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Keynote Speaker:

Cities towards the climate transition

“Driving the energy and environment transition”



VEOLIA

TOWARD SMART & RESILIENT CITIES



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Cities today...

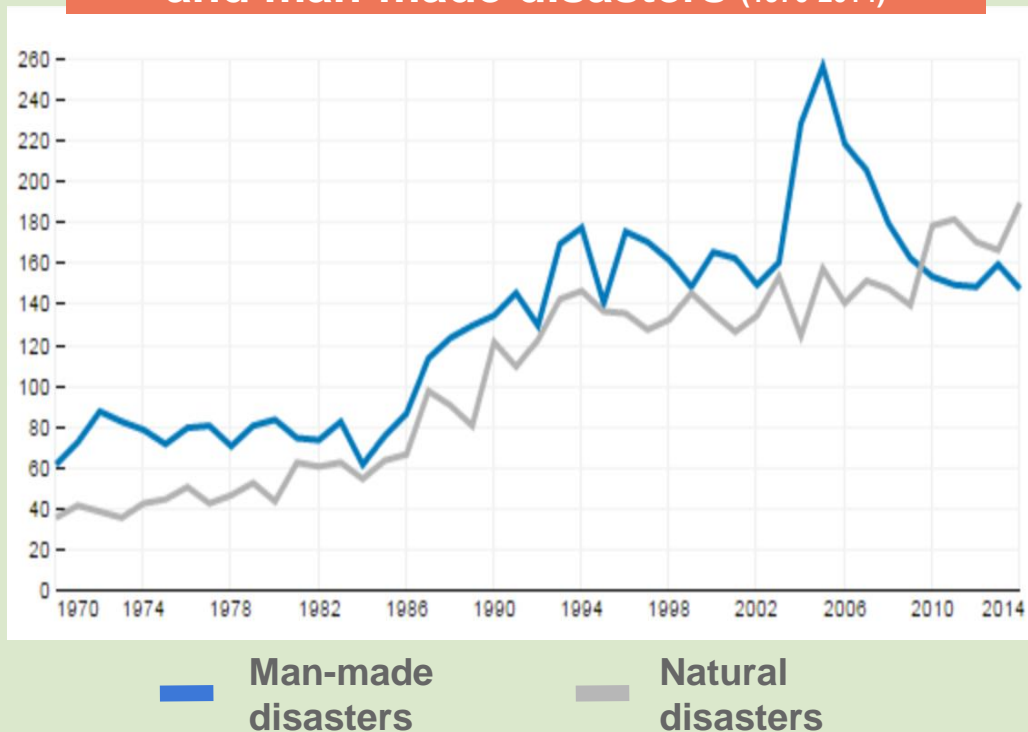
**50% of world population
80% of global GDP**

Urban ecosystem of actors



Facing shocks...

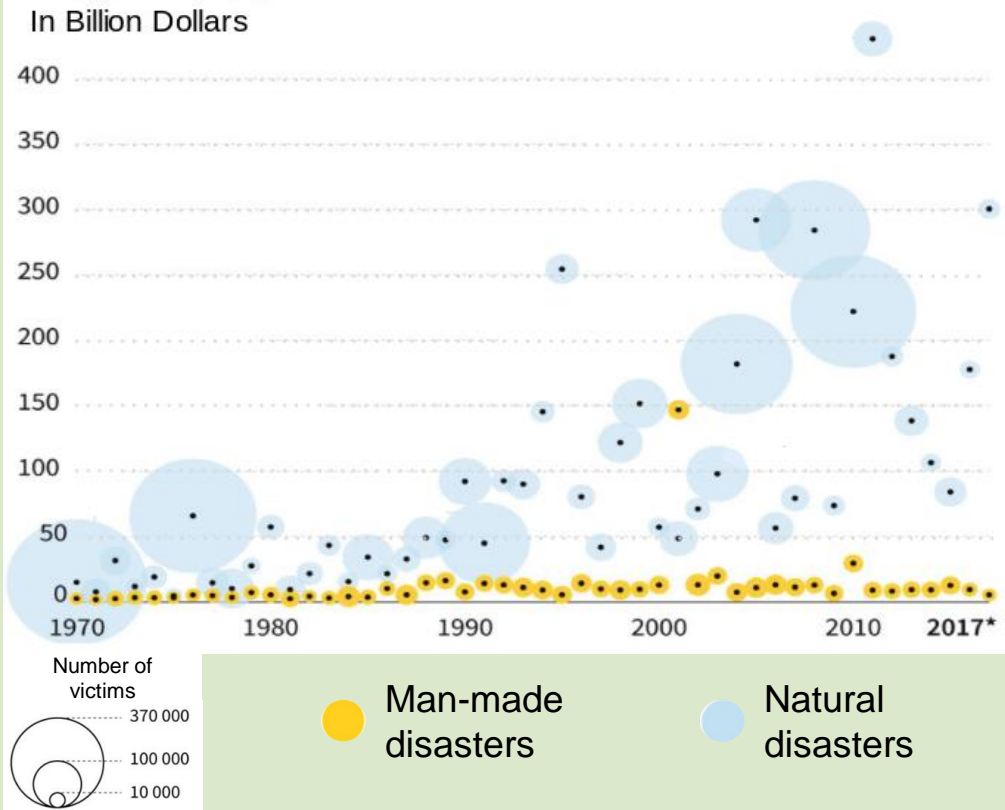
Increased number of natural disasters and man-made disasters (1970-2014)



