

11 SUSTAINABLE CITIES
AND COMMUNITIES



Sustainable Cities toward a Prosperous ASEAN

29 November 2017

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Description of Submission

Cities account for over 70 percent of the economic activities in the world today.

And with most of the global population and capital goods now concentrated in urban areas, cities are becoming more important as key drivers of social and economic development than ever before.

This submission explores the challenges and opportunities brought about by the multiple facets of sustainability at the city level — economic, environmental and social — and how they contribute towards economic prosperity.



BASIC STATISTICS

1
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3

of urban population in developing countries living in slum areas

3.5 billion currently living in urban areas

or 54% of world's total population

By 2030, 5 billion

or 60% of world's total population

expected population in urban areas

Top 750 cities

account for

57% of global GDP

3 percent

of Earth's total land area occupied by cities

> 600 million people

current population of ASEAN

~ 250 million

additional people in urban centers in ASEAN by 2025

75 percent

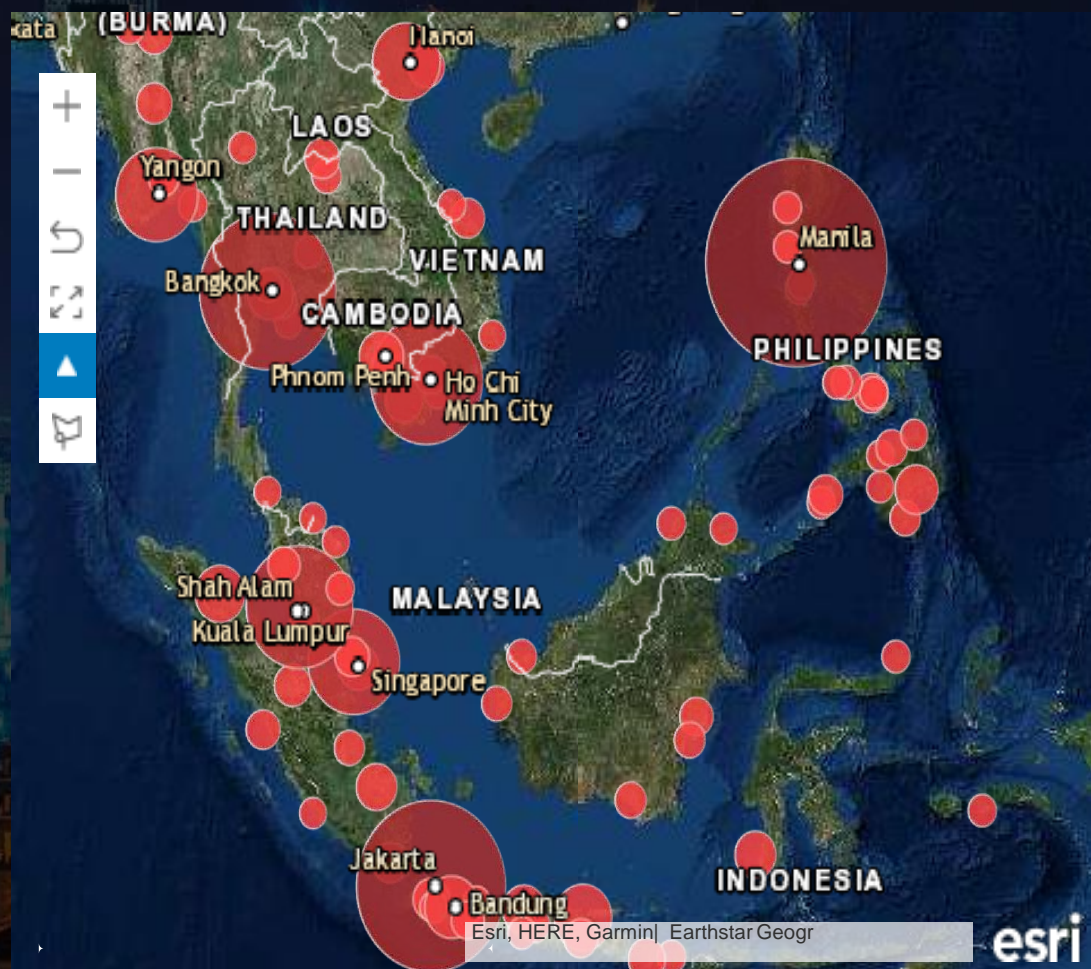
of world's total energy consumed by cities

