A dialogue on

Realizing Smart Cities

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Economic Research Institute for ASEAN and East Asia

ERIA

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ERIA - Who We are ?

- The Economic Research Institute for ASEAN and East Asia (ERIA) is an international organization, established by a formal agreement among 16 head of governments in 2007, to provide support to ASEAN and East Summits through policy research.
- Three Pillars of Research: (1) Deepening Economic Integration (2) Narrowing Development Gaps (3) Sustainable Development
- Capacity building : Seminars & Workshops for senior policy makers, administrators, researchers and business managers to strengthen the link between research and policy making.

Realizing Smart City

- Integrated Research and Capacity City Development Program (2019-2021)

- There are many initiatives worldwide on smart cities. However, there appears to be no clear guidelines to assist aspiring cities to become smart. Therefore, there is a need for a study not only to conduct a need and gap analysis of converting a city into a smart city, but also a procedure to assist the cities in this direction.

- Objectives (a) Measuring the smartness of a city through the use of Key Performance Indicators

(b) Examine the economics of smart cities: estimation of the technology deployment costs and socio-environmental benefits of introducing various smart measures

(C) Analyze the policy gaps/integration needed.

- The scope of sectors areas and the measures

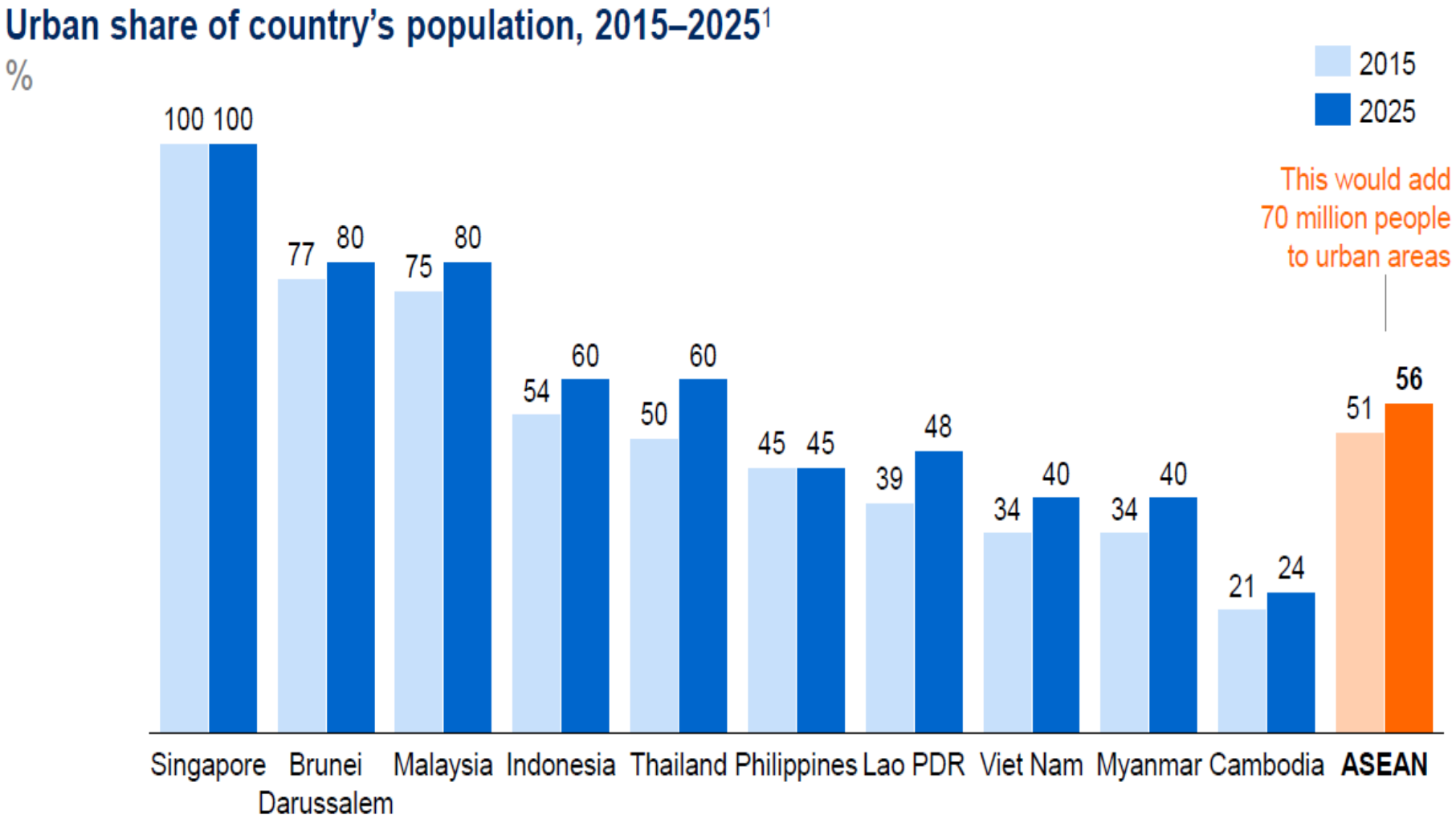
- 5 Service delivery areas (i) Energy (ii) Mobility (iii) Waste (iv) Water and (v) ICT related issues; Emission reduction opportunities

Why we need smart cities?

What constitutes a smart city?

How to measure the Smartness?

