Action for Cool Cities: Pathways for carbon reduction in building and improvement of outdoor thermal comfort

Amman – Jordan

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Amman is a leader on climate change action. The City is taking its responsibilities towards its people and the Globe.

Amman has taken great strides to minimize negative impacts of climate change and worked to reduce its emissions and focus on low-carbon green growth.

In 2018, Amman, as a member of C40, the global network of cities committed to climate action, set an ambitious new goal to develop a plan that start the Amman city on a path to a GHG emission neutral city by 2050.

Main Strategies Addressing Climate Change in Amman

Amman Resilience Strategy

5 Pillars
16 goals
54 Actions

- Integrated and Smart City
- Environmentally Proactive City
- Innovative and prosperous City
- Young and Equal City
- A united and proud City

Launched 2017

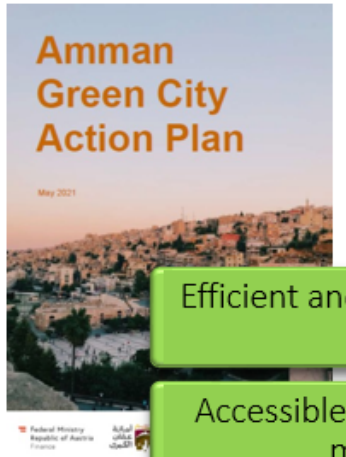
The Amman Climate Plan – A Vision for 2050 Amman

6 Pillars
21 goals
51 Actions

- Buildings
- Renewable energy
- Transport
- Solid Waste
- Water and waste water
- Urban planning

Launched 2019

Amman Green City Action Plan

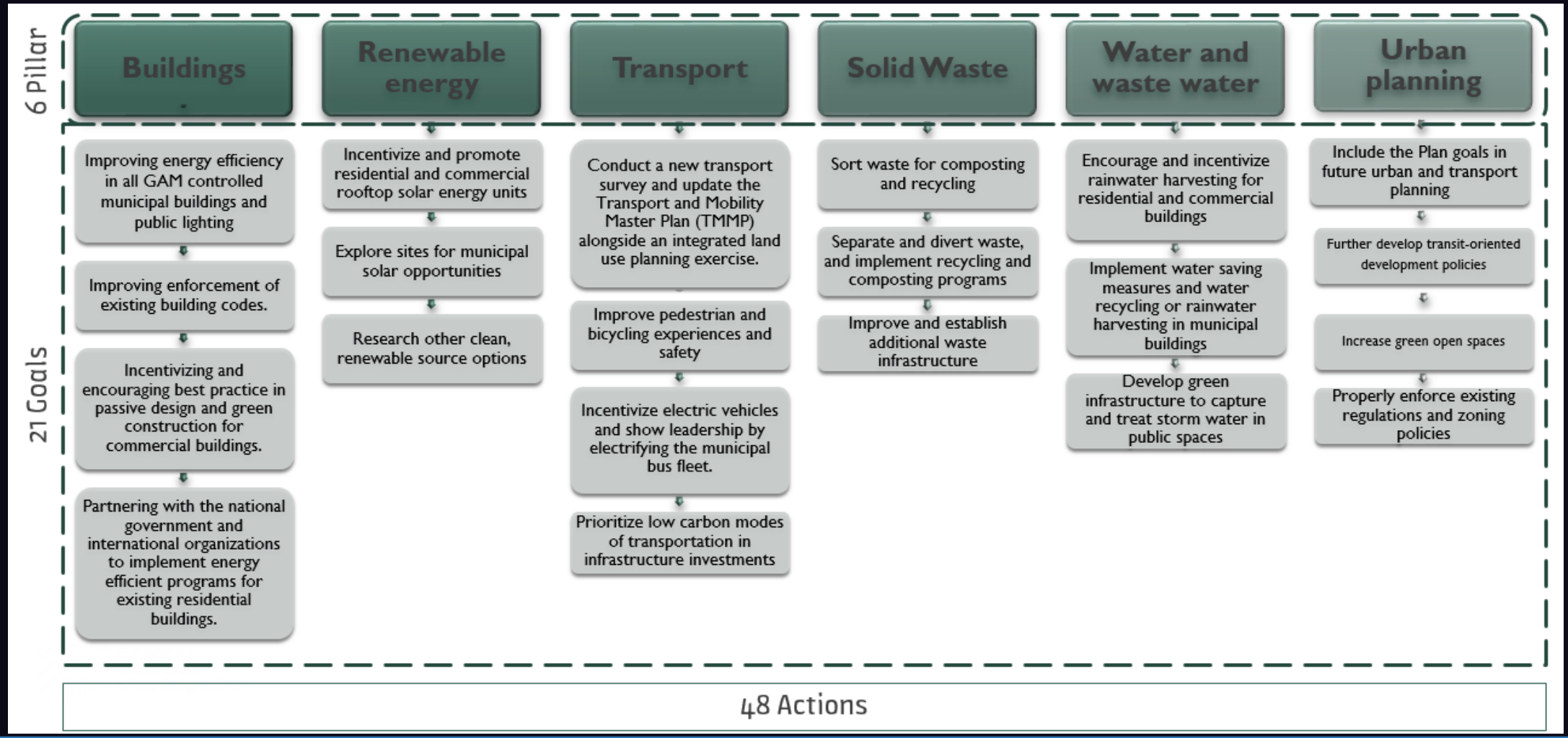


6 Pillars
19 goals
64 Actions

- Efficient and resilient energy systems and buildings
- Accessible, diverse and low-carbon mobility systems
- Resource efficient and holistic waste management systems
- Integrated water resources management
- Comprehensive and reflective land use planning
- Responsive and forward-looking climate adaptation practices

