Team ZeuS

Smart Solution Against Issues of Urban Cities
SDG 11  Sustainable Cities And Communities
Make cities inclusive, safe, resilient and sustainable

**Inclusive**
Meeting people's needs for basic services including food, water, and energy

**Resilient**
Creating an urban environment that can minimize the impacts of natural disasters

**Safe**
Ensuring access of all dwellers to safe and affordable shelter, building, and daily life.

**Sustainable**
To preserve existing useful features of society as well as to maintain/develop the nation without depleting existing resources
Urbanization & Smart City

Cities in SEA are **growing rapidly**

Combined urban population increased

**936.1 million to 1.6 billion**

people between 2000 and 2017

Smart city initiatives are increasingly being used to construct for solving issues in the urban city.

Smart city generally include the use of technology to collect and analyse data and to implement interventions designed to improved cities.

Smart city initiatives are being pursued in the ASEAN-5 countries (**Indonesia, Malaysia, Philippines, Thailand and Vietnam**) to varying degrees.
### Cities Growth 2015 - 2025

Largest ASEAN cities in 2025 and growth rate from 2015

<table>
<thead>
<tr>
<th>ASEAN cities with more than 1 million inhabitants in 2025</th>
<th>2015</th>
<th>2025</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manila</td>
<td>12.9</td>
<td>15.2</td>
<td>17.4%</td>
</tr>
<tr>
<td>Jakarta</td>
<td>10.3</td>
<td>12.6</td>
<td>22.0%</td>
</tr>
<tr>
<td>Bangkok</td>
<td>9.3</td>
<td>11.0</td>
<td>18.2%</td>
</tr>
<tr>
<td>Ho Chi Minh City</td>
<td>7.3</td>
<td>9.2</td>
<td>27.4%</td>
</tr>
<tr>
<td>Kuala Lumpur</td>
<td>6.8</td>
<td>8.7</td>
<td>27.3%</td>
</tr>
<tr>
<td>Singapore</td>
<td>5.6</td>
<td>6.3</td>
<td>12.7%</td>
</tr>
<tr>
<td>Yangon</td>
<td>4.8</td>
<td>6.0</td>
<td>24.3%</td>
</tr>
<tr>
<td>Ha Noi</td>
<td>3.6</td>
<td>5.0</td>
<td>37.5%</td>
</tr>
<tr>
<td>Surabaya</td>
<td>2.9</td>
<td>3.4</td>
<td>19.2%</td>
</tr>
<tr>
<td>Bandung</td>
<td>2.5</td>
<td>3.1</td>
<td>22.0%</td>
</tr>
<tr>
<td>Samut Prakan</td>
<td>1.8</td>
<td>2.9</td>
<td>62.3%</td>
</tr>
<tr>
<td>Medan</td>
<td>2.2</td>
<td>2.7</td>
<td>21.1%</td>
</tr>
<tr>
<td>Phnom Penh</td>
<td>1.7</td>
<td>2.3</td>
<td>30.7%</td>
</tr>
<tr>
<td>Batam</td>
<td>1.4</td>
<td>2.2</td>
<td>60.8%</td>
</tr>
<tr>
<td>Davao City</td>
<td>1.6</td>
<td>2.0</td>
<td>21.9%</td>
</tr>
<tr>
<td>Semarang</td>
<td>1.6</td>
<td>2.0</td>
<td>21.0%</td>
</tr>
<tr>
<td>Makassar</td>
<td>1.5</td>
<td>1.9</td>
<td>27.3%</td>
</tr>
<tr>
<td>Can Tho</td>
<td>1.2</td>
<td>1.7</td>
<td>45.9%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Urban Area</th>
<th>2015</th>
<th>2025</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palembang</td>
<td>1.4</td>
<td>1.7</td>
<td>16.9%</td>
</tr>
<tr>
<td>Denpasar</td>
<td>1.1</td>
<td>1.7</td>
<td>51.9%</td>
</tr>
<tr>
<td>Pekan Baru</td>
<td>1.1</td>
<td>1.6</td>
<td>38.8%</td>
</tr>
<tr>
<td>Vientiane</td>
<td>0.99</td>
<td>1.6</td>
<td>54.5%</td>
</tr>
<tr>
<td>Mandalay</td>
<td>1.2</td>
<td>1.5</td>
<td>27.6%</td>
</tr>
<tr>
<td>Hai Phong</td>
<td>1.1</td>
<td>1.4</td>
<td>31.5%</td>
</tr>
<tr>
<td>Bogor</td>
<td>1.1</td>
<td>1.4</td>
<td>28.8%</td>
</tr>
<tr>
<td>Nay Pyi Taw</td>
<td>1.0</td>
<td>1.3</td>
<td>22.2%</td>
</tr>
<tr>
<td>Da Nang</td>
<td>0.95</td>
<td>1.2</td>
<td>29.2%</td>
</tr>
<tr>
<td>Bandar Lampung</td>
<td>0.96</td>
<td>1.2</td>
<td>25.6%</td>
</tr>
<tr>
<td>Zamboanga City</td>
<td>0.94</td>
<td>1.2</td>
<td>25.4%</td>
</tr>
<tr>
<td>Tasikmalaya</td>
<td>0.78</td>
<td>1.2</td>
<td>48.7%</td>
</tr>
<tr>
<td>Samarinda</td>
<td>0.86</td>
<td>1.2</td>
<td>33.9%</td>
</tr>
<tr>
<td>Cebu City</td>
<td>0.95</td>
<td>1.1</td>
<td>20.2%</td>
</tr>
<tr>
<td>Johor Bahru</td>
<td>0.91</td>
<td>1.1</td>
<td>24.9%</td>
</tr>
<tr>
<td>Padang</td>
<td>0.90</td>
<td>1.1</td>
<td>24.7%</td>
</tr>
<tr>
<td>Bien Hoa</td>
<td>0.83</td>
<td>1.1</td>
<td>32.1%</td>
</tr>
<tr>
<td>Malang</td>
<td>0.86</td>
<td>1.0</td>
<td>21.2%</td>
</tr>
</tbody>
</table>

