

A Path to Smart Cities in Latin America

m2m



Where we are since 1992?

- GDB/capita Evolution → +39%
+80% on developing countries
+33% on development countries
- Extraction of Raw Material → +41%
- Greenhouse Gas Emission → +0.4 of 92
+ 36% global emissions, 80% from 19 countries
 +64% from developing countries
 +8% from developed countries
- + 7% emissions/capita
 + 29% from developing countries
 -18% from developed countries

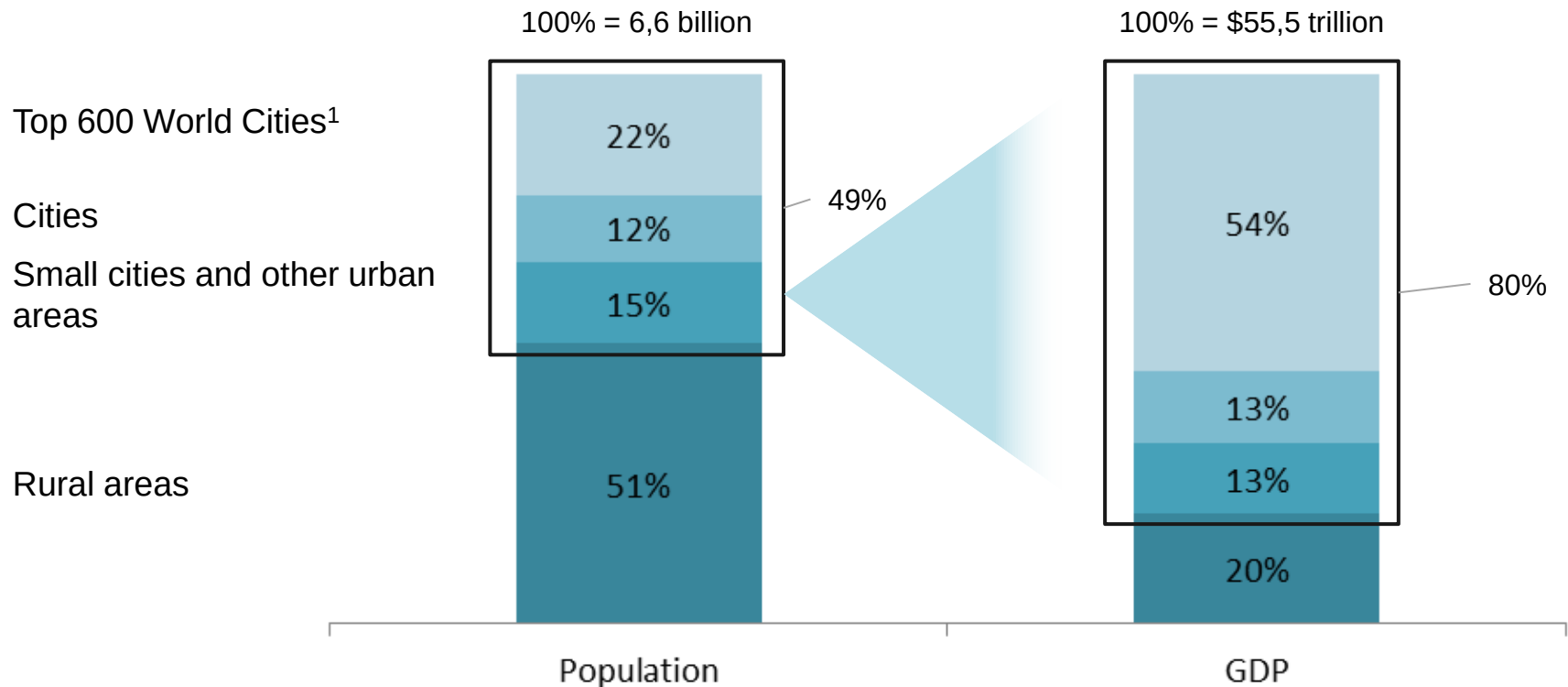
We need to be, at least, SMARTER!!

Source: Keeping Track of our Changing Environment

The Smart City is a heterogeneous concept



49% of world's population lives in cities and generate more than 80% of global GDP...

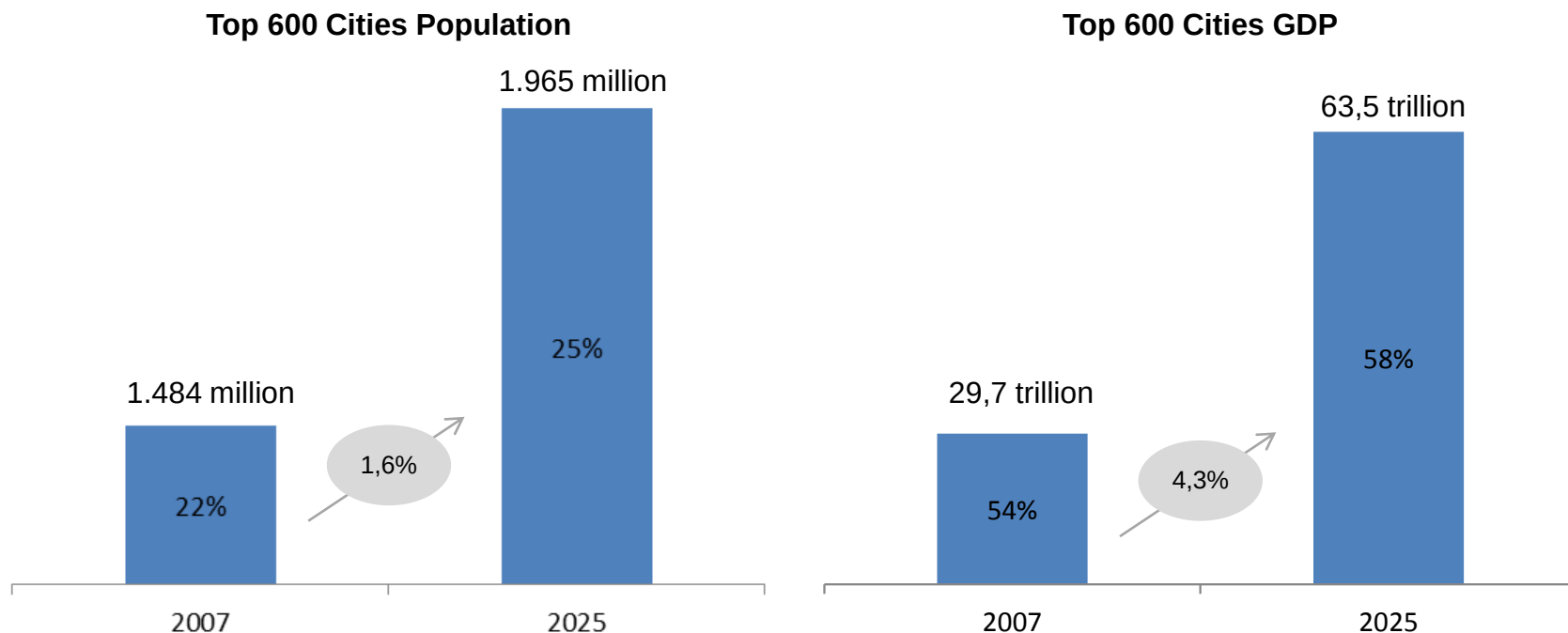


- Larger cities attract more talent
- Large cities attract more investment, specially in developing countries
- City network effects stimulate economic growth

