7. Toolkit: Smart Cities

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IEA #energyefficientworld

7. Toolkit: Smart Cities

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Scenario: Your mayor wants to be known for innovative solutions.

Question: What are the ways you can use digitalization to further reduce urban energy use and improve urban services?

7. Toolkit: Smart Cities

1. **Urbanisation and Smart city solutions**
   - Urban challenge and smart city concepts
   - Technologies to further improve efficiency
   - Increased connectivity in South East Asia
   - Benefits, initiatives, challenges and opportunities

40 mins

2. **Activity: Policies to encourage smart city development for energy efficiency**

50 mins

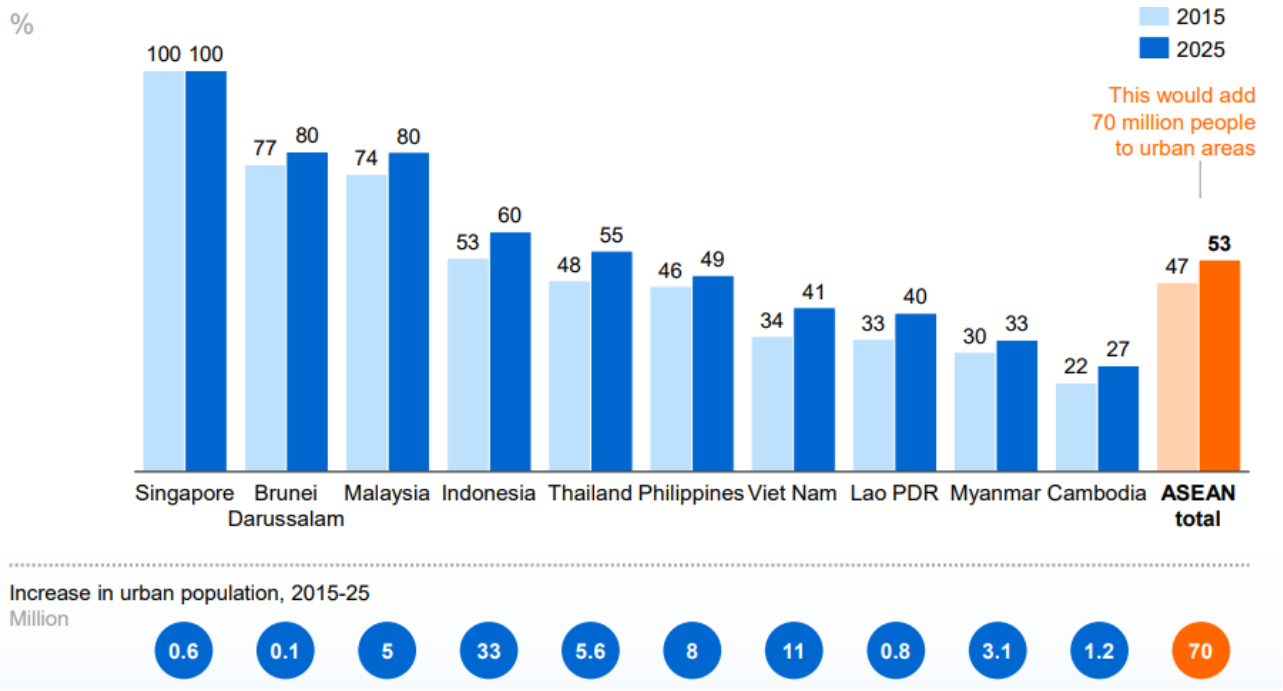
3. **Activity: A picture of digital solutions for your city**

1. Urbanisation and Smart city solutions

The urbanisation challenge

Where to start? | Tools | What are the steps?

Urban share of country's population, 2015-2025



An additional 70 million people are expected to live in urban areas in ASEAN by 2025

Source: https://asean.org/storage/2018/11/ASEAN-Sustainable-Urbanisation-Strategy-ASUS.pdf

Ethos of a smart city

Where to start? | Tools | What are the steps?