50-60 percent

of global greenhouse gas emission attributed to cities

Urbanization and Population Growth

Most Populous Cities in ASEAN (by Urban Agglomerations)

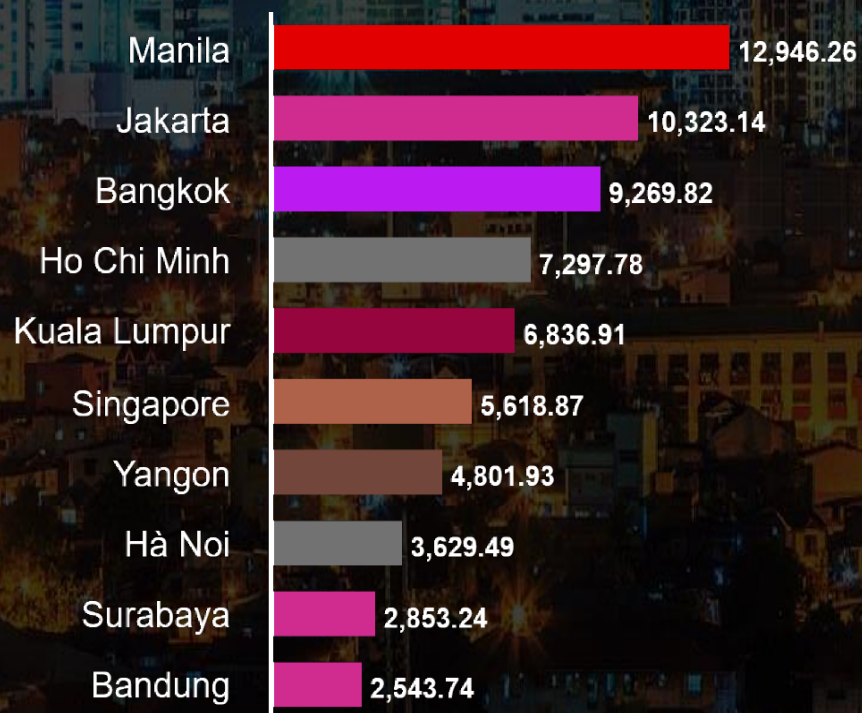


Source: World Urbanization Prospect 2015 (UNPD)

With a total population of more than 600 million, ASEAN is set to become one of the most dynamic regions in the world. With the rapid pace of urbanization, more people will live in cities in the future.

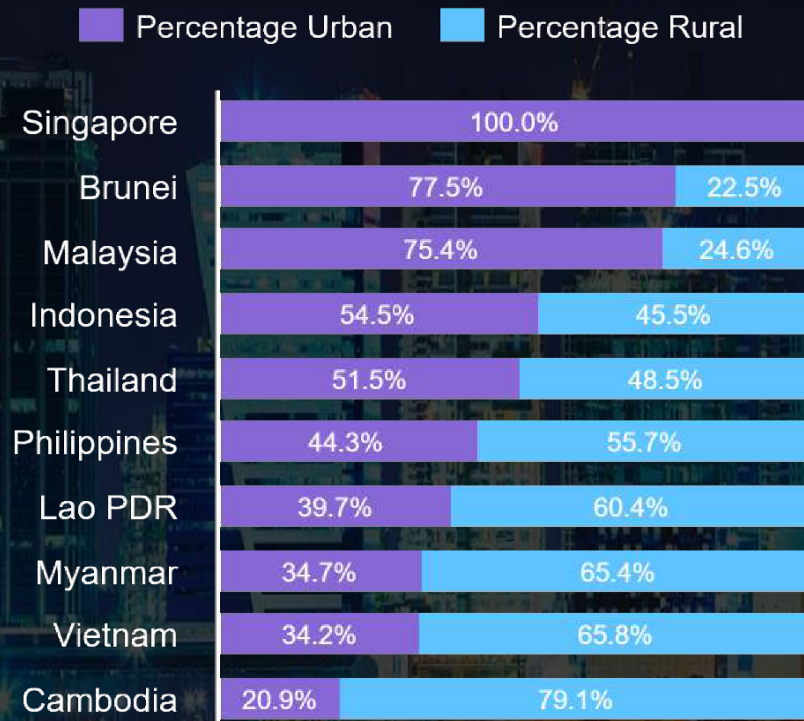
This expansion cities, together with the availability of better economic opportunities in urban areas will put increasing pressure on infrastructure and the provision of public services.

