GRUPPO TELECOM ITALIA

Telecom Italia
Smart sustainable cities experiences

ITU Forum on Smart Sustainable Cities

Abu Dhabi-UAE, 3-4 May 2015

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Smart Sustainable City is a great concept but needs to be supported by infrastructures and enabling platforms to be concretely achievable.

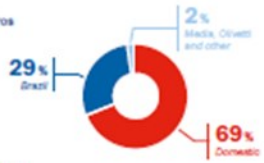
Telecom Italia at a glance

Telecom Italia is the leading Italian ICT Group and one of the most important players in the large Brazilian market.

2013 in numbers

Revenues

23.4 billion euros



Organic EBITDA

9.7 billion euros

Net financial position

26.8 billion euros

Net financial position

Telecom Italia confirmed as a component of leading sustainability indexes

MEMBER OF Dow Jones Sustainability Indices In Collaboration with RobecoSAM

FTSE4Good

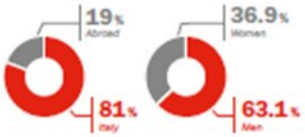
Customers

117,848,000

- 73.4 million — Mobile lines in Brazil
- 31.2 million — Mobile lines in Italy
- 13.2 million — Retail fixed lines in Italy
  - of which 6.9 million retail broadband access

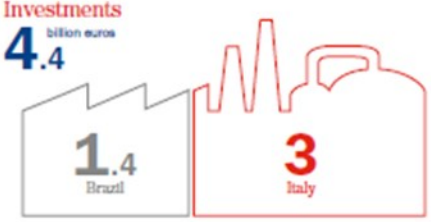
Employees

65,623



Investments

4.4 billion euros



Innovation-oriented investments in Italy during the 2014-2016 plan

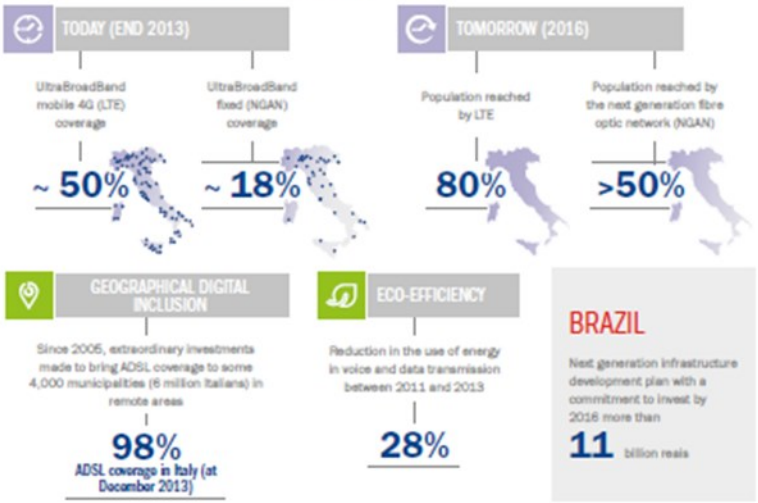
~ 3.4 billion euros out of 9 total

increased compared to the ~1.3 of the previous plan

TIME FOR ANNIVERSARIES 50

2014 marks the 50th anniversary of the merger in SIP of all of Italy's previous telephone companies, as well as the 20th anniversary of the transformation of SIP itself into Telecom Italia.

UltraBroadBand development in Italy



BRAZIL

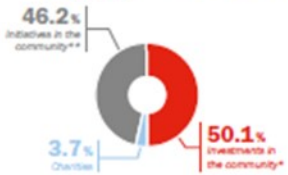
Next generation infrastructure development plan with a commitment to invest by 2016 more than **11** billion reais

For **15** years Telecom Italia has been sharing its initiatives in its Sustainability

Committed to people

Investments for the community

46.6 million euros invested (including Telecom Italia Foundation) + 28% investment in the community compared to 2012



* Long-term commitment to specific social projects

** Business activities in partnership with humanitarian organizations

Employee training

57.4 training hours per head

+10

Dow Jones Sustainability Indexes

Telecom Italia ***Best in Class*** in TLC sector in the Dow Jones Sustainability Indexes World and Europe 2014.

http://www.telecomitalia.com/content/dam/telecomitalia/en/archive/documents/Group/company-profile/Telecom-Italia-beyond-numbers2013

Energy Consumption and Energy Efficiency in Telecom Italia

Our Energy needs

65% Wireline
10% Wireless
12% DC
13% Offices

600 Heating gas Plants
22 Cogeneration 84 GWh/Year

100% of the electricity consumed by TI, comes from a renewable source

100%

Energy Efficiency for Telecom Italy is a priority:

- Economical
- Ethical
- Social

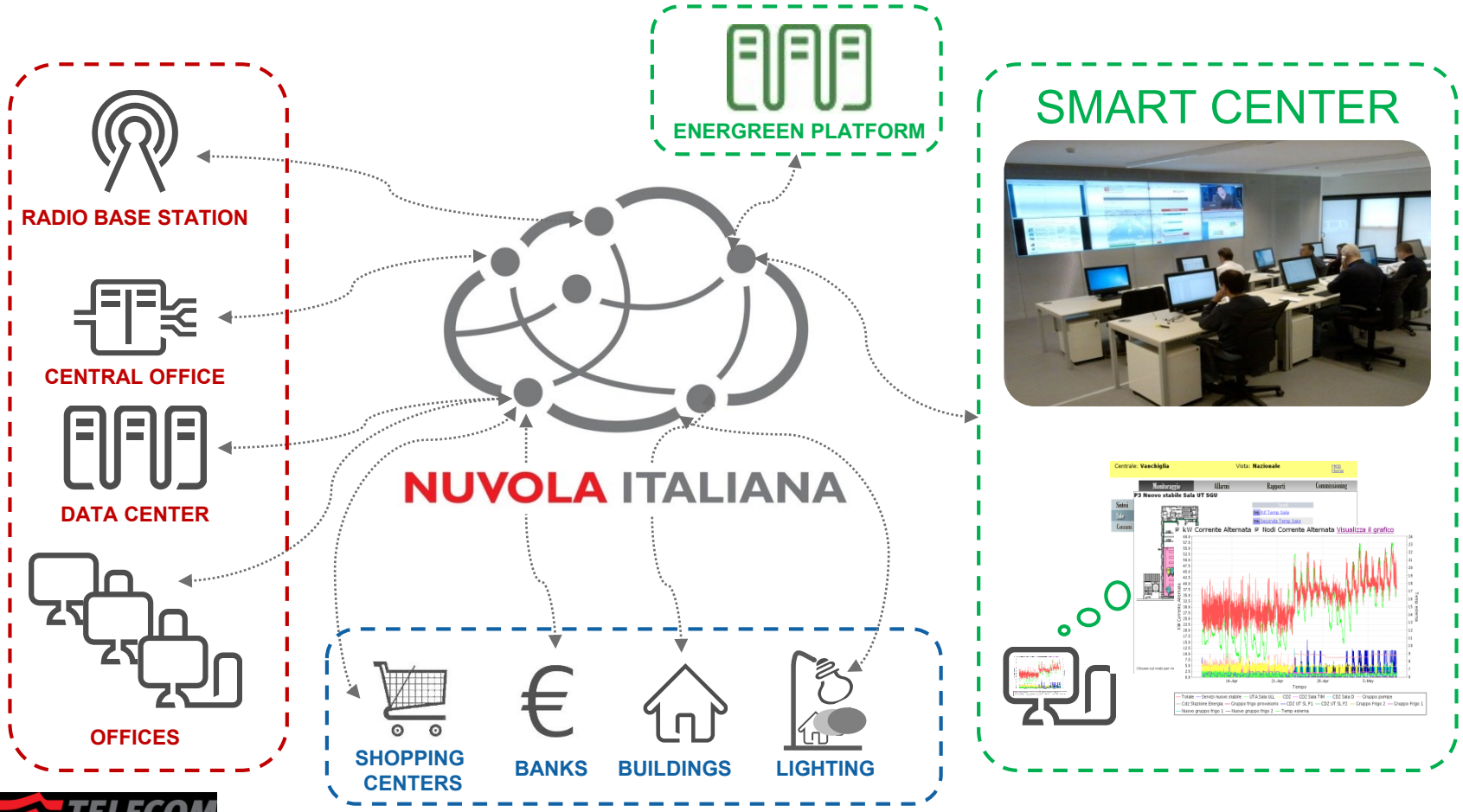
widespread distribution

- ~ 35.000 Consumption Points
- ~ 1.000 sites in medium voltage (offices and large central offices, Data Centers)
- Tens thousands in low-voltage (Central offices, Radio Base Stations), cabinets)

Smart Energy Management in Telecom Italia

SMART CENTER: applying technology and innovation

The Smart Center of TI oversees the design, testing and proper functioning of sensor networks for the collection of energy data of Telecom and its customers. It is also involved in Business Intelligence, Business Analysis and Energy Management.



Smart cities - the Telecom Italia committment

From the City to the "Connected City" and from the Citizens to the "Connected *(to the city)* Citizens"

Telecom Italia is committed on all these services with commercial offering and/or innovation activities

Mobility

- Intelligent Transport Systems
- Integration of Public & Private Transportation
- Car Sharing
- Safety
- ….

Health

- Digital Health record
- Telemedicine
- Tele-rehabilitation
- Wellness-Fitness
- ….