Source: https://www.forbes.com/sites/forbestechcouncil/2018/08/01/building-a-smart-city-10-big-priorities-government-leaders-should-focus-on/#6cbaf72f5b21

Smart Government
New methodologies & innovation for smart governance

Smart Economy
Technology & intelligent approaches for economic prosperity

Smart Mobility
New mobility solutions & efficient mobility management for increased efficiency

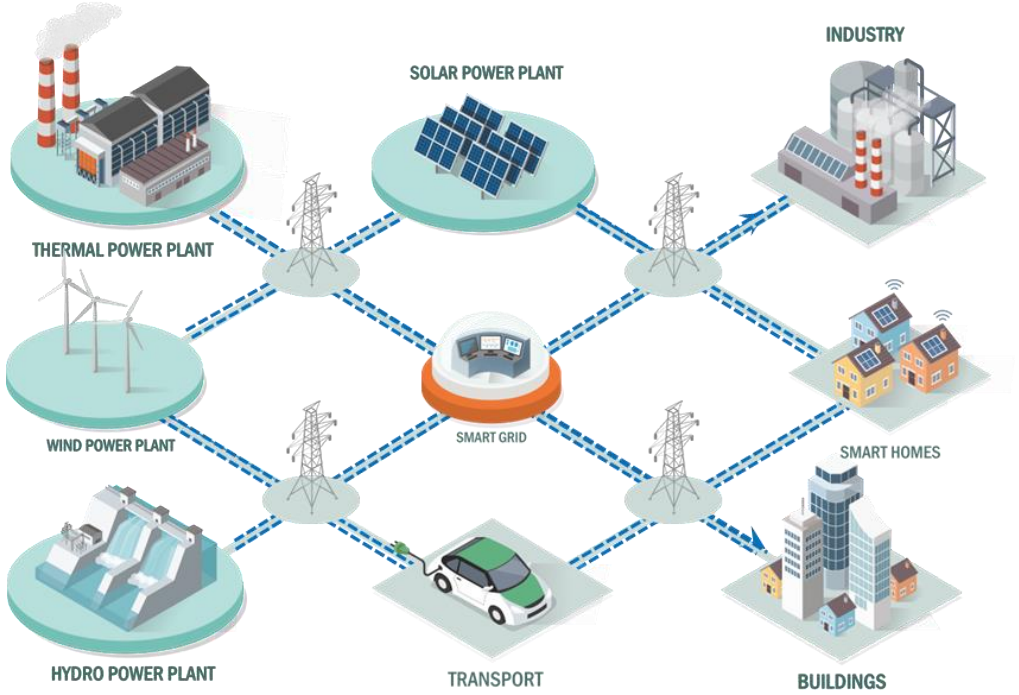
Smart Living
Increased liveability & optimised management of the living environment

Smart Environment
New technology to improve urban efficiency & minimise environmental impact

Smart People
Smart forms of information & public service provision for improved interaction

The digital transformation of the energy system

Where to start? | Tools | What are the steps?



Pre-digital energy systems are defined by unidirectional flows and distinct roles; digital technologies enable a multi-directional and highly integrated energy system

Digital trends in transport and buildings

Transport Sector

Key digital trends across all modes: connectivity, sharing, and automation

For Buildings

Smart building controls will improve comfort and transform building energy use

Digitalization has the potential to reshape, modernize, transform demand-side sectors. Policies are essential to maximise benefits and reap energy saving opportunities.

Technologies to further improve efficiency

Where to start? | Tools | What are the steps?

Smart meters

Efficient buildings

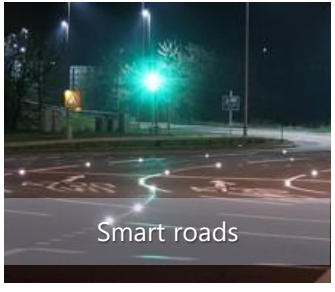
Smart parking


Smart lighting


Smart homes

Vehicle automation


Leakage identification


Smart roads


Smart traffic management


Smart bins


Intelligent service delivery


Smart public transport

Digital technologies in the transport sector

Where to start? | Tools | What are the steps?