Top 10 Cities in ASEAN (2015)

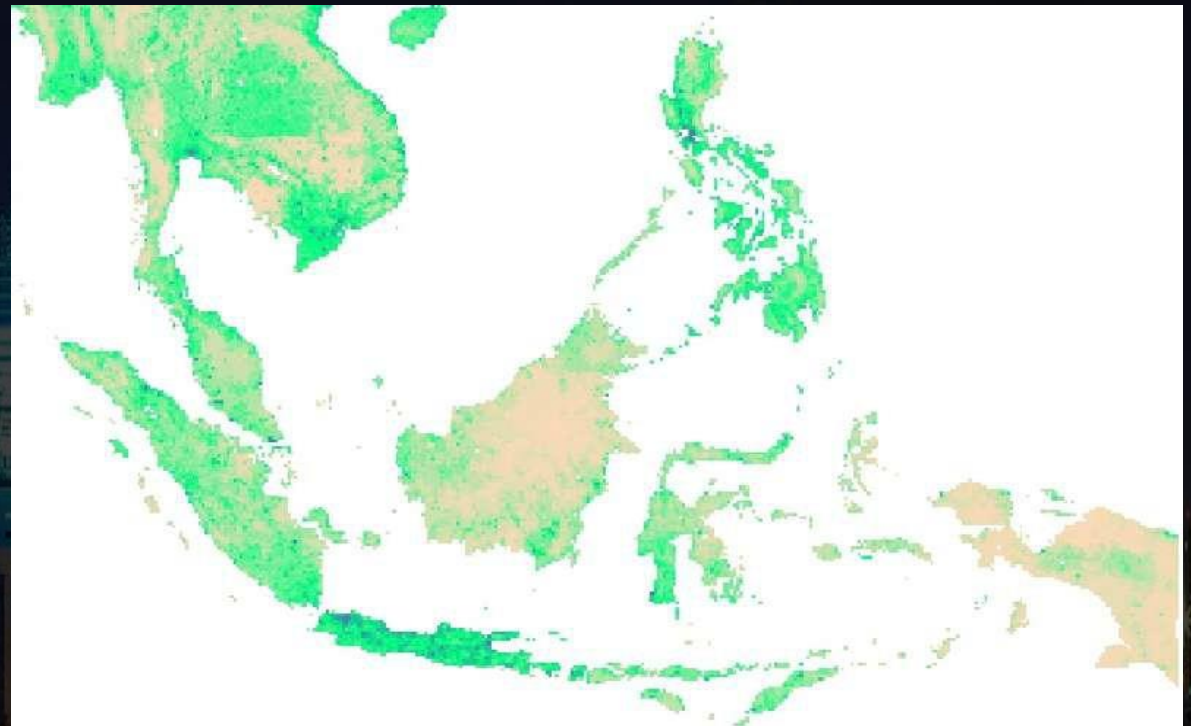


Urbanization and Population Growth

Urbanization Rate (2016)



