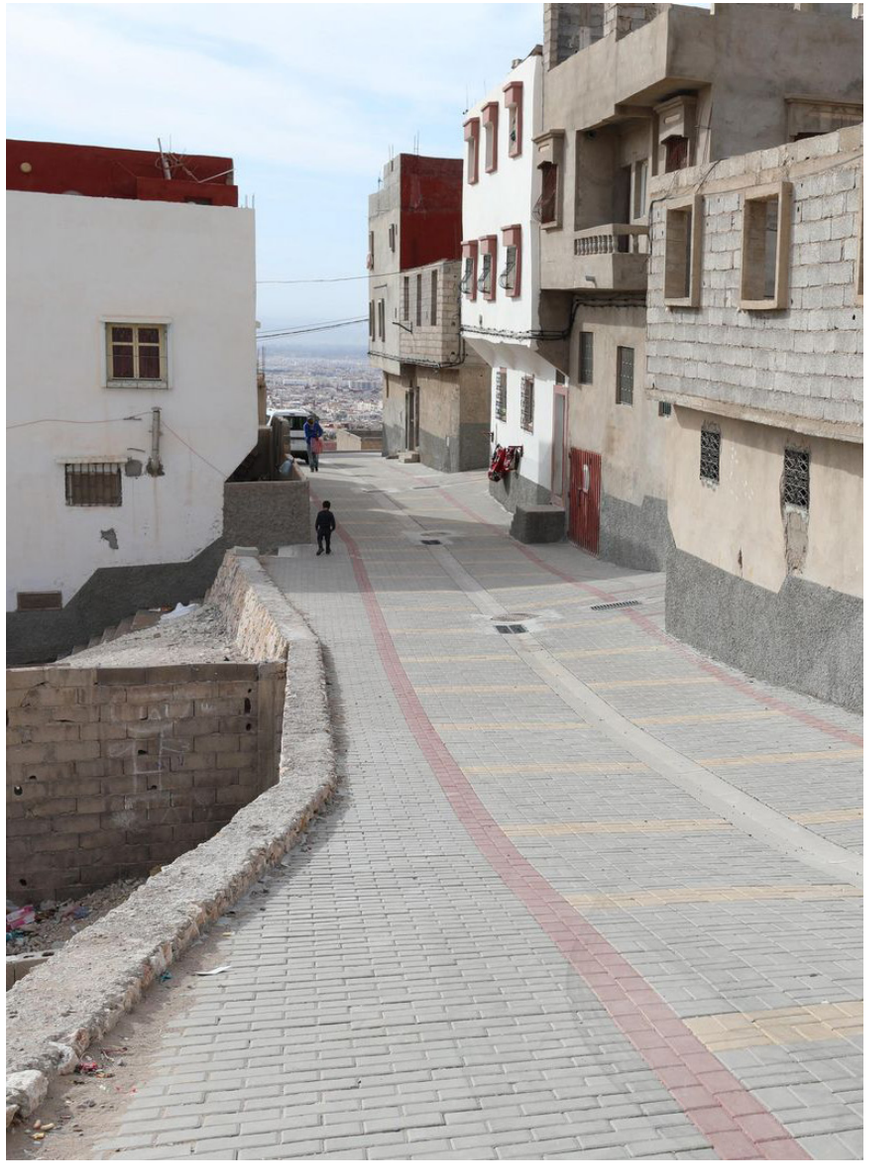
Municipality of Agadir
(Public Works Division, Environment and Quality of life Division and Public Works Division)

DELIVERY PARTNERS

- Department for Education (Ministère de l'Éducation nationale, du Préscolaire et des Sports)
- Pilot schools
- Local Voluntary organisations such as AESVT Maroc
- Agadir National School of Architecture

EA-05

Home retrofit one stop shop



AT A GLANCE

Programme to establish a one stop shop service for home retrofit in Agadir. The service will be supported by a distributed network of physical advisory points, offering personalised advice, support for retrofitting and solar panel installation, and information on funding. Outreach activities will ensure accessibility, and a monitoring framework will track effectiveness and gather citizen feedback.

TYPE OF ACTION
Service development

TIME HORIZON
2025-2030

SPATIAL EXTENT
Municipality of Agadir, within the existing neighbourhoods offices "Annexe Commune Agadir"

CAPEX
MAD 245,000
EUR 23,000
Outreach and Accessibility

OPEX
MAD 825,000 / year
EUR 76,000 / year
Development and Launch of Home Retrofit Advisory Services

ACTION DESCRIPTION

OVERVIEW

This action focuses on establishing a one-stop shop service for citizens across the city, aimed at improving energy efficiency and supporting retrofitting efforts. The service will be decentralised, with multiple advisory points distributed throughout the city to ensure accessibility for all residents, as well as being hosted on an online portal within the municipality website. Overall, this action will provide support to citizens in reducing energy consumption, improving indoor comfort and reducing emissions. The programme will also support regional suppliers in the construction sector and create opportunities for training and upskilling in building retrofit.

COMPONENT DESCRIPTION

DEVELOPMENT AND LAUNCH OF HOME RETROFIT ADVISORY SERVICES

The development of the One Stop Shop will include the design of a range of resources and services to support citizens in making their homes more energy efficient and resilient to heat. These will include:

- Preparing accessible guides and providing personalised advice on how to optimise household energy consumption, including tips on insulation, information on energy efficient air conditioning units, and behavioural changes;

- Assisting building owners with information and guidance on retrofitting their properties, including the installation of cool roofs, brise soleil, and other heat mitigation measures (see EA-05), and solar panels (see EA-02). This includes the creation of a trusted pool of qualified contractors and suppliers from Agadir and the wider Souss-Massa region, which can be browsed online;
- Providing information on small funds and grants available for retrofit interventions, supporting through the application process.

OUTREACH AND ACCESSIBILITY

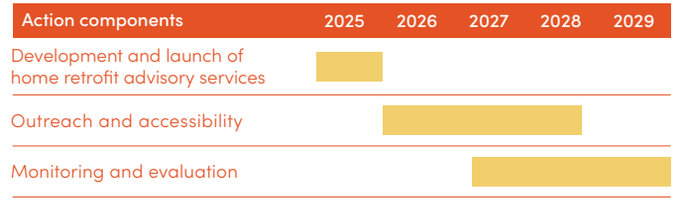
To ensure the one stop shop's services are accessible to all citizens, the programme will include:

- Creating a dedicated section on the city's official website www.agadir.ma and phone number;
- Opening physical advisory points across the city, co-located with the local branches of the municipality office ("Annexe commune") and if needed, in other community facilities;
- Community engagement through outreach online and in-person activities to raise awareness about the services and encourage participation, particularly in under-served communities (see CS-01).

MONITORING AND EVALUATION

To measure the effectiveness of the one stop shop, data will be routinely collected (every 6 months for the first two years, and then once a year) to monitor the uptake and effectiveness of the service. This will include polls, surveys and the analysis of records from the service's log. Monitoring activities will include metering of a sample of participating households to evaluate the impact of the implemented retrofit measures.

SCHEDULE OF IMPLEMENTATION



STRATEGIC GOALS

SG2
Design for a fair and inclusive society

SG5
Enable a healthy lifestyle for all

SG3
Optimise the use of its resources

SG7
Harness the potential of digital

RELATED GCAP ACTIONS

EA-02 EA-04 CS-01

CAP ALIGNMENT

Axis 5:
Agadir eco-city with low carbon

SOCIAL AND GENDER

Ensure that advisory points are accessible to all, including people with disabilities, by providing ramps, clear signage, and accessible communication methods.

Offer services in Arabic, Amazigh, French to cater to diverse communities.

Conduct targeted outreach to under-served communities, including low-income households, women-headed households, and elderly residents, to ensure they are aware of and can benefit from the advisory services.

Design advisory points to be safe and welcoming spaces for all citizens, particularly women and vulnerable groups. This includes ensuring good lighting, security measures, and comfortable waiting areas.

Implement feedback mechanisms that allow all users, especially women and marginalised groups, to share their experiences and suggestions. Use this feedback to continuously improve the services and address any barriers to access.

ECONOMIC DEVELOPMENT

Prioritise hiring and training women, youth, and individuals from marginalised communities for roles within the advisory system. This can help promote gender equality and provide economic opportunities.

DIGITAL

An online platform where citizens can access personalised energy efficiency advice, schedule in-person or online consultations, and apply for retrofitting grants and support, would provide easy access to energy-saving resources and support.

CLIMATE MITIGATION

N/A

CLIMATE ADAPTATION

Extreme temperatures

IMPACT INDICATORS

16: Share of renewable in total energy consumption

18: Electricity consumption in residential buildings

ACTION OWNER

Municipality of Agadir

DELIVERY PARTNERS

Agadir National School of Architecture

Digital

DA-01
Digital water treatment solutions

DA-02
Real time smart water management to identify and target decrease in NRW

DA-03
Agent-based modelling of Agadir transport network

DA-04
AI-powered traffic management

DA-05
Smart air quality monitoring system

DA-06
Digital ecosystem monitoring

DA-07
Integrated operations centre

Digital

Agadir has embarked on an ambitious journey with the "Digital Agadir" programme, a key initiative within its Communal Action Plan. This programme seeks to transform the city into a digitally advanced, sustainable hub, enhancing citizen services and modernising infrastructure. The development of Agadir's smart city relies on strong political support and a clear strategic vision. However, it faces significant obstacles in execution. The city benefits from comprehensive 4G connectivity but lacks 5G infrastructure, and its municipal IT systems require considerable improvements and standardization to address growing needs.

While Agadir has integrated several national e-service platforms, there are plans to expand local e-services to enhance the citizen experience. The city's data strategy, which includes the development of an Open Data Portal and a platform for cross-sector data integration ("Hyperviseur"), is central to improving decision-making and fostering innovation. Digital projects are underway in various sectors, addressing key urban challenges like land use management, waste collection, water quality monitoring, transport optimization, energy efficiency, and governance.

The GCAP digital actions build on the existing initiatives and work in synergy with the other sectoral actions of the Plan.