Technologies to further improve efficiency

Urban informatics through ICT:

Visualisation of an urban informatics service:

Source: Adapted from ARUP Smart Cities - file:///C:/Users/Mbazima_N/Downloads/Arup_SmartCities_June2011%20(1).pdf

Technologies to further improve efficiency

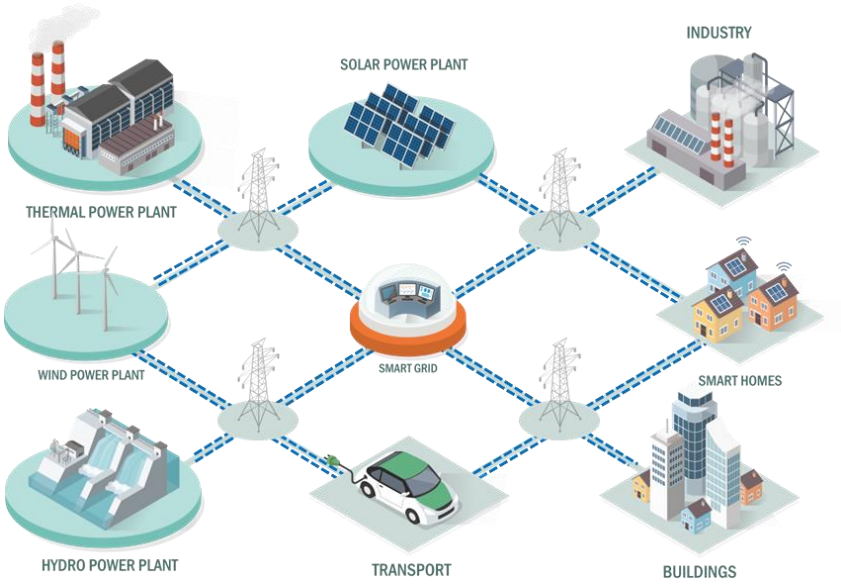
Smart utilities can track and improve end-use consumption of water and electricity

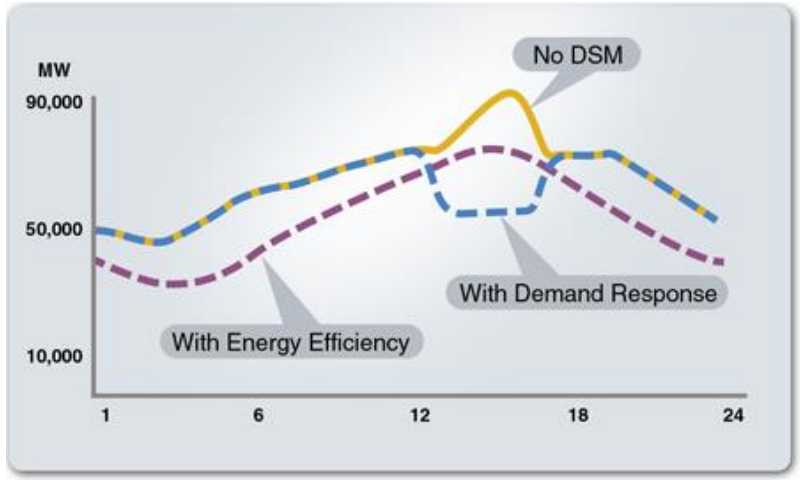
- Improved operational & cost efficiencies
- Improved demand & peak load management
- Improved leak detection
- Improved transparency & accountability
- Accurate billing for electricity consumption

Source: © Monty Rakusen/ via Gettyimages.co.uk via https://www.futurelearn.com/courses/smart-cities/11/steps/432477

Technologies to further improve efficiency

Where to start? | Tools | What are the steps?