Urban Demography and Agglomeration in ASEAN



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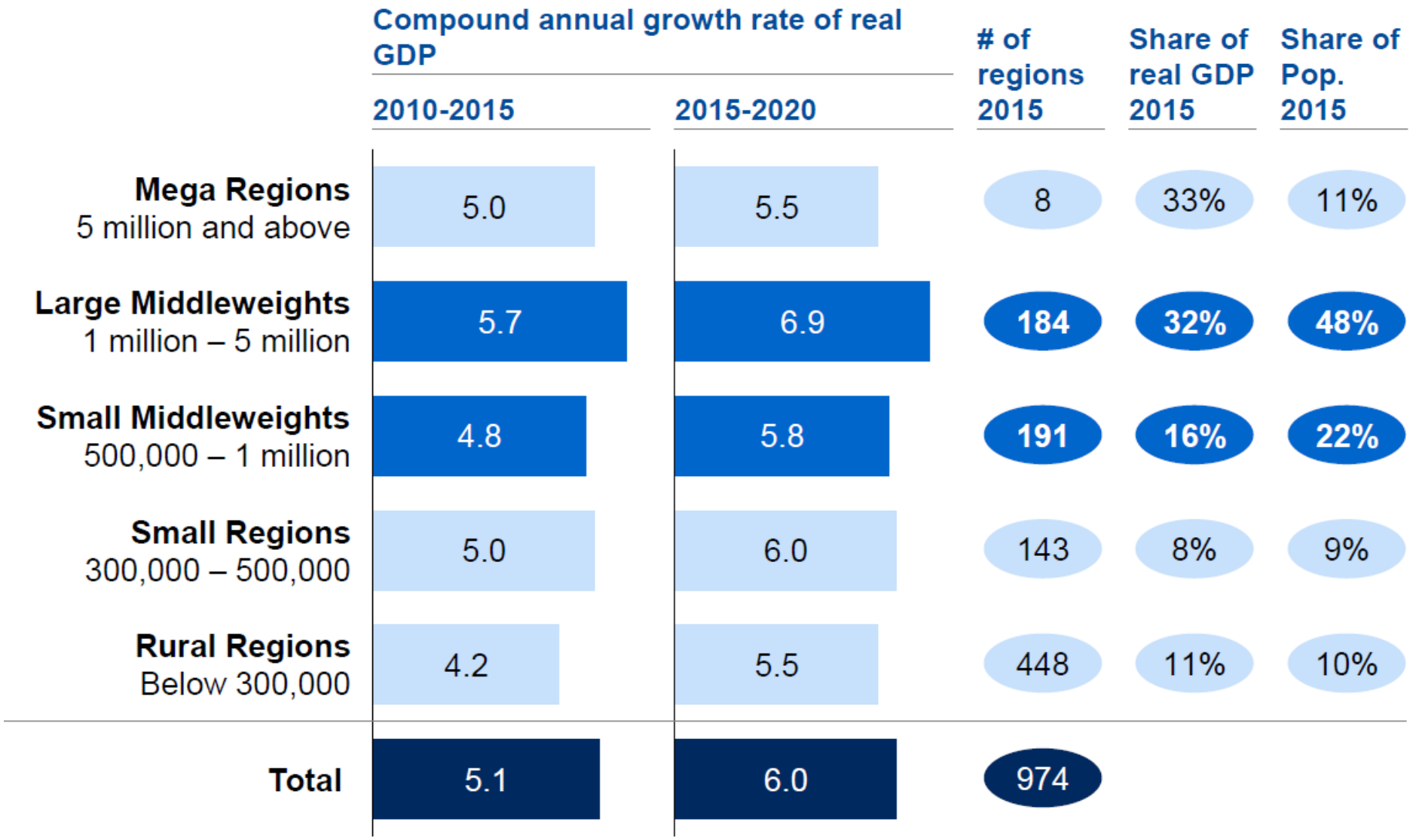
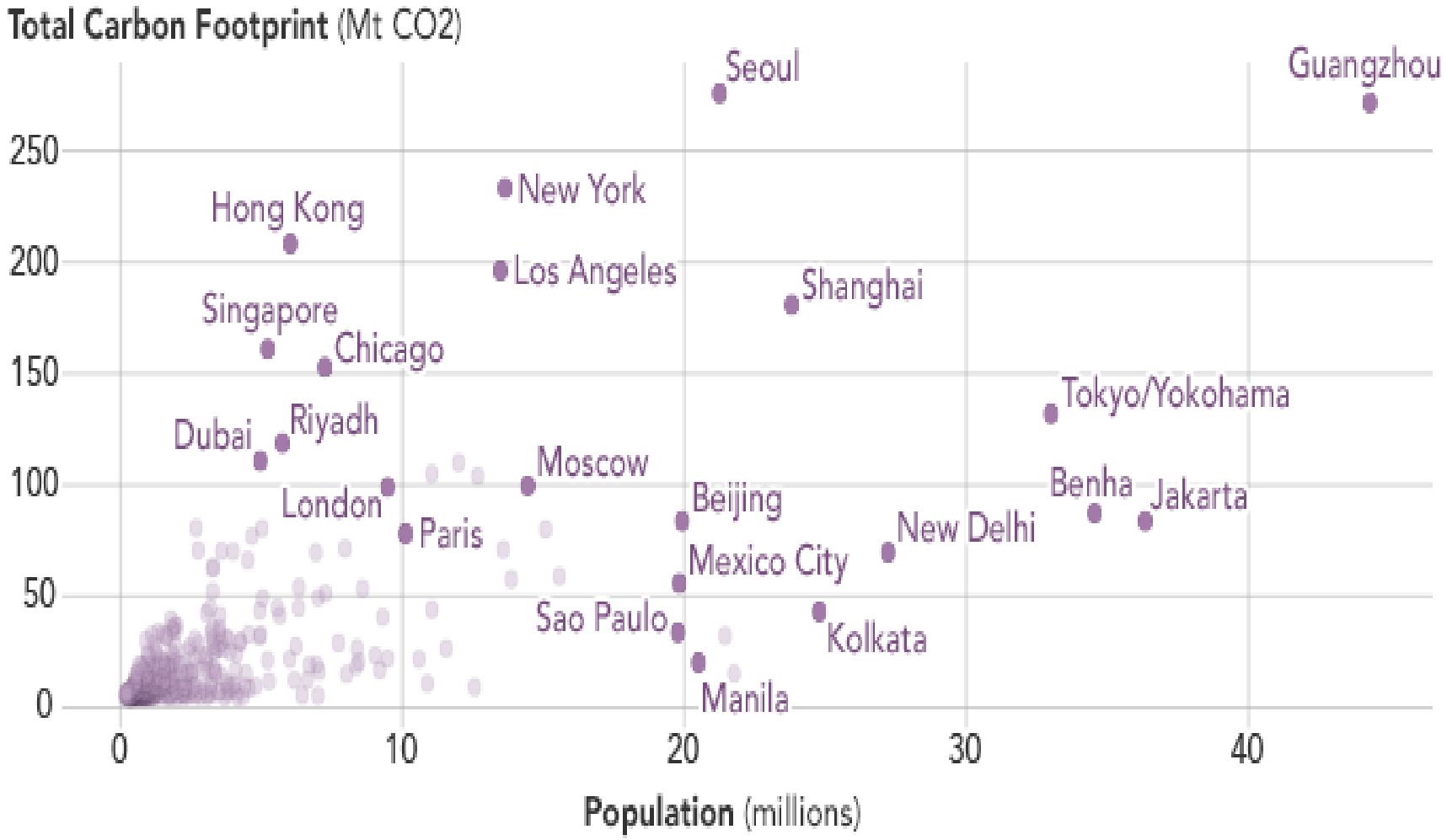
Mega cities and Second Tier cities are Growing Faster in ASEAN



Source: Desk Analysis with ASEAN economic data base

Sustainability Challenges Will be Won or Lost in Cities



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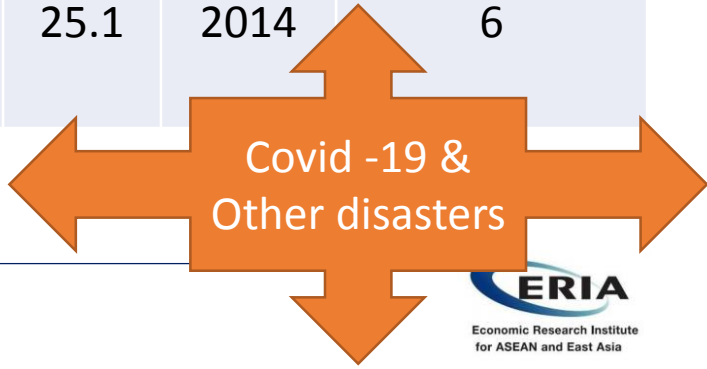
Living Functionalities and Social Inclusion in cities