Source: McKinsey Global Institute (MGI), United Nations World Urbanization Prospects
Top 600 World Cities: top 600 cities of the world by GDP, as defined by MGI

... and wealth distribution is going to be more polarized

25% of the population in top 600 cities will account for 58% of global GDP, 75% in today's developing economies



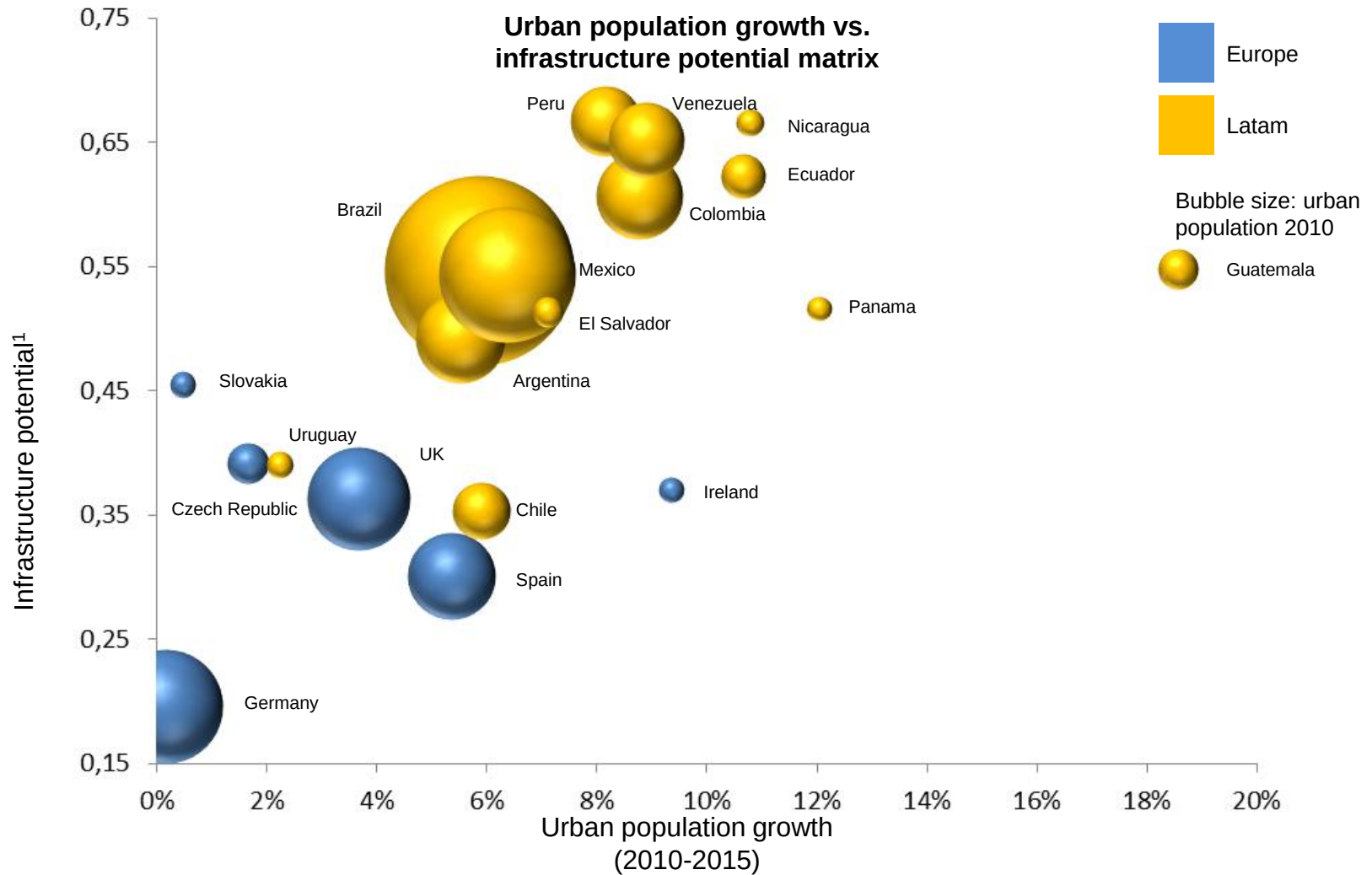
Furthermore, economic growth will be mainly driven by cities...

- 2,000 metropolitan areas are expected to contribute 75% of global GDP growth from 2007 to 2025
- Top 600 Cities are expected to contribute 62% of global GDP growth from 2007 to 2025

... and by developing countries: in 2025 almost 75% of top 600 cities will be there

Source: McKinsey Global Institute (MGI), United Nations World Urbanization Prospects
Top 600 World Cities: top 600 cities of the world by GDP, as defined by MGI

In Telefonica's footprint we'll see two different growth and investment paths for Latam and Europe



Source: World Economic Forum, World Bank, IFM, United Nations World Urbanization Prospects

1) Infrastructure potential: macroeconomic KPI calculated from a compounded set of per capita infrastructure gap indicators

Telefonica Latam main cities and relevant indicators

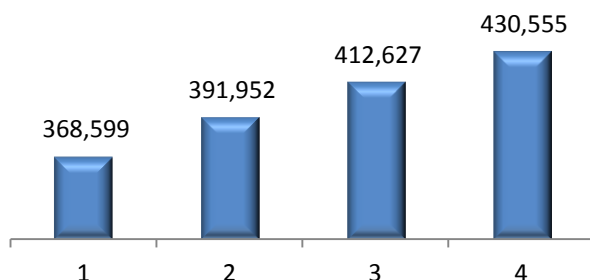


Urban population: 368,600,000 inhab.

Average public expenditure as % of GDP:
30,4%

	1.000K inhab.	300K inhab.	100K inhab.
Cities with over X inhabitants	34	157	419
Percentage of total urban population	29,7%	50,4%	76,5%

Urban population growth (thosands)



Region data and relevant grades*

	2010-2015	2015-2020	2020-2025	2025-2030
Urban growth	1,06 %	1,05 %	1,04 %	1,03 %
Urban population %	83%	85%	86%	87%