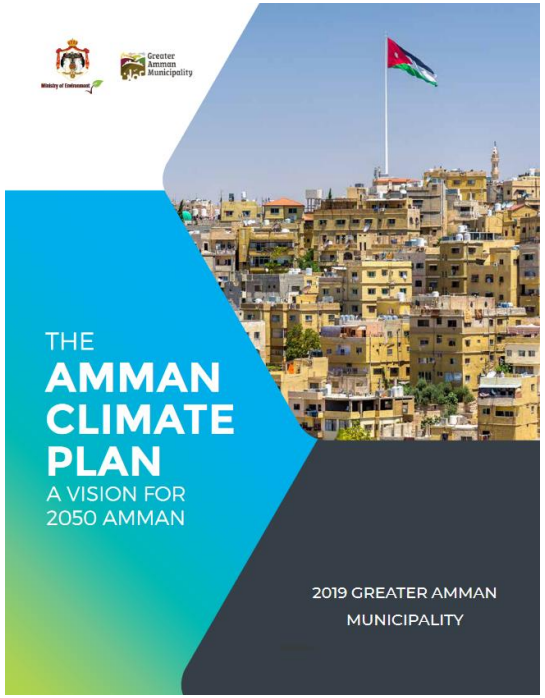
Launched 2021

Amman Climate Plan - 2019



Climate Action Plan 2019

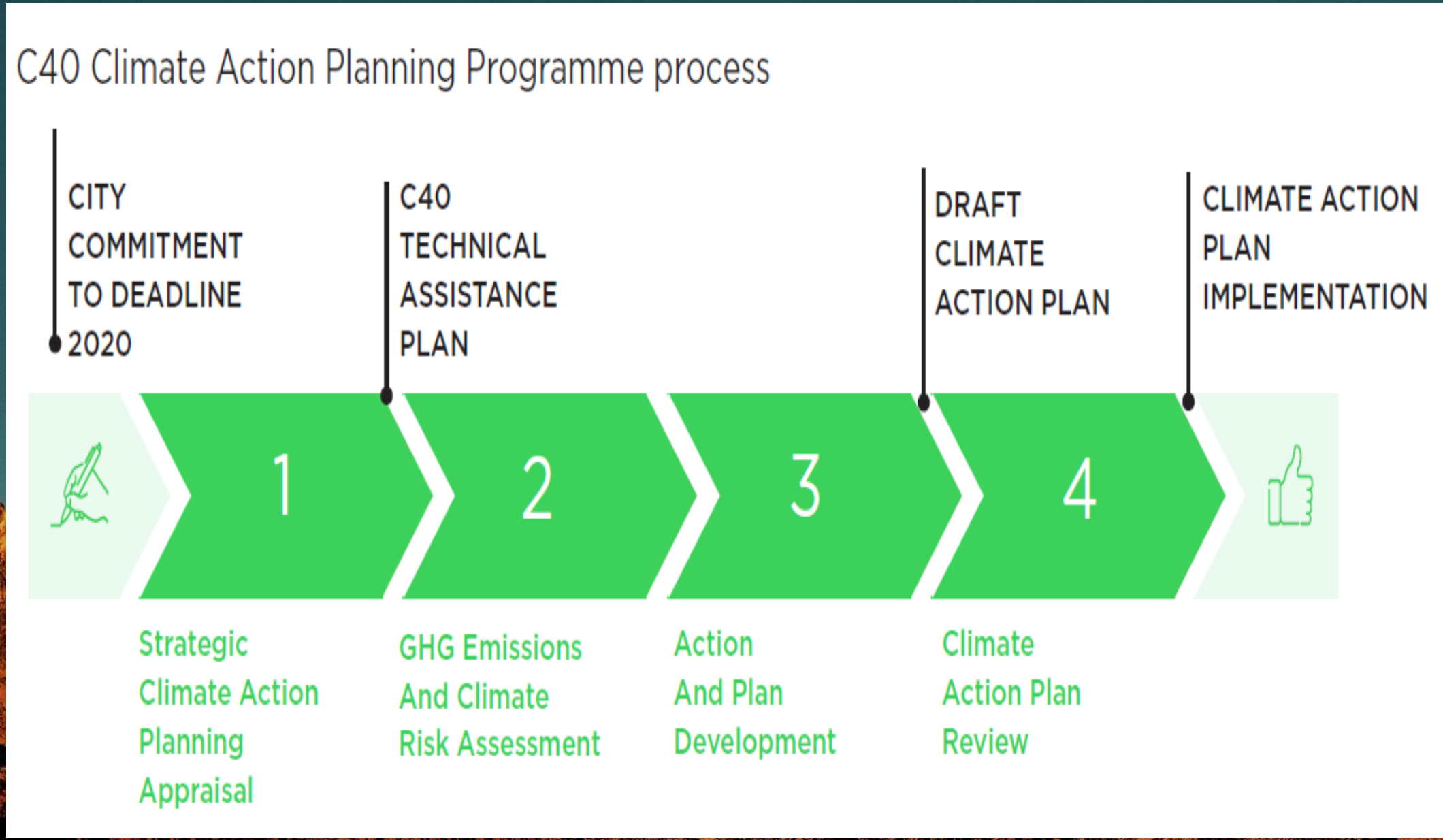
Amman Climate Plan (CAP) Update - 2022



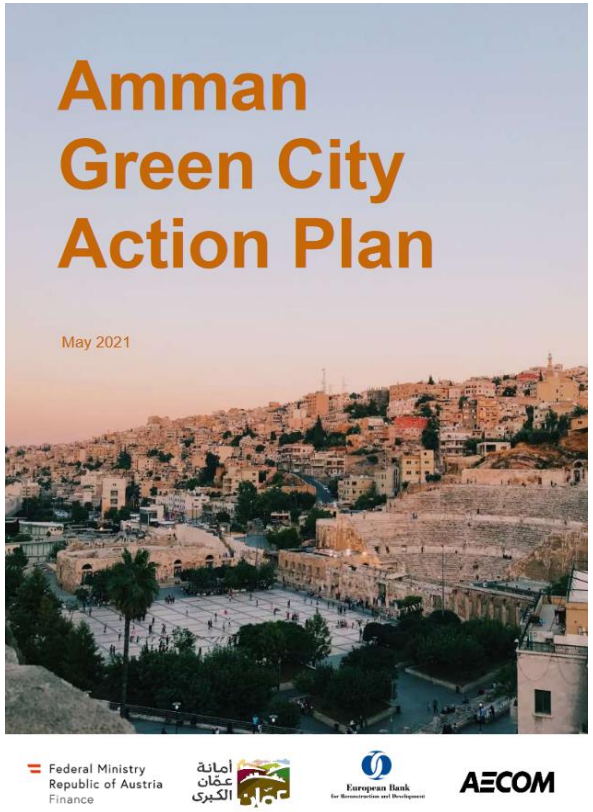
C40 CITIES
CLIMATE LEADERSHIP GROUP

- Migration of data from CURB tool to PATHWAYS, in addition to completion of PATHWAYS data collection.
- Perform scenario modeling based on new data.
- Complete missing datasets within the greenhouse gas inventory and identify gaps between current progress and actions needed to achieve 2030 and 2050 emissions targets.

Climate Action Panning Framework



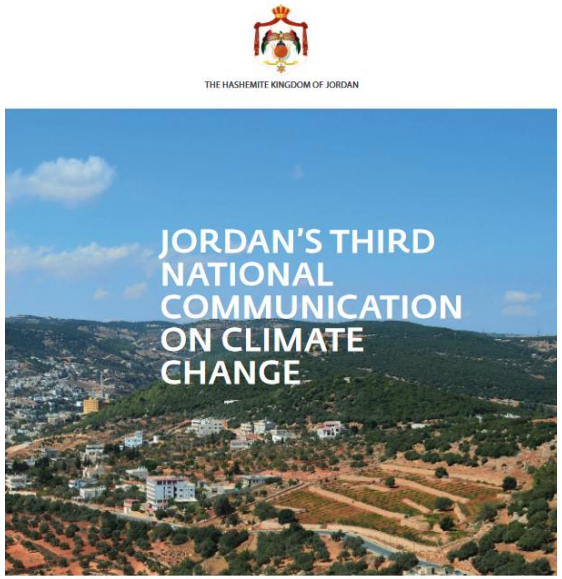
Amman Climate Plan (CAP) Update



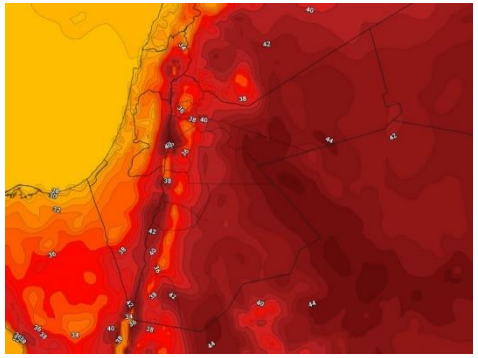
Amman
Resilience Strategy

- **Review, reassess, and validate mitigation and adaptation actions from the Amman Resilience Strategy, CAP, and GCAP, to be included in the updated CAP based on the targets and gaps.**
- **Update the CAP to eliminate any gaps in close coordination with GAM and the UNDP, increase adaptation actions, and improve the sectoral approach to GHG reduction.**

Climate Risk Assessment Through The 4NC



Floods and rainfall



High temperatures

Drought

- **4NC Sectors:**
  - **Climate Projection**
  - **Water & Agriculture**
  - **Energy**
  - **Biodiversity**
  - **Socioeconomic**
  - **Health**
  - **Urban**
- **Components:**
  - **Climate Projection**
  - **Vulnerability & Adaptation**
  - **GHG Inventory & Mitigation Analysis**