Increasing Inequalities

City	Year	Gini Co-efficient
Chiangmai	2014	0.58
Ho-chi Minh City	2011	0.53
Bangkok	2012	0.53
Davo	2009	0.44
Kula Lumphur	2009	0.41
Nonthaburi	2006	0.41
Manila	2006	0.40

Reduced Urban Poverty

Country	Year	% of urban population	Year	% urban population
Indonesia	1996	13.6	2015	8.8
Malaysia	1994	21.8	2015	6.7
Thailand	1990	20.5	2011	9
Viet Nam	1995	25.1	2014	6



Source: UN, ADB and ASEAN data base

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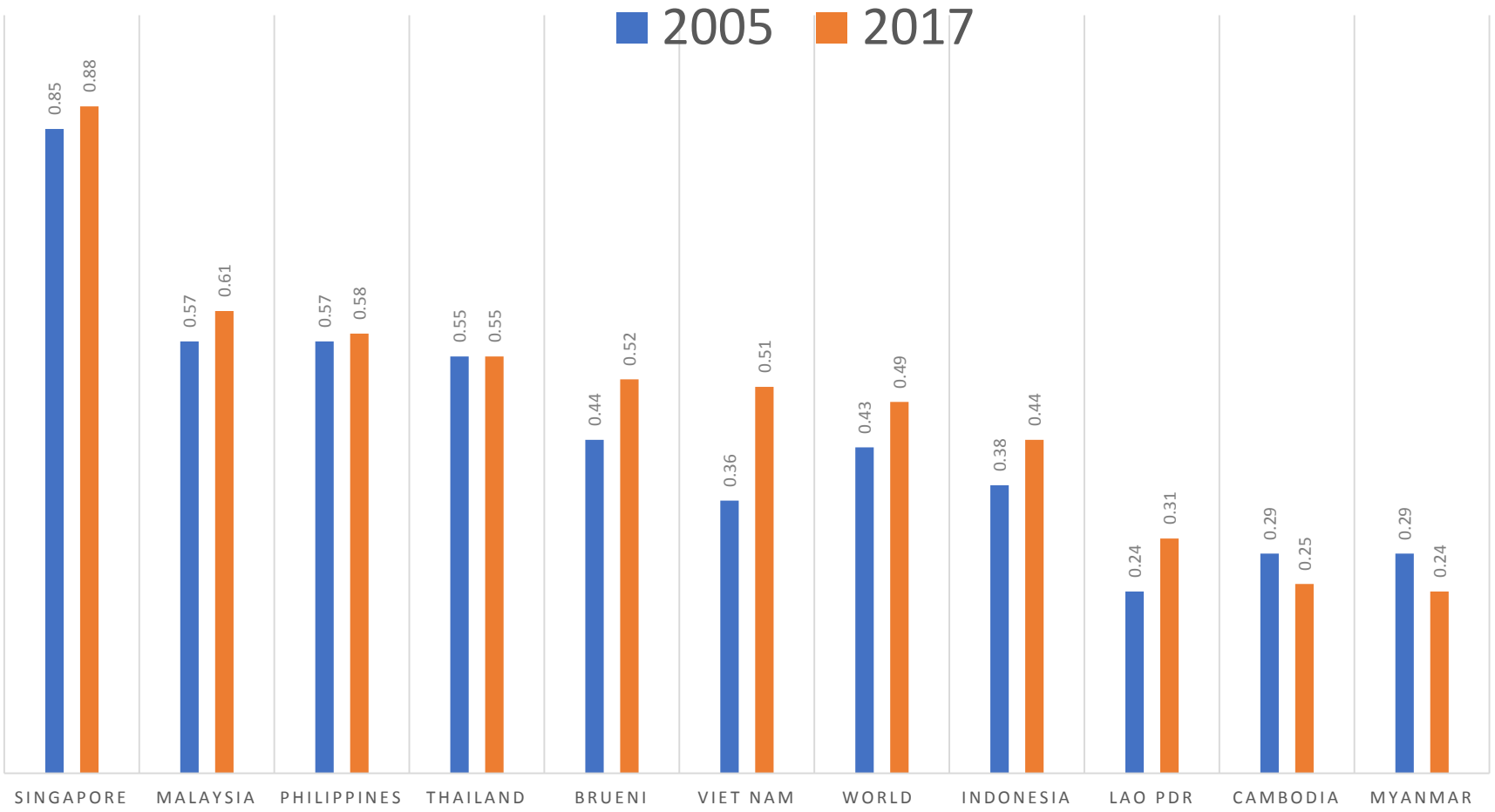
Improving quality and availability of e-governance services

UN E Government Development Index



EGDI is a weighted average of normalized scores on the three dimensions of e-government viz, scope and quality of online services, status of ICT infra and inherent human capital

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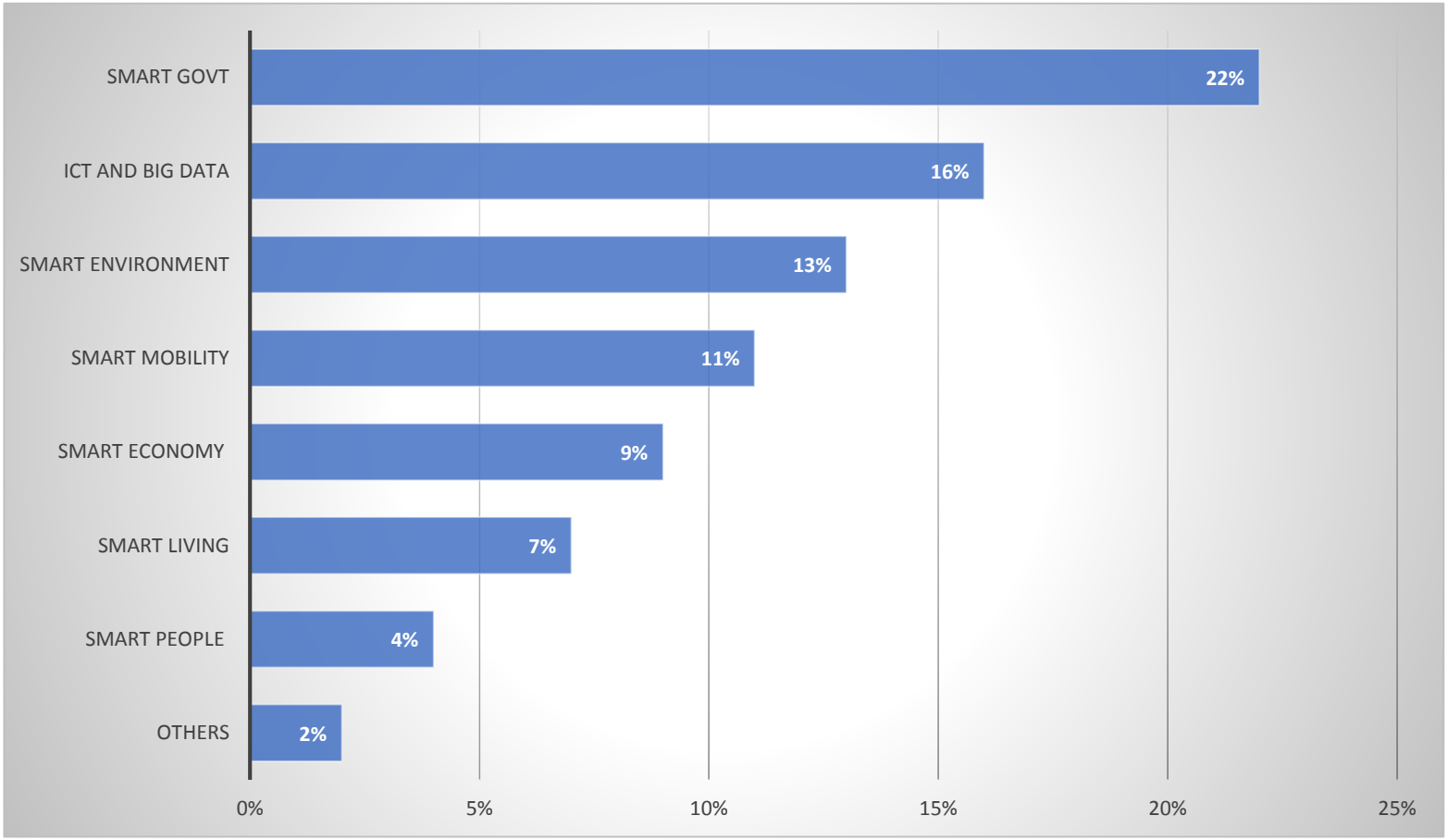
What is a smart city? Definitions