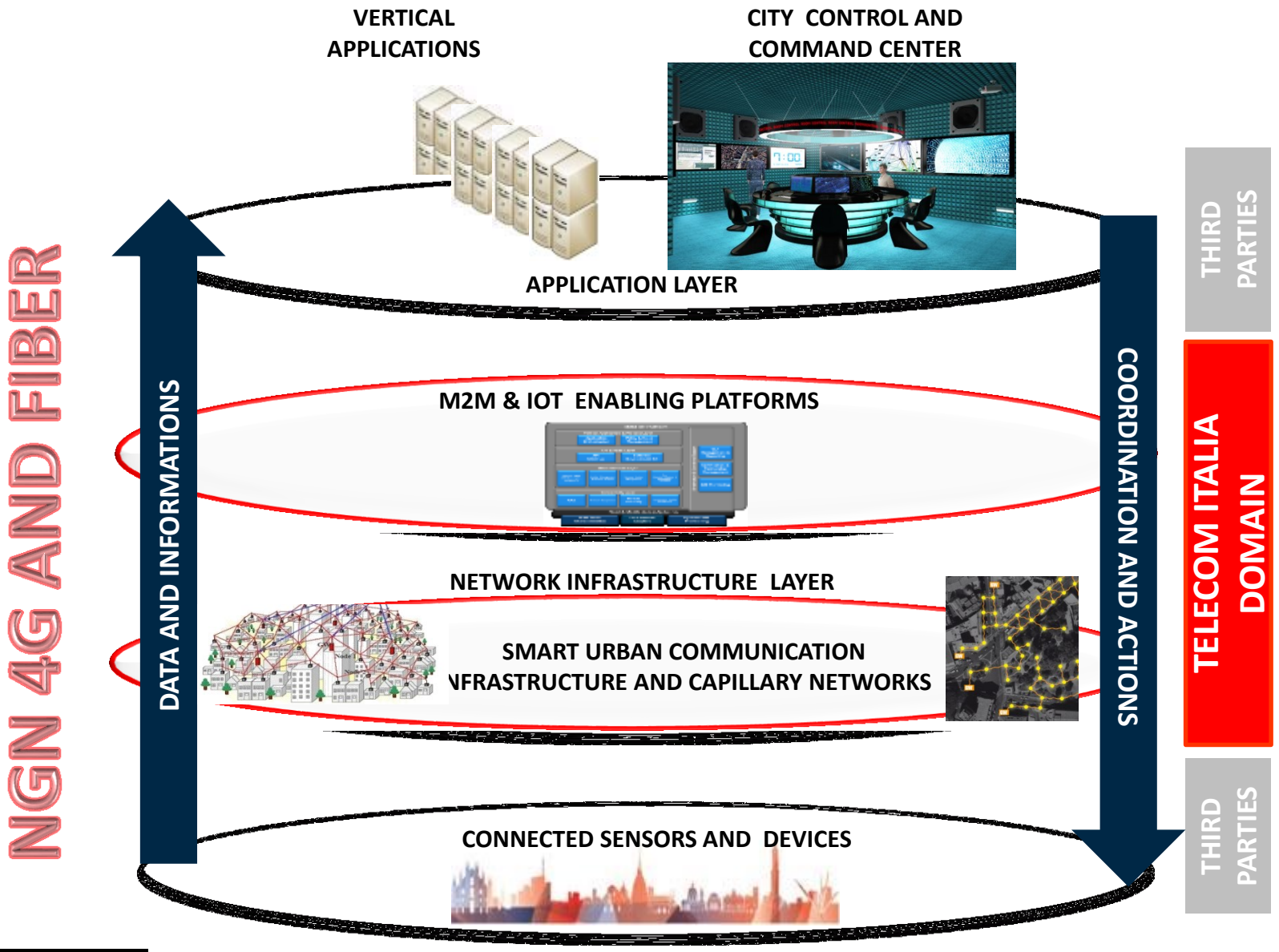
Quality of Life

- Citizen participation and participatory sensing
- Smart Education
- Smart Government
- Safecity
- Social & sharing
- Tourism
- Intelligent building
- ….