In the **water sector**:

- Smarter management of water resources will be achieved by monitoring of water quality and using **predictive analytics through AI and machine learning**, including real-time monitoring and early warning systems, water reuse and irrigation management, and sewer and storm water management DA-01 .
- This will be complemented by the implementation of **smart water management systems using IoT sensors**, network segmentation into district metering areas, and leak detection and contamination monitoring DA-02 .

In the **transport sector**:

- The design of a more efficient and sustainable urban mobility system will be supported thanks to the use of **agent-based modelling (ABM)** to simulate and analyse the movement patterns of individuals and vehicles, including data collection, model development and the setup of a simulation framework DA-03 .
- This will be complemented by the implementation of an **AI-powered traffic management system**, including adaptive traffic signals, real-time traffic information for drivers and the introduction of bus priority intersections. This includes a pilot, the implementation of end-user applications, an AI model evaluation and corresponding adjustment, prior to a full-scale roll-ou DA-04 .

Accurate, granular and timely data collection on the **state of the environment** will be achieved by deploying:

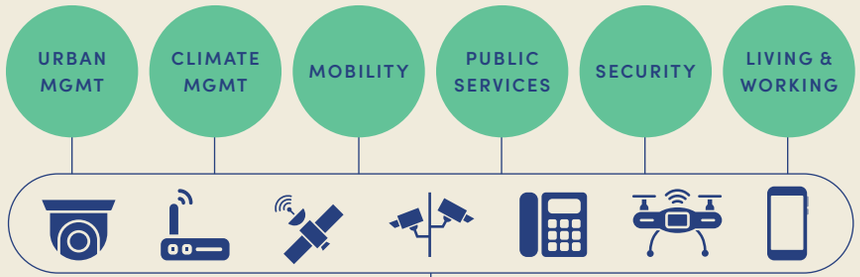
- An air pollution smart air quality monitoring system DA-05 and;
- The deployment of IoT sensors, drones, and remote sensing technologies to monitor local ecosystems including forests and coastal areas DA-06 ;

The proposed GCAP and CAP digital actions will feed into an **integrated operations centre**, which will collect and analyse data from sources such as traffic cameras, IoT sensors, public transport systems, and emergency services DA-07 .

The key components for Agadir smart city digital ecosystem can be understood as seven interconnected layers which, combined, form the stack that allow the green city digital actions to come to life.

With a total investment portfolio of MAD 319 million (EUR 29 million) and the potential to create 980 jobs, the GCAP digital actions will be key pillars in helping Agadir achieve its strategic goal of optimising the use of its resources to build a resilient, inclusive and smart city.

SERVICE LAYER
Smart services across all dimension of the city, from transport to government



TOUCH POINT LAYER
Rely on an array of data input such as sensing technologies, IoT enabled devices and mobile devices

DA-01 DA-02 DA-03
DA-04 DA-05 DA-06

CONNECTIVITY LAYER
Connected via wired and wireless network infrastructure

WIRED & WIRELESS CONNECTIVITY

ENABLING CONNECTIVITY INFRASTRUCTURE INVESTMENT NEEDED

MANAGEMENT LAYER
That link these touch points to a wide array of smart management systems

TRAFFIC MGMT | WATER MGMT | WASTE MGMT | AIR QUALITY MGMT | ETC... (POWER GRID, BUILDINGS MGMT)

DA-02 Real time smart water management to identify and target decrease in NRW

DA-03 Agent-based modelling of Agadir transport network

DA-04 AI-powered traffic management

OPERATIONS LAYER
These systems are centralised to visualise, control and operate the city or site wide areas

Centralised operations

DA-07 Integrated operations centre

AGADIR HYPERVISEUR - city data visualisation (paused initiative)

ANALYTICS LAYER
Are powered by advanced analytics that use data to enable data-driven decision making

Big data analytics

DA-01 Digital water treatment solutions

DA-05 Smart air quality monitoring system

DA-06 Digital ecosystem monitoring

INFRASTRUCTURE LAYER
They rely on robust digital and cloud infrastructure (grid, cell towers, data centres)

Digital / cloud infrastructure

ENABLING DATA & STORAGE INFRASTRUCTURE INVESTMENT NEEDED

Table 4
Diagram demonstrating the interconnected layers of the digital actions within the GCAP

DA-01

Digital water treatment solutions

AT A GLANCE

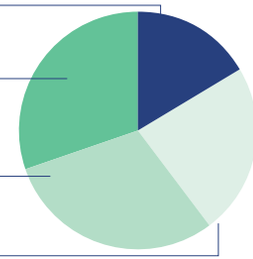
Monitoring of water quality and predictive analytics through AI and machine learning, including real-time monitoring and early warning systems, water reuse and irrigation management, and sewer and storm water management.

TYPE OF ACTION
Capital project, revenue project and monitoring or data collection

TIME HORIZON
2025-2030

SPATIAL EXTENT
City wide, Agadir coastline, Agadir farmland region

CAPEX
MAD 58,172,000
EUR 5,361,000



OPEX
MAD 5,817,000 / year
EUR 536,000 / year
Ongoing maintenance

ACTION DESCRIPTION

OVERVIEW

Agadir faces significant environmental challenges related to water quality and management, exacerbated by limited and variable rainfall, frequent droughts, and pollution from agricultural runoff and untreated industrial effluents. The percentage of bathing waters meeting minimum standards has dropped, indicating deteriorating water quality. Additionally, solid waste and agricultural pollutants often enter waterways during rainstorms, further exacerbating pollution. Investing in advanced water treatment technologies will ensure high water quality, reduce operational costs, and minimise environmental impact.

This action is to invest in advanced water treatment technologies that leverage AI and machine learning to optimise the water treatment process and ensure high water quality. Digital solutions such as this, will involve real-time monitoring of water quality parameters and predictive analytics to enhance the efficiency and effectiveness of water treatment plants.

These interventions will allow for dynamic adjustments to treatment processes based on incoming water quality, early detection of potential contaminants, and optimised water reuse. This approach will not only improve water quality but also reduce operational costs and environmental impact.

Digital interventions for water treatment will include real-time monitoring and early warning systems, water reuse and irrigation management, and sewer and stormwater management.

COMPONENT DESCRIPTION

STEERING COMMITTEE AND FEASIBILITY STUDY

The project will form a steering committee that includes stakeholders from local government, water authorities, and technology partners. A feasibility study will be conducted to assess current water treatment processes and identify gaps.

TECHNOLOGY PROCUREMENT AND INFRASTRUCTURE UPGRADES

The project will research and evaluate AI and machine learning technologies suitable for water treatment. It will identify necessary digital infrastructure and connectivity upgrades, select and procure the required technology, and deliver the upgrades.

REAL-TIME MONITORING AND EARLY WARNING SYSTEMS

Sensors will be installed for real-time bacterial measurements at key points in the water treatment process, ensuring timely detection and response to contamination. A machine-learning-based early warning system for bathing water quality will be developed to predict potential water quality issues, allowing for proactive measures to protect public health. Another early warning system for the safe reuse of treated wastewater for green urban spaces irrigation will ensure that treated wastewater meets safety standards before being used for irrigation.

WATER REUSE AND IRRIGATION MANAGEMENT

Machine learning (ML) will be leveraged for image processing to analyse irrigation efficiency and monitor agricultural practices, optimising water usage. A matchmaking tool will be developed to align water supply with demand using remotely sensed data, and stakeholders will be trained on using this tool for efficient resource management. It will be based on the assessment of irrigation needs using remotely sensed data (this might include sensors in fields, satellite imagery, forecast, users report) as well as on the amount and quality of available reused water from wastewater treatment plant (WWTP). The solution would be modelled on match making tool between water demand for irrigation and safe water availability being tested in Milano region in Italy.

SEWER AND STORMWATER MANAGEMENT

Sewer flow forecasting tools will be implemented to predict flow patterns, helping to manage wastewater effectively. An Interoperable Decision Support System (DSS) and Real-Time Control Algorithms for Stormwater Management will be developed, integrating various data sources (such as series of level and flow sensors within the sewer network, WWTP operation data, accurate flow forecast at the inflow of the WWTP) to improve decision-making processes via integration in the DA-07 Integrated Operations Centre.

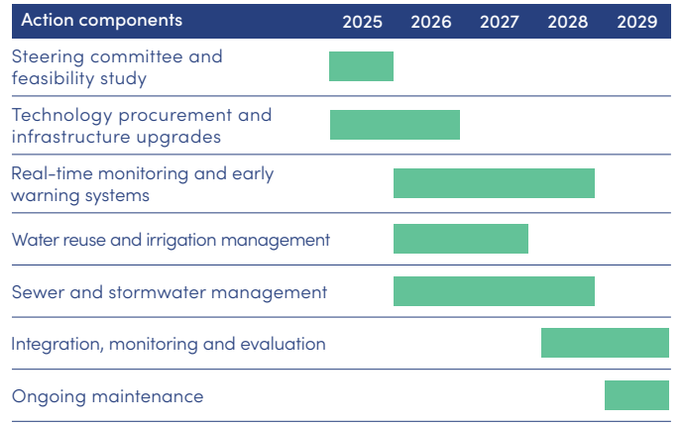
INTEGRATION, MONITORING AND EVALUATION

Key performance indicators (KPIs) will be established to measure water quality improvements, operational cost reductions, and environmental impacts. The project will integrate into the DA-07 Integrated Operations Centre and Hyperviseur.

ONGOING MAINTENANCE

Regular maintenance will be conducted to ensure the continued functionality and accuracy of the systems.

SCHEDULE OF IMPLEMENTATION



STRATEGIC GOALS

SG3
Optimise the use of its resources

SG7
Harness the potential of digital

SG5
Enable a healthy lifestyle for all

RELATED GCAP ACTIONS

WA-03 WA-04 WA-05 DA-07

CAP ALIGNMENT

Axis 5: Agadir eco-city with low carbon

Axis 6: Digital Agadir

SOCIAL AND GENDER

Develop training programmes specifically aimed at women to build their skills in operating and maintaining advances water treatment technologies. This could include workshops on AI and machine learning applications in water management.

Potential to partner with women-led and youth-led start-ups in the development and deployment of digital water treatment solutions.

Ensure that information regarding water quality and technology is accessible to all community members. This can be done through workshops, pamphlets and online platforms that are user-friendly.

ECONOMIC DEVELOPMENT

180 FTE

This initiative will be carried out in collaboration with Moroccan and local start-ups, creating jobs and fuelling the local economy.