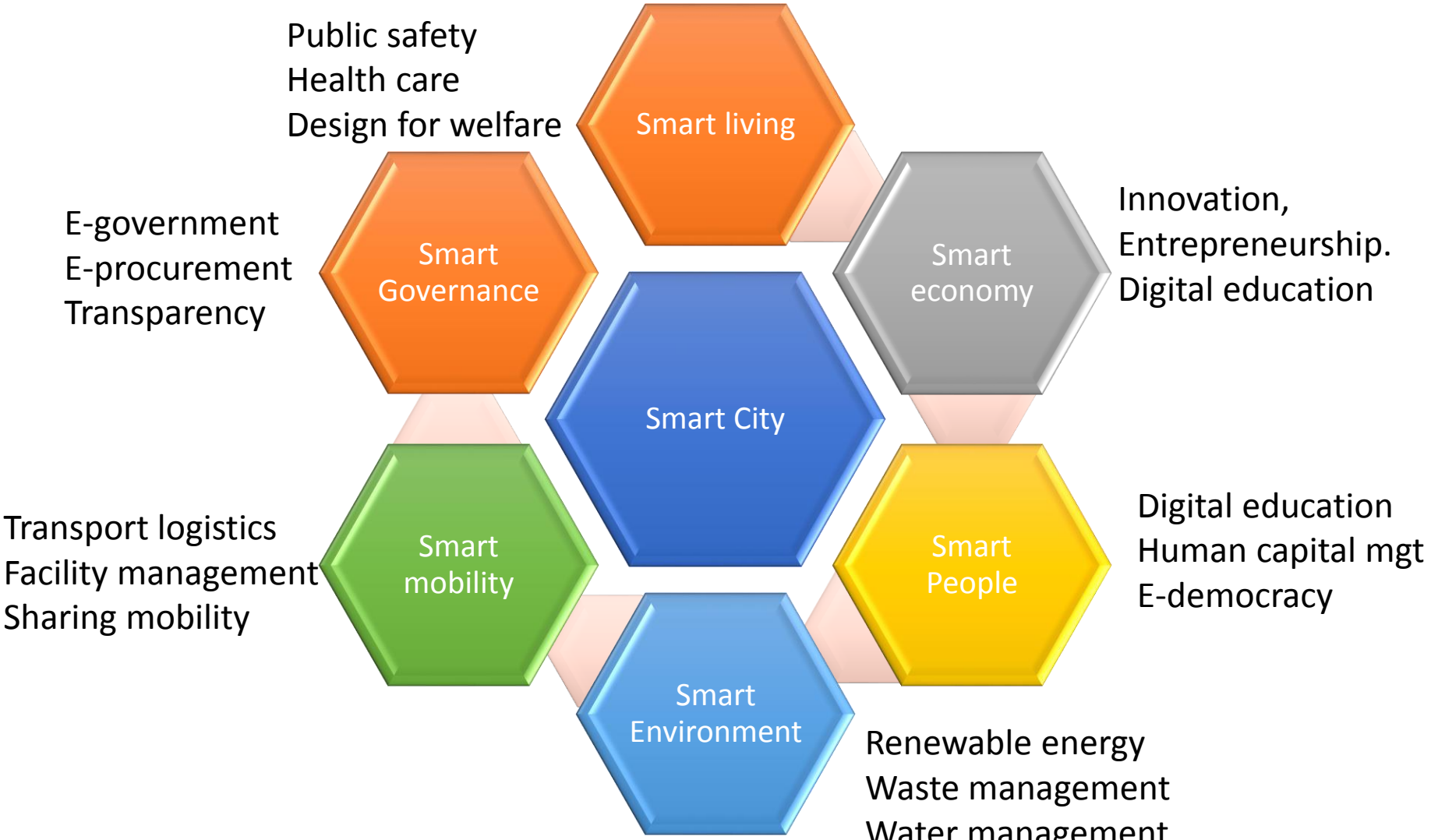
- Adopting ICT in order to enhance livability, workability and sustainability *(Smart Cities Council, 2013).*
- A city where the conditions of all its critical infrastructures are monitored and integrated . *(US Office of Scientific and Technical Information, 2014).*
- An instrumented, interconnected and intelligent city *(IBM, 2010).*
- A city seeking to address public issues via ICT-based solutions on the basis of multi-stakeholder and municipality-based partnership *(European Parliament, 2014).*
- A city that links physical capitals with social one in order to enhance the quality of services *(Corriea and Wunstel, 2011).*
- Integrating the physical, IT, social and business infrastructures into a single framework so as to leverage the collective intelligence of a city *(Harrison et al., 2016).*
- A innovative city that uses information and communication technologies (ICTs) and other means to improve quality of life, efficiency of urban operation and services, and competitiveness, while ensuring that it meets the needs of present and future generations with respect to economic, social, environmental as well as cultural aspects *(UNECE, 2017*)
- Automating routine functions as well as monitoring and planning the city to improve the efficiency, equity and quality of life for its citizens *(Batty et al., 2018).*
- Smart city is not about technology. It is really about how we apply ICT to enhance the quality of life of our citizens, to create greater opportunities for every one to prosper and thrive in this new world where economic restructuring is occurring and technology diffusion is occurring at an unprecedented pace and , to also strengthen community cohesion, quality of life. Opportunities and communities. Technology is a means to that end *(Vivian Balakrishnanan, Singapore Minister, 2018*).