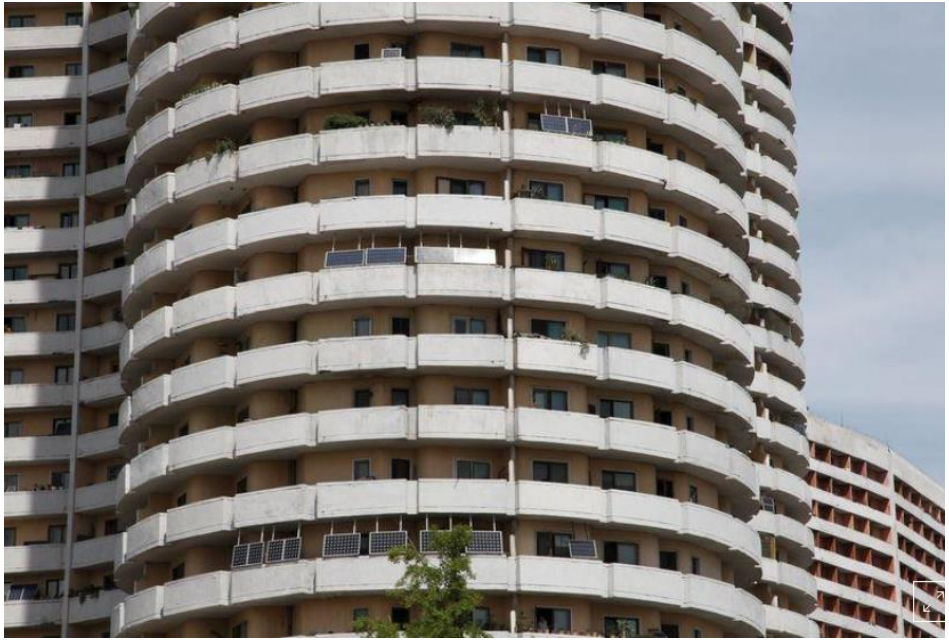


Source: https://www.moxa.com/Solutions/AMI/Application.htm

Technologies to further improve efficiency

Decentralised energy solutions: residential PV systems in Korea

Mini PV systems on a high-rise in Seoul



Solar panels on an apartment building in Pyongyang

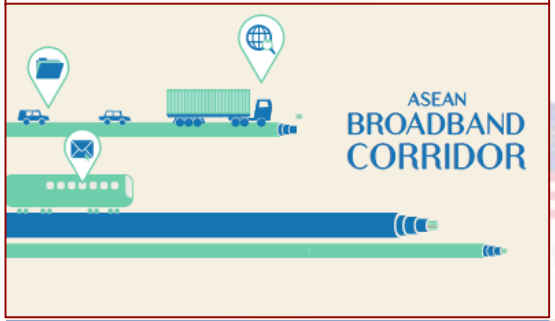
Source: http://www.koreaherald.com/view.php?ud=20170519000651 ; https://www.reuters.com/article/us-northkorea-solar/in-north-korea-solar-panel-boom-gives-power-to-the-people-idUSKBN0NC2FG20150421

Increased connectivity in South East Asia

Where to start? | Tools | What are the steps?

THE VISION OF ASEAN CONNECTIVITY

01 PHYSICAL CONNECTIVITY

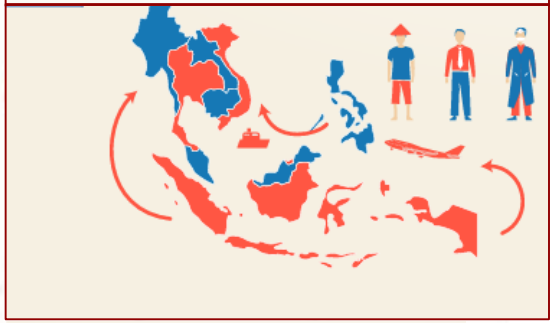


- ICT INFRASTRUCTURE AND THE ASEAN BROADBAND CORRIDOR
- ROADS AND THE ASEAN HIGHWAY NETWORK (AHN)
- THE SINGAPORE-KUNMING RAIL LINK (SKRL)
- MARITIME TRANSPORT AND INLAND WATERWAYS
- AIR TRANSPORT
- ENERGY

02 INSTITUTIONAL CONNECTIVITY

- FRAMEWORK AGREEMENTS ON TRANSPORT FACILITATION
- THE SINGLE AVIATION MARKET AND THE SINGLE SHIPPING MARKET
- TRADE AND THE ASEAN FREE TRADE AREA (AFTA)
- THE ASEAN SINGLE WINDOW
- INVESTMENT