DIGITAL

This action is entirely dedicated to support the digital transformation of the water sector and is linked to DA-07 Integrated operations centre

CLIMATE MITIGATION

N/A

CLIMATE ADAPTATION

Flood/Landslide

Drought

IMPACT INDICATORS

26: Percentage of residential and commercial wastewater that is treated according to applicable national standards – more than 60%

28: Percentage of dwellings damaged by the most intense flooding in the last 10 years – less than 0.5%

ACTION OWNER

SRM SM

DELIVERY PARTNERS

- Municipality of Agadir
- ONEE

DA-02

Real time smart water management to identify and target decrease in non-revenue water

AT A GLANCE

Implementation of smart water management systems using IoT sensors, network segmentation into district metering areas, and leak detection and contamination monitoring.

TYPE OF ACTION
Capital project, revenue project and monitoring or data collection

TIME HORIZON
2025-2030

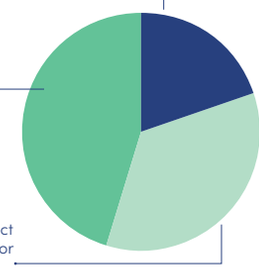
SPATIAL EXTENT
To be defined in collaboration with SRM SM

CAPEX
MAD 38,821,000
EUR 3,578,000

Planning, technology selection and procurement, phased implementation
MAD 7,770,000
EUR 716,000

Predictive analytics and data management, leak detection and contamination monitoring
MAD 17,461,000
EUR 1,609,000

Network segmentation and district metering areas (DMAs), IoT sensor installation and data integration
MAD 13,590,000
EUR 1,253,000



OPEX
MAD 3,878,000 / year
EUR 357,000 / year

Operational costs, including monitoring and evaluation

ACTION DESCRIPTION

OVERVIEW

Agadir's significant environmental challenges related to water, implementing systems that identify leaks, contamination and optimise water usage is crucial. The efficiency of water supply networks is at 78% for Agadir, resulting in a 22% of non-revenue water (NRW). These measures will ensure long-term sustainable water management and improve the feasibility of future water supply augmentation.

This action includes the implementation of a smart water management systems using IoT sensors to monitor water quality and levels in real-time, coupled with network segmentation into district metering area to enhance the ability to monitor the location and sources of NRW (Non-Revenue Water), and to implement measures to target reduction in NRW and increase billing.

COMPONENT DESCRIPTION

DETAILED PLANNING

The project will begin with a needs assessment to identify current challenges related to non-revenue water (NRW) and water management. This assessment will provide a clear understanding of the existing issues and help in formulating effective strategies to address them.

TECHNOLOGY SELECTION AND PROCUREMENT

The project will involve researching and evaluating suitable IoT sensors, control valves,

and flow meters. After identifying the appropriate technologies, vendors will be selected, and the necessary equipment will be procured, ensuring compatibility with existing systems to facilitate seamless integration.

NETWORK SEGMENTATION AND DISTRICT METERING AREAS

To enhance monitoring and management of NRW, DMAs will be created. This will involve installing control valves and flow meters within the municipal water supply zones. Additionally, the existing network will be mapped out to identify priority areas, particularly older sections with higher leakage potential.

IOT SENSOR INSTALLATION AND DATA INTEGRATION

IoT sensors will be strategically placed in key locations such as water treatment plants, reservoirs, and distribution networks. The data collected from these sensors will be transmitted to a central platform for analysis, in line with the DA-07 Integrated Operations Centre and Hyperviseur approach, ensuring comprehensive data integration and management.

PREDICTIVE ANALYTICS AND DATA MANAGEMENT

Algorithms for predictive analytics will be developed to identify patterns and provide actionable insights on water quality and usage. A dashboard will be implemented for real-time monitoring and reporting of water quality, levels, and NRW instances, linked with the DA-07 Integrated Operations Centre and Hyperviseur, to facilitate informed decision-making.

LEAK DETECTION AND CONTAMINATION MONITORING

Early warning systems for leak detection and contamination alerts will be developed. These systems will enable the creation of intervention measures based on predictive analytics, allowing for prompt and effective responses to identified issues. This monitoring capability will build upon the one on DA-01 and expand monitoring reach to inform responses.

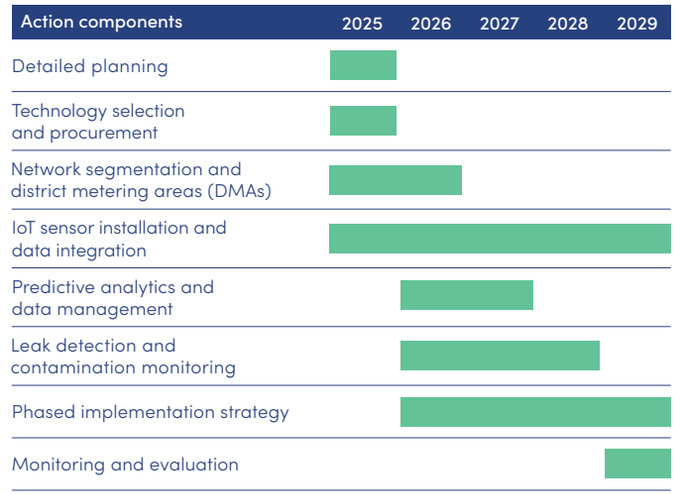
PHASED IMPLEMENTATION STRATEGY

The system will be rolled out in phases, starting with the oldest parts of the network where leakage levels are likely highest. This phased approach will ensure that the most critical areas are addressed first, gradually extending the improvements across the entire network.

MONITORING AND EVALUATION

Key performance indicators (KPIs) will be established to measure reductions in NRW, improvements in water quality, and operational efficiencies. Continuous monitoring and evaluation will ensure that the project meets its objectives and delivers the expected benefits.

SCHEDULE OF IMPLEMENTATION



STRATEGIC GOALS

SG3
Optimise the use of its resources

SG7
Harness the potential of digital

RELATED GCAP ACTIONS

WA-01 WA-04 DA-07

CAP ALIGNMENT

Axis 6: Digital Agadir

SOCIAL AND GENDER

Develop training initiatives aimed at women to equip them with the skills necessary for operating, maintaining and analysing data.

Prioritise collaboration with women-owned or women-led start-ups for the installation and maintenance of smart water technologies. This not only supports local economies but also empowers women in the technology sector.

ECONOMIC DEVELOPMENT

120 FTE

This initiative will be carried out in collaboration with Moroccan and local start-ups, creating jobs and fuelling the local economy.

DIGITAL

DA-07 Integrated operations centre

CLIMATE MITIGATION

N/A

CLIMATE ADAPTATION

Drought

IMPACT INDICATORS

25.1: Non revenue water – less than 30%

27: Sewer Network Integrity (Pipe break) – less than 2 breaks/km/year

ACTION OWNER

SRM SM

DELIVERY PARTNERS

- Municipality of Agadir
- ONEE

DA-03

Agent-based modelling of Agadir transport network

AT A GLANCE

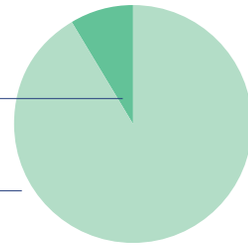
Implementation of agent-based modelling (ABM) to simulate and analyse the movement patterns of individuals and vehicles, including data collection, model development and the setup of a simulation framework, to support the definition of interventions based on the insights from the ABM simulations.

TYPE OF ACTION
Capital project, revenue project and monitoring or data collection

TIME HORIZON
2025-2030

SPATIAL EXTENT
Agadir metropolitan area and city region

CAPEX
MAD 11,634,000
EUR 1,072,000



Define intervention strategies
MAD 970,000
EUR 89,000

Planning, data collection, model development, simulation framework
MAD 10,665,000
EUR 983,000

OPEX
MAD 2,909,000 / year
EUR 268,000 / year
Operational costs, including monitoring and evaluation

ACTION DESCRIPTION

OVERVIEW

Heavy reliance on private vehicles, unreliability of public transport systems and poor provision of walking and cycling infrastructure increase congestion and reduce air quality in Agadir. By optimising traffic flow and public transport routes, Agadir can reduce congestion and improve air quality, while also better managing disaster scenarios by simulating evacuations and optimising emergency response strategies. This action supports numerous other actions within this GCAP, such as the better design of cycling infrastructure and the optimisation of public transport routes, enhancing overall urban mobility and sustainability.

This action will implement agent-based modelling (ABM) to simulate and analyse the movement patterns of individuals and vehicles within Agadir. ABM involves creating virtual agents that represent people, vehicles, or other entities, each with their own set of behaviours and interactions, gathering data on current movement patterns, including traffic flow, pedestrian movement, and public transport usage. By simulating these agents in a digital environment, we can gain insights into how different factors influence movement patterns and identify potential areas for intervention. This approach can be particularly useful in the Stadium district, especially during large events like the upcoming World Cup.

COMPONENT DESCRIPTION

DETAILED PLANNING

The project will begin with requirements gathering to identify specific needs for the simulation, including data requirements and desired outcomes. Boundary setting will clearly delineate what will be included in the project, such as specific areas of Agadir, and what will be excluded. As part of this component, the decision to buy/outsource all or part of the service versus building and running it in-house should follow due governance and assessment to ensure Agadir ends up with a service model that works well over time.

DATA COLLECTION

To understand current movement patterns, data on traffic flow, pedestrian movement, and public transport usage will be gathered. This will involve integrating various data sources, including GPS data, traffic cameras, surveys, and public transport schedules, to provide a comprehensive view of the city's mobility.

MODEL DEVELOPMENT

The model development phase will involve creating virtual agents representing individuals, vehicles, and public transport. These agents will have defined behaviours, including rules for movement, interactions, and decision-making. Additionally, a digital representation of Agadir will be developed, incorporating roads, buildings, and public spaces to create a realistic simulation environment.

SIMULATION FRAMEWORK SETUP AND EXECUTION

An appropriate agent-based modelling (ABM) platform will be selected for the simulation framework setup. Model calibration will be conducted by adjusting parameters based on real-world data to ensure accuracy. Multiple scenarios will be executed to observe different movement patterns, and the results

will be analysed to identify trends, bottlenecks, and areas for improvement.