Infrastructure



5,4
/10

Gov. Willingness**



5,2
/10

Digital Economy



5,3
/10

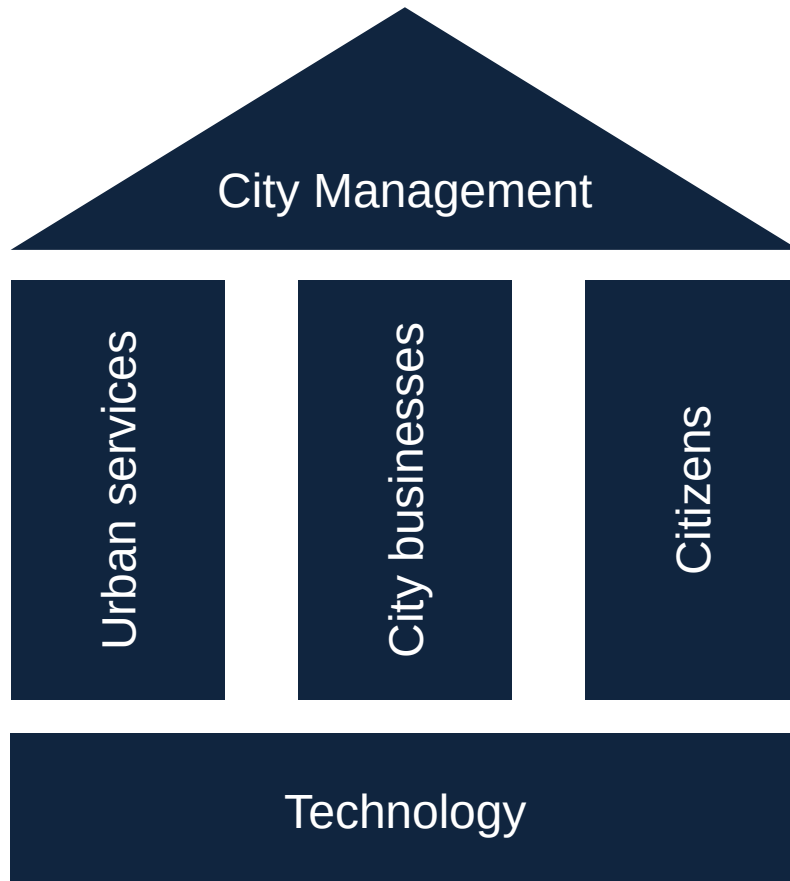
Top five cities:

1	México D.F.	20,137,000	México	
2	Sao Paulo	10,021,000	Brasil	
3	Lima	8,472,000	Perú	
4	Rio de Janeiro	6,023,000	Brasil	
5	Santiago de Chile	5,631,000	Chile	

*Data extracted from Global competitiveness report (2012) and Digital economy ranking(2010). Grades over 10

**Gov. Willingness: Predisposition to implement technological advances (Digital economy ranking, 2010)

Base of Smart City is the intensive use of ICTs to optimize current urban services and enable new businesses

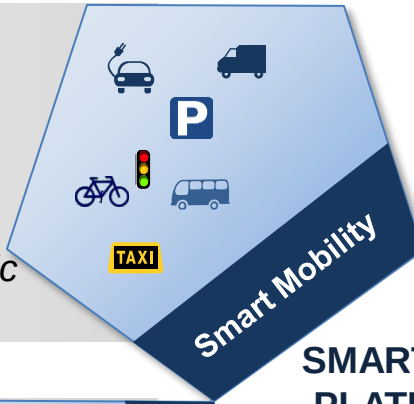


- **Control over urban services** fulfillment and quality
- **Real-time information** and **real-time decision making**
- **Urban planning based on integrated view** of the **city**: cross data from different areas
- **Optimize urban services** thanks to the use of relevant urban information:
 - **Save money** through **efficiency** (energy, resources, time, etc.)
 - **Enhance capabilities**: service scheduling, maintenance. etc.
 - **Optimize resource allocation** and **investment**
- **Improve city business and enable new ones** through new platforms and infrastructure
- **Improve citizen quality of life** saving him time or money, or giving him access to new services
- **Enable a new generation of services** through last generation **technology**: sensor deployment, M2M connectivity, cloud capabilities, Big Data, mobility, etc.

There is a wide range of Telefonica services falling within the Smart City value proposition

Smart Mobility

Services focused on decreasing city traffic density and citizen driving times, and optimizing public services routes.



Energy & Environment

Services whose main motivation is to reduce energy consumption (electricity, oil and gas, water, etc.), to better manage waste or to improve environment indicators.



City Economy

Services focused on modernizing how city businesses are performing and enabling city growth

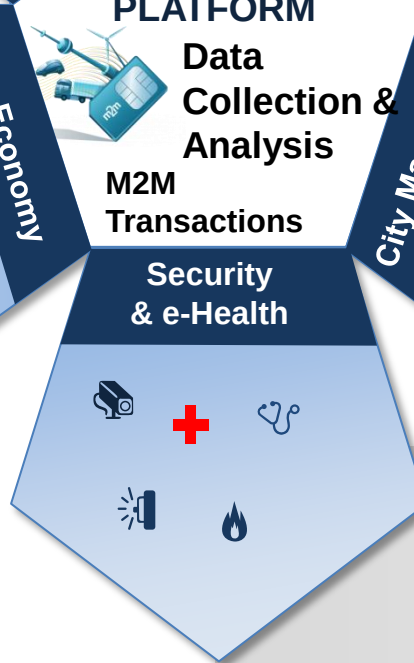


SMART CITY PLATFORM

Data Collection & Analysis

M2M Transactions

Security & e-Health



City Management

Services focused on modernizing public administration through IT and mobile solutions to better allocate city resources, prioritize investments thanks to an integrated view of the city.



Security & e-Health

Services focused either on crime prevention and prosecution and health care system quality and efficiency.



Smart Santander City Lab - 20,000 smart devices will be installed in between 2011 and 2014

OVERVIEW

Smart Santander is a **city lab** for the **research and experimentation** of architectures, services and applications for the Internet of Things (IoT).

20,000 IoT devices are planned to be installed from 2011 to 2014 to validate different approaches to the architectural model of the IoT and the social acceptance of the smart city concept

CITY LAB FOCUS

1. Innovative **applications and services**: develop new service applications, test and experiment existing ones, and adapt them.
2. Internet of Things **middleware solutions**: develop and test a smart city platform with an intelligent data management module
3. Internet of Things **communication protocols and technologies**: test, validate and certify different communication protocols and integrate them in the city platform

PLAYERS

15 organisations from 9 countries
(EU + Australia)

Project Leadership: *Telefónica*



APPLICATIONS & SERVICES



Smart Parking

- Free parking spot sensors
- Real-time notification of cars parking in restricted spots (bus, load, disabled,...)



Weather and Environment Stations

- Measure temperature, pressure, specific substances concentration in air



NFC services

- Payments
- Access control (offices, public transport,...)



Smart Urban Lighting

- Regulate light intensity based on presence detection, time, luminosity,...



Internet Based City TV Stations



Intelligent Transport Syst.

- Information about bus occupancy levels and delays
- Suggest alternative routes



Waste Management

- Optimise waste collection fleet routes based on real-time filling levels detected in containers



Smart Watering

- Reduce water consumption based on soil humidity, landscape conditions, soil density, weather forecasts,...



Traffic Monitoring

- Determine traffic intensity providing dynamic traffic maps

upcoming

upcoming

upcoming

Malaga Smart City: A new model of energy management in cities

OVERVIEW

SmartCity Malaga is a project that presents a new model of energy management in cities with the goal of achieving 20% energy savings, reducing carbon emissions (6,000 t CO2 per year) and an increase in renewable energy consumption.

