Smart City Standardisation

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Agenda

- Project SESEI in brief
- Smart City Standards
  - Why standards
  - ETSI view on Smart City
  - Smart City Assets & Infrastructure and Standards
  - Role of oneM2M standards
- Conclusion

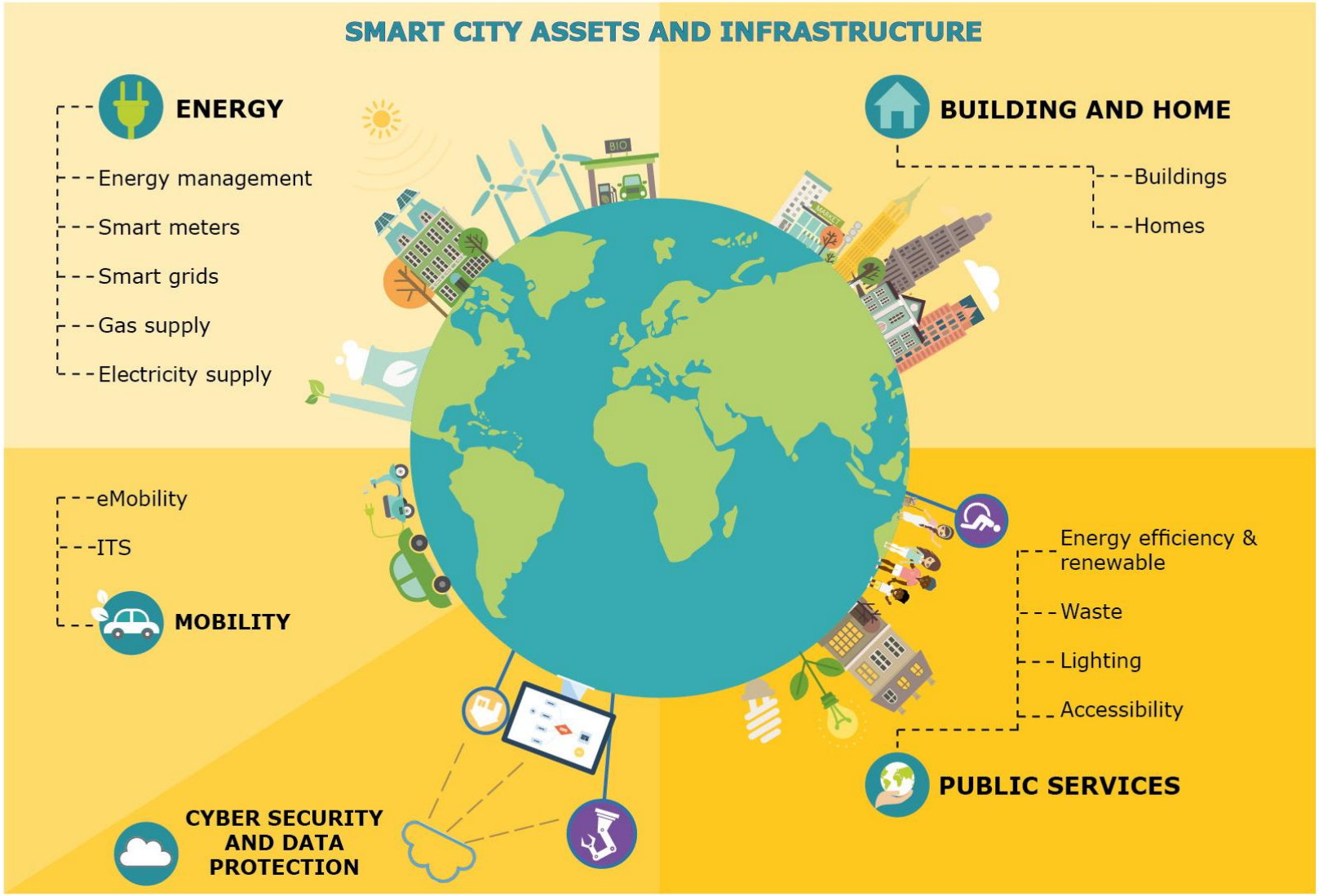
Project SESEI in brief

- Seconded European Standardization Expert in India
  - local representative and a connect-between standardizers' communities in EU/EFTA and India
  - EU-India dialogue and cooperation on standards, R&D, Innovation, and policy/regulation around standardization
  - Phase 3: March'16 to June'19
- Project Owners
  - EU Standards Organizations (ETSI, CENELEC and CEN), European Commission and EFTA - European Free Trade Association
    - Project is managed by ETSI
- Priority Sector for this phase of the project (3 Year)
  - Information & Communication Technologies (equipment and services)
  - Electrical equipment including Consumer Electronics – Smart Energy
  - Automotive - ITS
  - Smart City
  - Energy Efficiency in ICT, Manufacturing policy, WTO-TBT, IPR, R&D & Innovation

Why developing standards for smart city ?