Gridded Population of the World



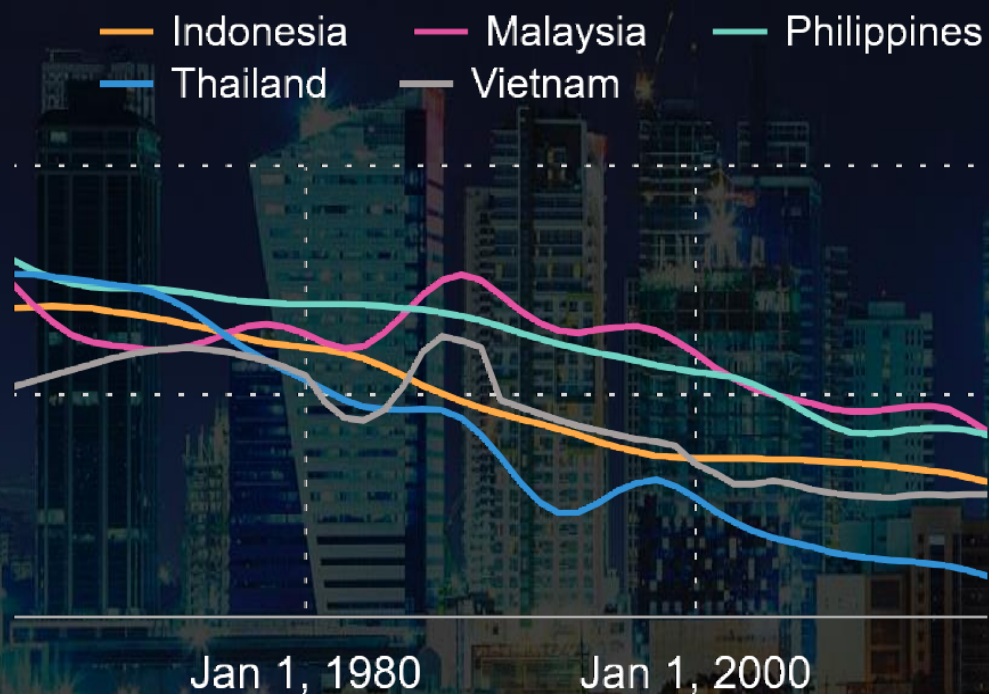
Data Source: WorldPop Project and Columbia University - CIESIN
(visualization by the team)

Across ASEAN, we can observe a disparity in terms of urbanization rate—with some countries having mostly, if not fully, urbanized societies, while others remain largely rural.

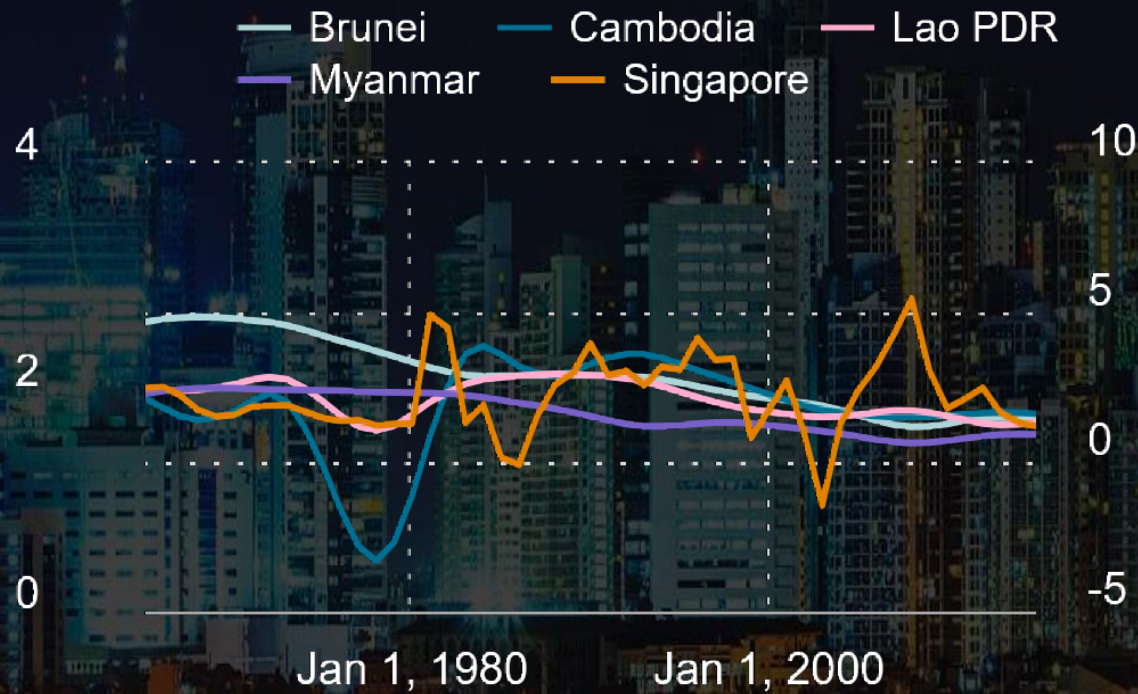
We can also observe that populations are mostly concentrated near coastal areas, which can be partly attributed to their close proximity to centers of trade and commerce.

