

# Porto's Pathway to Climate Change Adaptation

Protecting Coastal Cities from Sea Level Rise



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Population ~ 232.000 inhabitants  
Population density ~ 5.239 hab./km<sup>2</sup>  
Porto's Metropolitan Area population ~ 1.722.000 inhabitants

Daily floating population ~ 170.000 citizens (+73%)  
~ 89.000 jobs  
85% in services sector

Historic Center of Porto - Cultural Heritage of Humanity  
~ 4,6 millions tourists(2019)

Metropolitan Area gathers 12% of the national wealth



## PORTO'S MAIN PRIORITIES

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**CLIMATE CHANGE**

**CARBON  
REDUCTION**

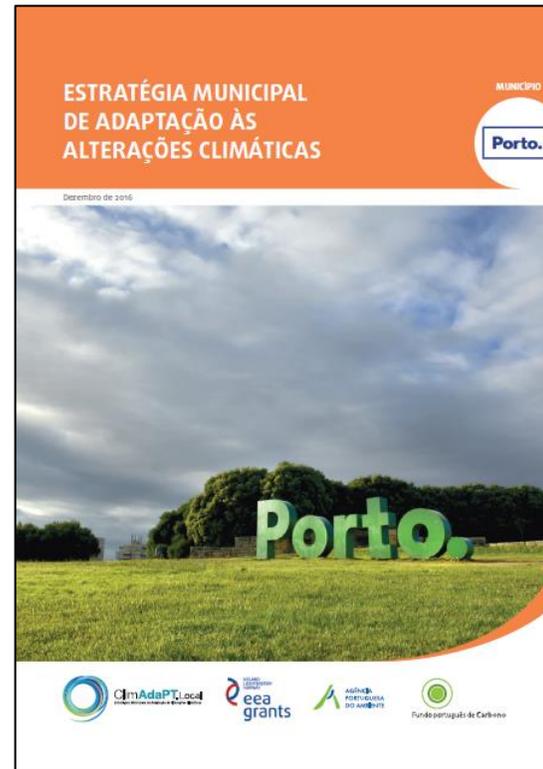
**ADAPTATION**

**NATURE-BASED  
SOLUTIONS**

**ADAPTATION**

**CIRCULAR  
ECONOMY**

# Porto Climate Projections by the end of the 21<sup>st</sup> century



Potential decrease in total annual precipitation



Potential increase in temperatures



Rise in the mean sea level



Increase in extreme precipitation events

# Climate Change Effects in Porto



## Water and territory planning



Think Blue to  
Make the City  
Greener

# 16 Years of Climate Action in Porto



Signature of Aalborg  
Letter  
**2006**



Sustainability Strategy  
and Covenant of  