CITY LAB FOCUS

- 1.Smart Energy Grid:** to deploy smart metering solutions
- 2.Environmental Intelligence:** integrate renewable energies and transform buildings into energy efficient structures.
- 3.Electric Vehicle Mobility:** developing end-to-end EV solutions, from the test of electric cars to the deployment of a 200 charging points infrastructure with real-time information

PLAYERS

Project Leadership:



APPLICATIONS & SERVICES



Smart Grid

- Smart Metering solutions to gain insight on consumption patterns
- Integrate renewable sources in the energy mix
- Promote distributed micro-generation and integrate it in the grid



Smart Building

- Energy efficiency solutions to monitor and reduce energy consumption.
- Smart Energy storage in batteries to count with extra electricity supply during peak hours



Electric Vehicle Infrastructure

- Develop the EV infrastructure with 200 charging points
- Real-time information about closest charging point, availability, booking, payments,...



Smart Urban Lighting

- Regulate light intensity based on presence detection, time, luminosity,...
- Monitor total working hours to anticipate maintenance processes
- Real-time notifications when failures occur.

Yokohama Smart City Project: A new model to reduce CO₂ emissions in cities

OVERVIEW

Yokohama Smart City is a project to **create a Japanese model of smart grid system** for the city and others cities
Seven companies + the council formed a consortium focused on **energy** and **environment** fields.
The goal of the consortium is to reduce 64000 t-CO₂ by 2014.

CITY LAB FOCUS

1. Next-generation infrastructure of **electric vehicles**
2. **Renewable energies** distributed generation
3. Energy consumption optimization with **smart building solutions** and the use of **thermal energy** for heating and cooling systems.

PLAYERS

Project Leadership:  **YOKOHAMA**

 **accenture**

 **TOKYO GAS**



TOSHIBA

Panasonic



APPLICATIONS & SERVICES



Smart Grids

- Smart Metering solutions to monitor consumption in real-time
- Advanced heat storage systems based on solar thermal energy and heat pumps
- Integrated and unified management across different grids



Smart Buildings

- Multi-site organizations remote control and automation of devices to reduce energy consumption
- Use of electricity storage batteries to reduce cost during peaks
- Advanced cooling and heating systems using district water supply (e.g. river water, solar energy...)



Electric Vehicle Infrastructure

- Develop the EV infrastructure with charging points.
- Develop V2G capabilities to use EV as electricity storage systems

San Diego Smart City– A resource-conscious region

OVERVIEW

Smart City San Diego is a **public-private partnership** formed by 2 companies, 2 public institutions and a university to test different **solutions** about **energy, environment** and **smart mobility**.

CITY LAB FOCUS

1. Develop the charging points infrastructure for **electric vehicles**
2. Combine smart appliances and smart meters for **Smart Home** solutions.
3. Enhance the use of **energy storage systems** to promote the integration of **renewable energies** in the energy mix

PLAYERS



APPLICATIONS & SERVICES



Smart Building

- Remotely control the home devices using the smart meter to monitor total consumption in real-time
- Use of energy storage systems to integrate the renewable energy (Photovoltaic)

upcoming



EV infrastructure

- Charging point infrastructure with real-time information about closest station, availability, booking, payments,...
- EV Car sharing: public fleet of EV vehicles to be shared for urban movements

upcoming



Smart Metering

- Monitor and control energy consumption in real-time

upcoming

Smart City Rio de Janeiro (Brazil) – An operation center to ensure the security and forecast natural disasters

OVERVIEW

Smart City Rio de Janeiro is a **project** of the city to **control** and **forecast natural disasters** in the city and **surveillance** for the next global **events** (FIFA World Cup and Olympic Games)

IBM is the responsible of creating the operation center

CITY LAB FOCUS

1. Integrate video surveillance in the city
2. Forecast environmental phenomenon
3. Controlling events in the city

PLAYERS

Project Leadership:



+ other companies

APPLICATIONS & SERVICES



Natural disasters forecast

- Forecast floods
- Weather forecasting
- Hydrological modeling system



Emergency Management



Video-surveillance

Telefonica Digital Smart City solution is based on relevant value levers

Telefonica Smart City



Value levers

I

Cost reduction & efficiency



II

Increase Income



III

Governance & city planning



VI

Sustainability and quality of life

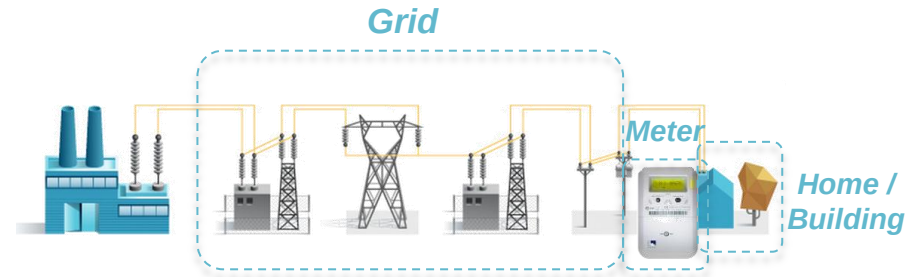


Example: Smart Grid



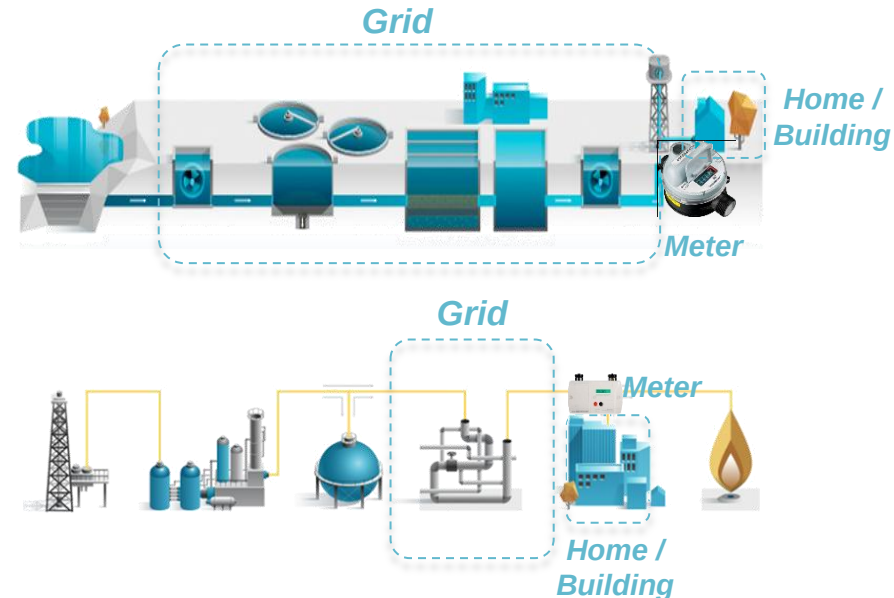
What is Telemetry?

Telemetry is used to **measure** the amount of **electricity / water / gas consumed**. The meter communicates with a concentrator, and the latter sends the information to the utility's server (i.e. GPRS or GSM)



What is Telecontrol?