DEFINE INTERVENTION STRATEGIES

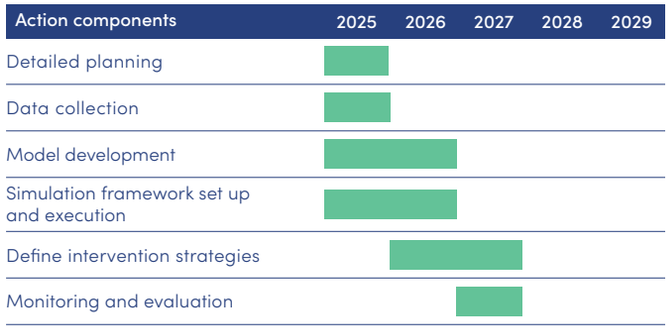
Based on the insights gained from the simulations, action plans will be developed to implement recommended changes. This will include proposing traffic management changes, such as adjustments to traffic signals, road layouts, and public transport routes. Additionally, strategies for efficient evacuation and resource allocation during disasters will be developed to enhance emergency response.

This live dynamic model can be continuously updated and used for multiple planning purposes, including zoning, and to optimise the design of transport investments, ensuring that the city's infrastructure evolves with its needs.

MONITORING AND EVALUATION

Metrics will be established to assess the impact of the implemented strategies over time. Continuous monitoring and evaluation will ensure that the strategies are effective and that any necessary adjustments can be made to improve outcomes.

SCHEDULE OF IMPLEMENTATION



STRATEGIC GOALS

SG2
Design for a fair and inclusive society

SG7
Harness the potential of digital

SG4
Promote sustainable mobility

RELATED GCAP ACTIONS

TA-01 TA-02 TA-05 DA-04 DA-07

CAP ALIGNMENT

Axis 6: Digital Agadir

Axis 12: Multimodal mobility

SOCIAL AND GENDER

Collect and analyse movement patterns disaggregated by gender to understand how different groups use transportation and public spaces. This includes differences in travel times, modes of transport, and destinations.

Use the insights gained from the ABM to design public transport routes and schedules that accommodate the needs of women, such as those traveling during non-peak hours or accessing destinations related to care-giving and community activities.

Model scenarios that ensure safety and accessibility for all users, including women who may be more vulnerable to issues such as harassment or inadequate lighting in public transport areas.

ECONOMIC DEVELOPMENT

40 FTE

This initiative will be carried out in collaboration with Moroccan and local start-ups, creating jobs and fuelling the local economy.

DIGITAL

DA-04 AI-powered traffic management

DA-07 Integrated operations centre

CLIMATE MITIGATION

18,600 tCO2/year

CLIMATE ADAPTATION

Infrastructure failure/ obsolescence

IMPACT INDICATORS

12: Average travel speed on primary thoroughfares during peak hour – more than 30km/h

12.1: Travel speed of bus service on major thoroughfares (daily average) – more than 25km/h

ACTION OWNER

Municipality of Agadir
(Environment and Quality of Life Division)

DELIVERY PARTNERS

Local Development Company for mobility (SDL mobilité)

DA-04

AI-powered traffic management

AT A GLANCE

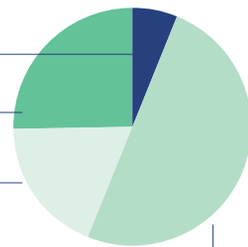
Implementation of traffic management systems, including adaptive traffic signals, real-time traffic information for drivers and the introduction of bus priority intersections. This includes a pilot, the implementation of end-user applications, an AI model evaluation and corresponding adjustment, prior to a full-scale roll-out.

TYPE OF ACTION
Capital project, revenue project and monitoring or data collection

TIME HORIZON
2025-2030

SPATIAL EXTENT
Pilot: Critical junction/s to be defined through initial study
Full scale roll out: Citywide

CAPEX
MAD 87,258,000
EUR 8,042,000



Planning and infrastructure assessment
MAD 4,848,000
EUR 447,000

Pilot implementation, full-scale roll-out
MAD 21,786,000
EUR 2,008,000

End user applications implementation
MAD 17,843,000
EUR 1,644,000

Data collection, storage and AI system development, AI model evaluation and adjustment
MAD 42,781,000
EUR 3,943,000

OPEX
MAD 8,726,000 / year
EUR 804,000 / year
Ongoing maintenance

ACTION DESCRIPTION

OVERVIEW

Traffic load on the streets changes from month to month. This depends on various reasons. The main ones are school holidays, public and religious holidays, climatic conditions, and the time of year such as holiday seasons and tourism. Optimising traffic and having control over it all together is crucial to improve daily lives. The high traffic demand on the city's arterial streets exceeds the capacity of these streets, causing congestion which spills back to the city's main intersections. The resulting congestion affects not only the flow of private vehicles and public transport but also the overall quality of life in the city.

This action will implement AI-driven traffic management systems to reduce congestion and emissions from vehicles. This initiative will include adaptive traffic signals and real-time traffic information for drivers. It will improve capacity and efficiency of overall transport system. It will be possible to integrate public transport locations and introduction of bus priority intersections.

AI-powered traffic management systems will use artificial intelligence to optimise traffic flow and reduce congestion. These systems will employ real-time data from traffic cameras, sensors, and GPS devices to analyse traffic patterns. AI algorithms will then dynamically adjust traffic signals, provide real-time traffic information to drivers, and manage incidents more efficiently. This will reduce vehicle emissions and improve overall air quality. Significant infrastructure (high-resolution cameras, sensors, and communication networks) and system (integration with traffic control systems) upgrades will be needed.

COMPONENT DESCRIPTION

PLANNING AND INFRASTRUCTURE ASSESSMENT

The initiative will establish clear goals for reducing congestion and improving air quality and develop intelligent transport system guidelines to be implemented. It will evaluate existing traffic signal systems and communication networks to identify gaps and determine necessary installations for high-resolution cameras and sensors. It will also identify cyber-security requirements and best practice needed to be implemented to help protect critical traffic infrastructure following guidelines such as ISO/IEC 27001 Standards and NIST Cybersecurity Framework.

DATA COLLECTION, STORAGE AND AI SYSTEM DEVELOPMENT

Traffic cameras and GPS devices will be installed on public vehicles to gather real-time data. Data management solutions will be established, linked to the data storage strategy for the DA-07 Integrated Operations Centre, allowing for external data feeds in Hyperviseur once this initiative progresses. It will integrate with city traffic control systems, bus schedules, route databases, and other data sources, and implement protocols for secure and efficient data transmission. Partnerships with local tech companies to develop AI algorithms will support the review of historical data to inform AI model training and test AI models in simulated environments to refine their effectiveness.

PILOT IMPLEMENTATION

Adaptive traffic signals will be rolled out in selected areas and monitor their performance.

END USER APPLICATIONS IMPLEMENTATION

The initiative will create an interactive dashboard that provides real-time traffic data, analysis, and insights for operational decision-making. It will roll out intelligent traffic light control systems, set up a notification system to alert users about significant traffic changes and incidents, and integrate with Hyperviseur for data visualization once this initiative progresses.

AI MODEL EVALUATION AND ADJUSTMENT

Improvements against established KPIs post-implementation will be measured and AI models will be adjusted based on performance metrics and user feedback.

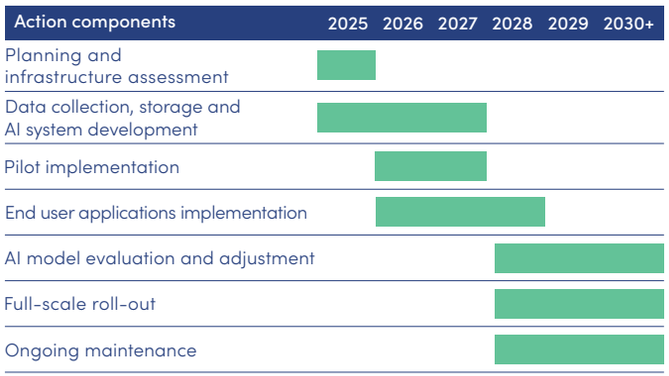
FULL-SCALE ROLL-OUT

The initiative will scale implementation citywide, establish bus priority intersections, and integrate public transport data.

ONGOING MAINTENANCE

Regular checks for hardware and software and continuous improvement algorithms with new traffic data will ensure successful outcomes.

SCHEDULE OF IMPLEMENTATION



STRATEGIC GOALS

SG4
Promote sustainable mobility

SG7
Harness the potential of digital

RELATED GCAP ACTIONS

TA-02 TA-03 DA-07

CAP ALIGNMENT

Axis 6: Digital Agadir

Axis 12: Multimodal mobility

SOCIAL AND GENDER

Analyse traffic patterns to understand how different demographic groups use the roads. For example, assess if women's travel patterns differ from men's due to commuting routes, time of day, or vehicle types used.

Examine how traffic congestion impacts women differently, especially if they are more likely to use public transport or travel during peak hours due to care-giving responsibilities.

ECONOMIC DEVELOPMENT

270 FTE

This initiative will be carried out in collaboration with Moroccan and local start-ups, creating jobs and fuelling the local economy.

DIGITAL

This action will integrate data from various transport actions to optimise urban mobility. It will use real-time information from the expanded cycling network and bike-sharing scheme (TA-01), and mobility hubs to adjust traffic signals and improve multi-modal transport flow (TA-02). The system will prioritise electric feeder buses at intersections (TA-03), and enhance pedestrian safety through optimised traffic calming measures (TA-05). Together, these actions will create a cohesive, efficient, and sustainable urban transport network.

All data captured will be integrated through DA-07.