03 PEOPLE-TO-PEOPLE CONNECTIVITY

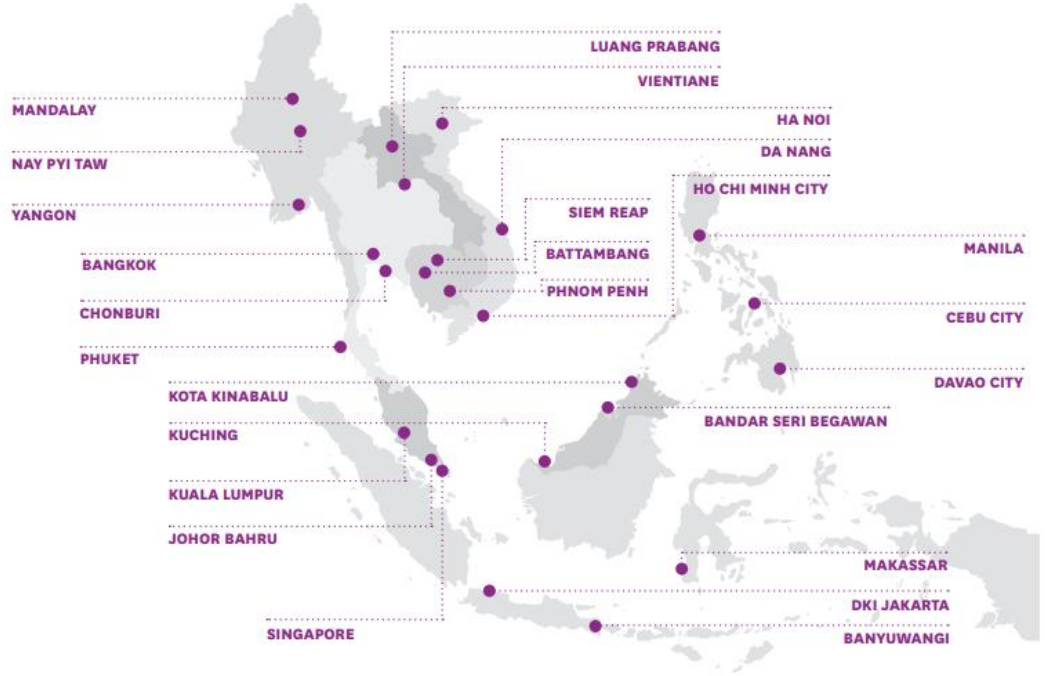


- ASEAN VIRTUAL LEARNING RESOURCE CENTERS
- INCREASING EDUCATIONAL OPPORTUNITIES
- VISA EXEMPTIONS AND TOURISM
- PEOPLE MOBILITY

Increased connectivity in South East Asia

Where to start? | Tools | What are the steps?

ASEAN SMART CITIES NETWORK



FRAMEWORK

Strategic Outcomes

High Quality of Life
Competitive Economy
Sustainable Development

Urban Systems

- Integrated Master Planning and Development
- Dynamic and Adaptive Urban Governance

Development Focus Areas

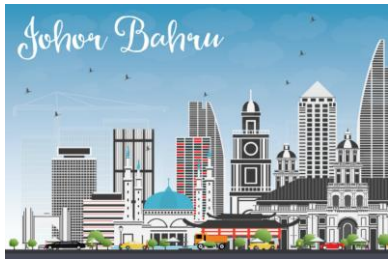
Enablers

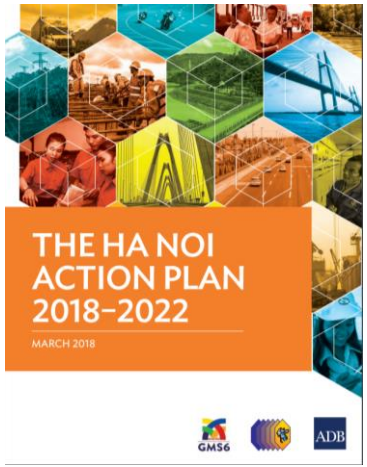
- Digital Infrastructure and Applications
- Partnership and Funding

 Source: https://www.clc.gov.sg/docs/default-source/books/book-asean-smart-cities-network.pdf

ASEAN Smart City Initiatives

Where to start? | Tools | What are the steps?