Telecontrol is used for the **remote monitoring** of the **network** (substations, grid, manholes, etc.) that can **intelligently integrate the behaviour and actions of all users** connected to it in order to efficiently deliver sustainable, economic and secure supplies



Smart Metering Industry Context

Main benefits to encourage the Smart Metering roll-out



End-user benefits

- **Direct control** of billing data and consumption
- **Tailored tariffs** according to the real consumption.
- Contribution to **energy savings**: greater awareness drives a rational energy usage
- Develop services based on **prepaid system**



Peak load management

- Better electric supply management thanks to Smart Meters remote consumption reading :
 - Provision of important data to enable **peak monitoring**



Energy efficiency

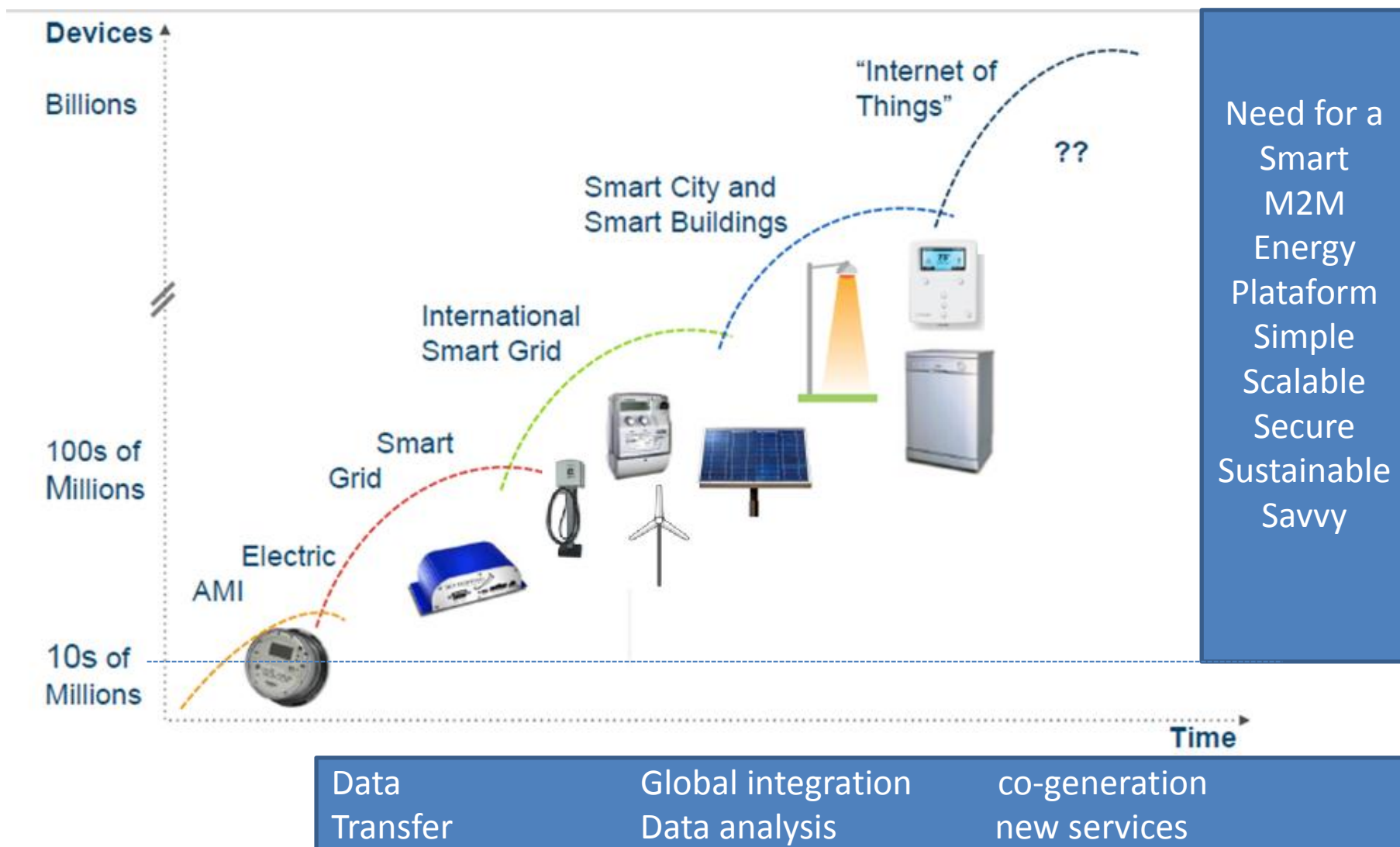
- Increase energy efficiency through **cutting emissions**
- **Reduction in consumption peaks** through customer awareness and energy price signals
- Reduction of the average service interruption (**outages**):
 - Service improvement
 - DSOs cost reduction



Fraud detection

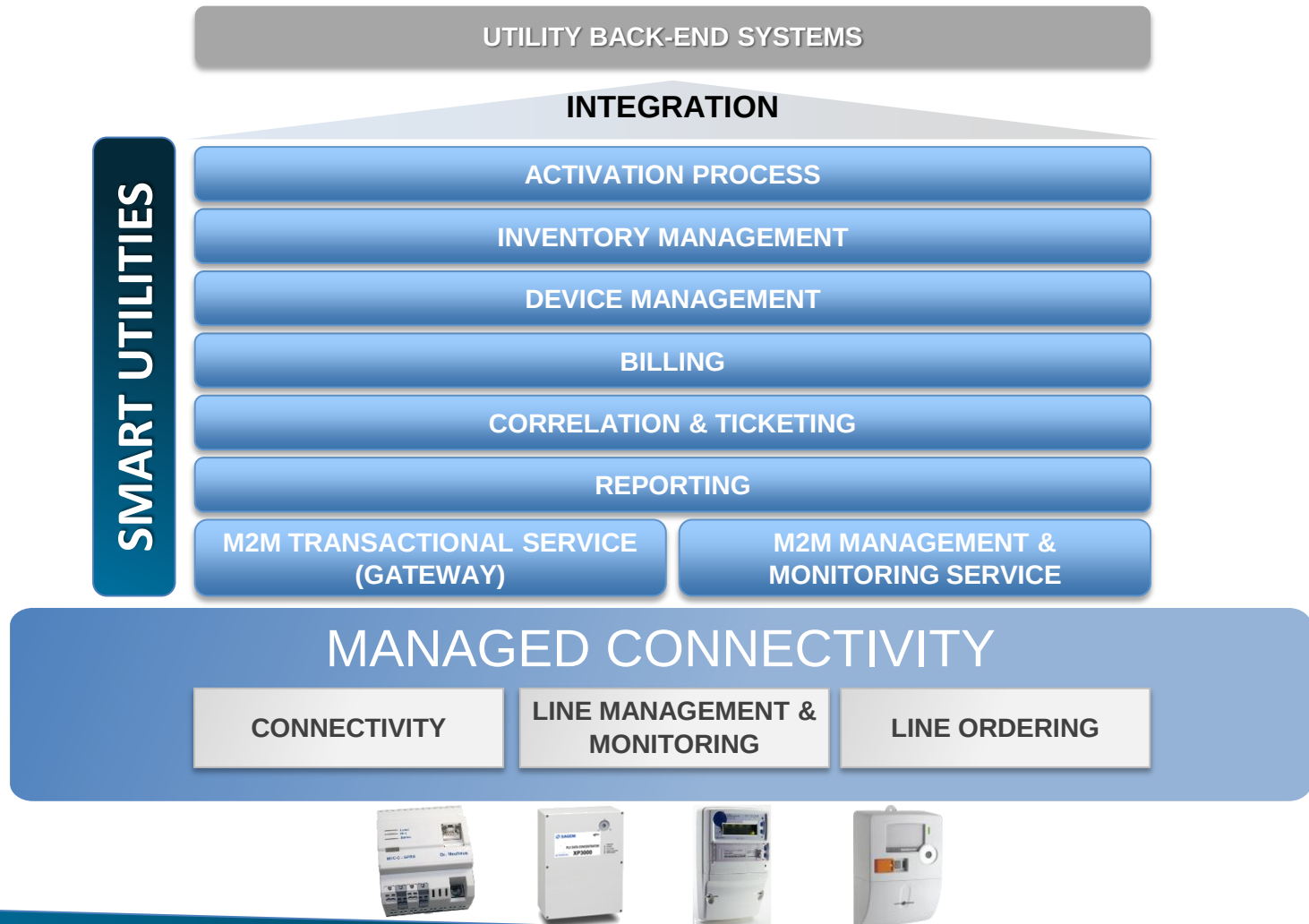
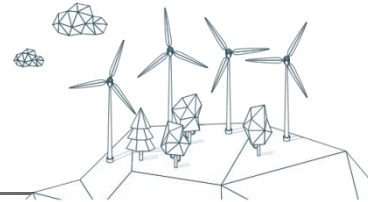
- **Anti-tampering devices** included in the smart meters, alerting DSOs of meter manipulation
- **Reduction of non technical losses** (fraud or energy theft)