CLIMATE MITIGATION

18,600 tCO2/year

CLIMATE ADAPTATION

Infrastructure failure/ obsolescence

IMPACT INDICATORS

12: Average travel speed on primary thoroughfares during peak hour – more than 30km/h

12.1: Travel speed of bus service on major thoroughfares (daily average) – more than 25km/h

ACTION OWNER

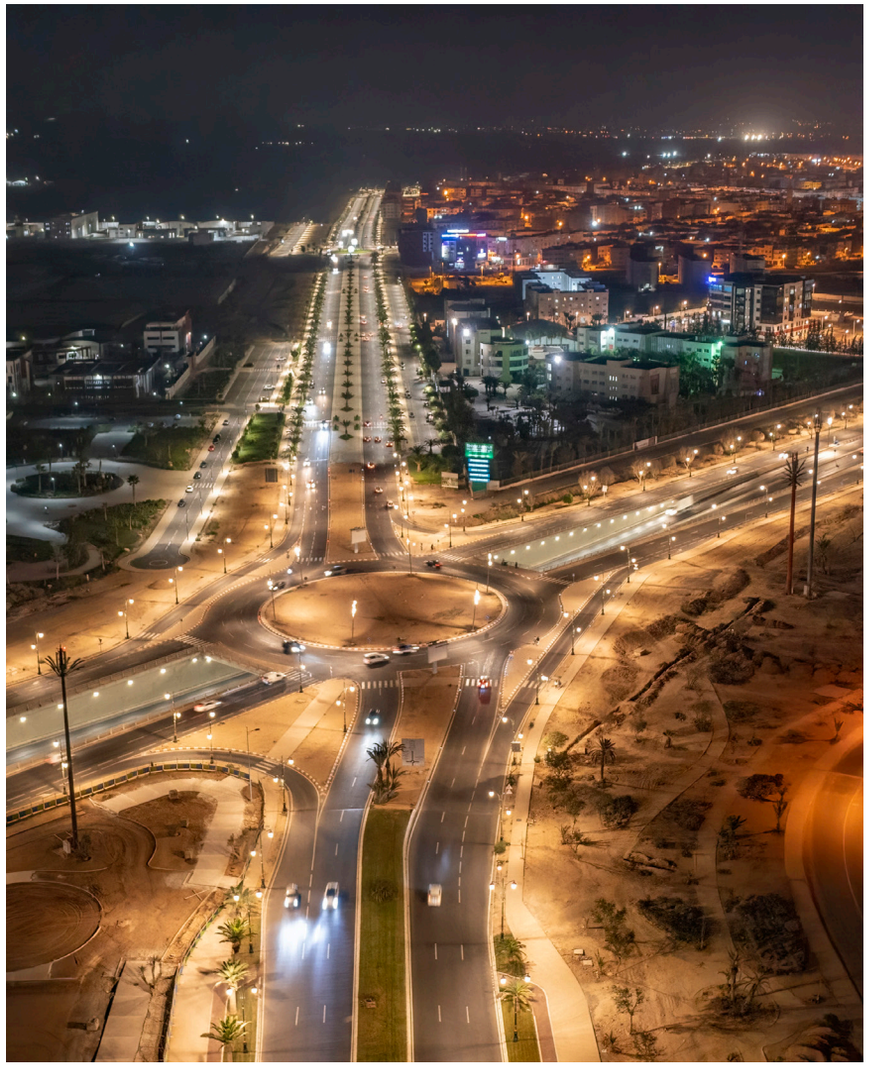
Municipality of Agadir (Environment and Quality of Life Division and Public works Division)

DELIVERY PARTNERS

- Local Development Company for public works (SDL Agadir Souss-Massa aménagement)
- Local Development Company for mobility (SDL mobilité)

DA-05

Smart air quality monitoring system



AT A GLANCE

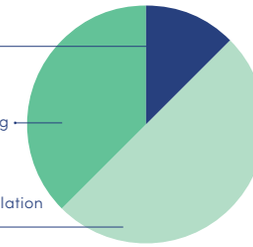
Deploy IoT-enabled air quality sensors across the city to monitor pollution levels in real-time and guide interventions to reduce pollution.

TYPE OF ACTION
Capital project, monitoring or data collection and revenue project

TIME HORIZON
2025-2027

SPATIAL EXTENT
Municipality of Agadir

CAPEX
MAD 3,878,000
EUR 357,000



OPEX
MAD 630,000 / year
EUR 58,000 / year
Monitoring and maintenance

ACTION DESCRIPTION

OVERVIEW

Agadir faces significant air quality challenges, primarily due to emissions from an outdated vehicle fleet, inadequate enforcement of pollution control laws, and extensive dust pollution from construction activities. The city's geographical location and minimal rainfall further exacerbate pollution dispersion. Monitoring air quality is important to protect public health, reduce environmental damage, and ensure a better quality of life for residents.

This action involves deploying a network of internet of things-enabled air quality (IoT) sensors throughout Agadir. These smart air quality monitoring systems will measure various pollutants, including PM2.5, PM10, NO2, and CO, in real-time.

Sensors will be strategically located across the city to ensure comprehensive coverage, allowing for accurate monitoring of air quality in densely populated and high-traffic areas. Successful deployment will require establishing necessary infrastructure, including reliable power supplies and communication networks, to support the sensors and ensure seamless data transmission.

The data collected from these sensors will initially be stored and analysed using a solution that integrates with DA-07 Integrated Operations Centre to start with, as the Hyperviseur platform is not yet operational and therefore lacks the necessary data management, storage, and analytics capabilities to handle sensor data. However, once Hyperviseur is fully developed, the integration of this data will enhance decision-making processes.

The analysed data will be utilised to inform the public about air quality conditions, guiding policy decisions and implementing targeted interventions to reduce pollution.

COMPONENT DESCRIPTION

PLANNING AND INFRASTRUCTURE ASSESSMENT

The initiative will clearly outline its goals and involve local government, community organisations, and potential technology partners and SMEs to gather input and support. It will assess current power supplies and communication networks to identify gaps, and determine necessary upgrades or installations needed to support sensor deployment.

SENSOR PROCUREMENT AND INSTALLATION

Suitable IoT-enabled air quality sensors will be identified to meet technical specifications. Strategic locations for sensor installation will be chosen based on population density and pollution hotspots, and a detailed plan for the physical installation of sensors, including timelines will be developed.

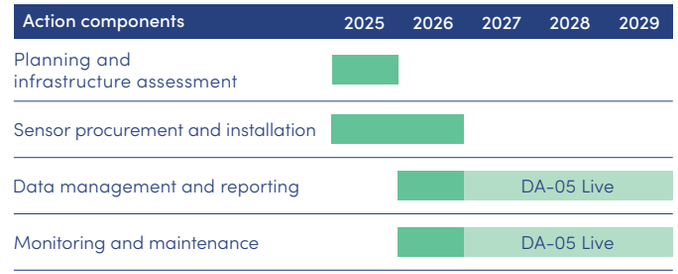
DATA MANAGEMENT AND REPORTING

Data management solutions will be established in line with the DA-07 Integrated Operations Centre to collect and store sensor data. Future integration with Hyperviseur will be assessed once the Hyperviseur city platform initiatives become live again. Protocols for secure and efficient data transmission from sensors to the central platform will be implemented. Analytical tools will be utilised to process and visualize air quality data, and findings will be regularly shared with the community and local government to inform policy decisions.

MONITORING AND MAINTENANCE

A routine maintenance plan will be established for sensor upkeep and calibration, and data quality checks will ensure the accuracy and reliability of the data collected. Additionally, air quality monitoring could be further enhanced through service providers that leverage satellite imagery and air dispersion models to improve near real-time air quality monitoring.

SCHEDULE OF IMPLEMENTATION



STRATEGIC GOALS

SG5
Enable a healthy lifestyle for all

SG7
Harness the potential of digital

RELATED GCAP ACTIONS

DA-07

CAP ALIGNMENT

Axis 6: Digital Agadir

SOCIAL AND GENDER

Involve women in the data collection and analysis process by providing training on how to operate and maintain the air quality sensors.

Ensure that data and information collected are presented in accessible formats for all community members, including women who may have limited access to technology. This can include community meetings, printed materials and social media campaigns.

Engage with local stakeholders to ensure that the placement of air quality sensors consider the needs of different community groups, particularly women and marginalised population (e.g., Conduct surveys to identify areas where this groups frequent or live and strategically locate sensors in those areas).

ECONOMIC DEVELOPMENT

10 FTE

This initiative will also foster collaboration with Moroccan and local start-ups, creating jobs and stimulating the local economy while enhancing Agadir's smart city capabilities.

DIGITAL

DA-07 Integrated operations centre

CLIMATE MITIGATION

N/A

CLIMATE ADAPTATION

N/A

IMPACT INDICATORS

N/A

ACTION OWNER

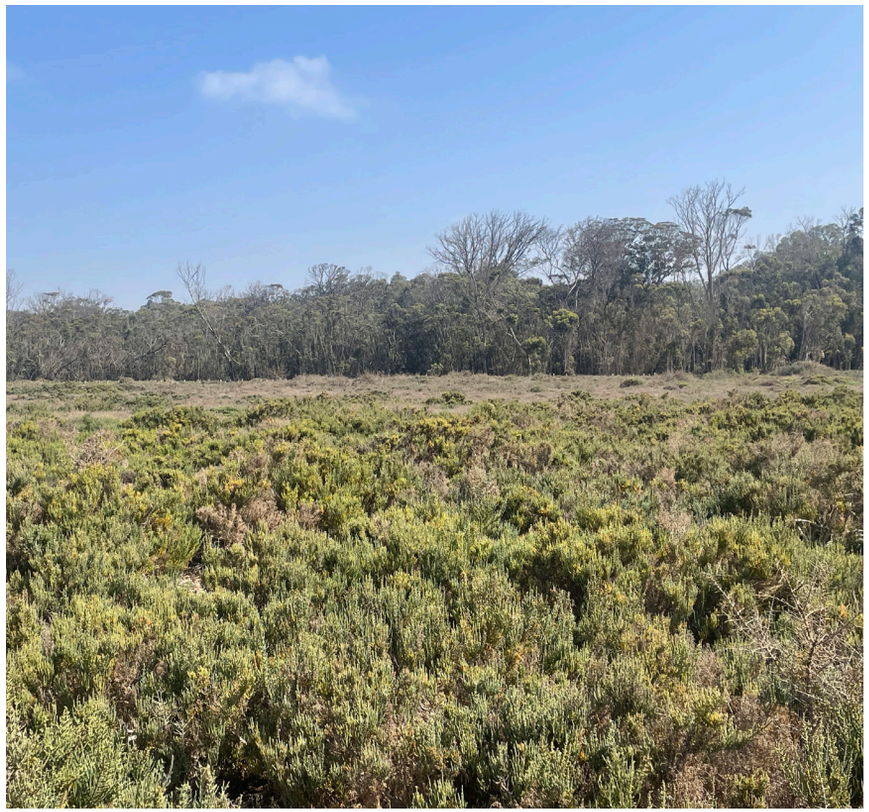
Municipality of Agadir

DELIVERY PARTNERS

Local SMEs

DA-06

Digital ecosystem monitoring



AT A GLANCE

Deployment of IoT sensors, drones, and remote sensing technologies to monitor local ecosystems, track environmental parameters, and support restoration and resilience efforts.