What is a Smart City? Application Types in ASCN



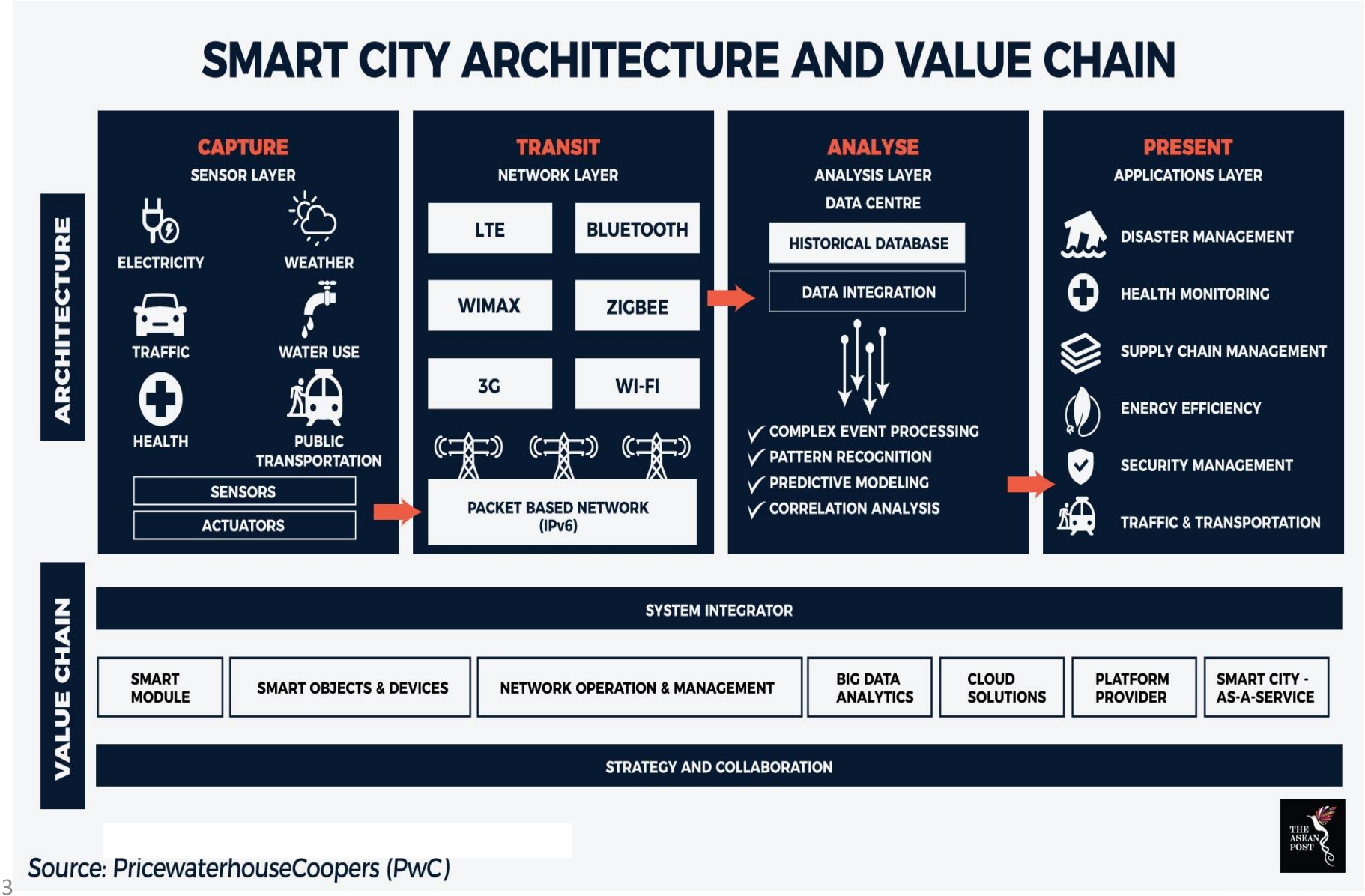
Source: Desk Analysis of ASEAN ASCN-e book

ASEAN Smart City- Will it be a best option to Resolve New and Multiple Challenges of Service delivery ?



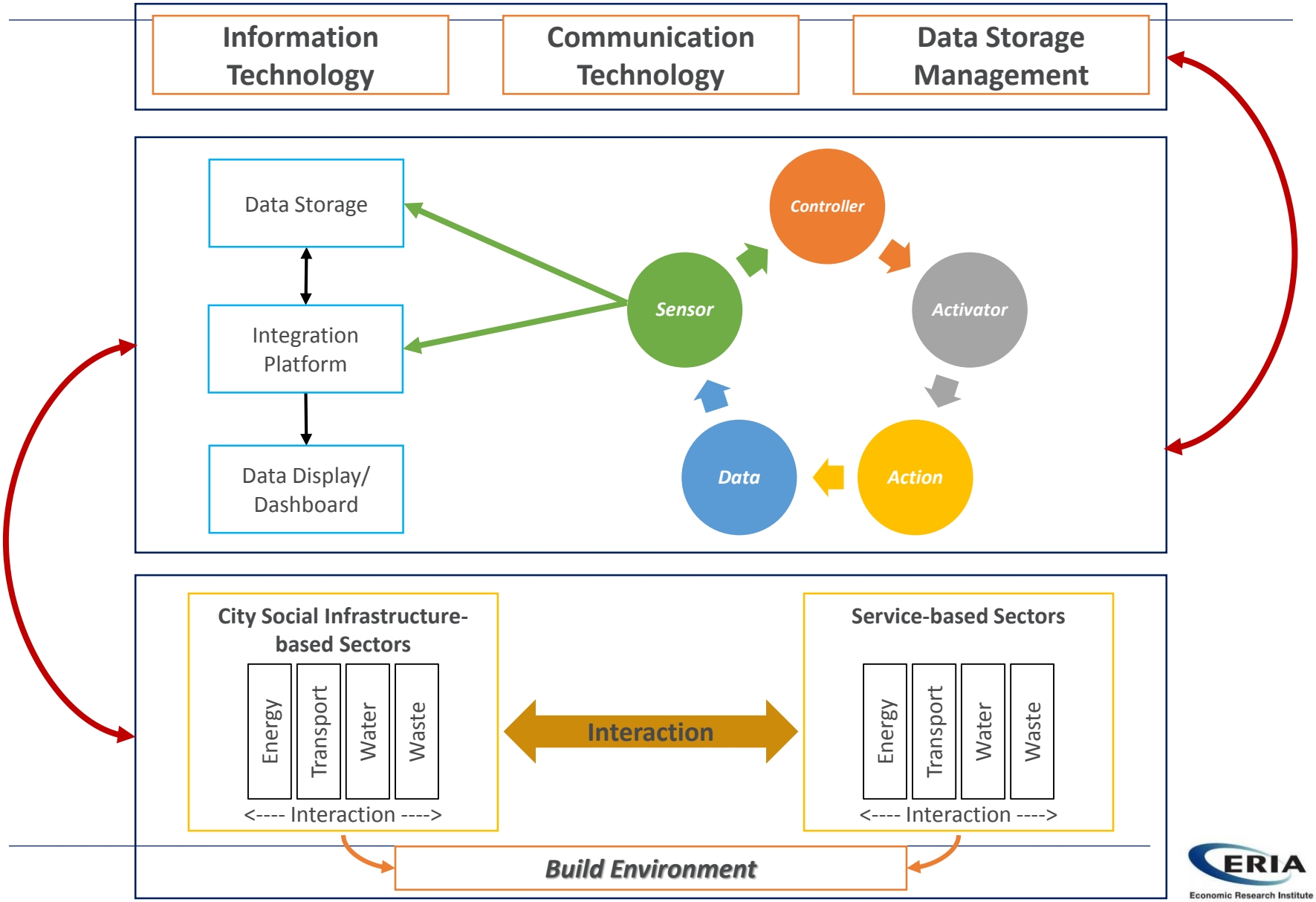
Source: ASCN – e-book
https://www.clc.gov.sg/docs/default-source/books/book-asean-smart-cities-network.pdf

What could be a Smart City Architecture?