Using standards, cities can:

- Reap the benefits of codified and disseminated **best practice**
- Enable **integration** between city systems
- Improve their management systems assets, processes and **performance**
- Reduce inefficiency and costs - '***doing things smarter***'
- Accelerate **smart city solutions** and provide confidence in the market
- Deploy **non-vendor-lock i**n solutions
- Facilitate the **procurement processes**
- Support smart cities **strategies** and projects


SMART CITY ASSETS AND INFRASTRUCTURE
ENERGY
Energy management
Smart meters
Smart grids
Gas supply
Electricity supply
BUILDING AND HOME
Buildings
Homes
eMobility
ITS
MOBILITY
Energy efficiency & renewable
Waste
Lighting
Accessibility
PUBLIC SERVICES
CYBER SECURITY AND DATA PROTECTION

ETSI's View of a Smart CITY?

"Connecting" "users" and "data" across "multiple domains" to share "information"

... a Smart City described by the main technologies

Smart City Technology domains

Enabling technologies:

Fixed:

xDSL, Fibre, PoF, PLT, NGN, SDN/NFV, co-axial (cable)

Wireless:

Wi-Fi, Digital Radio, Wide band, narrow band, LTE -> 5G, Satellite, NFC, RFID

Horizontals / Platforms:

Security/privacy, Energy efficiency, Machine to Machine, QoS/QoE, Interconnect & Interop, Smart Card, data management, semantics, User/Human

What is a Smart CITY? (ETSI domains)

Impacted groups: **(from ETSI portal)** **http://portal.etsi.org**

BOARD	FC	GA	IPR	OCG	3GPP	oneM2M	ATTM	BRAN	BROADCAST	CABLE
CYBER	DECT	EE	eHEALTH	EMTEL	ERM	ESI	HF	INT	ITS	LI
MSG	MTS	NTECH	PLT	RRS	RT	SAFETY	SAGE	SCP	SES	SmartBAN
SmartM2M	STQ	TCCE	USER	CCM	ECI	IP6	ISI	MEC	mWT	NFV
NGP	OEU	ORI	QKD	QSC	SMT	OSM	NSO	STF	WORKSHOP	

Fixed:

ATTM, CABLE, NTECH, PLT, ISG NFV, ISG MEC, ISG NGP

Wireless:

3GPP, BRAN, DECT, EMTEL, ERM, mWT, ITS, MSG, RRS, RT, SES. TCCE-SA6,

Horizontals:

Security (ESI, Li, SAGE, Cyber, ISG_ISI, ISG_QKD/QSC), **Energy Efficiency** (ATTM/EE/ISG OEU), **M2M** (oneM2M, smartM2M), **QoS/QoE** (STQ), **Interconnect & test** (INT, MTS) **Smart Card** (SCP), **Data management / semantics** (Cloud/smartM2M), **Health** (eHealth, SmartBAN), **Others** (USER, HF, SAFETY)

SMART ENERGY - SMART GRIDS

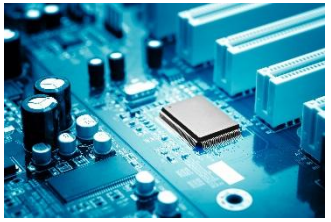
Changes in the existing grid infrastructures of cities

- Convergence of utilities/ICT
- Renewables
- Power networks: increased flexibility and reliability
- Control peaks demands, reduce energy losses, efficiency & security of energy supply
- Keep Consumers aapraised
  - Support information exchange and communications
- Integration of e-mobility services

Achievements relevant for smart cities

- CEN-CENELEC-ETSI Smart Grid Coordination Group : First & Second Set of Standards (2012, 2014)
- Smart Grids Architecture Model (SGAM)
- Sustainable standardization processes integrated
- Cybersecurity, data protection and privacy defined
- The identification of gaps and their prioritization

SMART ENERGY- SMART METERS



CEN-CENELEC-ETSI Smart Meters Coordination Group

- Standardization support for the smart meter rolling-out in EU MS by 2020
  - **CLC/TC 13** 'Electrical energy measurement and control'
  - **CLC/TC 205** 'Home and Building Electronic Systems (HBES)'
  - **CEN/TC 294** 'Communication systems for meters and remote reading of meters'
  - **ETSI/TC M2M**
- More than 60 European standards

Achievements relevant for smart cities

- CEN-CLC-ETSI TR 50572:2011 'Functional reference architecture for communications in smart metering systems' (2011)
- Guidelines for the development of Smart Metering Use Cases
- Privacy and Security addressed
- Demand side flexibility built-in

Smart Energy - Smart Homes

CENELEC TC 205 'Home and Building Electronic Systems'

- Standards series EN 50090 smart home and building protocol since 2010, the EN 50491
  - European standardized Hardware requirements for home and building automation products
  - Smart metering/grid specific extensions (part of M/441)
  - Internationalization ongoing in IEC TC23