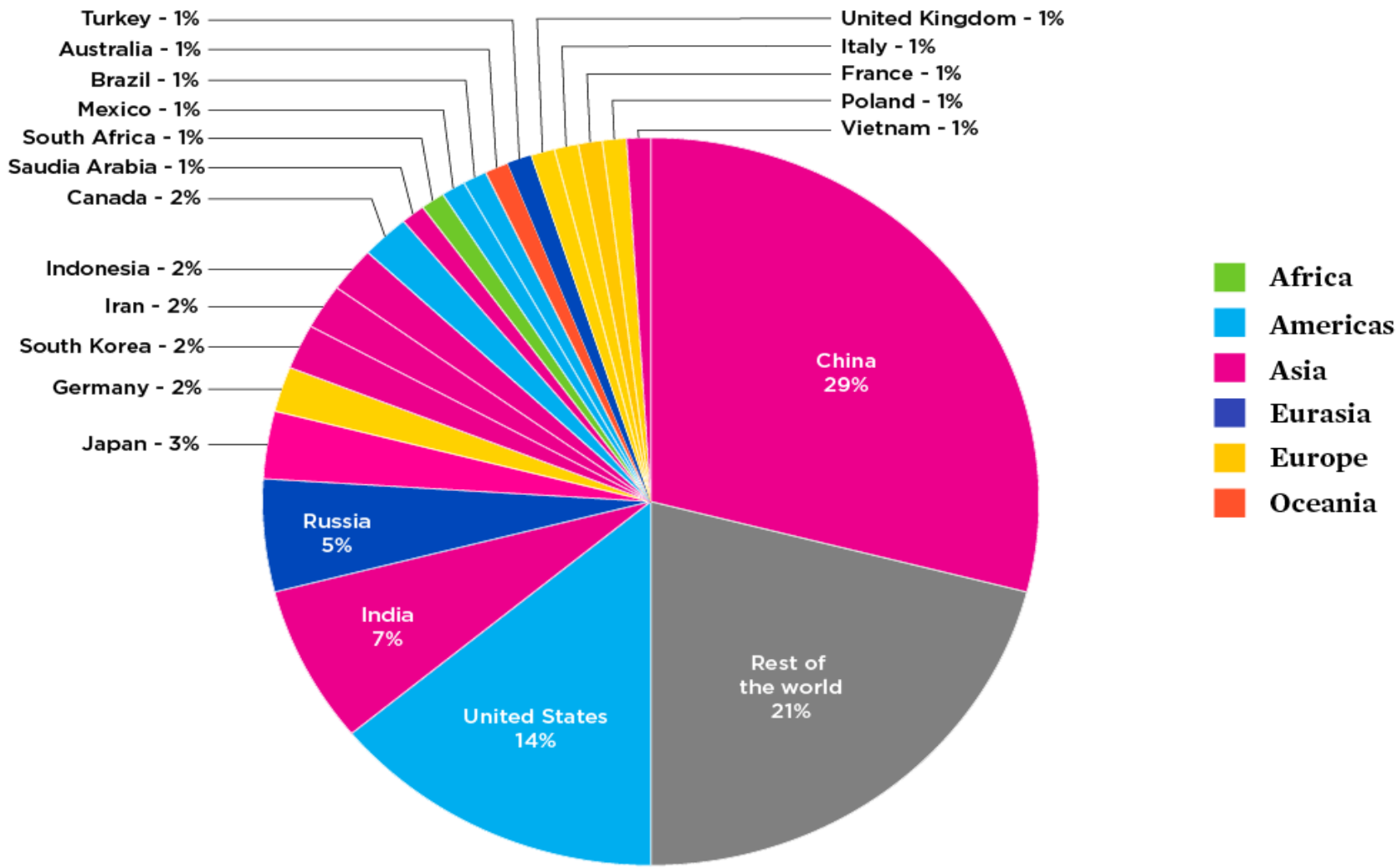
Amman’s Voluntary Local Review

The following review of the targets under SDG 13 outlines the major potential impacts on Amman from climate change, including the risk of increasing temperatures, erratic rainfall, water scarcity, heat waves, flash floods, droughts, and other natural disasters

To strengthen its resilience and adaptive capacity, Amman has made a number of investments in critical urban infrastructure, especially in relation to renewable energy, green buildings, sustainable water, and wastewater management (see the section on SDG 9 above for more details). The climate change agenda is deeply integrated into Jordan’s national and local policy frameworks, enabling a systemic approach to address its consequences. Amman is yet to streamline gender and child rights into its policies, strategies, and initiatives on climate change, in accordance with the national strategic vision.

Top Annual CO_2 Emitting countries, 2019

(from fossil fuels)