TYPE OF ACTION
Capital project, revenue project and monitoring or data collection

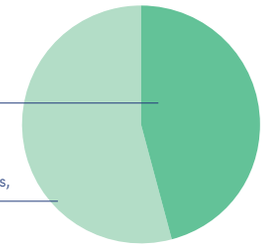
TIME HORIZON
2025-2030

SPATIAL EXTENT
City of Agadir, Souss Estuary, coastline, foothills of the Atlas Mountains, orbital forest

CAPEX
MAD 23,269
EUR 2,145

Detailed planning technology procurement and installation
MAD 10,665,000
EUR 983,000

Data integration and AI analysis, Biodiversity and restoration
MAD 12,604,000
EUR 1,162,000



OPEX
MAD 2,327,000 / year
EUR 214,000 / year

Operational costs, including monitoring and evaluation

ACTION DESCRIPTION

OVERVIEW

Agadir has committed to restoring 8 million hectares of degraded forest ecosystems by 2030, making it an ideal location for advanced monitoring technologies along with other sensitive habitats such as Agadir the Souss estuary, coastline, and the foothills of the Atlas Mountains.

This action focuses on deploying advanced technologies, including IoT sensors, aerial vehicles, and remote sensing, to monitor the diverse ecosystems of Agadir—coastal, urban, forest, farmland, and wetlands— some aspects in real-time. By leveraging these advanced technologies, Agadir will have a holistic approach to monitoring and managing its rich natural resources. The insights gained will not only support restoration efforts but also enhance the resilience of the region's ecosystems, ensuring sustainable development and environmental resilience for the future.

By strategically placing the proposed technology, Agadir will be able to track essential environmental parameters like soil moisture and air quality. This will enable the monitoring of various environmental factors, such as:

- Reforestation progress by using satellite imagery (or other remote sensing data capture methods) and historical data to monitor the restoration of degraded forest ecosystems
- The albedo effect, which reflects how different land uses impact local urban climates
- Land surface permeability and better understanding of water infiltration and runoff patterns, which are vital for effective stormwater management and flood risk reduction.
- Coastal erosion, providing insights into sediment movement and enabling the development of effective coastal management strategies.
- Flooding risks by monitoring topographical changes and water levels in real-time. This capability is essential for implementing proactive measures to protect communities and ecosystems from potential flooding events.

Integrating AI will empower Agadir to analyse collected data, identify patterns, and predict potential threats to biodiversity. This approach offers valuable insights into ecosystem health and enables timely interventions. Moreover, biodiversity monitoring will assess both species loss and growth, providing a comprehensive view of ecosystem vitality and the effectiveness of restoration efforts.

COMPONENT DESCRIPTION

DETAILED PLANNING

The project will begin with a comprehensive needs assessment to identify current environmental challenges, target ecosystems/habitats and monitoring gaps. This assessment will provide a clear understanding of the existing issues and help in formulating effective strategies to address them.

TECHNOLOGY PROCUREMENT AND INSTALLATION

The next step involves evaluating and selecting IoT sensors, aerial vehicles (drones), and remote sensing technologies (e.g. Satellite) and data providers suitable for ecosystem monitoring. Additionally, infrastructure and connectivity gaps will be identified to ensure seamless integration of the new technologies.

Key locations for sensor installation will be identified based on the target ecosystems, including coastal areas, urban zones, forests, farmland, and wetlands. Sensors will be installed to track essential environmental parameters such as soil moisture and air quality, providing comprehensive data for analysis. Remote sensing will be used for comprehensive environmental monitoring. This includes assessing the albedo effect, understanding land surface permeability, tracking sediment movement, and monitoring topographical changes and water levels.

DATA INTEGRATION AND AI ANALYSIS

Data from IoT sensors and remote sensing technologies will be integrated into a central platform. AI algorithms will be utilised to analyse the data, identify patterns, and predict potential threats. A dashboard will be implemented for real-time monitoring of some aspects and reporting on ecosystem health, integrated into the DA-07 Integrated Operations Centre.

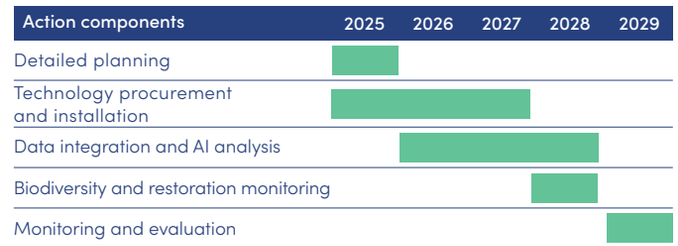
BIODIVERSITY AND RESTORATION MONITORING

Protocols for monitoring biodiversity will be developed, focusing on key species and habitats within the target ecosystems. Monitoring efforts will be aligned with restoration projects in sensitive habitats, including the 8 million hectares of degraded forest ecosystems, the Souss estuary, coastline, and the foothills of the Atlas Mountains. Insights gained from monitoring will inform restoration strategies, and data analytics will be used to evaluate the effectiveness of restoration efforts and overall ecosystem vitality, enhancing ecosystem resilience.

MONITORING AND EVALUATION

Key performance indicators (KPIs) will be established to measure improvements in ecosystem health, biodiversity, and restoration success. Continuous monitoring and evaluation will ensure that the project meets its objectives and delivers the expected benefits.

SCHEDULE OF IMPLEMENTATION



STRATEGIC GOALS

SG1
Protect and enhance its environment

SG7
Harness the potential of digital

RELATED GCAP ACTIONS

LA-01 LA-04 DA-07

CAP ALIGNMENT

Axis 5: Agadir Eco-city with low carbon

Axis 10: Patrimony management and urban planning

SOCIAL AND GENDER

Develop training programmes specifically aimed at women and marginalised groups to equip them with the skills needed to operate, maintain, and analyse data from IoT sensors, aerial vehicles, and remote sensing technologies. This can enhance women's participation in environmental monitoring and technology fields.

Encourage the participation of women and local community members in monitoring activities. This could involve forming community groups that include women as leaders to ensure diverse perspectives are included in data collection and interpretation. The needs of different community groups, particularly women and marginalised population (e.g., Conduct surveys to identify areas where this groups frequent or live and strategically locate sensors in those areas).

ECONOMIC DEVELOPMENT

70 FTE

This initiative will be carried out in collaboration with Moroccan and local start-ups, fostering innovation and creating job opportunities that will fuel the local economy.

DIGITAL

DA-07 Integrated operations centre

CLIMATE MITIGATION

N/A

CLIMATE ADAPTATION

N/A

IMPACT INDICATORS

7: Abundance of bird species – more than 0% annual change

ACTION OWNER

Municipality of Agadir
(Environment and Quality of Life Division)

DELIVERY PARTNERS

- Local Voluntary Organisations
- Municipality Environmental Division

DA-07

Integrated operations centre

AT A GLANCE

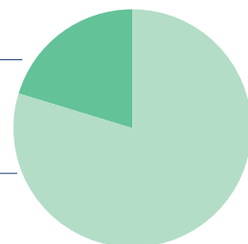
Implementation of a centralised system to collect and analyse data from sources such as traffic cameras, IoT sensors, public transport systems, and emergency services.

TYPE OF ACTION
Revenue project and monitoring or data collection

TIME HORIZON
2025-2035

SPATIAL EXTENT
Municipality of Agadir

CAPEX
MAD 96,953,000
EUR 8,936,000



Pilot testing, training and capacity building
MAD 19,391,000
EUR 1,787,000

Define IOC scope, data source identification, infrastructure setup, select software and tools, integration of smart infrastructure, develop emergency response system
MAD 77,562,000
EUR 7,148,000

OPEX
MAD 14,543,000 / year
EUR 1,340,000 / year

Operational costs, including monitoring and evaluation

ACTION DESCRIPTION

OVERVIEW

The city is currently exploring the development of data collection and visualisation platform (Hyperviseur), with the purpose of supporting data-driven decision making, improving the monitoring of the built environment in the city and developing use cases for operational improvement.

This action involves the implementation of an integrated operations centre (IOC), a centralised system to collect and analyse data from various sources such as traffic cameras, IoT sensors, public transport systems, and emergency services will help Agadir enhance real-time decision-making and improve coordination among different city departments. Integrating smart infrastructure components such as intelligent street lighting, smart waste management, and water management systems into the IOC will also help optimize resource use, reduces operational costs, and improves service delivery.

Many actions planned in the GCAP consider the deployment of sensors, IoT devices, and traffic cameras, which will support data capture. This action aims to centralise this data and allow the municipality to have a '360 view' of energy, transport, waste, etc., thereby enhancing overall urban management and sustainability.

Additionally, the IOC could also support the Municipality in the development of a disaster risk reduction (DRR) framework, enhancing the city's ability to manage and respond to emergencies effectively.

COMPONENT DESCRIPTION

DEFINE IOC SCOPE

The first step is to establish clear goals for the IOC, focusing on enhancing real-time data collection and analysis to improve decision-making and coordination among city departments. The aim is to create a centralised system that integrates data from various sources, facilitating a holistic view of urban dynamics. Additionally, a review of the use cases identified for Hyperviseur and green city actions across all sectors will be conducted, prioritising those that best meet the GCAP objectives and Agadir's critical operational needs.

DATA SOURCE IDENTIFICATION

Identifying and cataloguing data sources such as traffic cameras, IoT sensors, public transport systems, and emergency services is crucial. Ensuring data compatibility and integration capabilities among different systems will enable seamless data flow and comprehensive analysis. Establishing robust data governance mechanisms is equally important to facilitate coordination among the municipality, utilities, SDLs, and other stakeholders. This involves breaking down data silos, defining protocols for data ownership, access, and sharing, and fostering collaboration across all entities. Given the city's current limited capacity (as highlighted in the SMA/ Baseline), external technical support and capacity-building initiatives will be necessary to effectively implement these measures.