Mayors  
**2009**



Participation in  
Carbon Closure  
Project  
**2014**



EU Covenant  
of Mayors for  
Climate & Energy  
**2018**



Asprela + Sustentável  
project  
**2021**

**2007**

Porto Energy  
Matrix



**2010**

Sustainable Energy  
Action Plan



**2016**

ClimAdaPT – Porto  
EMAAC



**2020**

Integration of energy  
in Águas do Porto



**2022**

Porto Climate  
Pact



## Porto Climate Pact (2022)

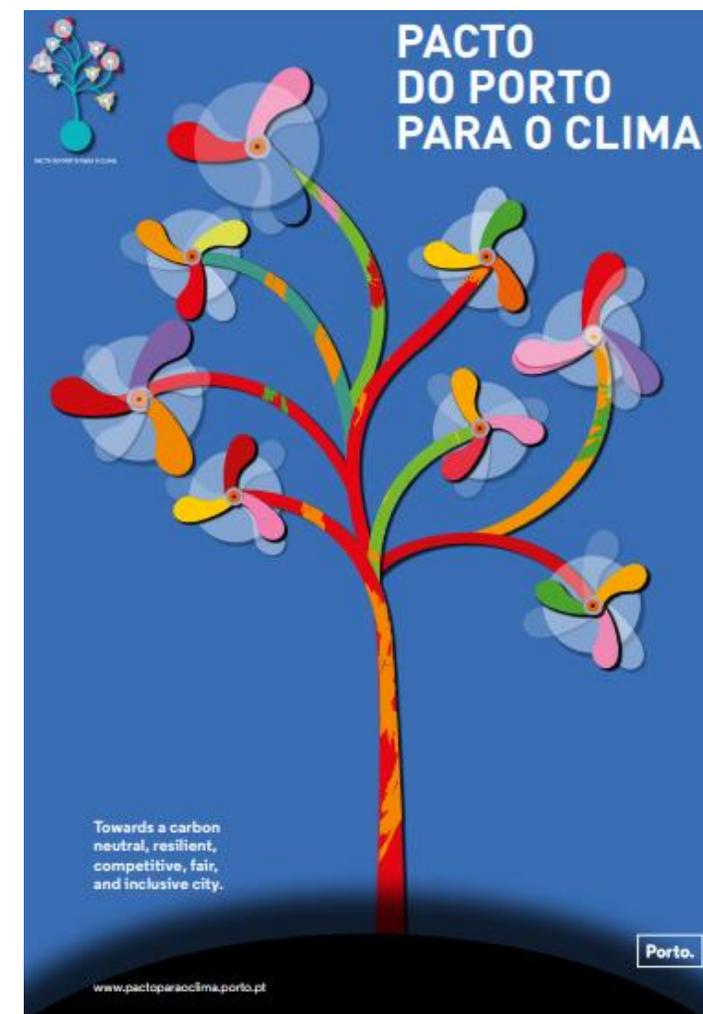
- Mitigating these emissions is urgently needed to avoid unpredictable consequences on the natural, economic, and social systems.
- The European Union has been leading the way: member states should set a target of 55% reduction in 2030 and neutrality in 2050.
- At a national level, the Climate Framework Law of 2021 sets a reduction in emissions of at least 55% by 2030, 65% by 2040, and 90% by 2050.
- Reducing GHG emissions requires ambitious measures and high public and private investment, but at the same time represents an opportunity for competitiveness, employment, and social justice.



Municipal ambition to reduce carbon emissions by 2030 (compared to 2004).



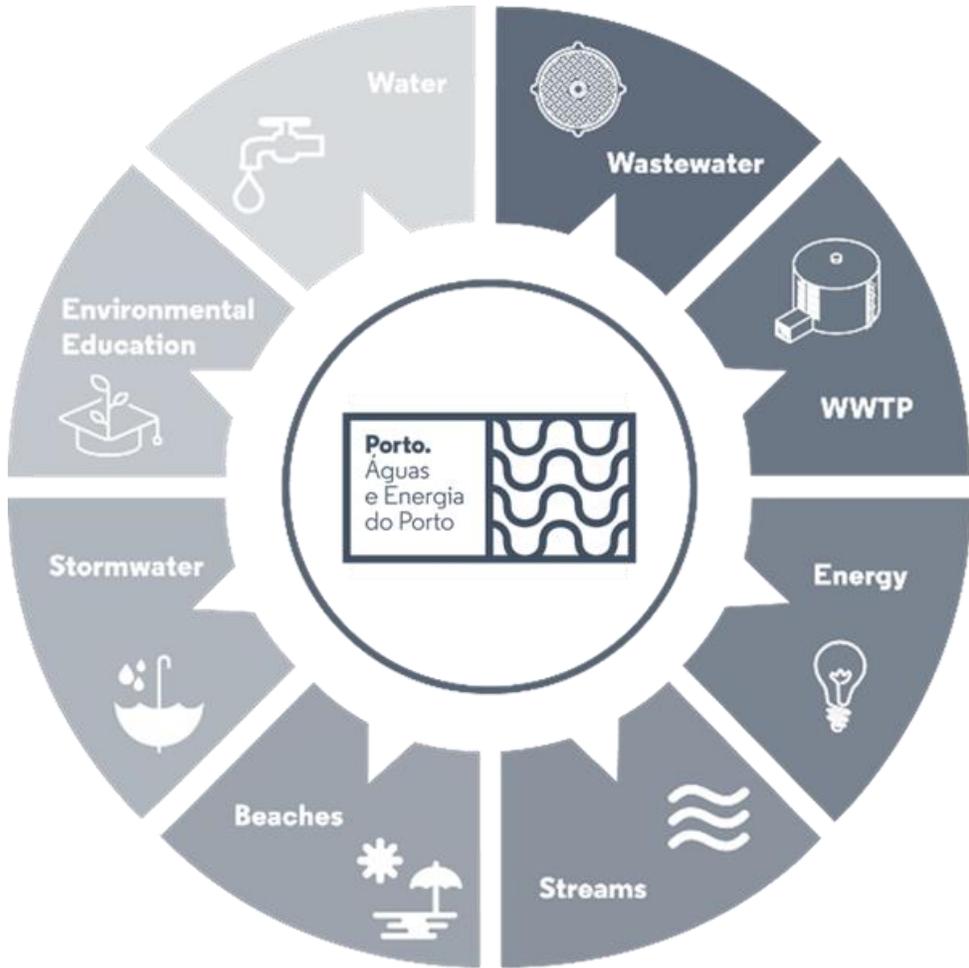
Reduction of carbon emissions achieved in 2020 in Porto (compared to 2004).