- Smart energy meters are essential components of Smart homes
  - EN 50491 Part 11 'Smart Metering - Application Specifications - Home Display' – published in May 2015
  - EN 50491 Part 12 'Smart grid - Application specification - Interface and framework for customer' under development
  - CLC/TS 50560:2014 'Interoperability framework requirement specification'

Smart Energy - Summary

Standardization

- Smart grids deployment
- Interoperability within smart metering and smart grids systems
- Future interoperability with smart home energy systems, electric vehicles connected to the grid, integration of new energy sources and new services
- Electricity with Heat and Gas
- Methodologies to facilitate Smart Grid system interoperability

Key learnings for smart cities

- Existing standards available including Methodology with use cases and architectural model (SGAM)
- Collaboration ESOs/SDOs is in place

But

- Harmonisation of standards is needed (such as those for data models) from both Utility industry and the Telecom industry
- Interfaces to other domains (home - building) need to be developed on existing domain standards

Energy Management

- **CEN-CENELEC Sectorial Forum on Energy Management**
- **CEN- CENELEC JWG 3**
  - EN ISO 50001:2011 Energy management systems -Requirements with guidance for its use
- **CEN-CENELEC JWG 1**
  - EN 16247 (5 parts) on Energy audits
- **New activities**
  - CEN-CLC JWG 9 Energy Measurement plan for organisations
  - CEN-CLC TC 6 on Hydrogen: measurement and use of hydrogen from renewables and other sources

Buildings

Energy performance

CEN/ TC 371 'Energy Performance of Buildings'

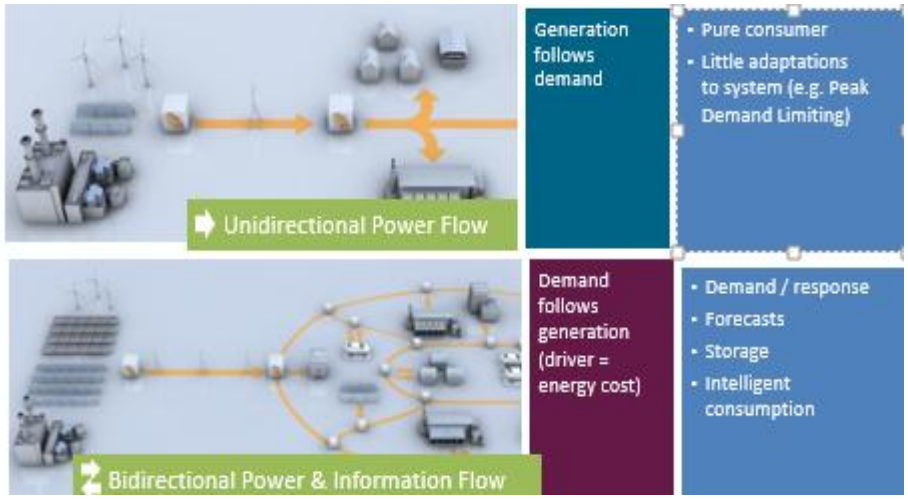
- Development procedures and standards for buildings, systems and products towards low energy buildings and nZEB targets
- EN 15603:2008 EPBD Over-Arching Standard (OAS)
- CEN and ISO cooperate to achieve a common set of EPB standards- goal is to agree on global standards

CEN/TC 442 'Building Information Modelling' (BIM)

- Collaboration with ISO/TC59/SC13 'Information of Construction works'
- Possible adoption of ISO 16739, ISO 12006-2 and ISO 29481

Buildings & grids

CEN/TC 247 'Building Automation, Controls and Building Management'



eMobility

CEN-CENELEC eMobility CG

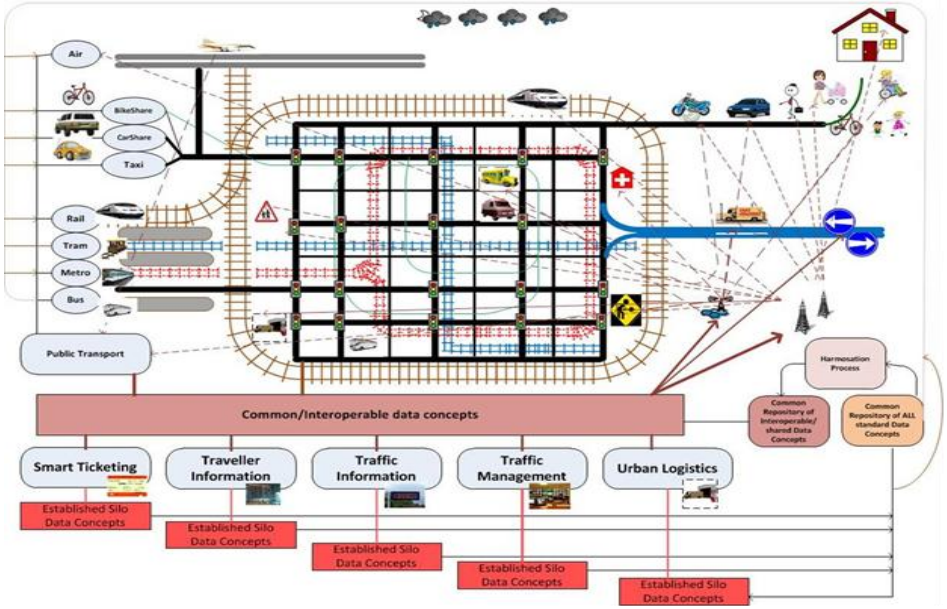
- Standardization for electric vehicles
- M/468 about the charging of electric vehicles
  - Smart charging and Ensure interoperability and connectivity between electricity supply point and the charger of EV
- International work on the development of charger and connector standards is ongoing