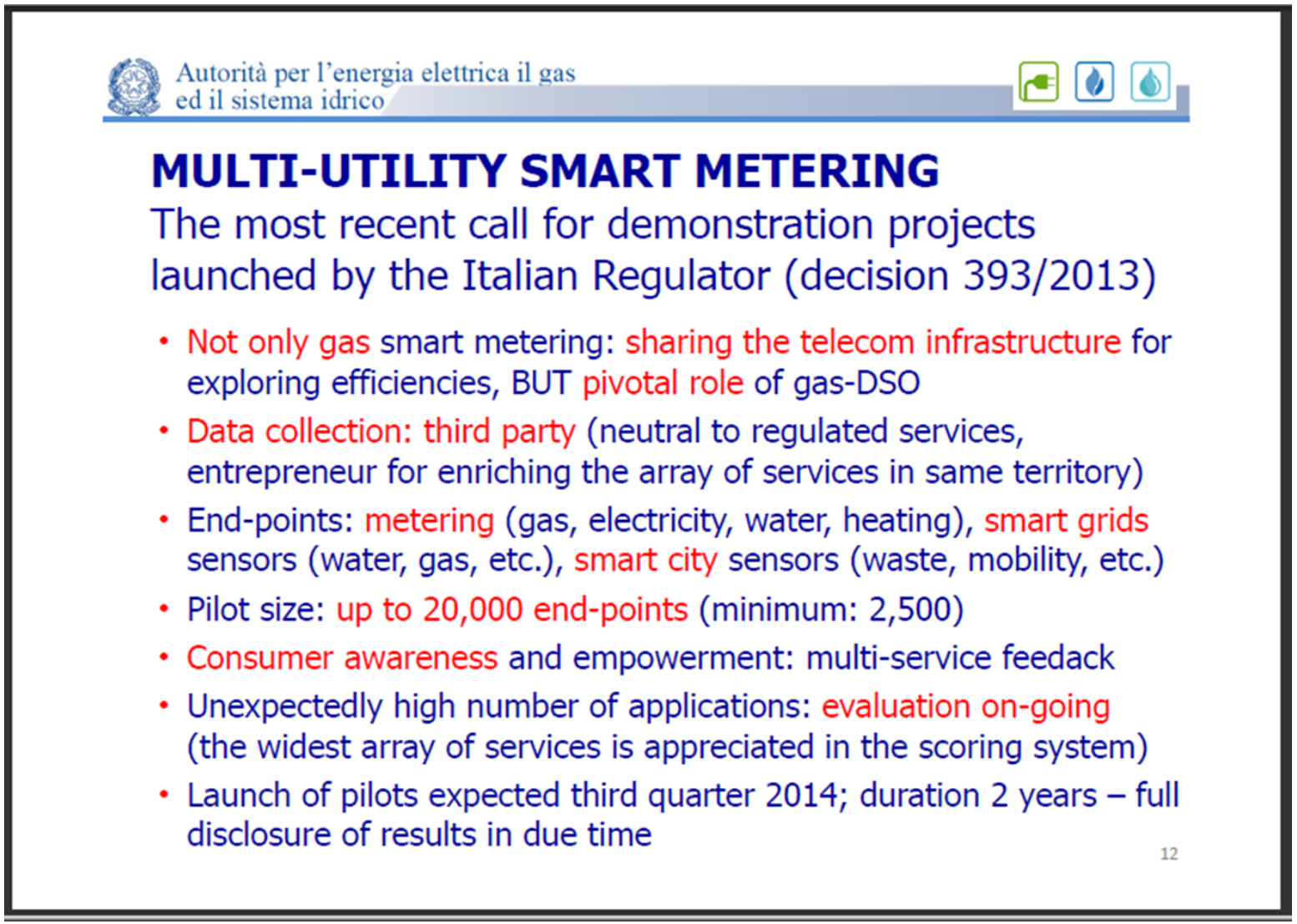
Energy and Green

- Energy Efficiency
- Smart Grid
- Pollution Reduction
- Electric vehicles
- Water management
- Waste cycle optimization
- Smart Lighting
- Eco Buildings
- …..