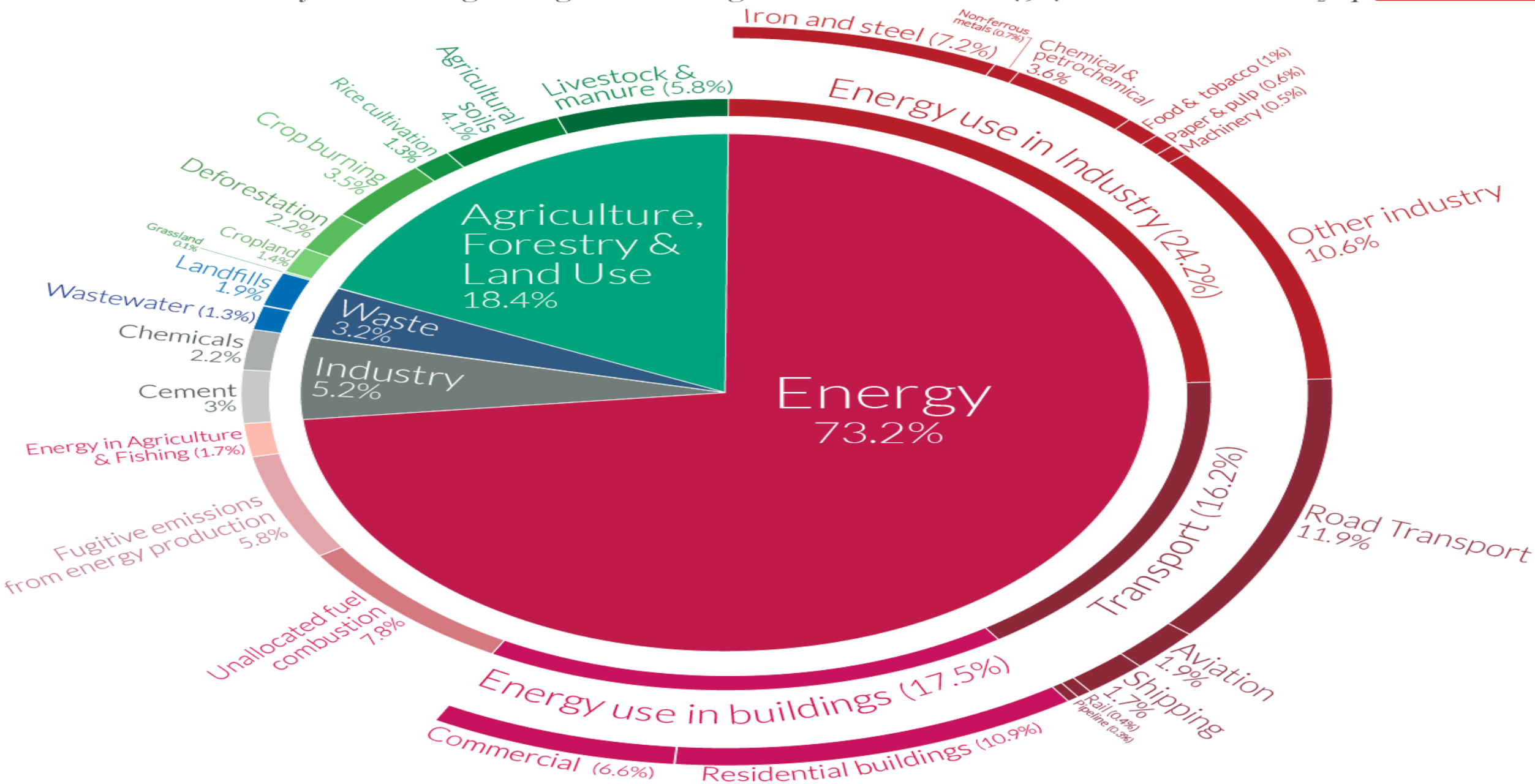


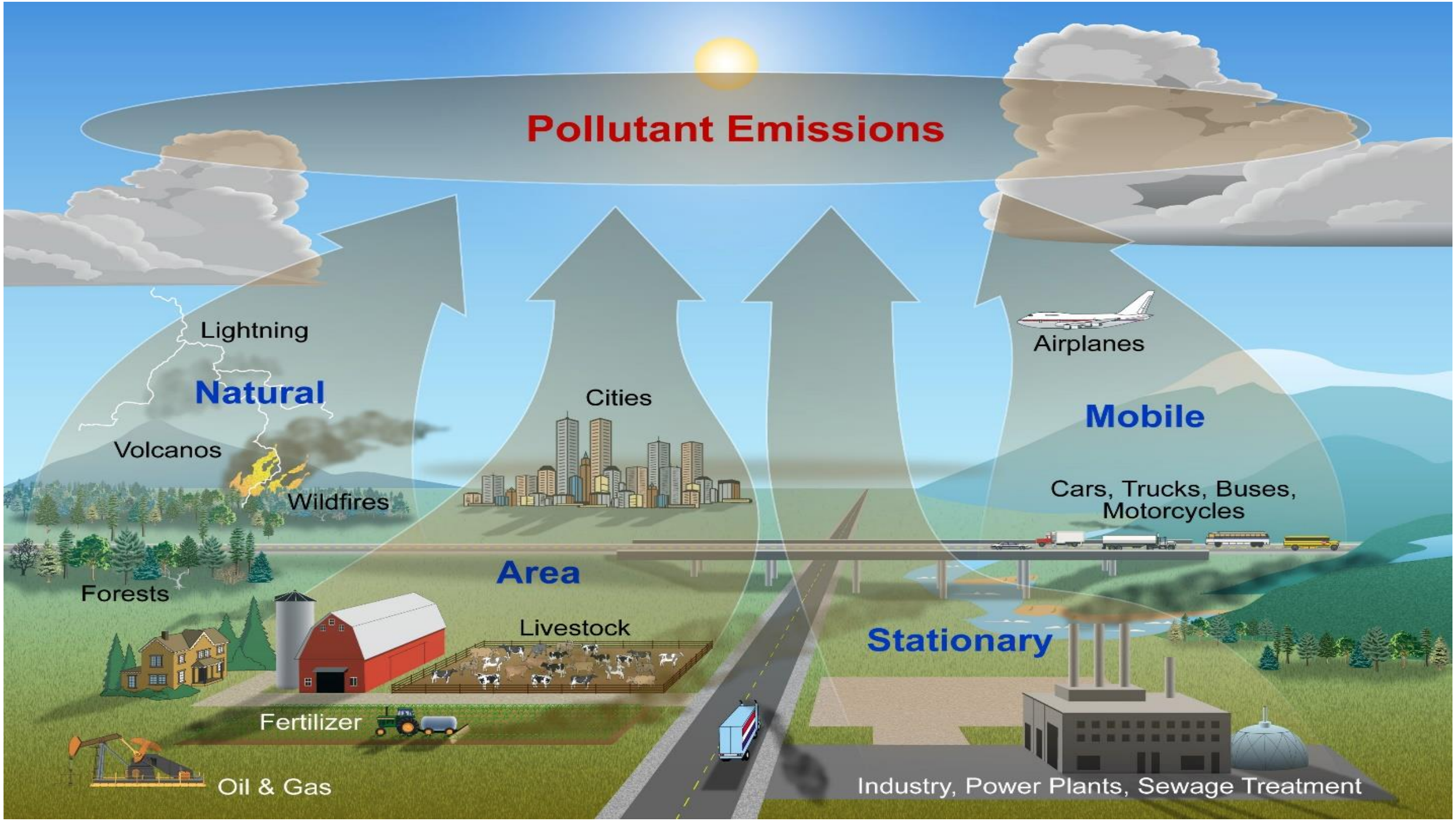
Data: IEA Atlas of Energy

Global greenhouse gas emissions by sector

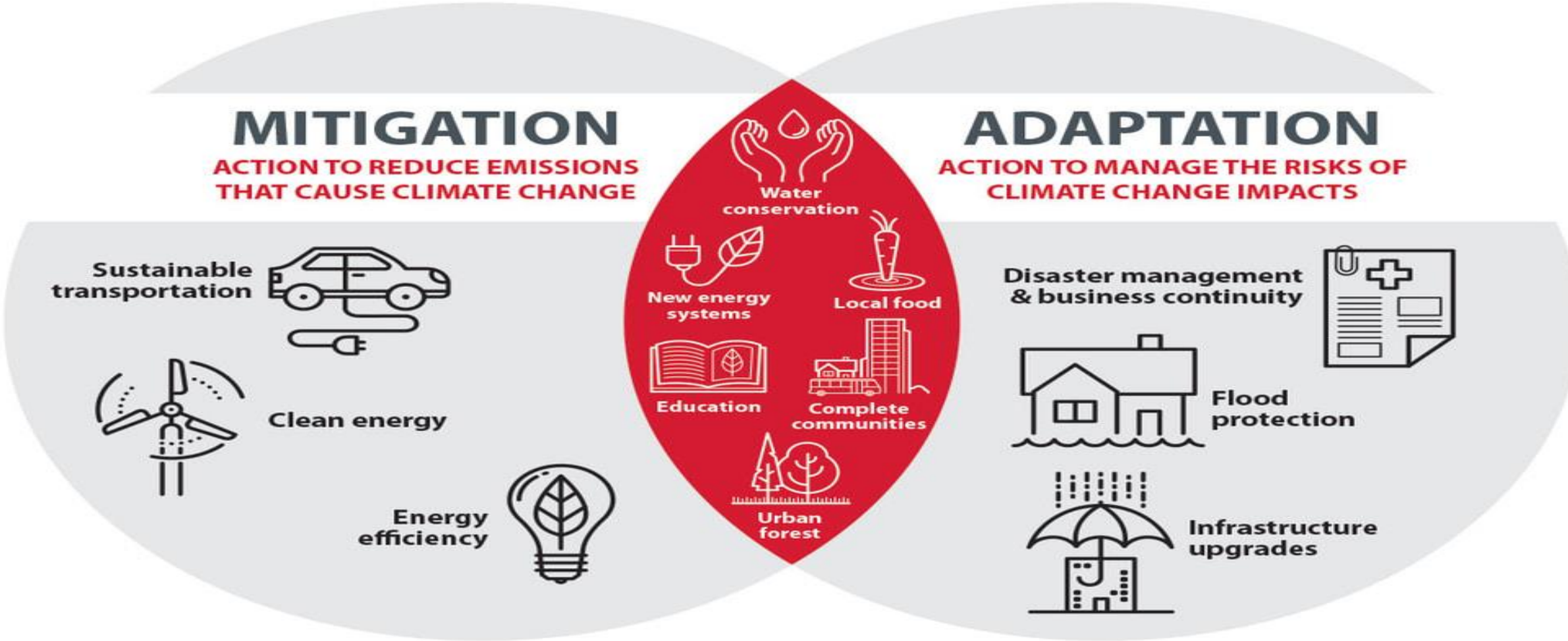
This is shown for the year 2016 – global greenhouse gas emissions were 49.4 billion tonnes CO_2eq.