**PORTO.**  
A city shaped by water





**ALL WATER IS ONE WATER**

 <b>160,476</b> Number of customers	 <b>539</b> Number of employees	 <b>78%</b> Customer satisfaction level	 <b>€ 15.8</b> Average bill for a standard family	 <b>42.1 M€</b> Turnover
 <b>813 km</b> Extension of water pipe network	 <b>99,74%</b> Water quality	 <b>14,78%</b> Non revenue water	 <b>561 km</b> Extension of sewers network	 <b>2</b> WWTP
 <b>100%</b> Fulfilment of discharge criteria	 <b>662 km</b> Extension of stormwater network	 <b>85 km</b> Extension of streams and rivers	 <b>9</b> Number of beaches with Blue Flag	 <b>26,391</b> Number of participants in environmental education activities



### Regenerative Water Services

- Replenish waterbodies and their ecosystems
- Reduce the amount of water and energy used
- Reuse, recover, recycle
- Use a systemic approach integrated with other services
- Increase the modularity of systems and ensure multiple options

### Basin Connected Cities

- Plan to secure water resources and mitigate drought
- Protect the ecological health of water resources
- Prepare for extreme events

### Water Sensitive Urban Design

- Enable regenerative water services
- Design urban spaces to reduce flood risks
- Enhance liveability with visible water
- Modify and adapt urban materials to minimise environmental impact

### Water-Wise Communities

- Empowered citizens
- Professionals aware of water co-benefits
- Transdisciplinary planning teams
- Policy makers enabling water-wise action
- Leaders that engage and engender trust