The Utilities Path to Smart City



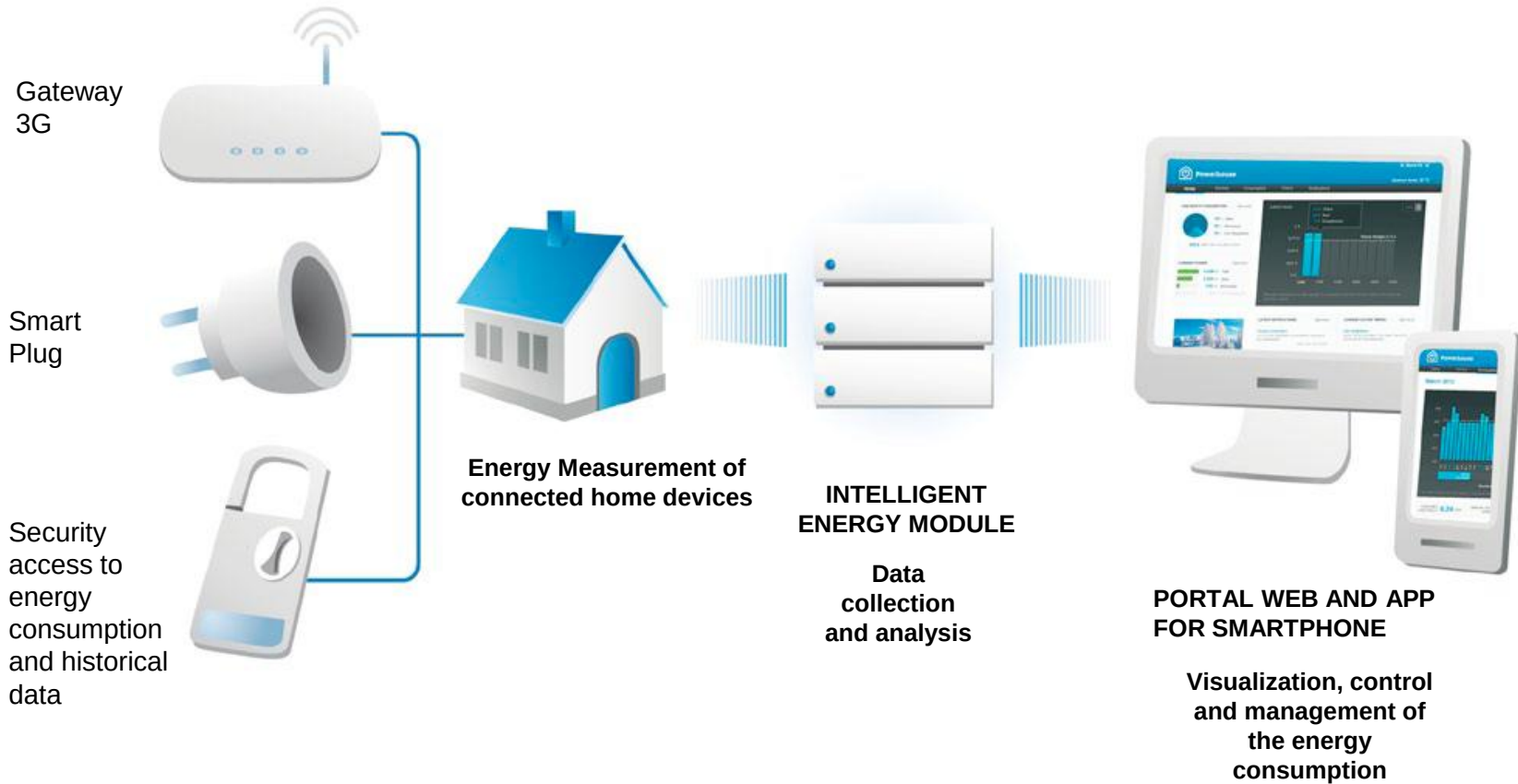
Value Proposition

Modularity, flexibility, security and scalability beyond connectivity through a **vertical** solution



Smart Home

System flow diagram



Telefónica

Obrigado!

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Country targeting: Argentina

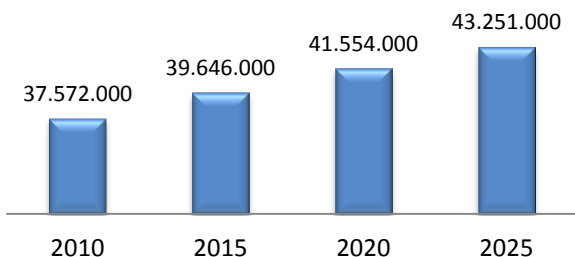


Urban population: 37.572.000 hab.