Our World in Data

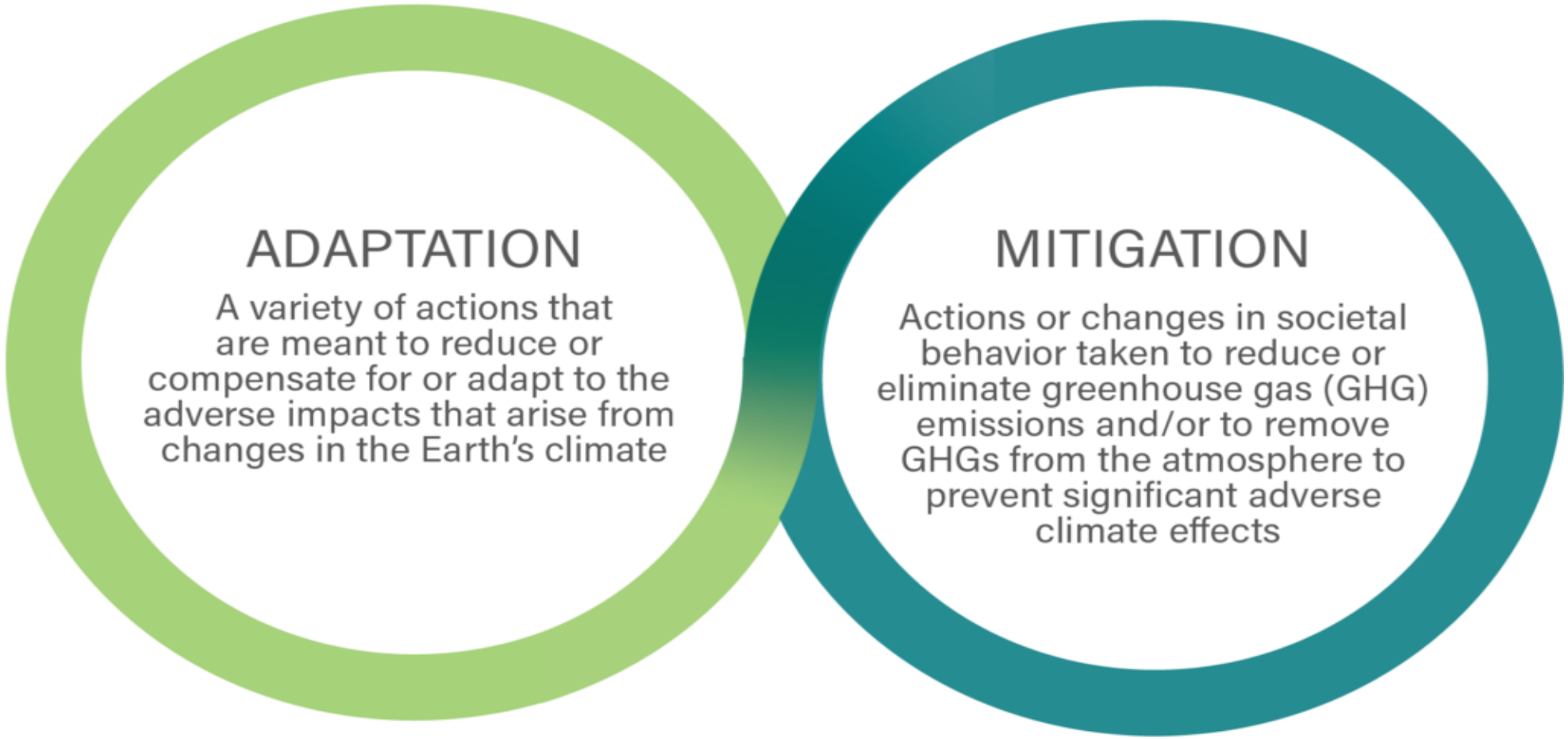



Pollutant Emissions
Lightning
Natural
Volcanos
Wildfires
Forests
Cities
Area
Livestock
Fertilizer
Oil & Gas
Airplanes
Mobile
Cars, Trucks, Buses,
Motorcycles
Stationary
Industry, Power Plants, Sewage Treatment