Urbanization and Population Growth

Population Growth Rate (5 Largest Countries)



Population Growth Rate (Smaller Countries)



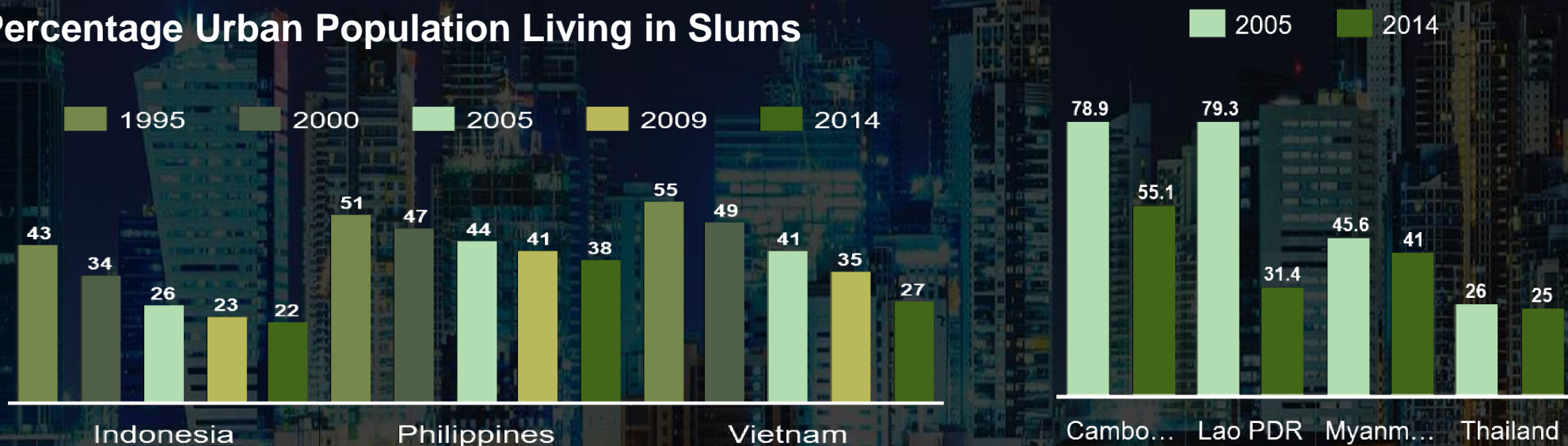
Historically, ASEAN has seen a generally decreasing trend in terms of population growth. But with more people moving to cities in search for better opportunities, we expect the urban growth rate to be higher than the national average.

Also, erratic growth trends can also be observed in smaller ASEAN nations, such as Singapore due to factors like migration movements.

Urbanization and Population Growth

Lack of Affordable Housing for the Urban Poor Remains a Challenge

Percentage Urban Population Living in Slums



Despite the declining trend over the past two decades, the challenge remains over the availability of affordable and adequate housing for the poor. This shows that behind the picture of economic growth, the issue of inequality is still a big concern.