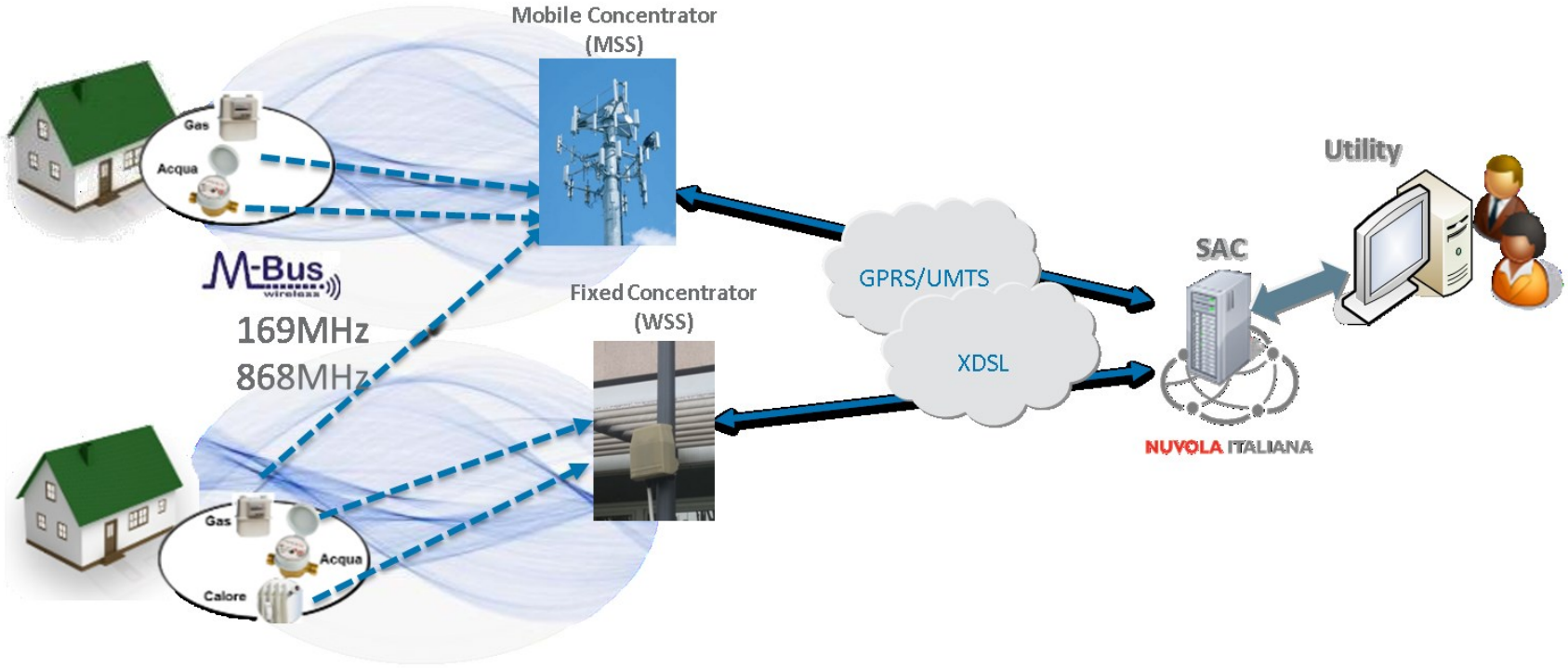
Smart City ICT reference platform



Multiservice & Multiprotocol Networks – National trials



Smart Metering and Capillary Network



MAIN OBJECTIVES

Capillary Network

- → Development of a **new access network** for Smart Metering and IoT sensors as:
  - → Meters should work several years without battery changes
  - → Million devices/very limited traffic
- → Re-use of Telecom Italia **fixed and mobile assets** for hosting the new network element (Concentrator)
- → Adoption of standard RF and protocols to achieve a **multi service network** for utilities (gas, water, waste etc.) enabling the smart urban communication infrastructure of a smart city
- → Commercial Project in partnership with an Italian Utility involving 4 cities.

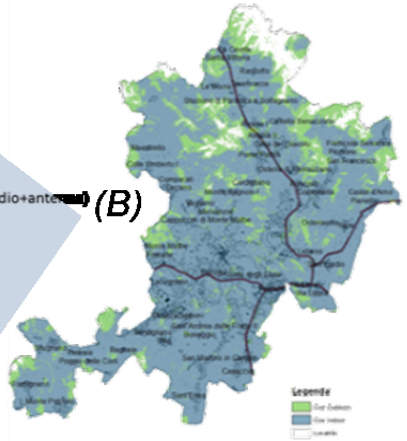
Wireline sites

DISTRIBUTORE

RU

(modulo radio+antenna)

(B)