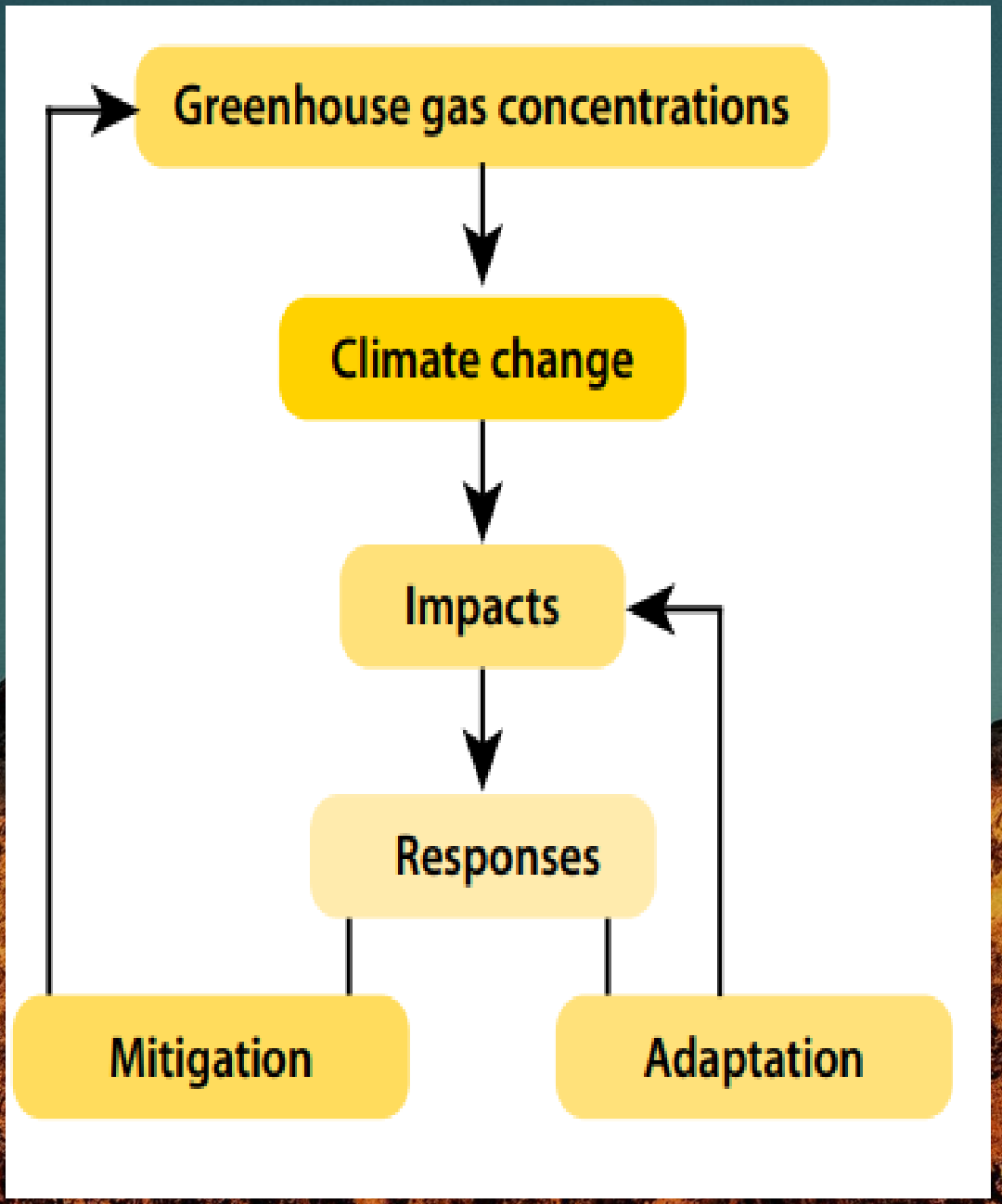
Building Climate Resilience



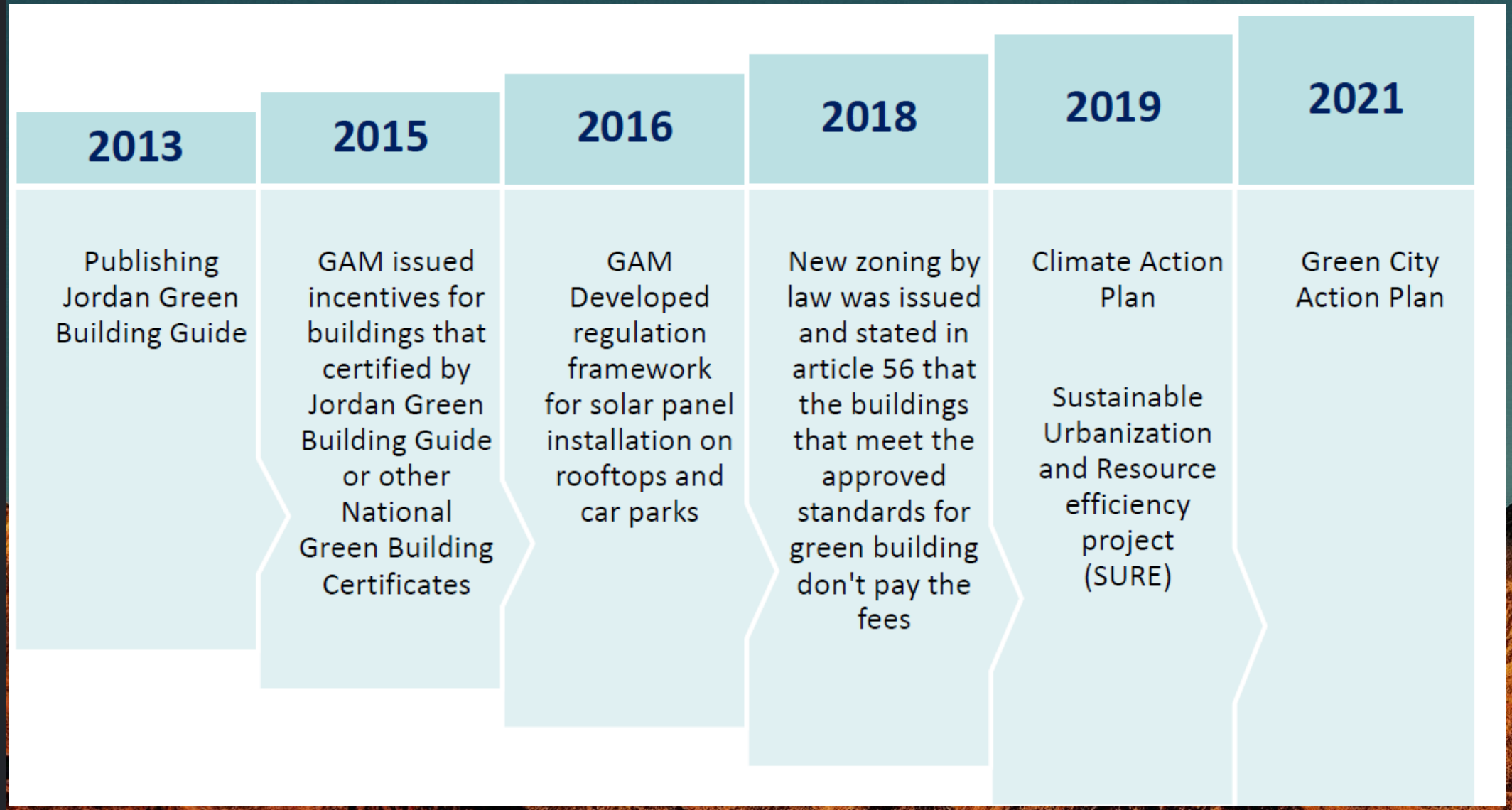
ADAPTATION VS. MITIGATION



	Mitigation	Adaptation
Spatial scale	Primarily an international issue, as mitigation provides global benefits	Primarily a local issue, as adaptation mostly provides benefits at the local scale
Time scale	Mitigation has a long-term effect because of the inertia of the climatic system	Adaptation can have a short-term effect on the reduction of vulnerability
Sectors	Mitigation is a priority in the energy, transportation, industry and waste management sectors	Adaptation is a priority in the water and health sectors and in coastal or low-lying areas
	Both mitigation and adaptation are relevant to the agriculture and forestry sectors	



Green Buildings



GRAPHIC Based on Amman's climate and heating and cooling demand, improvements in the following areas of the building sector can create the highest emission reductions:

Residential

New construction

- building lighting, envelopes (insulation and windows)
- cooling and heating equipment

Existing buildings

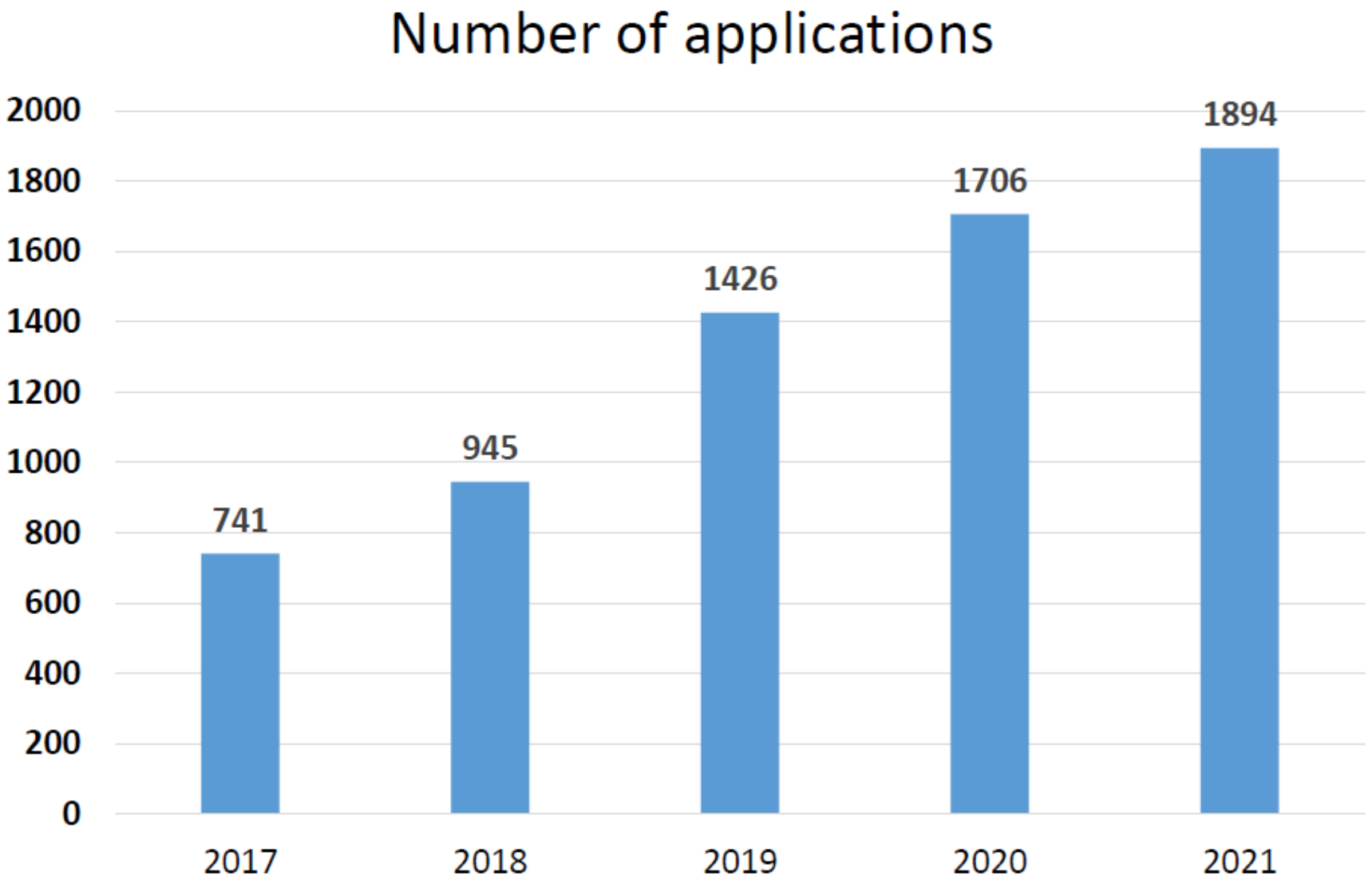
- lighting
- appliances
- cooling and heating equipment
- thermal insulation techniques