Source: PricewaterhouseCoopers (PwC)

A common Minimum Technology Road Map for a Model Smart City



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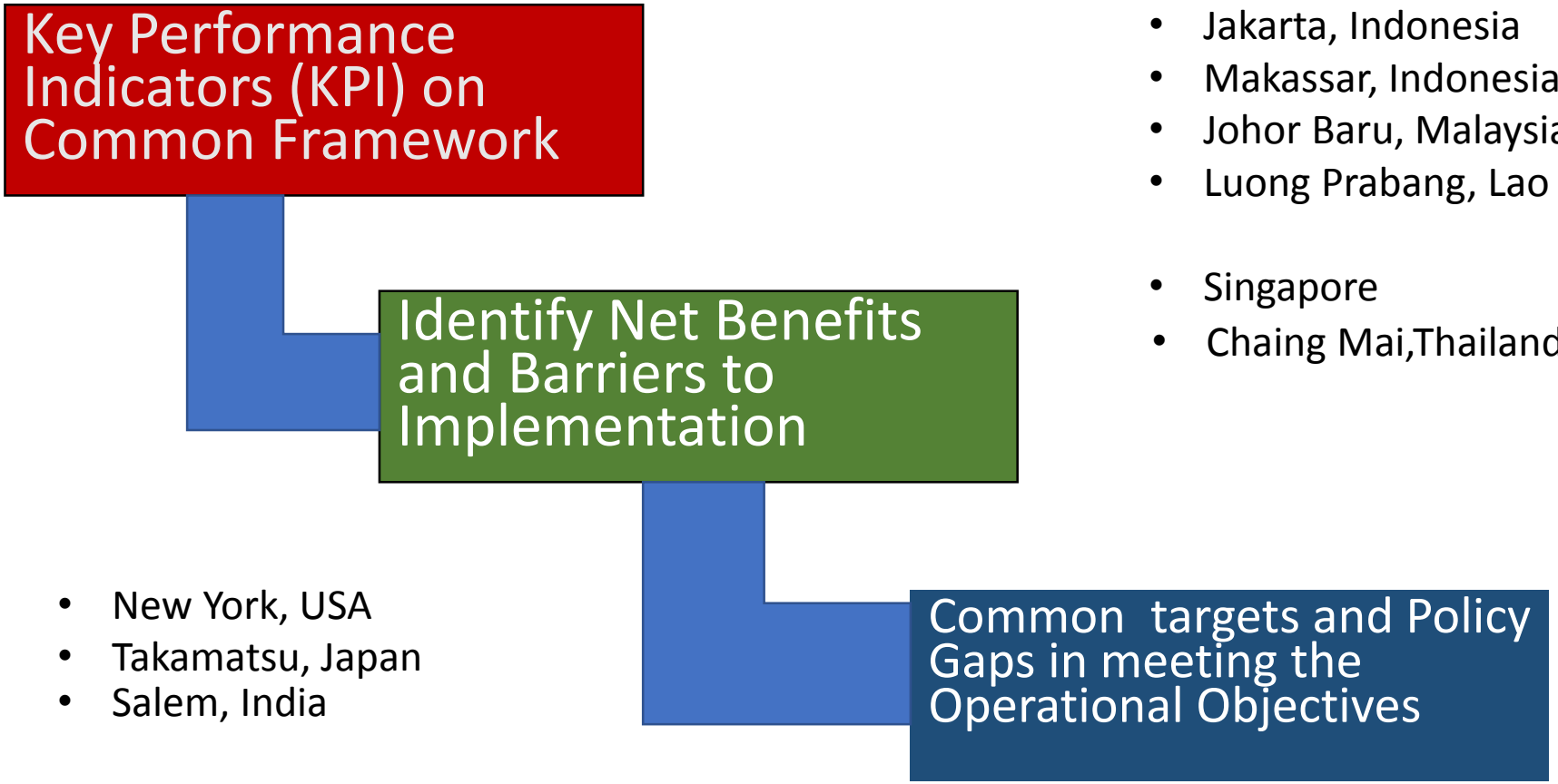
Process Towards Building a Strategic Implementation Plan of smart Cities



The overall objective is to examine how cities can embark into a smart city program. This would be done by first assessing their level of smartness and then estimating the costs and benefits of becoming smart.

Key Performance Indicators

1. General – Socio-economic indicators	
2. ICT	6. Waste
3. Energy	7. Economy
4. Transport	8. Society & Culture
5. Water	9. Environment

- **Each dimension has 2 indicator types:**

- **Core indicators:** these can be used by all cities universally.
- **Advanced indicators:** these may be used by some cities depending on their economic capacity, social capital, environmental conditions, etc.

Some of the advanced indicators are very “smart” and can be addressed by cities that are already ahead in their smartness journey. These indicators are optional, especially for self-benchmarking.

Total 70 Key Performance Indicators (KPIs) – Pre- chosen criteria /Fuzzy Logic

	Dimension	Core	Advanced
1	General	7	-
2	ICT	4	4
3	Energy	5	4
4	Transport	4	8
5	Water	3	1
6	Waste	4	-
7	Economy	7	2
8	Society & Culture	10	2
9	Environment	5	-
	TOTAL	49	21

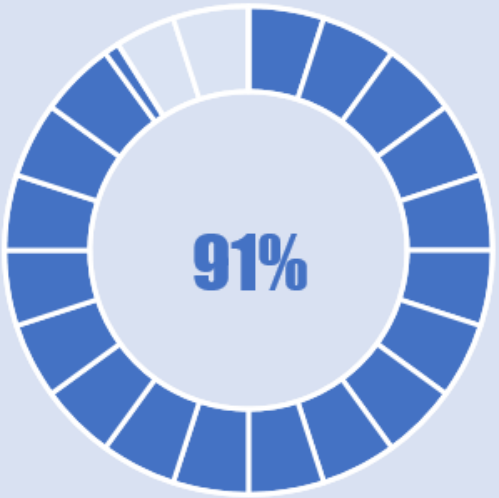
Singapore Smart City KPI

- **ICT Dimension – Inputs for Household Internet Access KPI**

1	Household Internet Access	CORE
This indicator demonstrates the access to information and technology connectivity, which is generally correlated to economic prosperity, development and growth.		
1.1	Total Number of Households with Internet Access *(includes fixed and mobile networks)*	1,206,023
Source	https://www.imda.gov.sg/infocomm-media-landscape/research-and-statistics/infocomm-usage-households-and-individuals#2	2017
1.2	Percentage of Households with Internet Access	**91%**
1.3	Target percentage of households with internet access	98%
1.4	Target to be achieved by	2025