Vision



Governance



Knowledge  
& Capacity

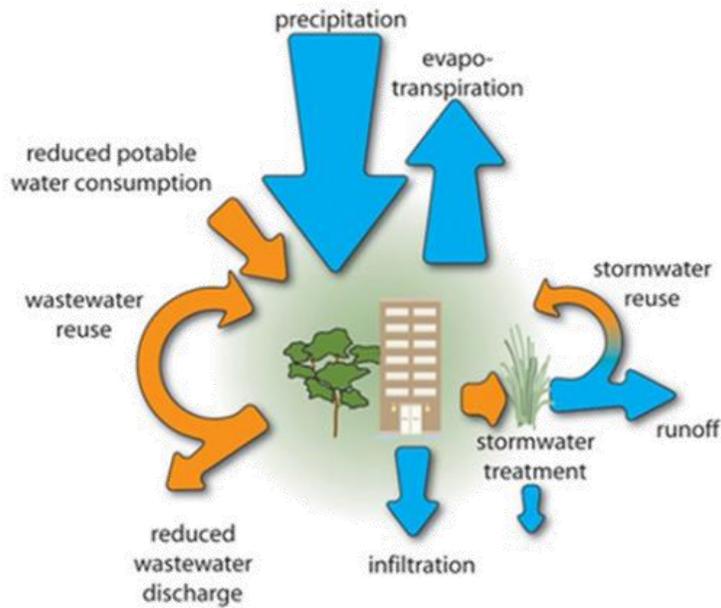


Planning  
Tools



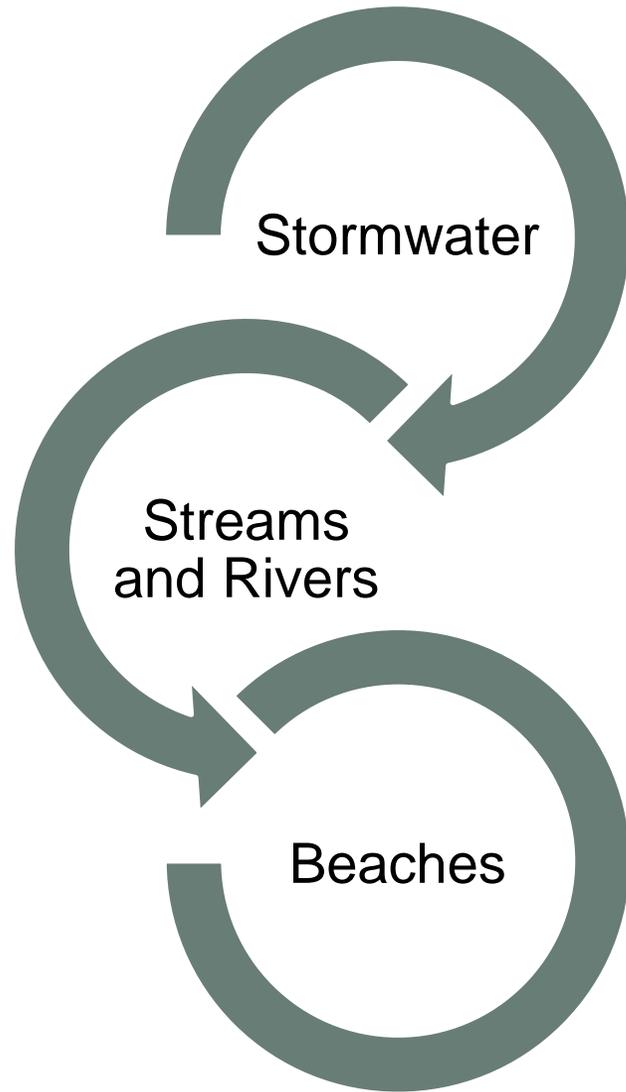
Implementation  
Tools

### WSUD water balance



Key:



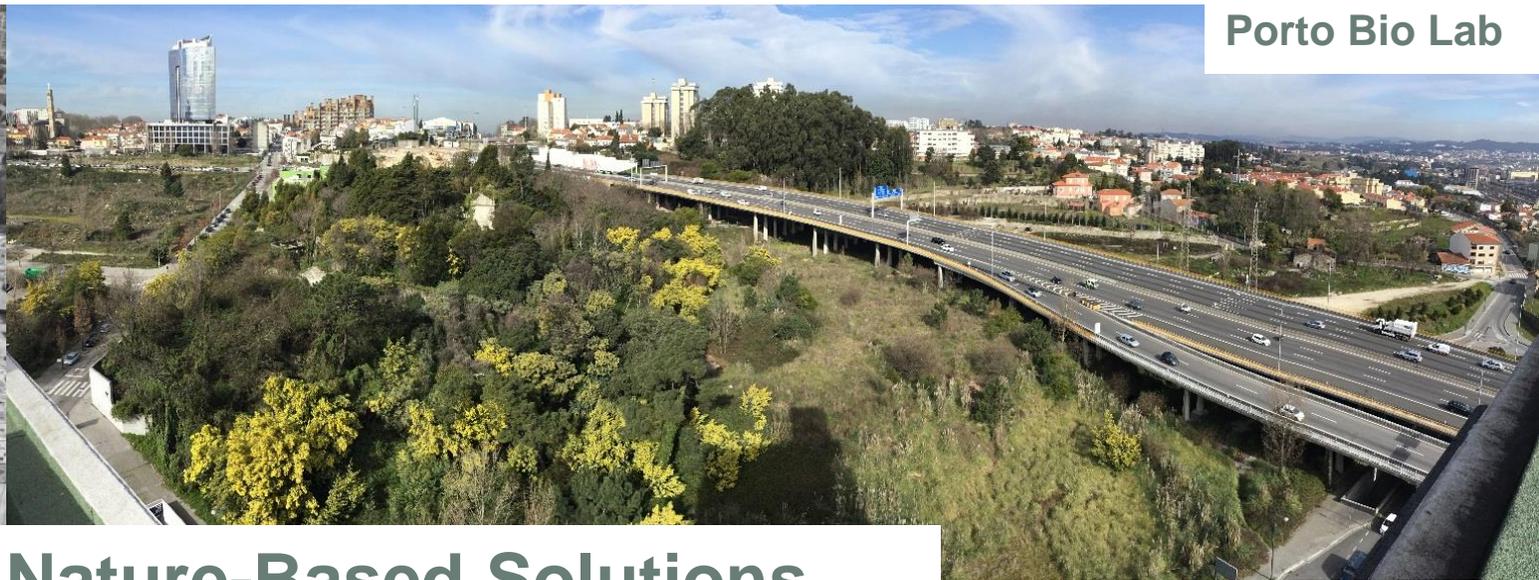


Adaptation



Protection

**Asprela Central Park**



**Porto Bio Lab**

**Nature-Based Solutions**



**Trindade Metro Station**



**River rehabilitation**



**New trees**

## Protecting Porto's City from Sea Level Rise

Collaboration on coastal defense projects



Integrated vision of water



Preventive action of civil protection

Annual Sand Nourishment



Coastline management plan



And what can we expect in the future with increasing sea level rise?



New types of NBS?



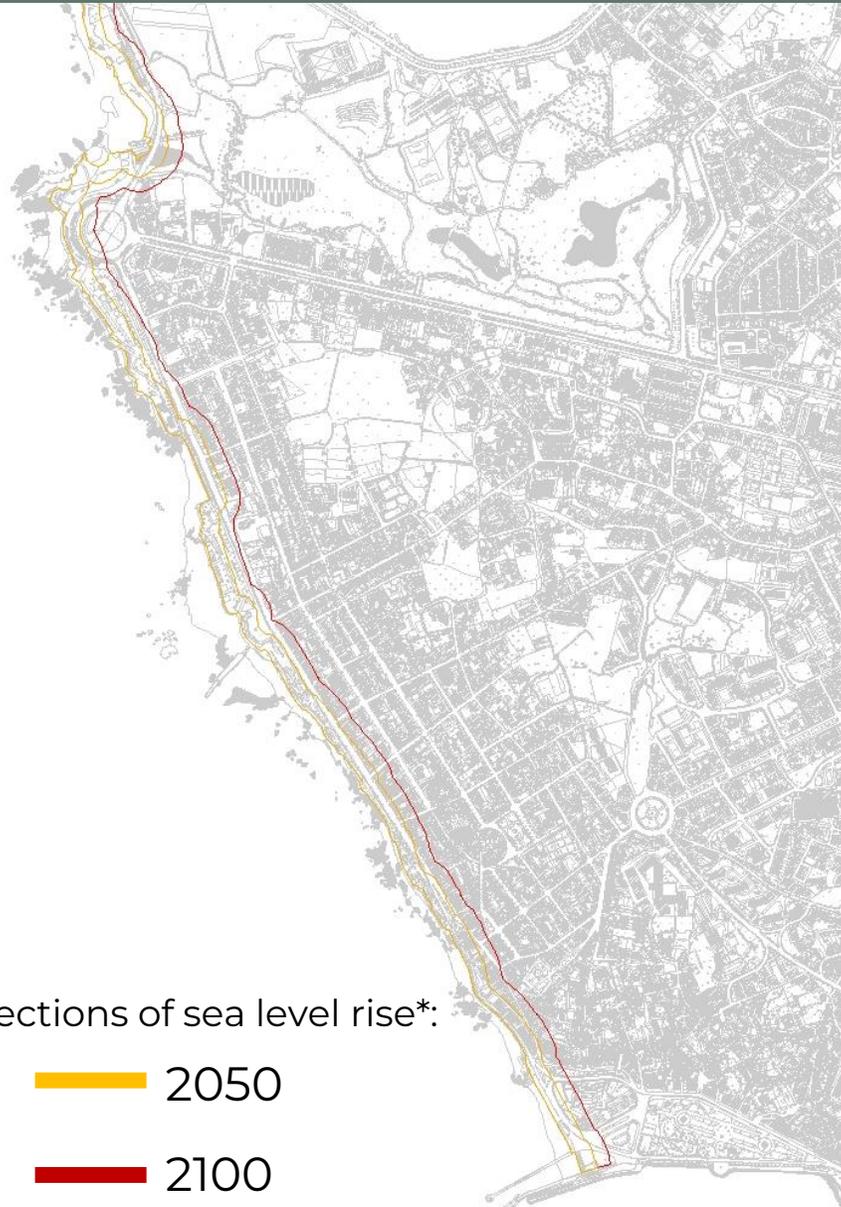
New coastal defense structures?



Land use changes?



Relocation of people and activities?



Projections of sea level rise\*:

2050

2100

\* Source: Portuguese Environmental Agency



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