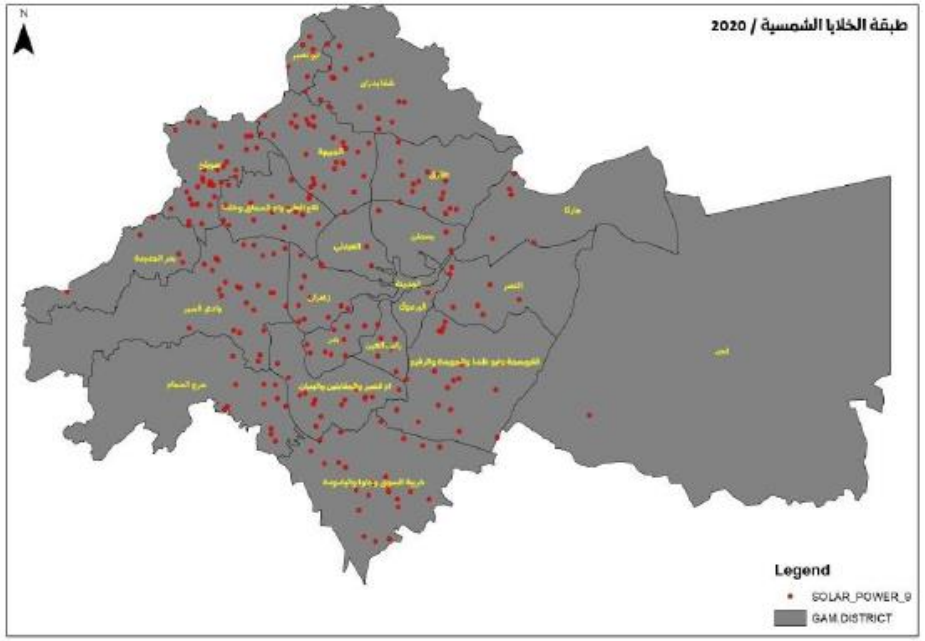
Commercial

New and Existing buildings

- lighting
- cooling and heating equipment

Solar Panels

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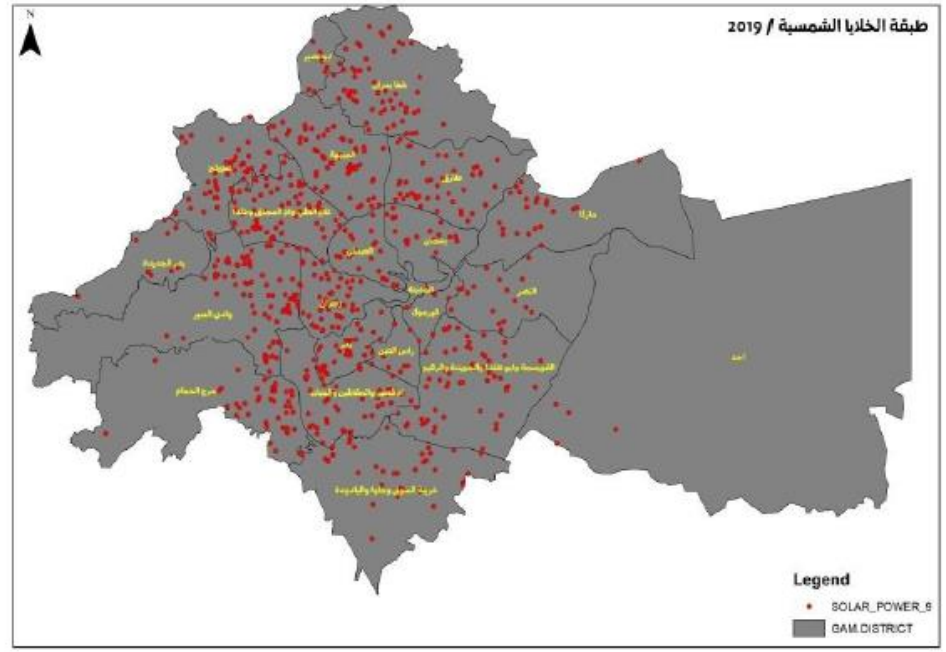
طبقة الخلايا الشمسية / 2020
Legend
SOLAR_POWER_9
GAM.DISTRICT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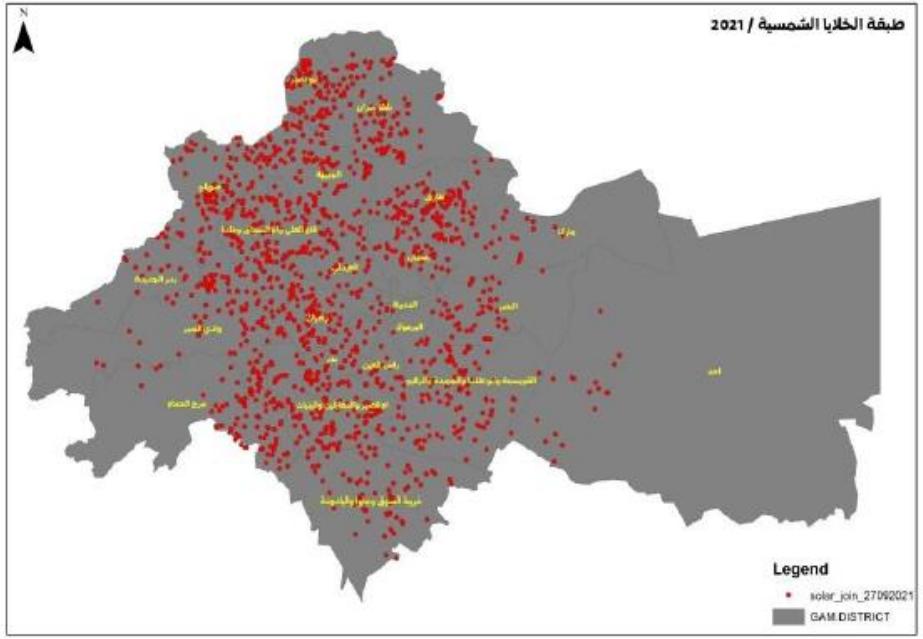
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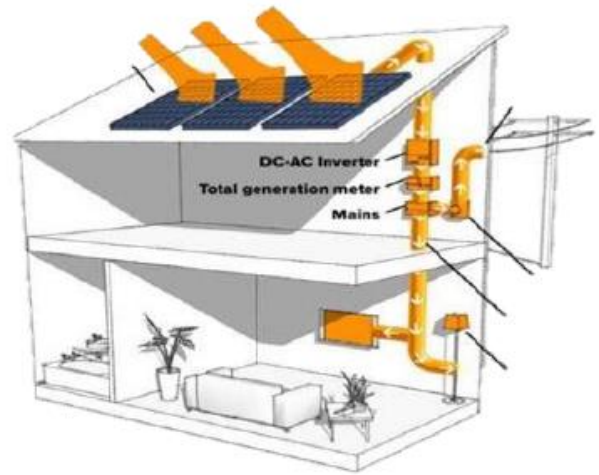
solar_join_27092021
GAM.DISTRICT


DC-AC Inverter
Total generation meter
Mains

Amman Plan Sector Goals

THE ELECTRICITY SOURCE for the city will need to be predominately carbon free in 2050.

NEWLY CONSTRUCTED BUILDINGS will all comply with green building guidelines, and a majority of existing buildings will be renovated to improve energy efficiency.