Achievements relevant for smart cities

- A report on role model and reference architecture for the smart charging of electric vehicles (EM-CG and the SEG-CG, 2014)
- CEN-CENELEC set of standards ensuring interoperability and connectivity between the electric supply point and the charger of electric vehicles, and between the charger of the electric vehicles and its removable battery (2012)

URBAN ITS

Urban ITS architecture is about linking different layers of the Smart City System (Transport information, communication and networks)



M/546 (2016) Standards for :

- Multimodal information services
- Traffic management
- Urban logistics including parking management

CEN/TC 278 'Intelligent Transport Systems'

- Relevance of the International perspective: CEN/TC 278 and ISO/TC 204 on ITS

Standards for sustainable cities

83 European Standards (Eurocodes) on structural design of buildings and construction works

❑ Buildings

- Given the long lifetime of buildings, it is essential to encourage **design improvements** that will reduce their environmental impacts and increase the durability and recyclability of their components
- Indicators to **assess environmental performance of buildings**
- **Smart construction products** allowing smart construction and 'circular economy' buildings (CEN/TC 351)

15 European Standards on sustainability of construction works

Build the city infrastructures climate proof/resilient: **CEN and CENELEC Adaptation to Climate Change** Coordination Group

Waste management

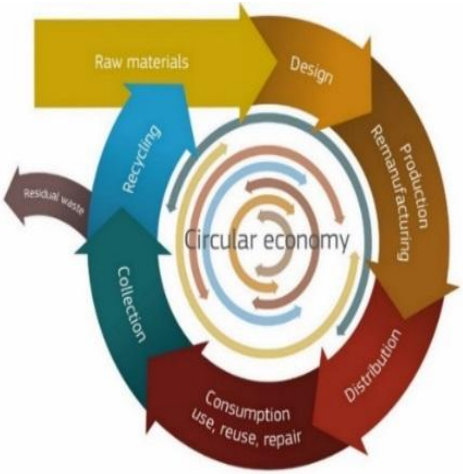
Only 40% of EU household waste is recycled

CENELEC TC 111X
EN 50574 and EN 50625 series on collection, transport, sorting and waste treatment of WEEE

NEED → **Higher level of material recovery**

HOW

- **Better waste collection and storing**
- **Increased recycling targets**
- **Restricted landfilling – Energy recovery preferred**