Source: https://asean.org/storage/2018/11/ASEAN-Sustainable-Urbanisation-Strategy-ASUS.pdf

DanaBus Danang Urban bus | qlue | IBM | cisco | NOKIA Connecting People | HUAWEI | Schneider Electric | PHILIPS Lighting | VIETNAM NIPPON SEIKI

ASEAN Smart City Initiatives

Spotlight: Jakarta Smart City

Sought to use **information technology** to seek smarter ways of delivering public services by automatically collecting and analysing feedback from citizens

How it works?

Data is extracted, transformed and loaded into a central data warehouse

Data is analysed within a robust data governance framework

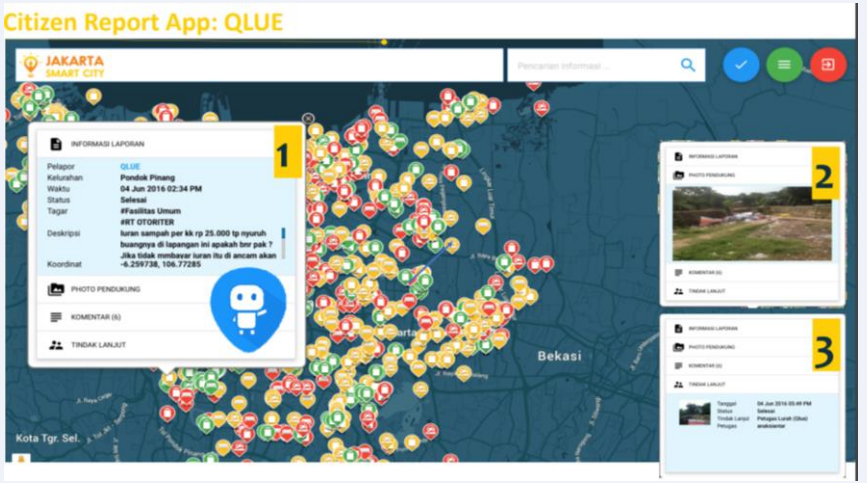
Using predictive modelling and sentiment analysis, smarter policy decisions can be made

40,000 emails, SMS messages and tweets automatically analyzed per month in 2016

Engages citizens by listening and responding to feedback fast

Empowers government agencies to make better policy decisions

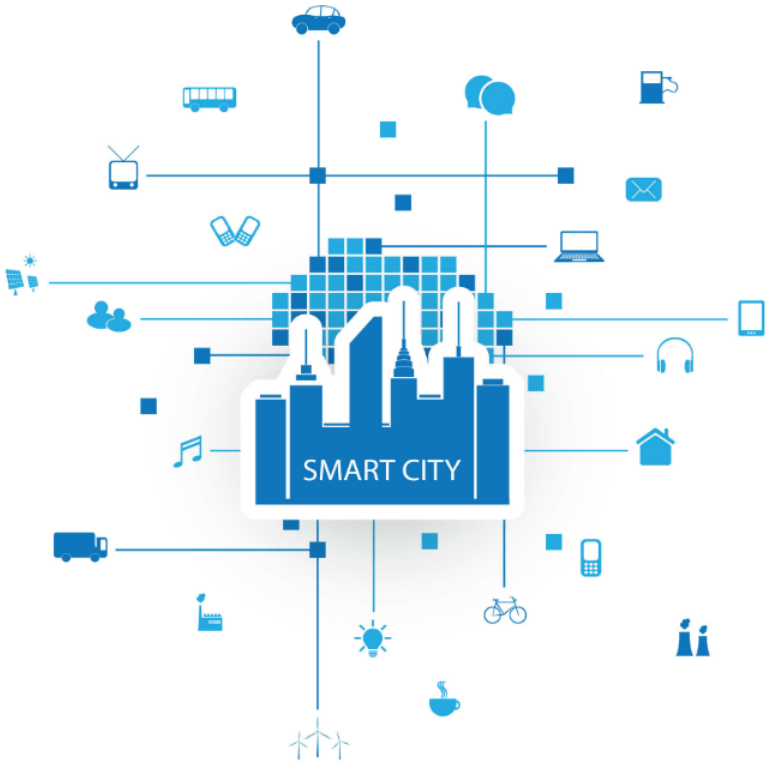
Citizen Report App: QLUE



 Source: https://www.itu.int/en/ITU-D/Regional-Presence/AsiaPacific/Documents/Events/2017/Sep-SCEG2017/SESSION-4_Indonesia_Mr_Setiaji.pdf