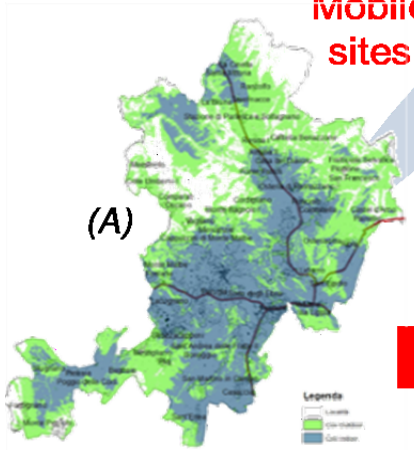
Mobile sites

Moduli radio

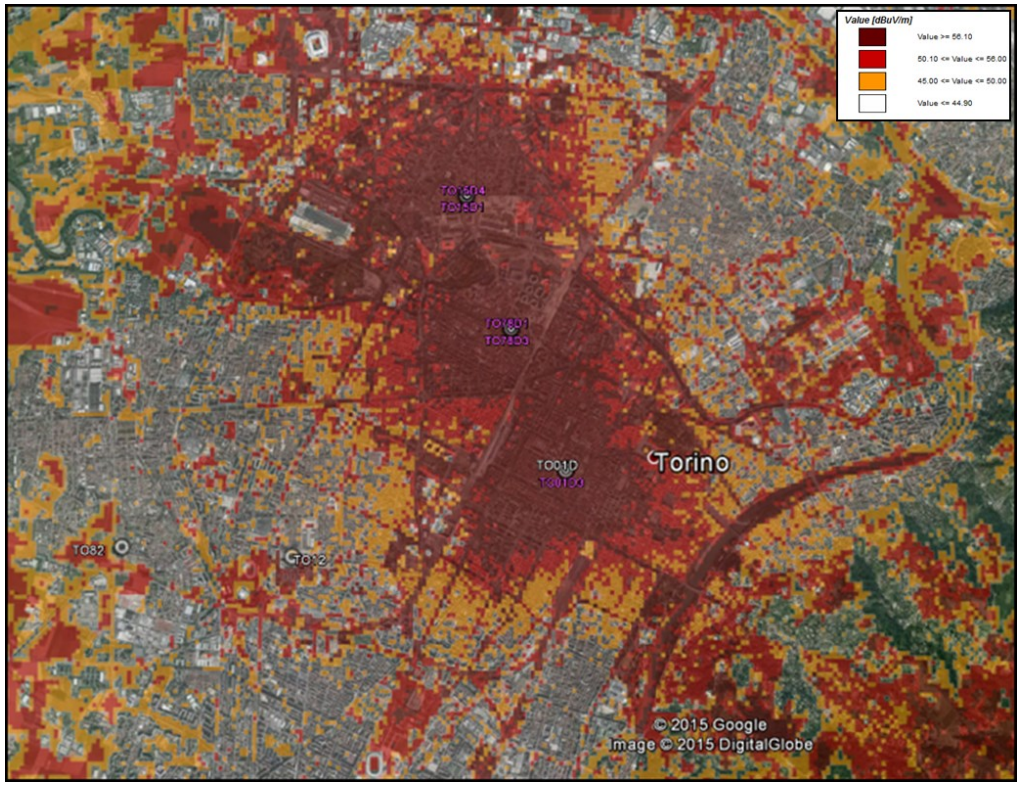
BTS

Concentratore

(A)



Coverage simulation



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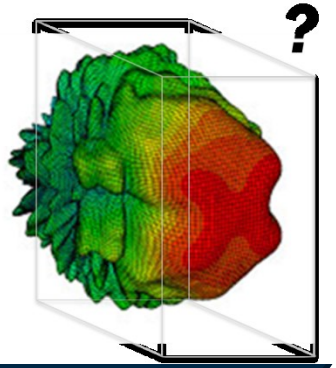
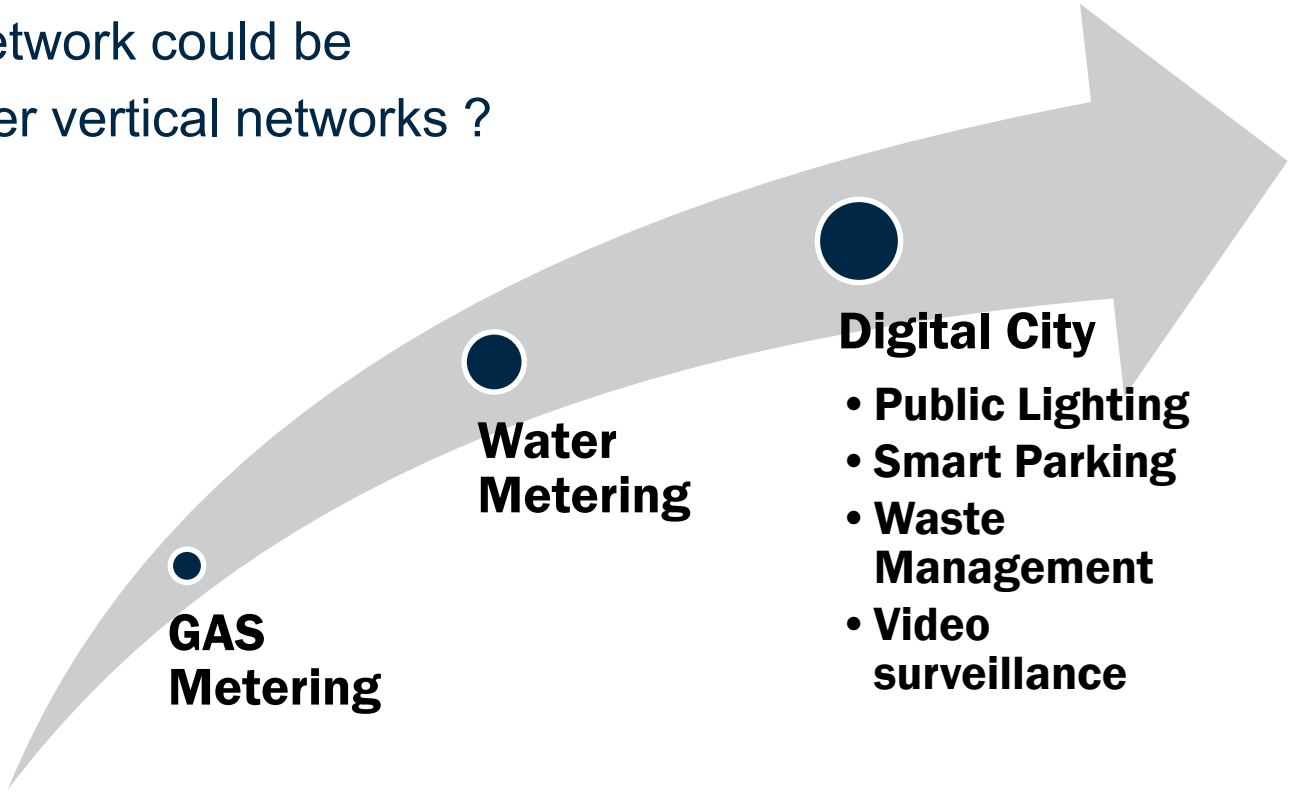


The Capillary Network open issues

Can the multi-utility gas metering become a multiservice network?