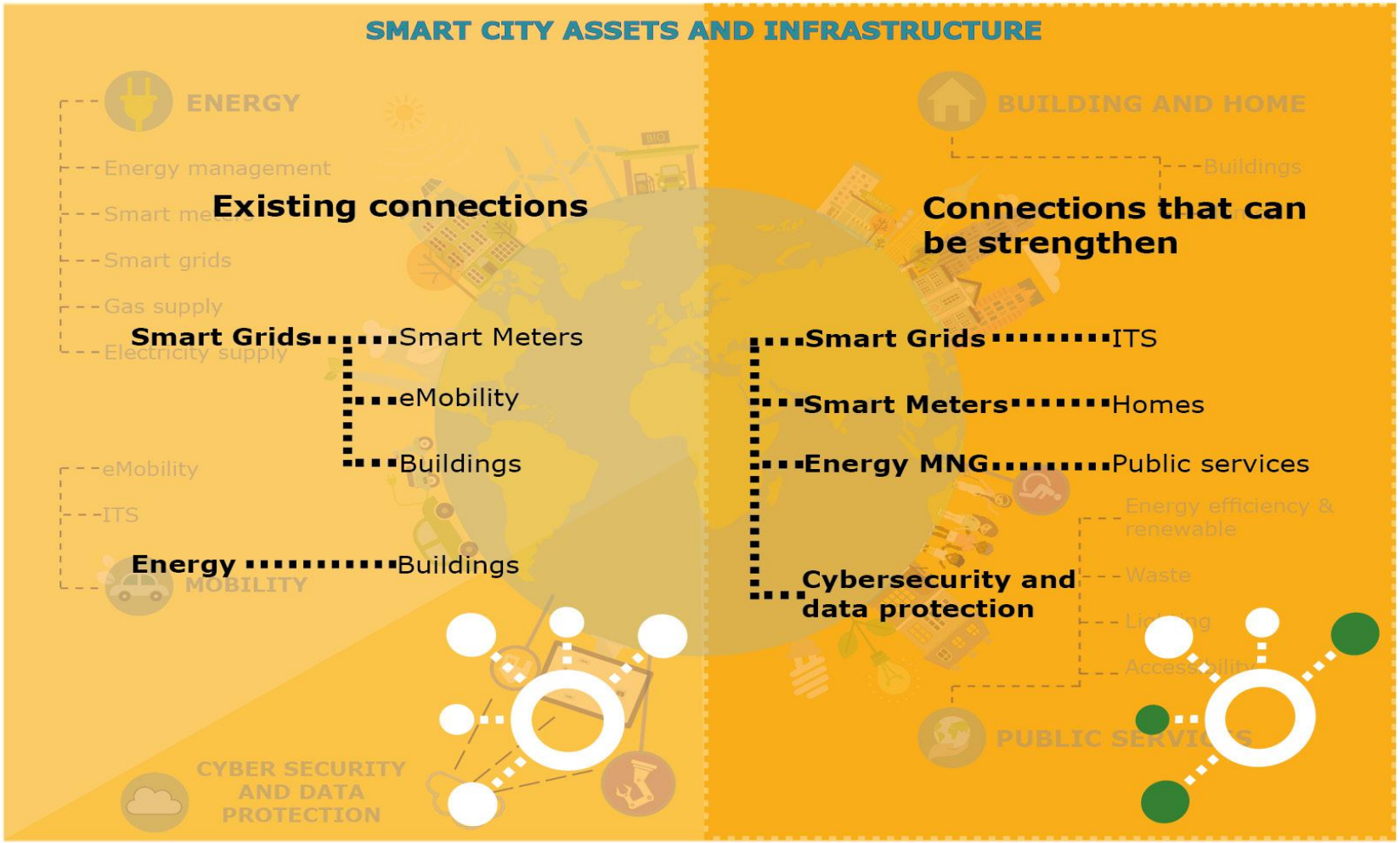
CEN/TC 249 standards on characterization of plastics recyclates | CEN/TS 14243 on materials produced from end of life tyres

CEN/TC 343 standards on solid recovered fuels for energy recovery

Cross cutting issues

- **Accessible & inclusive cities**
  - Accessibility following Design for All approach in products, goods and services (M/473)
  - Accessible **ICT products and services (M/376):** EN 301 549:2015
  - Accessible **Built environment (M/420):** EN containing a set of functional European accessibility requirements of the built environment is built on ISO 21542:2011