Source: Swiss Re Economic Research

Intense shocks...

Increased cost and frequency of natural and man-made disasters (1970-2017)



Source: Swiss Re

Facing stresses...



Aging
Infrastructures



São Paulo,
Brazil



Weakened resources



Cape Town,
South Africa



Growing complexity of
management



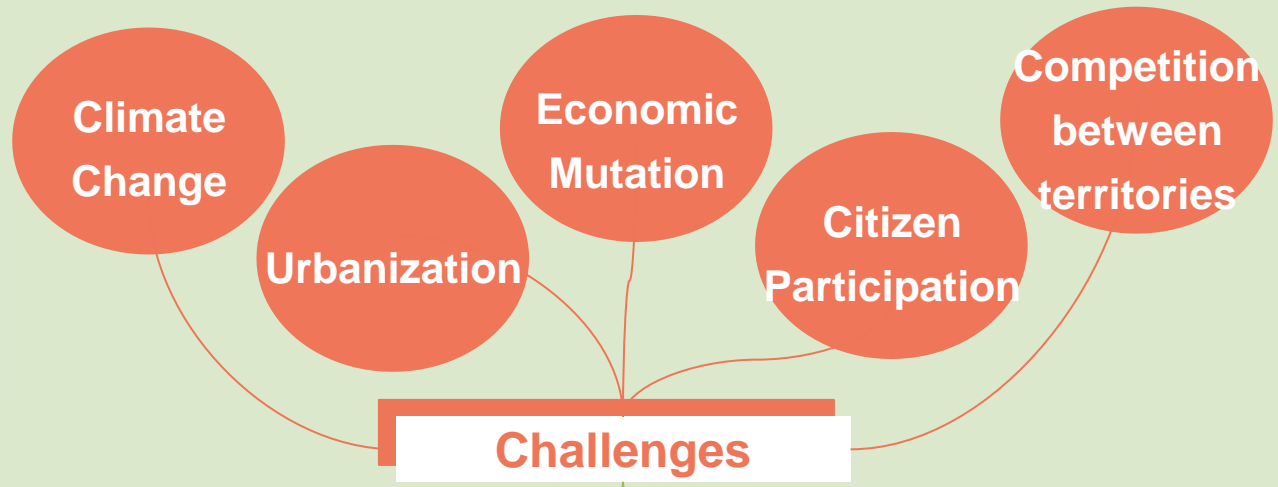
Delhi,
India



Social
Tensions



Milan,
Italy





**Using resilient solutions to prepare
for the next wave**



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Veolia key figures (2017)

€24,390 M

in revenue

163,226

employees

WATER



100

million people supplied
with drinking water

61

million people
connected to
wastewater systems

4,052

drinking water
treatment plants
managed

2,928

wastewater treatment
plants operated

WASTE



40

million people provided
with collection services
on behalf of
municipalities

45

million metric tons
of treated waste

764,477

business customers

591

waste treatment facilities
operated

ENERGY



44

million MWh produced

37,339

Heating installations
managed

2,086

Industrial sites
managed

551

heating and cooling
networks operated

What is Resilience for Veolia?