Average public expenditure as % of GDP:
37,90%

	1.000K inhab.	300K inhab.	100K inhab.
Cities over X inhabitants	4	16	57
Percentage of total urban population	21%	35%	55%

Urban Population Growth



Country data and relevant grades*

	2010-2015	2015-2020	2020-2025	2025-2030
Urban growth	1,07 %	0,94 %	0,80 %	0,67 %
Urban population %	92,4 %	93,2 %	93,8 %	94,3%

Infrastructure



5,0
/10

Gov. Willingness**



4,0
/10

Digital Economy



5,0
/10

Top five cities:

1	Buenos Aires	3.776.138 hab.	Buenos Aires City	
2	Córdoba	1.613.211 hab.	Córdoba	
3	Rosario	1.325.090 hab.	Santa Fé	
4	Mendoza	1.109.104 hab.	Mendoza	
5	La Plata	957.800 hab.	Buenos Aires	

*Data extracted from Global competitiveness report (2012) and Digital economy ranking(2010). Grades over 10

**Gov. Willingness: Predisposition to implement technological advances (Digital economy ranking, 2010)

Country targeting: Brazil

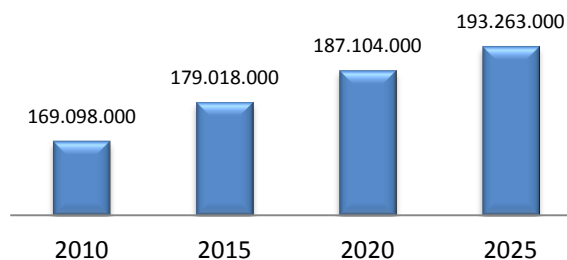


Urban population: 169.098.000 hab.

Average public expenditure as % of GDP:
38,80%

	1.000K inhab.	300K inhab.	100K inhab.
Cities over X inhabitants	13	74	-
Percentage of total urban population	20%	38%	-

Urban Population Growth



Country data and relevant grades*

	2010-2015	2015-2020	2020-2025	2025-2030
Urban growth	1,14 %	0,88 %	0,65 %	0,47 %
Urban population %	86,5 %	88,2 %	89,5 %	90,4%

Infrastructure



5,1
/10

Gov. Willingness**



5,6
/10

Digital Economy



5,3
/10

Top five cities:

1	Sao Paulo	10.021.437 hab.	Sao Paulo 
2	Rio de Janeiro	6.023.742 hab.	Rio de Janeiro 
3	Salvador de Bahía	2.711.903 hab.	Bahía 
4	Belo Horizonte	2.373.255 hab.	Minas Gerais 
5	Fortaleza	2.311.911 hab.	Ceará 

*Data extracted from Global competitiveness report (2012) and Digital economy ranking(2010). Grades over 10

**Gov. Willingness: Predisposition to implement technological advances (Digital economy ranking, 2010)

Country targeting: Colombia

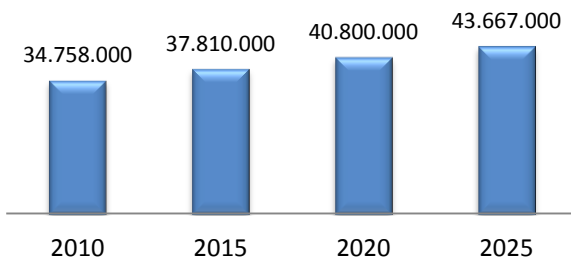


Urban population: 34.758.000 hab.

Average public expenditure as % of GDP:
29,40%

	1.000K inhab.	300K inhab.	100K inhab.
Cities over X inhabitants	4	20	61
Percentage of total urban population	39%	61%	80%

Urban Population Growth



Country data and relevant grades*

	2010-2015	2015-2020	2020-2025	2025-2030
Urban growth	1,68 %	1,52 %	1,36 %	1,20 %
Urban population %	75,1 %	79,5 %	78,0 %	79,5 %

Infrastructure



5,1
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Gov. Willingness**



5,7
/10

Digital Economy



4,8
/10

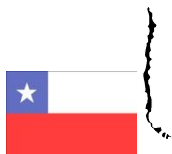
Top five cities:

1 Bogotá	7.571.345 hab.	Cundinamarca
2 Medellín	2.393.011 hab.	Antioquia
3 Cali	2.294.653 hab.	Valle del Cauca
4 Barranquilla	1.200.513 hab.	Atlántico
5 Cartagena de Indias	967.103 hab.	Bolívar

*Data extracted from Global competitiveness report (2012) and Digital economy ranking(2010). Grades over 10

**Gov. Willingness: Predisposition to implement technological advances (Digital economy ranking, 2010)

Country targeting: Chile

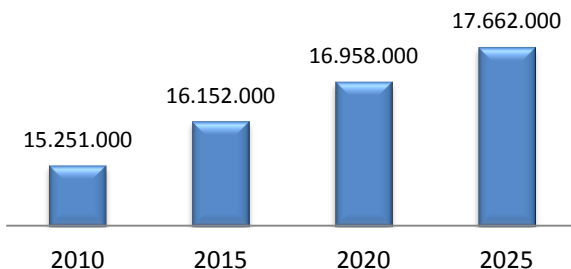


Urban population: 15.251.000 hab.

Average public expenditure as % of GDP:
24,40%

	1.000K inhab.	300K inhab.	100K inhab.
Cities over X inhabitants	1	3	21
Percentage of total urban population	37%	48%	69%

Urban Population Growth



Country data and relevant grades*

	2010-2015	2015-2020	2020-2025	2025-2030
Urban growth	1,15 %	0,97 %	0,81 %	0,65 %
Urban population %	89,0 %	90,1 %	91,0 %	91,7 %

Infrastructure



7,9
/10

Gov. Willingness**



5,7
/10

Digital Economy



6,4
/10

Top five cities:

1	Santiago	5.631.839 hab.	Santiago
2	Concepción	848.023 hab.	Concepción
3	Valparaíso	824.006 hab.	Valparaíso
4	La Serena	296.253 hab.	Coquimbo
5	Antofagasta	285.255 hab.	Antofagasta

*Data extracted from Global competitiveness report (2012) and Digital economy ranking(2010). Grades over 10

**Gov. Willingness: Predisposition to implement technological advances (Digital economy ranking, 2010)

Country targeting: Ecuador

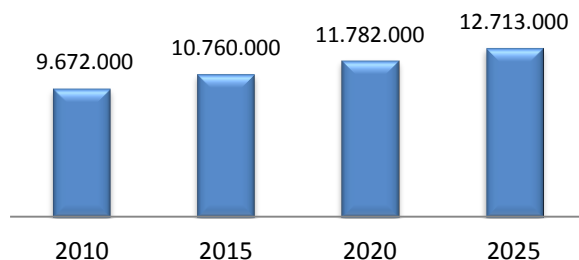


Urban population: 9.672.000 hab.