- **Cybersecurity and Data Protection**
  - Smart Cities = "**Connected Cities**" with the prevalence of data exchange at a larger scale
  - New forms of communication and data exchange needed to ensure interoperability, usability and access of data
  - TC Cyber at ETSI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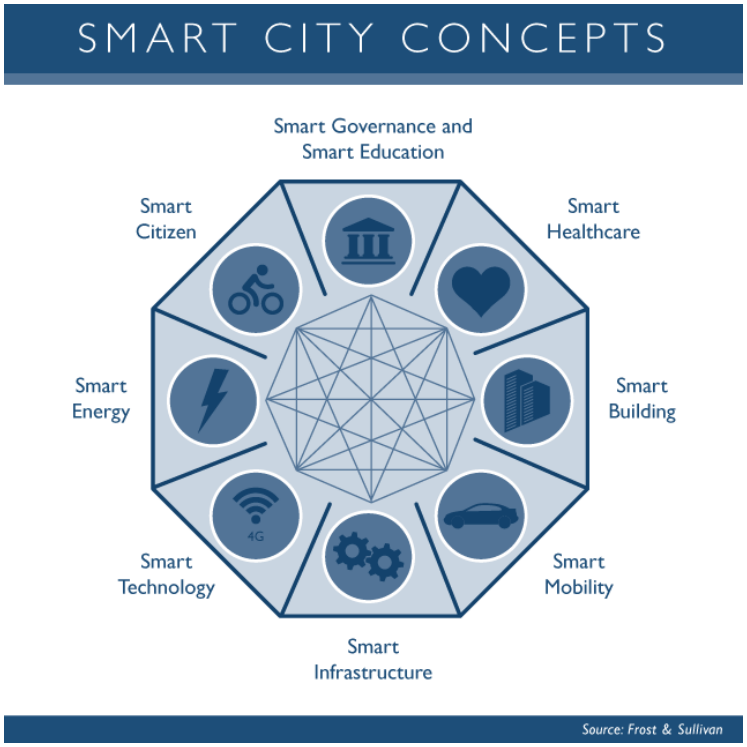
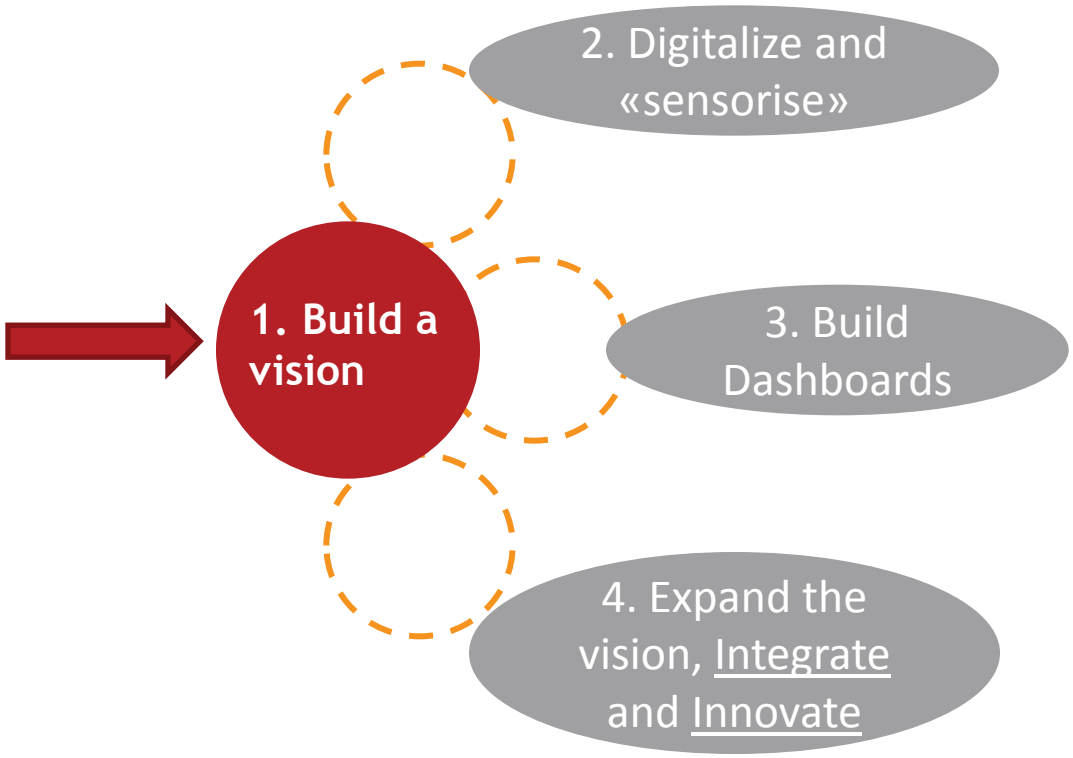
MOBILITY
BUILDING AND HOME
Buildings
Connections that can be strengthen
Smart Grids
ITS
Smart Meters
Homes
Energy MNG
Public services
Cybersecurity and data protection
Energy efficiency & renewable
Waste
PUBLIC SERVICES
CYBER SECURITY AND DATA PROTECTION

ROLE OF ONEM2M IN SMART CITIES

Vision for building smart cities





Source: Based on discussions with Dr. Martin Serrano, OASC and Insight centre

Example - Singapore "Smart Nation" initiative: Anticipation, Vision and Execution