2015 highest populated city in growth
1. Manila, Philippines
2. Jakarta, Indonesia
3. Bangkok
Predicted second-tier cities SEA fastest growth by 2025

Indonesia and Vietnam demographic boom in 2015

Cities speculated to grow most by 2025:

- **Samut Prakan** (Thailand) +62.3%
- **Batam** (Indonesia) +60.8%
- **Vientiane** (Laos) +54.5%

Urbanization

- Mobile Application - Smart Waste Disposal
- Traffic Congestion
  - Intelligent Transportation System (ITS)
- Urban Waste
- Energy Consumption
  - Clean Coal Technology
Traffic Congestion
Estimated annual hours spent in traffic congestion in selected cities, per person using motorised transportation

<table>
<thead>
<tr>
<th>City</th>
<th>Hours lost per worker per year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jakarta, Indonesia</td>
<td>124.8</td>
</tr>
<tr>
<td>Kuala Lumpur, Malaysia</td>
<td>99.2</td>
</tr>
<tr>
<td>Manila, Philippines</td>
<td>233.6</td>
</tr>
<tr>
<td>Singapore, Singapore</td>
<td>89.6</td>
</tr>
<tr>
<td>Ho Chi Minh City, Viet Nam</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Urban population growth, rising incomes and limited transportation alternatives have all contributed to growing automobile use in the region.

In some of the larger cities, a significant amount of time is wasted in traffic congestion.
Traffic congestion for selected roads of Southeast Asia cities 2018

- **Rama IV (Bangkok)**
- **Jalan Sultan Ismail (Kuala Lumpur)**
- **EDSA (Metro Manila)**
- **Bukit Timah (Singapore)**
Intelligent Transportation System (ITS)

ITS mitigate traffic congestion
Cost efficient compared to the high construction cost of expanding the road network
Carbon from Transportation

ITS reduce environmental impact.

Transportation generates CO2

Dynamic parking guidance system avoid unnecessary traffic circulation reduce CO2 emission

Sources: University of California, Berkeley / IEN Consultants
There are several ways waste is commonly disposed of:

1. Composting
2. Open burning
3. Landfilling
4. Incineration
5. Recycling
Brunei per capita solid waste output of 1.4kg per day

70% of the waste goes directly to Brunei’s 6 main landfills
“You don’t see it, but it’s definitely there”

- People who live near such facilities
- Waste disposal workers - inhale of toxic chemicals
- Employees whose workplaces manufacture or come into contact with waste materials
- Increase spread of diseases

Victims to these practices
An mobile application for users to dispose their wastes to redeem rewards (cash, coupons, goods).
Energy Consumption
Primary energy demand

Highest Energy Demand
35% Indonesia

Primary Energy Mix
75% Fossil fuels

Largest increases Of Usage
10% coal

Evolution of primary energy demand in Southeast Asia

Primary energy demand has increased by around 70% since 2000, with coal accounting for the largest share of the growth.
Energy demand by fuel and sector

Industry has led energy demand growth among the end-use sectors since 2000, overtaking buildings to become the largest end-use consumer.

Industry 70%

Largest Increases
Transport ×2
Electricity consumption RISE
Biomass DROP
Electricity consumption

Average annual growth in per-capita electricity consumption in Southeast Asia, 2000-2015

Growth in per-capita electricity consumption was well above the global average in most Southeast Asian countries, driven by strong economic growth.

Rapid city population growth pushed up 6.1% electricity demand.
Gases Emission

Greenhouse Gas Emissions in Southeast Asia per Country, 2010 (in carbon dioxide equivalent)


Note: Includes fossil fuels emissions only.

Increases in Total Carbon Dioxide Emissions in World Regions between 1990 and 2010
SEA is considered to be among the most vulnerable regions to the effects of climate change due to Energy production and consumption.
Clean Coal Technology - Integrated Gasification Combined Cycle (IGCC)

Coal worst culprits greenhouse gas & air pollution

Coal Gasification Combined-cycle

Sulphur dioxide (acid rain) particulates affects people's respiratory systems.

Coal contain 10% sulphur.

Desulphurisation of coal:
Optimise sulphur removal by up to 90%.