INFRASTRUCTURE SETUP

Establishing the necessary IT infrastructure, including servers, data storage, and network capabilities, is essential. Robust cybersecurity measures must be in place to protect sensitive data and ensure the integrity of the system.

SELECT SOFTWARE AND TOOLS

Choosing a centralised data management platform that can integrate data from various sources is vital. This selection should consider the other Digital Actions (DA-01, DA-02, DA-03, DA-04, DA-05, DA-06) to ensure compatibility. The platform must support real-time analytics and reporting to provide timely insights.

INTEGRATION OF SMART INFRASTRUCTURE

Integrating components such as intelligent street lighting, smart waste management, and water management systems into the IOC is necessary. This integration should also include all other digital actions (DA-01, DA-02, DA-03, DA-04, DA-05, DA-06). Integration with Agadir planned open data portal and other open data initiative would prove highly valuable. Developing protocols for data sharing and communication between these systems will enhance overall efficiency.

ITERATIVE PILOT TESTING

Conducting iterative pilot tests to evaluate the functionality of the IOC and its integration with various data sources is essential. Gathering feedback from stakeholders will help identify areas for improvement and ensure the system meets operational needs.

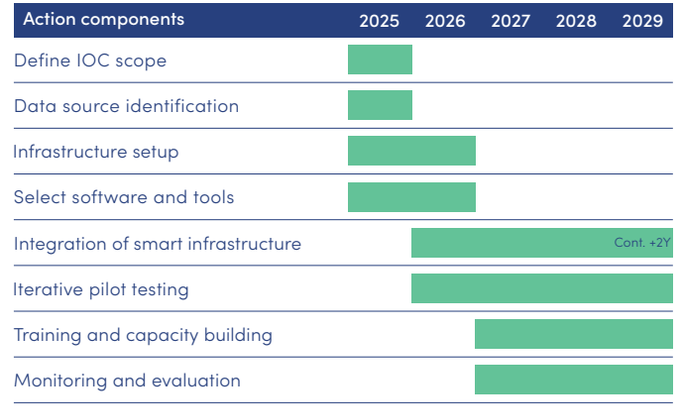
TRAINING AND CAPACITY BUILDING

Providing training for city staff and stakeholders on using the IOC effectively is important. Developing resources and support systems will ensure ongoing learning and adaptation, enabling continuous improvement.

MONITORING AND EVALUATION

Establishing metrics to assess the effectiveness of the IOC in enhancing decision-making and coordination is necessary. Continuous monitoring and evaluation will ensure the project meets its objectives and delivers the expected benefits.

SCHEDULE OF IMPLEMENTATION



STRATEGIC GOALS

SG3
Optimise the use of its resources

SG7
Harness the potential of digital

RELATED GCAP ACTIONS

DA-01 DA-02 DA-03
DA-04 DA-05 DA-06

CAP ALIGNMENT

Axis 6: Digital Agadir

SOCIAL AND GENDER

Implement intelligent street lighting that improves safety in areas frequented by women, particularly during early morning or late evening hours. Ensure that lighting is sufficient in areas identified as higher risk based on gender-specific safety data.

Create emergency response protocols that consider the specific needs of women and other vulnerable groups, such as those with children, elderly family members, or pregnant women.

ECONOMIC DEVELOPMENT

290 FTE

This initiative will be carried out in collaboration with Moroccan and local start-ups, creating jobs and fuelling the local economy.

DIGITAL

This integration includes all other digital actions (DA-01, DA-02, DA-03, DA-04, DA-05, DA-06) and data generated by different actions of the GCAP.

CLIMATE MITIGATION

N/A

CLIMATE ADAPTATION

Infrastructure failure/ obsolescence

IMPACT INDICATORS

N/A

ACTION OWNER

Municipality of Agadir
(Environment and Quality of Life Division)

DELIVERY PARTNERS

- SRM SM
- Municipality Environmental Division
- Local Development Company for public works (SDL Agadir Souss-Massa aménagement)
- Local Development Company for mobility (SDL mobilité)

Cross-sector

CS-01
City-wide sustainability awareness campaign

Cross-sector

Local knowledge of the environmental challenges facing Agadir and behavioural change were identified as a key success factor across all sectors during stakeholder engagement workshops.

In order to generate public interest and raise awareness of climate change, the GCAP proposes to run an awareness campaign across all sectors to promote behavioural change and promote sustainable practices across the community. This is achieved by delivering educational programmes, community engagement, business collaboration, and media and communication, through sector-specific incentivisation mechanisms supported by a steering committee.

Costing MAD 1.556 million (EUR 114 thousand) across all sectors, this initiative has the potential to create 15 jobs and will strengthen the governance of the action plan through an inclusive campaign aimed at all Gadiris.

CS-01

City-wide sustainability awareness campaign

AT A GLANCE

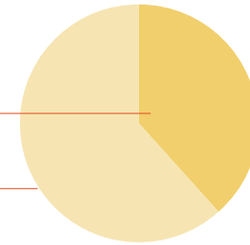
Awareness campaign across all sectors to promote behavioural change and promote sustainable practices across the community, through educational programmes, community engagement, business collaboration, and media and communication, and through sector-specific incentivisation mechanisms supported by a steering committee.

TYPE OF ACTION
Awareness raising and service development

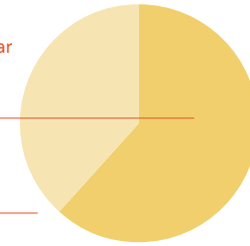
TIME HORIZON
2025-2030

SPATIAL EXTENT
Municipality of Agadir

CAPEX
MAD 1,556,000
EUR 143,000



OPEX
MAD 1,237,000 / year
EUR 114,000 / year



ACTION DESCRIPTION

OVERVIEW

This action will launch a city-wide campaign to raise awareness and incentivise sustainability across all sectors. This action will work with private businesses, public entities (such as schools and universities), community groups, NGOs and members of the public. It includes actions such as:

- Educational programmes in schools, this includes introducing mandatory modules on recycling, sustainable energy use and environmental stewardship, and workshops to teach students about waste reduction, composting and water conservation
- Community engagement, this includes hosting public seminars and workshops on topics such as sustainable living, water saving practices, plastic reduction. Additionally, organising community clean up events such as litter picking in Oueds or beaches, and community gardening and tree planting to promote urban greening
- Business collaboration, this includes working with local restaurants, cafés and business to promote sustainable practices such as reducing single use plastics
- Media and communication, this includes launching social media campaigns and advertisements to disseminate information, develop seasonal events to align with World Environment Day

This action can be complemented by incentivisation mechanisms such as:

- Water: litter picking events in Oueds; free water efficiency audits and provision of water saving devices (cistern bags, shower heads, etc) for private homes and businesses
- Solid waste: food waste composting accreditation scheme for local cafés and restaurants; introduce mandatory recycling module in primary schools
- Land use: design competitions and grants for construction of community gardens; community tree planting days
- Transport: free or discounted public transport fares on specific days; subsidies for EV vehicles for private SMEs; cycle-to-work/school scheme; monthly free cycle repair pop-ups/training
- Buildings: grants to adapt buildings through the Home retrofit one stop shop (EA-05); implement mandatory green building standards/certifications for all new buildings
- Energy: subsidies for installation of cool roofs on private buildings through the home retrofit one stop shop (EA-05); introduce mandatory sustainable energy use module in primary schools, aligned with the implementation of urban heat building retrofit programme (EA-04) on school buildings.

By focusing on education and awareness, the city will inspire behavioural change and promote sustainable practices across the community.

COMPONENT DESCRIPTION

FORM A STEERING COMMITTEE

The steering committee will include representatives from public bodies, community groups, private businesses, NGOs, and other relevant stakeholders. This committee will oversee the planning, implementation, and monitoring of the campaign, ensuring that all voices are heard and that the campaign aligns with the community's and the Municipality's needs and goals.

PLAN AND LAUNCH CAMPAIGN

Develop a detailed plan to deliver the campaign by defining the specific goals, programme, and resources needed to deliver the suite of sub-actions and incentivisation mechanisms. This plan should outline the timeline, budget, and key performance indicators (KPIs) to measure success. Once the plan is finalised, launch the campaign with a series of kick-off events and promotional activities to generate engagement around the new sustainability initiatives.

MONITOR AND EVALUATE

Monitor and evaluate the delivery of sub-actions and incentivisation mechanisms against the campaign goals. This will involve regular data collection and analysis to track progress and public engagement, identify challenges, and make necessary adjustments. The steering committee should also provide periodic reports to the Municipality.

SCHEDULE OF IMPLEMENTATION

Action components	2025	2026	2027	2028	2029
Form the steering committee					
Develop a detailed plan to deliver campaign					
Launch campaign					
Monitoring and evaluation					

STRATEGIC GOALS

SG1 Protect and enhance its environment

SG2 Design for a fair and inclusive society

SG3 Optimise the use of its resources

SG4 Promote sustainable mobility

SG5 Enable a healthy lifestyle for all

RELATED GCAP ACTIONS

WA-06 SW-02 LA-02 EA-04 EA-05

CAP ALIGNMENT

Axis 5: Agadir eco-city with low carbon

SOCIAL AND GENDER

Include representatives from diverse gender, age, ethnic and socio-economic background in decision-making through the steering committee.

Water: prioritise low-income households for water efficiency audits; schedule litter picking events at time suitable for women and families and provide PPE suitable for all genders, ages and abilities.

Solid waste: encourage women-owned businesses to participate in composting accreditation; design content suitable for special educational needs (SEN) students.

Land use: ensure tree planting days include activities suited for children and families; encourage women, young people and marginalised groups to participate in design competitions.

Transport: prioritise discounted fares for low-income families, women and older people; target women-owned businesses for EV subsidies; offer cycling training specifically for children and women and ensure training takes place in diverse neighbourhoods to broaden access.

Buildings: grants should prioritise buildings in low-income neighbourhoods; ensure adapted buildings are accessible to all.

Energy: prioritise low-income households for white roof subsidies; ensure sustainability curriculum in schools is adapted to SEN students.