Singapore Government
Integrity · Service · Excellence

Past

NG-NBN
National Fiber Network

Wireless
National WiFi Network

In Progress

COLLECT & COMPREHEND

Deploy an "operating system" accessible by all stakeholders

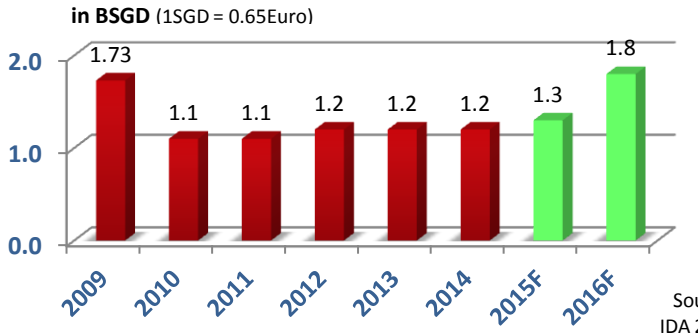
CONNECT

Deploy sensors using Above Ground Boxes for electricity & connectivity

Generalized Heterogeneous Network to boost Citizen Quality of Services

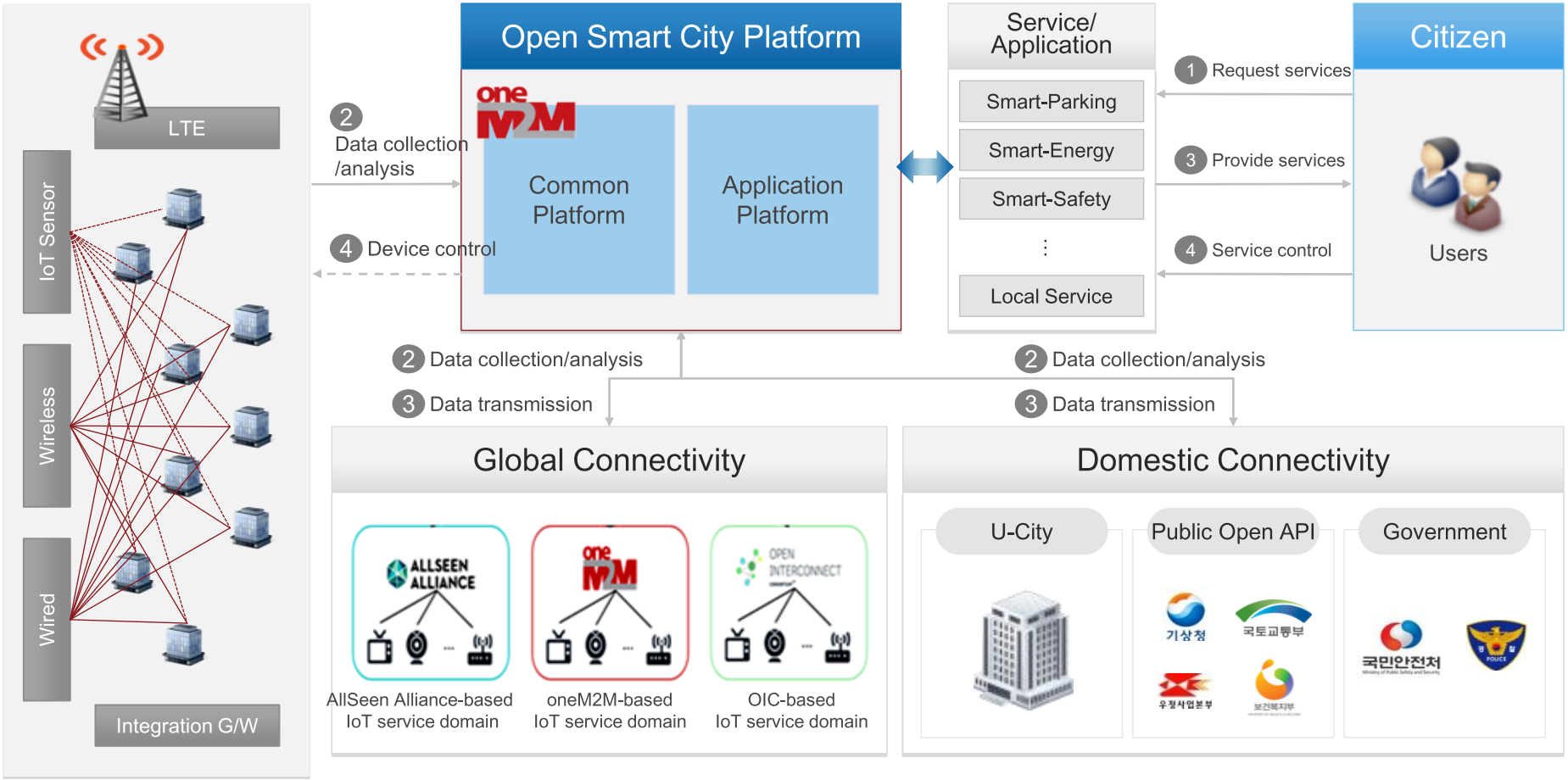
Future

Sustain livability and position Singapore as a (regional) Digital Harbor to drive economic growth.