Targets and Goals

SUSTAINABLE DEVELOPMENT GOAL 11

Make cities and human settlements inclusive, safe, resilient and sustainable



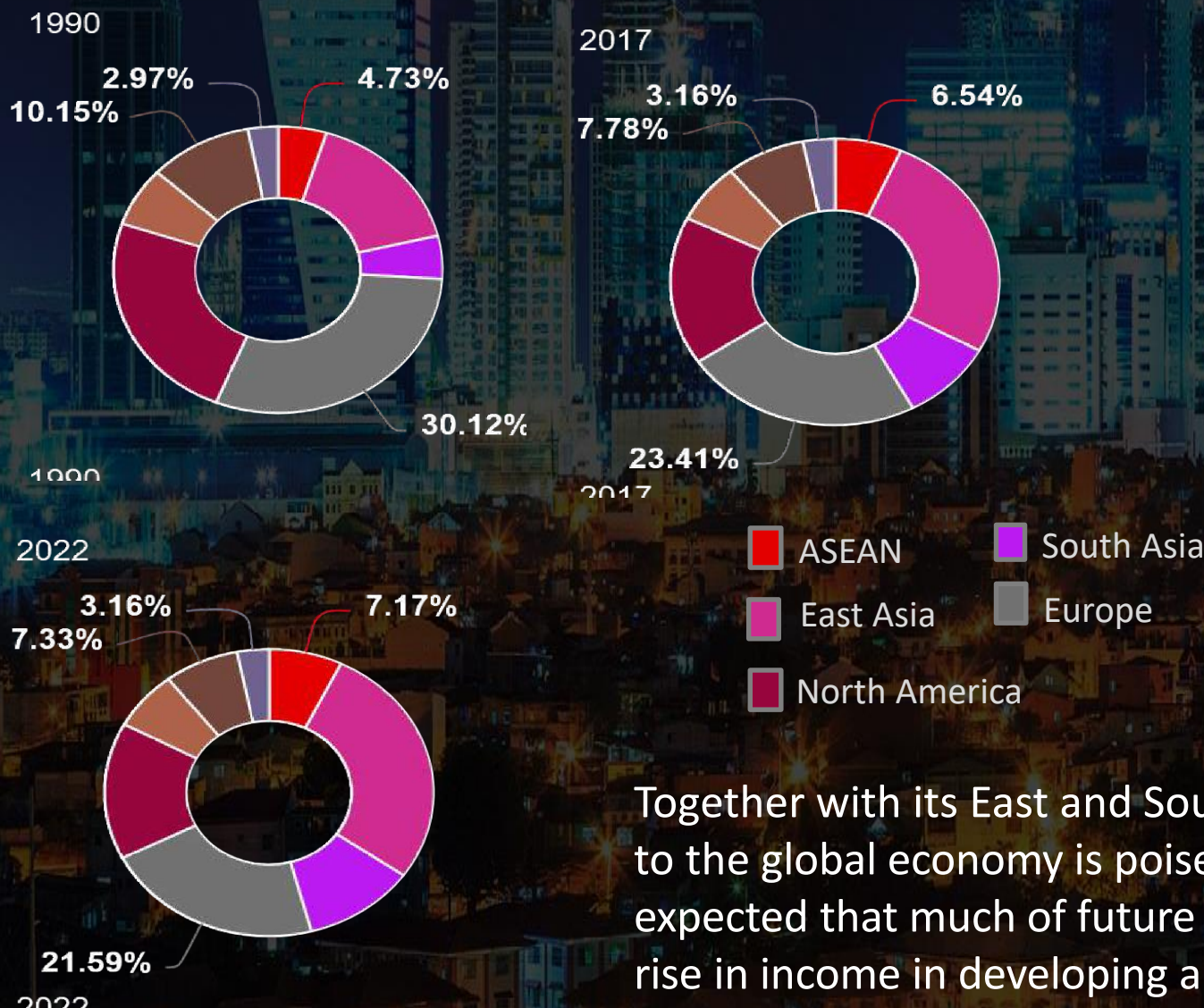
Goal 11 Targets	Pillars of Sustainability
11.1 Adequate, safe and affordable housing	Inclusive Growth (Economic)
11.2 Accessible and sustainable transport systems for all	Inclusive Growth (Economic) Safe and Resilient (Social)
11.3 Inclusive and sustainable urbanization	Inclusive Growth (Economic) Green and Sustainable (Environmental)
11.4 Safeguard the world's cultural and natural heritage	Safe and Resilient (Social)
11.5 Reduce the number of people affected by disasters	Safe and Resilient (Social)
11.6 Reduce the environmental impact of cities	Green and Sustainable (Environmental)

Inclusive Growth (Economic)

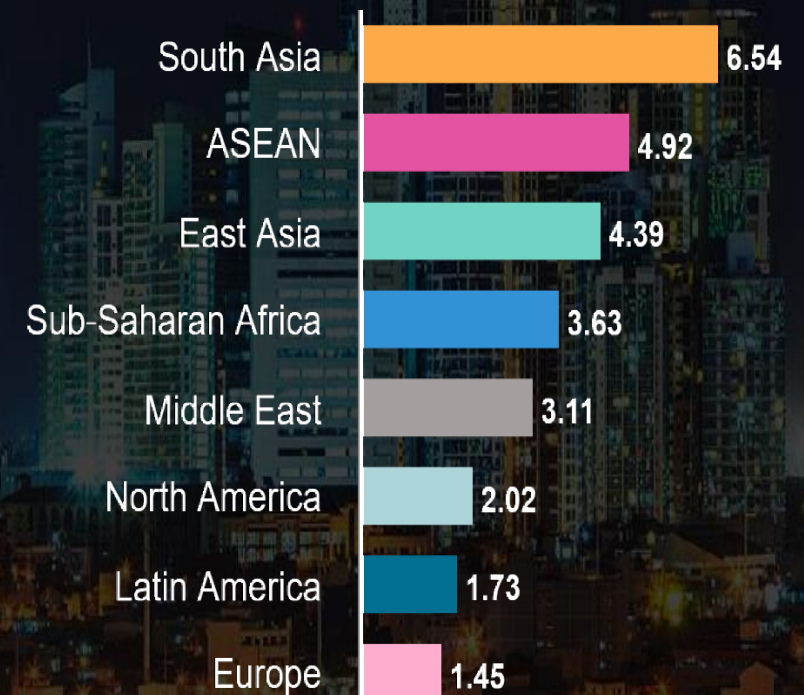
Increasing Economic Significance of ASEAN in the Global Economy