Which are the additional services?

How the metering network could be integrated with other vertical networks ?



Standardization best practices in Italy:

CEI* 64-8 – Low voltage electrical installation

CEI 64-8 is the National transposition of IEC 60364

… totally dielectric optical cables are considered safe to be installed together with electrical cables …

CEI* TC64 – TC 86 joint activity (in progress)

Guide for public light ducts sharing with optical cables

The objective is to define a balanced solution that respects the rights and needs of the duct owner, while maximizing its use for broadband development

CEI* TC 306/86/100 – Optical fiber ready buildings

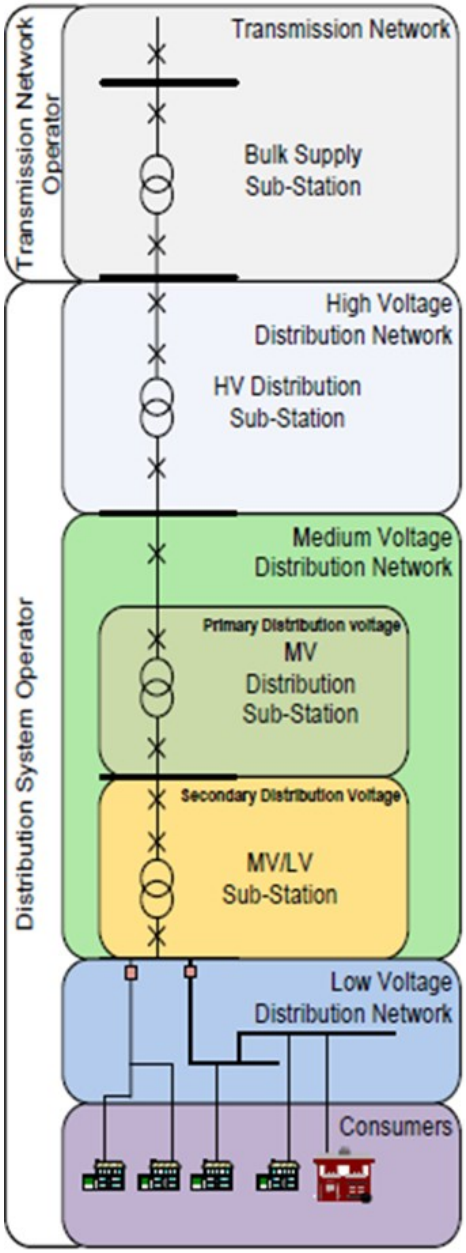
National law 133/2014

Guide to facilitate and clarify the application of the Law

*** CEI is the Italian Electrotechnical standardization Committee**

ICT networks and services for the Grid
Matching needs with capabilities

- The Grid can be segmented in three areas:
  - Transmission and HV network (extremely high availability, resilience and latency requirements)
  - Distribution (MV) network (high requirements)
  - Low voltage, metering, user network (lower requirements)
- Each segment is very likely to be served through different kinds of telecommunication networks
- Not all telecom networks can fit the needs of Utilities
- Some should be upgraded