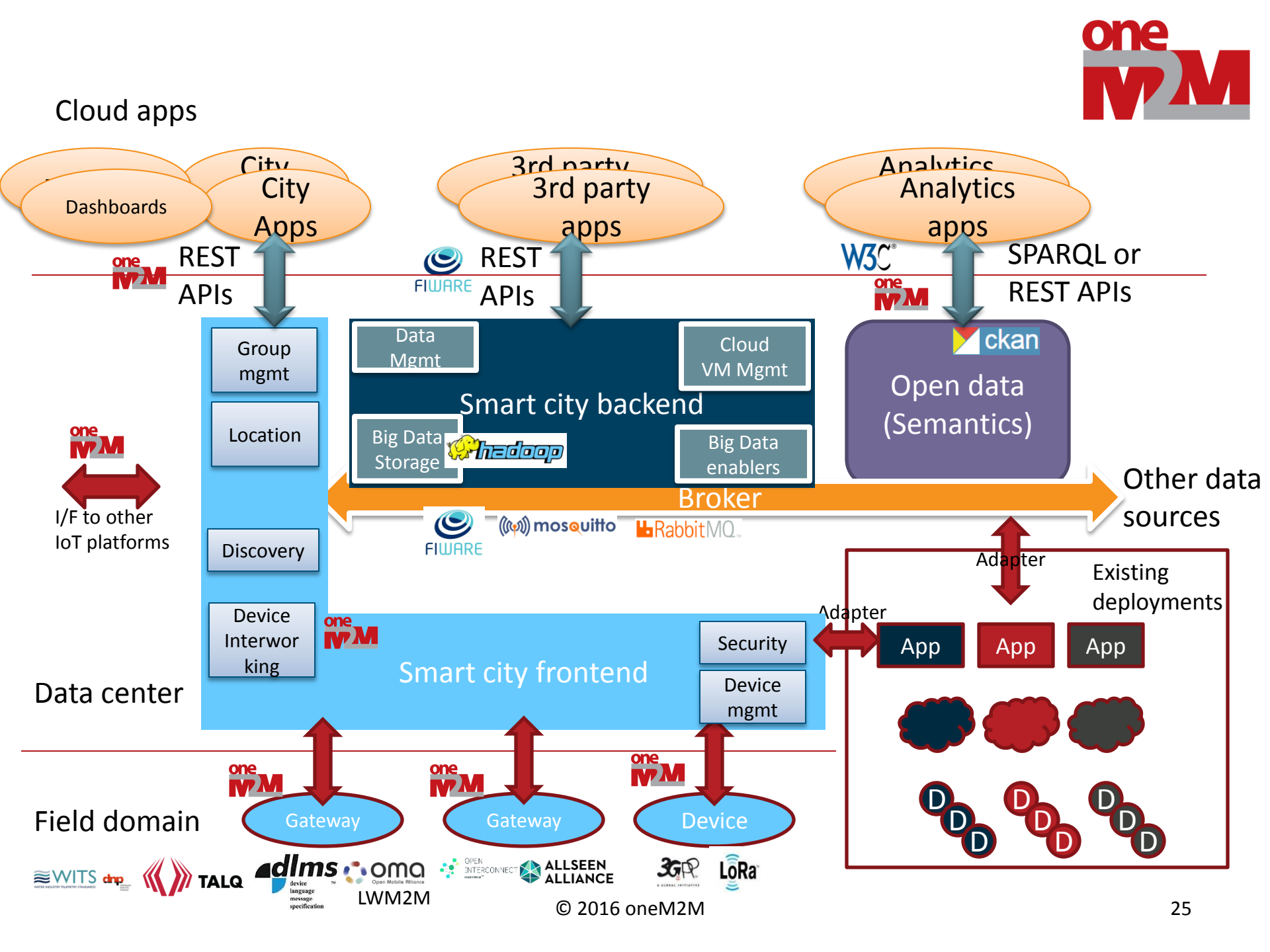


Source: IDA 2014

oneM2M based smart city deployment example - Busan



Source: SKT


Cloud apps
Dashboards
City Apps
3rd party apps
Analytics apps
REST APIs
REST APIs
SPARQL or REST APIs
Group mgmt
Location
Discovery
Device Interworking
Data Mgmt
Cloud VM Mgmt
Smart city backend
Big Data Storage
Big Data enablers
Open data (Semantics)
ckan
Broker
I/F to other IoT platforms
Other data sources
Adapter
Existing deployments
Adapter
Security
Device mgmt
Smart city frontend
App
App
App
Data center
Field domain
Gateway
Gateway
Device
LWM2M
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Various Smart City Initiatives

- NIST International Technical Working Group on IoT-Enabled Smart City Framework
- CEN-CENELEC-ETSI Coordination Group ‘Smart and Sustainable Cities and Communities’ (SSCC-CG) Full Report >>>>
- AIOTI WG3 (standards) and WG08 (Smart Cities) Full Report >>>>
- EU H2020 project ESPRESSO (Espresso - systEmic standardisation apPRoach to Empower Smart citieS and cOmmunities)
- UK: BSI published PAS 180,181,182, PD8100, 8101, 8904,11000..
- Germany developed a joint roadmap and Smart Cities recommendations for action in Germany, Poland and Spain also have programs
- ISO/TC268, ISO/IEC/JTC1 , ITU FG, NIST & ANSI, KOREA, CHINA..

Conclusion

City

- Every city is unique
- Build a vision: initial set of use cases
- Build an architecture that leverages cross sector applications using open standards
- Integrate existing deployments
- Stimulate and cultivate a collaborative culture for innovation

- Avoid fragmentation, develop together and adopt Global Standards and Specification for M2M/IoT/Smart City:
  - OneM2M Partnership Project
  - 3GPP work on IOT
- Consensus based Framework for Smart City Architectures:
  - NIST and its partners have started an international public working group : IoT-Enabled Smart City Framework: IES-City Framework

www.eustandards.in

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