CITIZEN ENGAGEMENT – a cross-cutting program that includes launching a city-wide awareness program about climate change action and GAM's ongoing efforts.

RENEWABLE ENERGY WILL BE EXPANDED

- Building integrated solar photovoltaics (PVs) will provide residential and commercial buildings with the majority of their energy needs.
- The Greater Amman Municipality will produce its own renewable energy.

SUSTAINABLE MOBILITY

- Public transport will be clean, efficient and widespread.
- A majority of private vehicles and taxis will be electric powered.
- Walking will be a core mode of mobility in the city center.

WASTE

- Waste will be reduced, sorted, composted and recycled.
- Remaining solid waste will be processed in waste to energy sites.

WATER AND WASTE WATER

- Water will be efficiently used.
- Rainwater will be captured and reused.
- Waste water will be effectively treated, with a focus on capturing gases for energy use.

URBAN PLANNING AND LAND USE

- New development areas will be focused on public transit-oriented corridors
- Green spaces, parks and urban forestry will increase, and new building will be focused on underutilized land

Cilamte Action Plan And Green City Action Plan 2021

GCAP

Efficient and resilient energy systems and buildings	
G01	Invest in large grid-scale solar projects
G02	Integrate LED systems into municipal street lighting
G03	Finance smart meters and batteries to promote grid stabilization
G04	Increase awareness of green building design
G05	Pilot municipal green building retrofit
G06	Establish green school buildings
G07	Develop solar-powered bus stands
G08	Expand the existing Landfill Gas Recovery (LFG) System
G09	Establish awareness campaign around national solar-panel subsidy
G10	Install rooftop solar units on GAM-owned municipal buildings, parking lots and pergolas
G11	Install alternative heating systems in municipal buildings

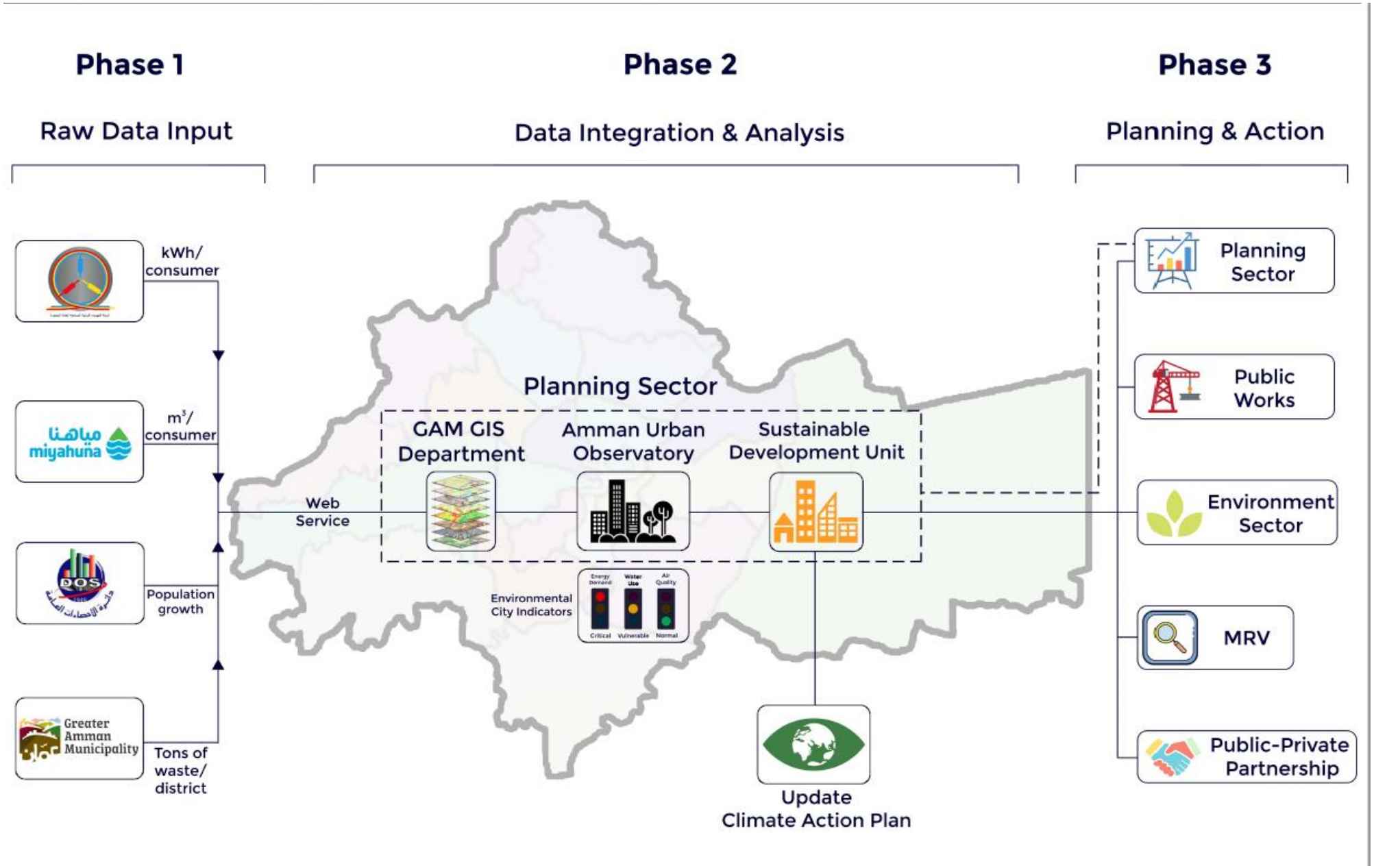
Challenges

- Although GAM issued incentives for the green building but the number of the licensed green buildings in the last 12 years is not more than 13 buildings.
- Incentives are not fulfilling the investors needs to have an effect on the direct cost of the building construction .
- The materials used for constructing green buildings and all the fittings are not tax free and it doesn't have any tax discount .
- People confirm that the initial cost for construction is 30 % more than the standard buildings .
- Codes issued from the national building council are very good and meet the requirements for the national code but still we have an implementation problem on site for the standard building with the absence of adequate engineering supervision and construction control from both the municipality and the private sector

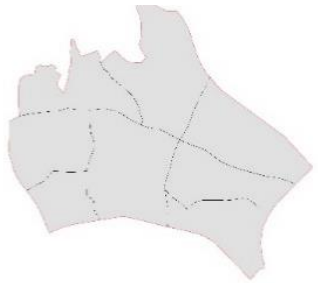
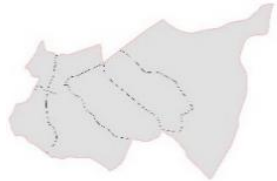
Challenges

- Installation of PV panels on roof tops and parking areas got the attention of most people since they touched the direct effect on the electricity bill , but not all applications are approved due to the effect of solar panels on city image (distortion) and the ownership problems.
- Law enforcement for implementing green building strategies and regulation .
- Financing GAM own projects .
- Funds from the government or any other agencies in retrofitting existing building and installation of PV panels .
- Codes and Jordan Green Building Guide doesn't deal with retrofitting existing buildings .
- Jordan Green Building Guide needs updating , simplification , awareness ,training to municipalities , designers , contractors and supervising engineers .

Amman City Dashboard(external Data sources)



Amman's District Dashboard (ADD)

Green areas	Services	Water consumption	Energy consumption	district
٢م٤٨٤٩٢	10000 M2	1000 M/W / MONTH	500 M/W / MONTH	 وادي السير
٢م٧٢٩٥١	50000 M2	3000 M3/ MONTH	600 M/W / MONTH	 تلاع العلي
٢م١٣٨٠٣٩	40000 M2	2000 M2/ MONTH	800 M/W / MONTH	 القويسمة
٢م٦٨٠٠	20000 M2	3000 M2 / MONTH	400 M/W / MONTH	 النصر

Thank You

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