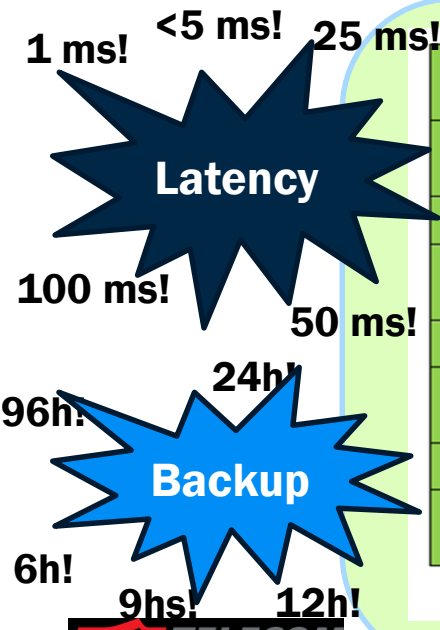


Source EUTC

ICT networks and services for the Grid
Matching needs with capabilities

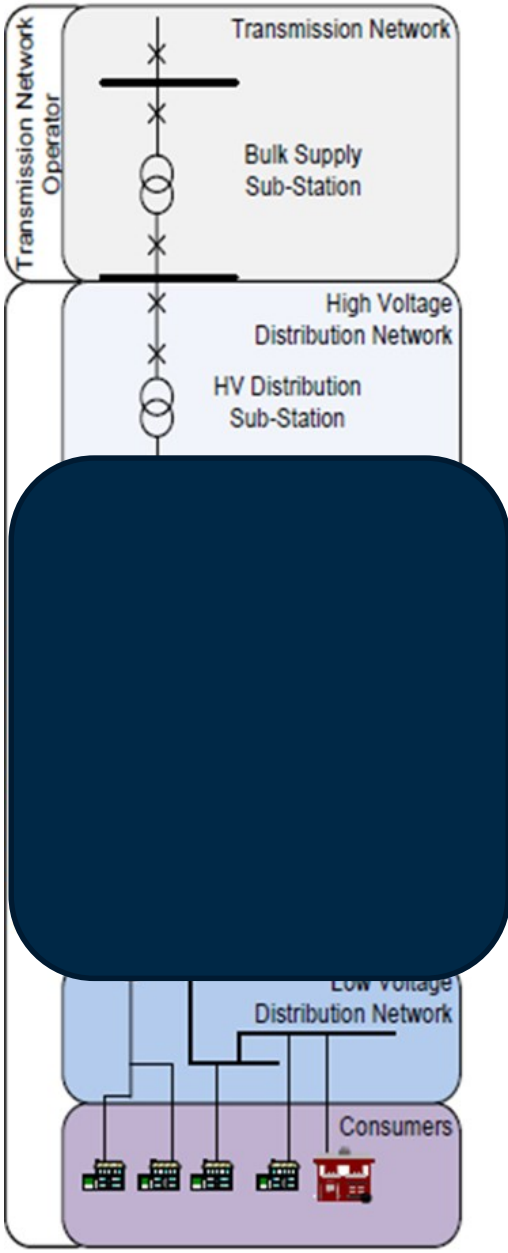
- The “best” solution should be the one (or the ones) that satisfy the real needs of smart grids … and of smart cities
- The different segments have different requirements on:
  - latency, availability, backup, geographic coverage, throughput, communication concurrency, QoS, CoS …

But numbers around are not clear at all!



	Mobile networks		Wired networks	Fi
Inject energy surplus into the grid	✓✓		✓✓	
Produce maximum power	✓✓		✓✓	
Peak shaving (generation curtailment)	✓		✓✓	
Anti-islanding	✓		✓✓	
Voltage and reactive power regulation	✓✓		✓✓	
Support island operation	x		✓✓	
Ensure correct operation of power system	x		✓✓	

Source: SEESGEN-ICT project [72].



Source EUTC

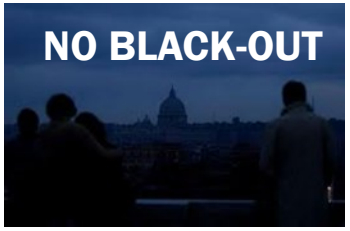
ICT load and flexibility for the Grid - an opportunity
Needs of the electricity system

Renewables

- Should be used when and where they are available
- Cannot be connected to the grid without adding extra amount of primary and spinning reserve (to balance the overall energy budget)

Flexibility

- Needed to balance electricity generation and demand
- Needed to grant stability to the eletricity system



Demand/Response

- Capability to reduce/increase the electrical load to the Grid
- If suitably incentivized can contribute to grant stability and efficiency to the power grid

ICT load and flexibility for the Grid - an opportunity
ICT sites as Demand Response actors

ICT service providers are energy prosumers, in that ICT sites have their own energy systems

- **ICT operators own and operate huge energy backup power reserves (e.g., batteries, diesel generators, co-generators, fuel cells, …) both to guarantee the continuity of their services and to reduce energy costs**
- **Energy systems can be used to provide flexibility with very short reaction time**
- **They can provide the fast response most needed to keep the Grid stable**

ICT load and flexibility for the Grid - an opportunity
ICT sites as Demand Response actors

ICT energy demand matters

- **The overall energy consumption of ICT assets accounts for about 2% of the national electricity demand.**
- **If suitably managed, it could provide a sizeable impact on the stability of the electricity system.**
- **ICT network assets constitute a group of customers that could influence significantly the operation of the distribution grids.**

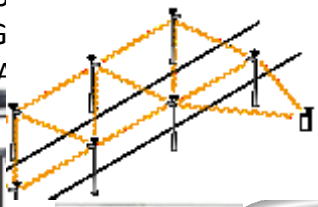
- **Interruptibility (load shedding) – service to the Grid defined in National regulation**
  - Telecom Italia is part of it since 2004 with 76 network sites, involving 21 MW
  - Upon request from the National Transmission System Operator, the sites are automatically disconnected from the Grid
  - Reaction time within seconds

OPENAIRLAB - The Smart City Lab in Turin

SMART UTILITY/METERING +
AUGMENTED REALITY APP
FOR MAINTENANCE SUPPORT

SMART
WASTE

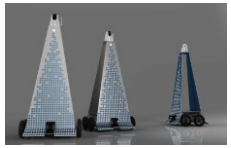
SMART
LIG
SA



DIGITAL ISLAND

(*) Release planned 2Q15

SMART CITY
CONTROL ROOM(*)



SERVICE
ROBOTICS

EV SMART
MOBILITY

SMART BUS
STOP

SMART BENCH +
CYBERHEAD/
INTERACTIVE
TRACKING +
SMART GREEN

Thank you

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