SHOCKS

- Natural Disasters
- Terrorist Attacks
- Pandemics
- Human-caused environmental disasters

Disturb

Cities
Attractiveness

Disturb

STRESS

- Aging infrastructures
- Urbanization
- Resources shortages
- Greenhouse gas
- Air pollution
- By-products management

Needs

New approach

Breaking governance
silos to create
synergies

**New tools and new
service offer**

Risk management as
an opportunity

Veolia partner of Braunschweig

1. Braunschweig dependency on fossil fuels

- Heating installations powered by gas, oil or coal
- Centric location of the power plant
 - Pollution, noise
 - Citizen concern

2. Veolia & Braunschweig developing innovative central heating system

- **Modular construction** of the Hungerkamp combined heat and power plant
- **Cogeneration plant**, powered by **bio-methane**
- **Wood boiler** and store for wood chippings
- Two thermal storage units with innovative insulation ensure especially low heat loss
- Boiler house with reserve **natural gas** boiler

3. Benefits of the partnership

- Sustainable fuels and modern filtering systems
- Lower emissions of harmful substances
 - Savings of approximately 8,000 tonnes of harmful CO2 per year
- Modular system, flexibly adapted to outdoor temperatures
 - 15,600 MWh heating per year
 - 9,200 MWh electricity per year
- Use of regional waste wood supplies
 - Use of wood ash as fertiliser

Veolia partner of Braunschweig

Braunschweig,
a model of energy transition



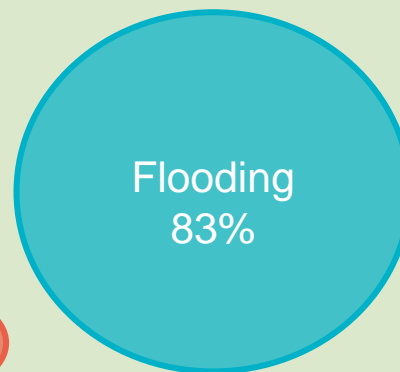
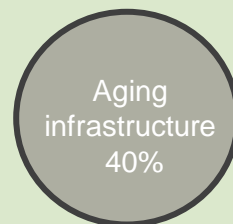
Veolia & the 100 Resilient Cities initiative

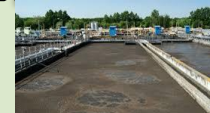
A \$100 million effort launched by the Rockefeller Foundation on its Centennial in 2013.



100RC is a non-profit entity, managed by Rockefeller Philanthropy Advisors (RPA).

CHALLENGES FACED BY CITIES WITHIN 100 RC:



**Edmonton****Lyon****New Orleans****Cali****Milwaukee****Belgrade****Milan****Surat****Montevideo****Wellington**

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Veolia partner of New Orleans



Veolia partner of New Orleans

1. Veolia & New Orleans context

- More than **20 years of collaboration**
- **Two sewage treatment plants** (330,000 people connected)

⇒ **10 year O&M contract**, renewed in 2015 for an **estimated total value at \$ 122M**

2. Crisis management: Hurricane Katrina - During and After

- **Installations operated by Veolia, under 6m of water**
 - *After 30 days: dry of the facilities*
 - *After 45 days: return to service of the first treatment lines*
 - *After 95 days: return to service of the secondary treatment service*
- The Federal Emergency Management Agency (FEMA) coordinated **\$244 million investment** → **82% reduction in potential risk profile**

3. Risk assessment

First Partnership Contract on Resilience: Veolia, Swiss Re and SWB

- **1/ Risk diagnosis** of the most critical assets
 - *Study over 8 month with the city water authority*
- **2/ Issues:** aging infrastructure and mismanagement
- **3/ Recommendations:** operational and change management
 - Hardening infrastructure (wastewater and energy)
 - Talent management
 - Digital hypervision systems

Veolia Resilience offer

Global Risk Assessment

Identification of the urban ecosystem's challenges (risks: shocks and stress)

Resilience Strategy

Planning identified solutions according to the urban ecosystem's risks

Implementation

Deployment of mitigation and adaptation measures to reduce the risk profile of the system