ECONOMIC DEVELOPMENT

15 FTE

DIGITAL

The action could benefit from the development of a comprehensive website for citizens on all incentives and rewards available.

CLIMATE MITIGATION

N/A

CLIMATE ADAPTATION

Flood/Landslide

Drought

Extreme temperatures

Infrastructure failure/ obsolescence

IMPACT INDICATORS

11.1: Transport modal share in total trips – less than 30% private transport motorised journeys

25: Domestic water consumption per capita – between 120-200 L/day/capita

30.1: Proportion of dry recyclables sourced segregated – more than 35%

ACTION OWNER

Municipality of Agadir

DELIVERY PARTNERS

- Local voluntary organisations
- Community groups
- Schools
- Local businesses

5 Delivery, monitoring and evaluation

Delivery

Funding and finance

There is a wide array of sources of funding and finance available to support the implementation of GCAP sectoral actions (Table 4). These include instruments suitable for larger revenue-generating investments (i.e. lending), as well as complementary sources for smaller interventions (i.e. crowdfunding). The make-up of the funding mix will be further defined at the pre-feasibility stage of each action.

Implementation

Implementation of the actions will be led by the Municipality of Agadir and other local actors such as SRM SM. The implementation of the actions will mostly take place during the first five years of the Green City Action Plan. Collaboration with government agencies, local providers, SMEs and civil society will be crucial to ensure that the actions deliver the best environmental, social and economic outcomes.

The Municipality of Agadir has highlighted the importance of establishing a dedicated governance body to ensure the successful implementation and sustainability of the GCAP beyond 2027. This governance body could take the form of a Société de Développement Local (SDL), which would provide the necessary structure, expertise, and coordination to oversee and manage the plan's actions. Such an entity would enable stronger collaboration with stakeholders, ensure accountability, and maintain momentum toward achieving Agadir's long-term environmental, social, and economic goals.

INSTRUMENT CATEGORY	INSTRUMENT	WATER	SOLID WASTE	LAND USE	TRANSPORT	ENERGY AND BUILDINGS	DIGITAL	CROSS-SECTOR
MUNICIPAL OWN SOURCE REVENUE (OSR) AND POLICY STEERING INSTRUMENTS	Land or infrastructure leasing							
	Taxes							
	Charges and pricing for actions and services							
LAND VALUE CAPTURE (LVC)	Development-based land value capture (LVC)							
NATIONAL GOVERNMENT TRANSFERS	Intergovernmental transfer							
	Revenue support							
INTERNATIONAL CLIMATE FINANCE	Technical assistance grants							
	Dedicated credit lines							
	Blended finance vehicles							
NATIONAL, REGIONAL AND MUNICIPAL FUNDS	City climate funds							
	Revolving funds							
	Green investment funds							
	Regional development funds							
DEBT FINANCING	Commercial loan							
	Municipal bond							
PUBLIC-PRIVATE PARTNERSHIPS	PPP							
LEASING AND ASSET FINANCE MODELS	Operating lease finance							
	As-a-service models							
	Pay-as-you-save / on-bill repayments							
INDIVIDUAL AND COMMUNITY FINANCING	Crowdfunding							
	Philanthropic organisations and charities							

Table 5
Sources of funding and finance by sector

Monitoring and evaluation

Monitoring and evaluation of the GCAP is critical to understand the impact delivered by the GCAP actions towards reducing greenhouse gas emission and mitigating climate change in Agadir. Two types of monitoring will be undertaken with the GCAP:

1. Monitoring of the implementation process, which will focus on how the actions are implemented against the timeframe, budget and components of each of the actions. The aim of the implementation monitoring is to ensure that the actions are delivered in keeping with the original aim of each action, that the right data is collected to ensure further monitoring and that lessons learnt are shared between actions.
2. Monitoring of the results, evaluating whether the implemented actions are bringing the expected benefits. This will be done through the analysis of quantitative and qualitative data collected during and post implementation of the action, and compared with the baseline analysis presented in this GCAP (see City baseline, p. 25).

Components of implementation process monitoring

The monitoring of the implementation process will contain several components:

ORGANISATION

A specific unit within the municipality will be in charge of overseeing the implementation and coordination of the GCAP actions. This will not necessarily be the action owner. Each action owner will be responsible for the implementation and collection of data, which will be fed back to the central GCAP coordination unit. Action implementation will sit with the relevant divisions, while the “governance, internal inspection and Communal Action Plan monitoring service” will perform the function of GCAP unit. The GCAP unit will oversee the integration of GCAP actions between themselves and with wider policy interventions within the municipality, such as Communal Action Plan. The unit will also be responsible for the coordination with external stakeholders, including ministries and civil society.

REPORTING AND MONITORING FRAMEWORK

For each action, the GCAP unit will create a reporting and monitoring framework, as detailed in Figure 24. The framework will detail the action owner’s responsibilities, timelines for implementation processes, and methods and arrangements for tracking of progress. The framework will build on the information and implementation timeline provided for each action. It will include a schedule of indicators to be collected and agreement over periodic reporting of data from the action owner to the GCAP unit.

BUDGETING

Each action owner will be responsible for creating a budget for each action with internal and/or external funds and for monitoring financials. These will be reported periodically to the GCAP unit to ensure uniform reporting between different actions.

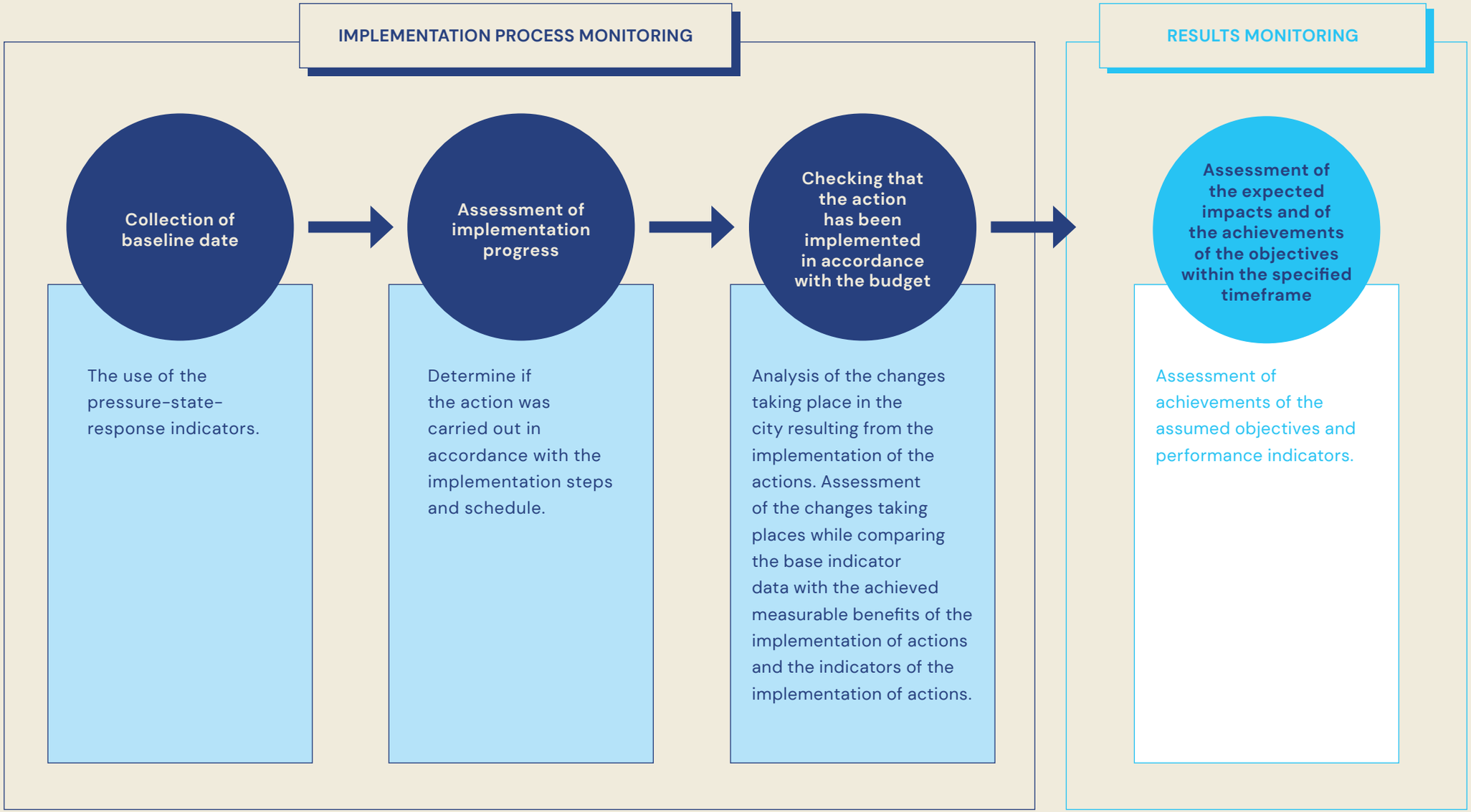


Figure 24
Monitoring and evaluation framework

Components of results monitoring

Monitoring the results of the action will be an important part of understanding the impacts and outcomes delivered by the GCAP actions. The on-going monitoring of these results will allow to track change over time and to adjust investment and actions to ensure that the expected outcomes are reached.

REPORTING AND MONITORING FRAMEWORK

Throughout the implementation of the actions, the GCAP unit will have developed a reporting and monitoring framework, which will include a results monitoring section. The development of the requirements for the two phases in parallel will ensure continuity of data collection between the implementation and operational phases of the action. The framework will measure the achievement and change derived from the implementation of the action, based on the expected benefits of each action and the relevant strategic goals.

INDICATOR DATABASE

The indicators collected as part of the drafting of the GCAP will be used as the baseline for an indicator database. Through annual reviews, indicators will start being collected during the implementation phase of the actions. This will give the opportunity to put in place the mechanisms needed to ensure the right data is collected, both through the implementation of the action and into the operational phase of the action.

RESPONSIBILITIES

Data collection will be the responsibility of the action owner through the implementation of the action. Following completion, transitional arrangements will need to be put in place to ensure that the operator is aware of the monitoring duties highlighted in the framework.

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