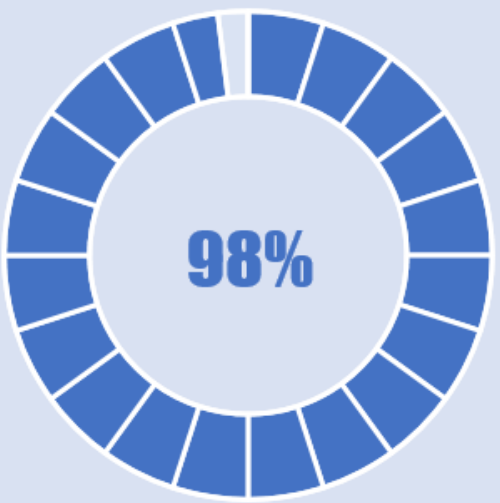
ICT Dimension – Outputs for Household Internet Access KPI

Current Level of Smartness



2017

Future Targets



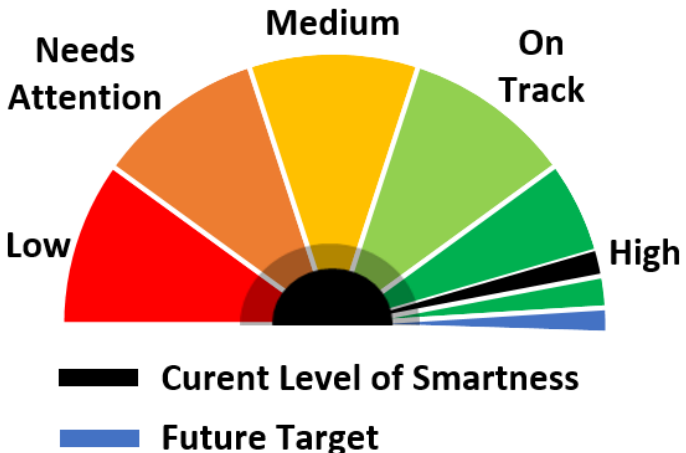
2025

Summary

To achieve the future target of **98%** **households with internet access**

The total number of households with internet access must increase to **1,298,794** **households**

by **2025**



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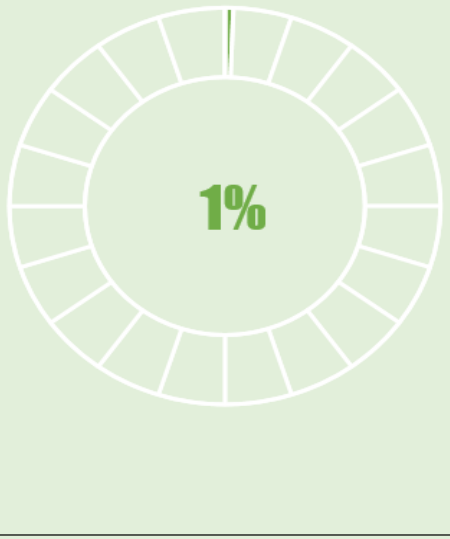
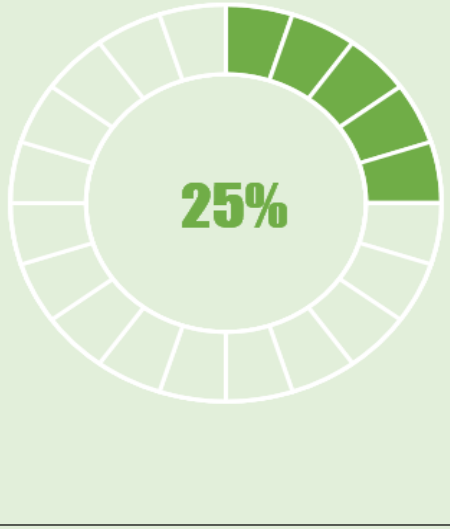
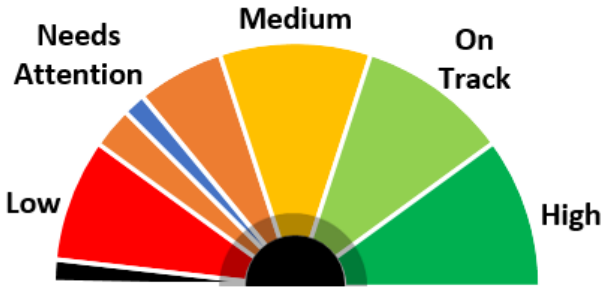
Measuring the Smartness of Singapore

- **Energy Dimension – Outputs for RE Consumption KPI**

Current Level of Smartness	Future Target	Summary
 2018	 2030	To achieve the future target of **25%** **share of renewable energy consumed in the city** the total renewable energy generation in the city must increase to **12,612.23** **GWh/year** by **2030**



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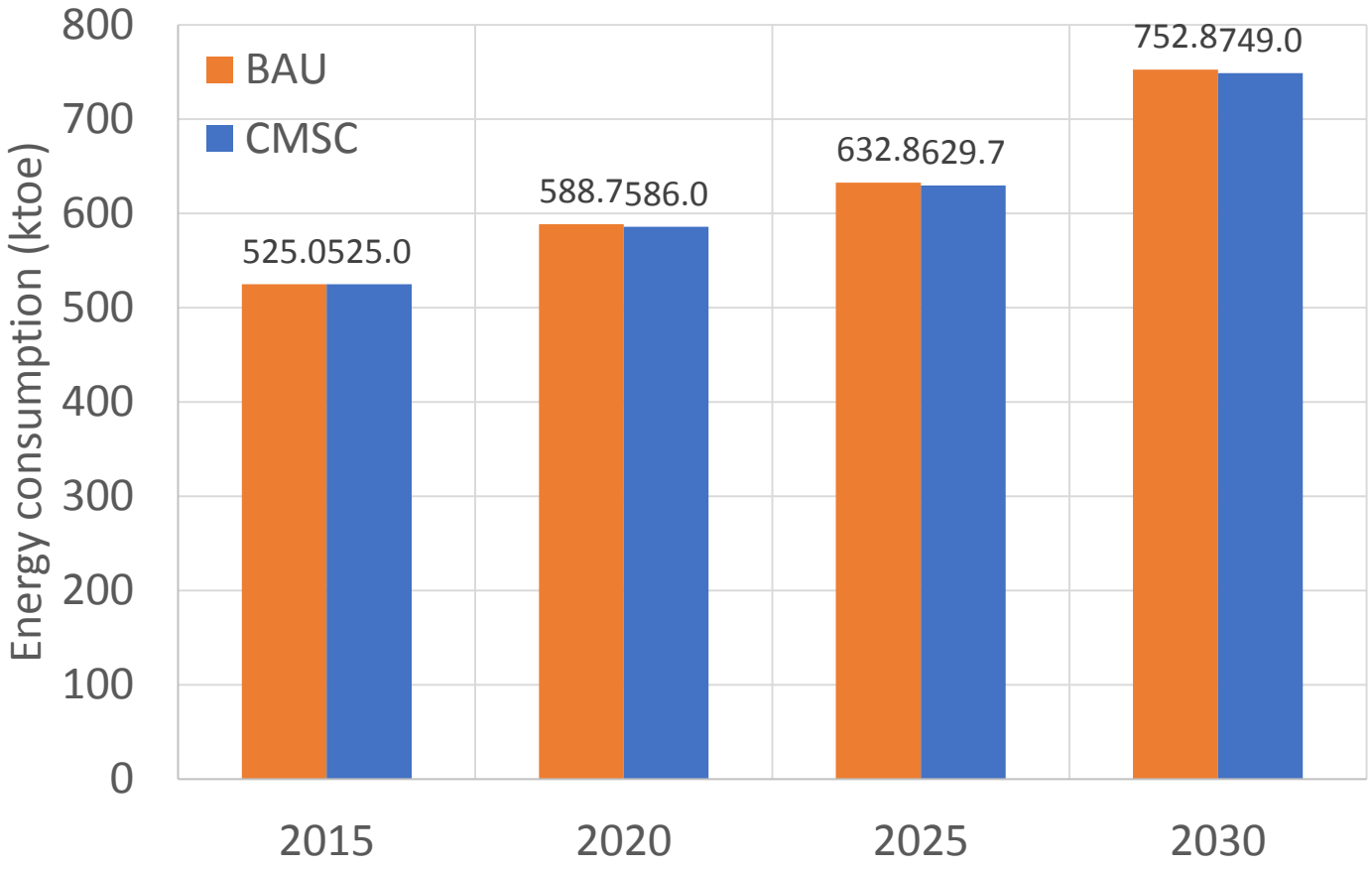
Economics of Becoming Smart City – Chiang Mai