Monitoring

Measure implemented actions and monitor progress and performance

Emergency responses due to sudden critical event

Foster a continuous improvement of systems and services



Big Data supporting Resilient services



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A new world of Analytics



UrbanNamics



Yield management

Predictive maintenance

Leak detection

Smart metering

Real-time quality control

UrbanBoard

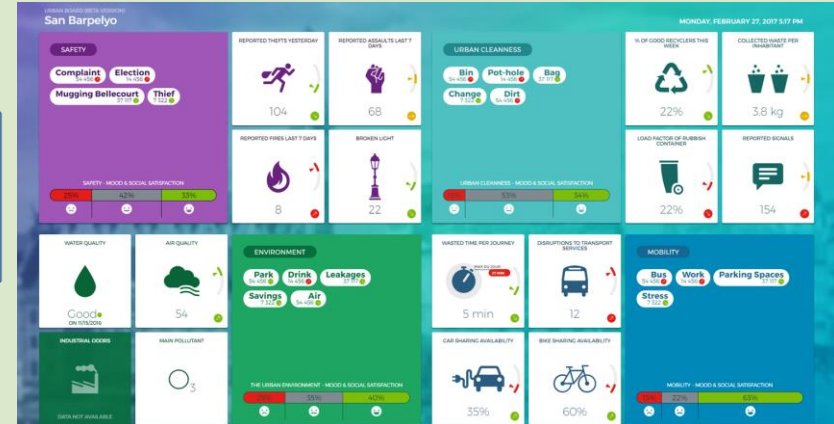
Mobility

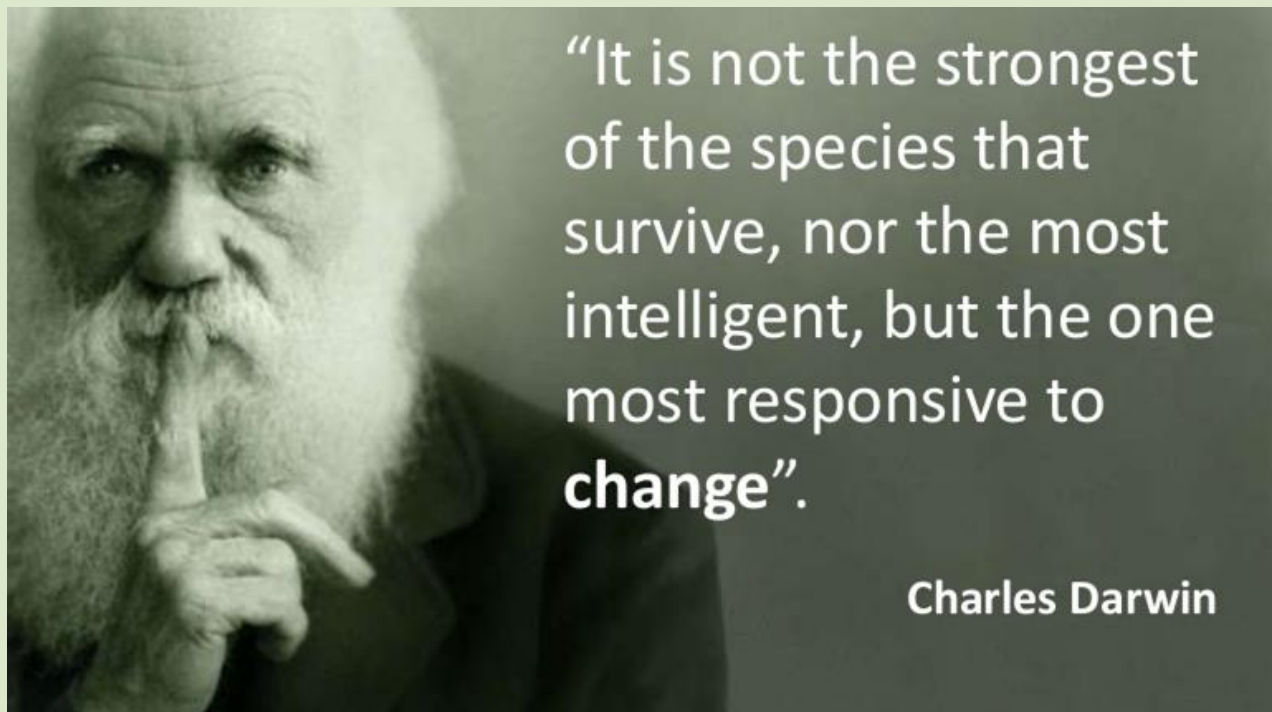
Safety

Water

Waste

Environment





“It is not the strongest
of the species that
survive, nor the most
intelligent, but the one
most responsive to
change”.

Charles Darwin



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THANK YOU FOR YOUR ATTENTION!