Average public expenditure as % of GDP:
34,50%

	1.000K inhab.	300K inhab.	100K inhab.
Cities over X inhabitants	2	4	14
Percentage of total urban population	41%	48%	67%

Urban Population Growth



Country data and relevant grades*

	2010-2015	2015-2020	2020-2025	2025-2030
Urban growth	2,13 %	1,81 %	1,52 %	1,26 %
Urban population %	66,9 %	69,7 %	72,0 %	74,0 %

Infrastructure



5,3
/10

Gov. Willingness**



4,9
/10

Digital Economy



3,9
/10

Top five cities:

1	Guayaquil	2.300.000 hab.	Guayas	
2	Quito	1.700.000 hab.	Pichincha	
3	Cuenca	330.000 hab.	Azuay	
4	Santo Domingo	305.000 hab.	Santo Domingo	
5	Machala	245.000 hab.	El Oro	

*Data extracted from Global competitiveness report (2012) and Digital economy ranking(2010). Grades over 10

**Gov. Willingness: Predisposition to implement technological advances (Digital economy ranking, 2010)

Country targeting: Mexico

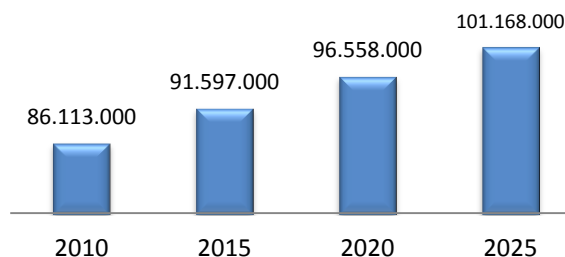


Urban population: 86.113.000 hab.

Average public expenditure as % of GDP:
26,90%

	1.000K inhab.	300K inhab.	100K inhab.
Cities over X inhabitants	11	42	58
Percentage of total urban population	48%	70%	73%

Urban Population Growth



Country data and relevant grades*

	2010-2015	2015-2020	2020-2025	2025-2030
Urban growth	1,23 %	1,05 %	0,93 %	0,80 %
Urban population %	77,8 %	79,3 %	80,7 %	82,0 %

Infrastructure



6,0
/10

Gov. Willingness**



5,0
/10

Digital Economy



5,5
/10

Top five cities:

1	Mexico City	20.137.152 hab.	Mexico D.F.	
2	Guadalajara	4.434.252 hab.	Jalsico	
3	Monterrey	4.080.329 hab.	Nuevo León	
4	Puebla	2.668.347 hab.	Puebla	
5	Toluca	1.846.602 hab.	Mexico State	

*Data extracted from Global competitiveness report (2012) and Digital economy ranking(2010). Grades over 10

**Gov. Willingness: Predisposition to implement technological advances (Digital economy ranking, 2010)

Country targeting: Perú

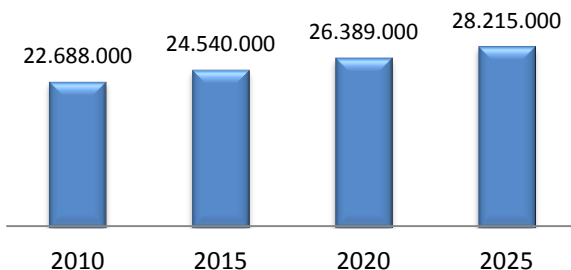


Urban population: 22.688.000 hab.

Average public expenditure as % of GDP:
17,40%

	1.000K inhab.	300K inhab.	100K inhab.
Cities over X inhabitants	1	9	22
Percentage of total urban population	37%	55%	64%

Urban Population Growth



Country data and relevant grades*

	2010-2015	2015-2020	2020-2025	2025-2030
Urban growth	1,57 %	1,45 %	1,34 %	1,16 %
Urban population %	76,9 %	78,7 %	80,3 %	81,7 %

Infrastructure



5,0
/10

Gov. Willingness**



4,7
/10

Digital Economy



4,7
/10

Top five cities:

1	Lima-Callao	8.472.935 hab.	Lima	
2	Arequipa	815.166 hab.	Arequipa	
3	Trujillo	790.459 hab.	Trujillo	
4	Chiclayo	574.408 hab.	Lambayeque	
5	Piura	441.769 hab.	Piura	

*Data extracted from Global competitiveness report (2012) and Digital economy ranking(2010). Grades over 10

**Gov. Willingness: Predisposition to implement technological advances (Digital economy ranking, 2010)

Country targeting: Uruguay

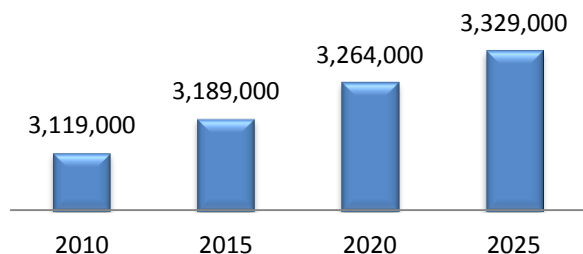


Urban population: 3.119.000 hab.

Average public expenditure as % of GDP:
32,30%

	1.000K inhab.	300K inhab.	100K inhab.
Cities over X inhabitants	1	1	3
Percentage of total urban population	41%	41%	48%

Urban Population Growth



Country data and relevant grades*

	2010-2015	2015-2020	2020-2025	2025-2030
Urban growth	0,45 %	0,47 %	0,39 %	0,32%
Urban population %	92,5 %	93,0 %	93,4 %	93,9 %

Infrastructure



6,1
/10

Gov. Willingness**



5,6
/10

Digital Economy



-
/10

Top five cities:

1	Montevideo	1.269.648 hab.	Montevideo	
2	Salto	118.013 hab.	Salto	
3	Conurbación Maldonado-San Carlos- Punta del Este	103.082 hab.	Maldonado	
4	Paysandú	90.251 hab.	Paysandú	
5	Ciudad de la Costa	83.399 hab.	Canelones	

*Data extracted from Global competitiveness report (2012) and Digital economy ranking(2010). Grades over 10

**Gov. Willingness: Predisposition to implement technological advances (Digital economy ranking, 2010)

Country targeting: Venezuela

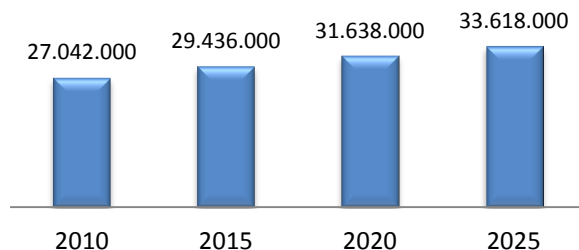


Urban population: 27.042.000 hab.

Average public expenditure as % of GDP:
33,00%

	1.000K inhab.	300K inhab.	100K inhab.
Cities over X inhabitants	6	17	45
Percentage of total urban population	58%	80%	98%

Urban Population Growth



Country data and relevant grades*

	2010-2015	2015-2020	2020-2025	2025-2030
Urban growth	1,70 %	1,44 %	1,21 %	1,02%
Urban population %	93,3 %	94,3 %	94,9 %	95,3 %

Infrastructure



4,1
/10

Gov. Willingness**



3,4
/10

Digital Economy



4,3
/10

Top five cities:

1	Caracas	6.012.204 hab.	Caracas	
2	Maracaibo	3.005.155 hab.	Zulia	
3	Valencia	2.527.267 hab.	Carabobo	
4	Barquisimeto	1.720.718 hab.	Lara	
5	Maracay	1.278.890 hab.	Aragua	

*Data extracted from Global competitiveness report (2012) and Digital economy ranking(2010). Grades over 10

**Gov. Willingness: Predisposition to implement technological advances (Digital economy ranking, 2010)