Energy Consumption in BAU vs Chiang Mai Smart City Scenario
(Effect of Public Transport Network)



Reduction 3.8 ktoe in 2030 (0.5%)

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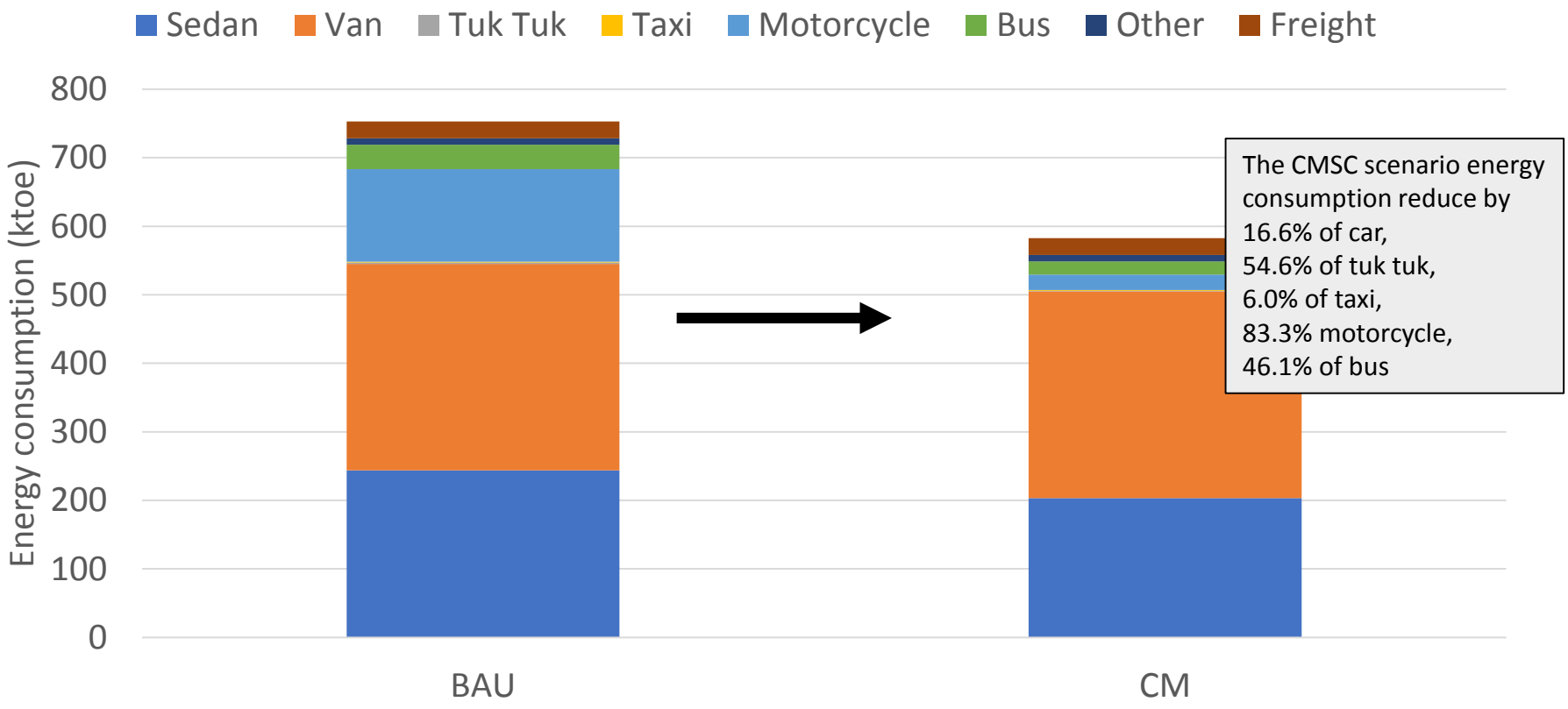
Economics of Becoming Smart City – Chiang Mai

Energy Consumption in BAU vs Chiang Mai Smart City Scenario (Effect of Low-Carbon Emission Passenger Vehicles)

2030



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Preliminary Conclusions

- As of now, many smart city models in ASEAN fail to see them as part of long term, comprehensive national low-carbon transformation plans. However, their smart city strategies represents an opportunity for paradigm shift
- The defining characteristic of ASEAN smart city model is the promotion of technological infrastructure development. ICT, Big Data and AI are indispensable dimension of critical infrastructure and service delivery.
- Strategic planning ASEAN SC models need to capitalize on both digital intelligence for energy efficiency and on the development of knowledge and innovation networks for digital inclusion.

Key Policy Challenges for ASEAN Smart Cities

- Integration of privacy protection & social intelligence securement to get reflected in Key Performance Indicators.
- Formulation of government – Industry-citizen holistic governance
- Political Rationality: Difficulty in structural Innovation rather than technological innovation
- Future Investment: High Risk and High Return-venture capital for startups/unicorns Vs big players

Moving Foreword

1. Continue to examine how cities are embarking into smart cities program - what are the current plans, performance and perceived benefits → Measurement Metrics
2. Asses the critical technology needs and existing financial gas in realizing smart city goals in regard to sustainability and governance parameters →Financing Models.
3. Sharing and exchange experience on key adjustments required in policy making in managing the transition to smart cities → **SC Guidelines**

Thank You!

Reach us at:

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