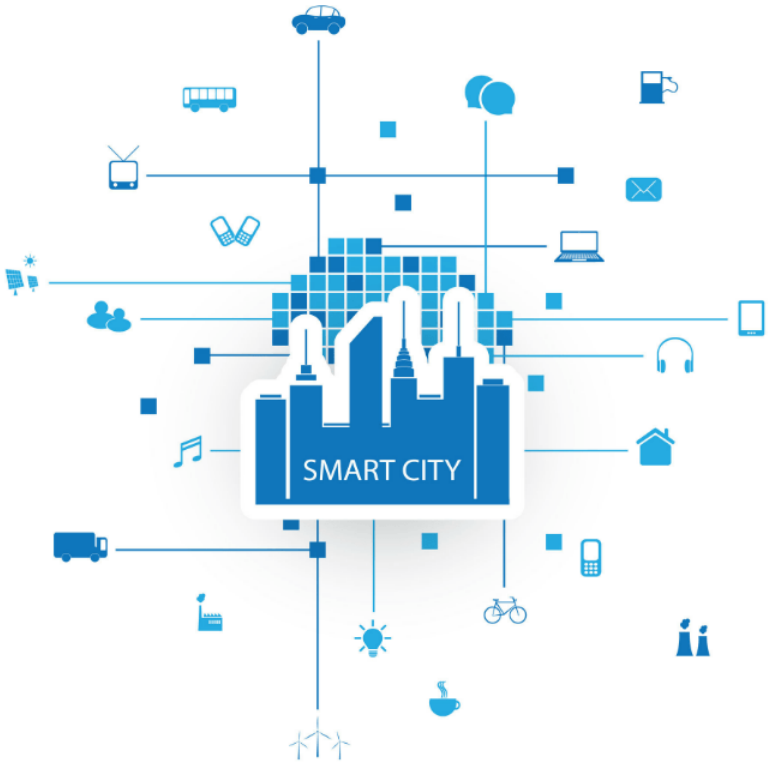
Challenges and Opportunities

- Challenges:
  - Technology challenges with **coverage and capacity**
  - **Government co-ordination** for enabling legislation and policies
  - **Reluctance** by citizens for smart products & services
  - **Funding** for smart city projects
  - **Existing infrastructure** for energy, water and transportation systems
  - Digital **security**



Challenges and Opportunities

- Opportunities:
  - **Government co-ordination** for enabling legislation and policies
  - Development of smart city **action plans**
  - Technology **education programs**
  - **Innovative financing** solutions for smart projects
  - **Technology innovation** for smart city elements
  - Implementing adequate digital **security measures**



2. Activity: Policies to encourage smart city development for energy efficiency

Activity: Policies to encourage smart city development for energy efficiency

On three tables, discuss consequences and possible solutions on the following barriers: regulatory/institutional; economic; information/capacity

Regulatory/Institutional

Barrier	Consequence	Solution
…	…	…

Economic

Barrier	Consequence	Solution
…	…	…

Information/Capacity

Barrier	Consequence	Solution
…	…	…

https://www.esmap.org/sites/default/files/esmap-files/FINAL_EECI-WWU_TR001-12_Resized.pdf

Activity: A picture of digital solutions for your city

Think about the current context of your city – or a city you know well – and identify 5 challenges it faces or will face in the coming decade:

- Come up with potential digitalisation opportunities for addressing those challenges
- In which of the 6 principles of a Smart City do those opportunities lie? Could they lie in more than one & are there interlinkages between them?
- Who are the key stakeholders that would need to be make those opportunities happen?

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