Asia and Developing Countries as Future Global Growth Drivers

Composition of Global Economy by Region



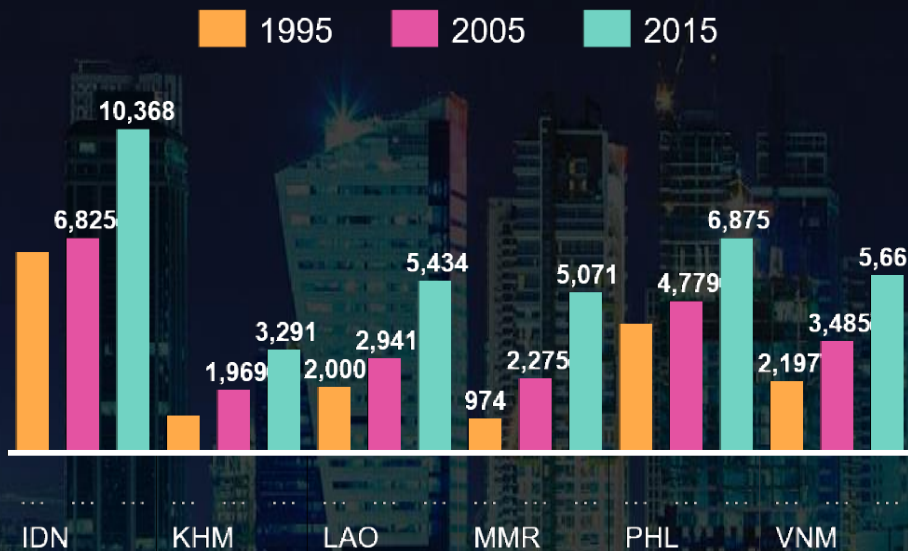
Average Growth Rate (2011-2016)



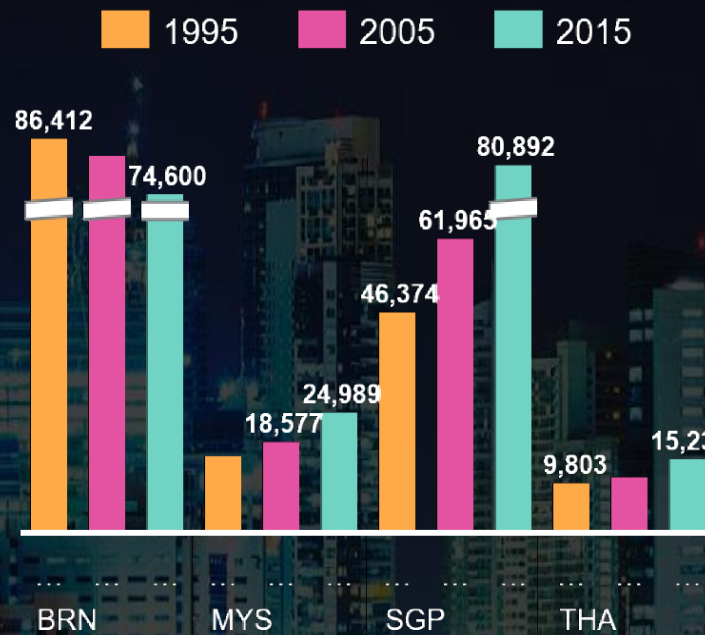
Together with its East and South Asian neighbors, ASEAN's share (red) to the global economy is poised to increase in the future. It is also expected that much of future economic growth will be driven by the rise in income in developing and emerging countries

Inclusive Growth (Economic)

GDP per capita of Southeast Asian Nations
in terms of purchasing power parity (constant 2011 \$)



higher and upper-middle income countries

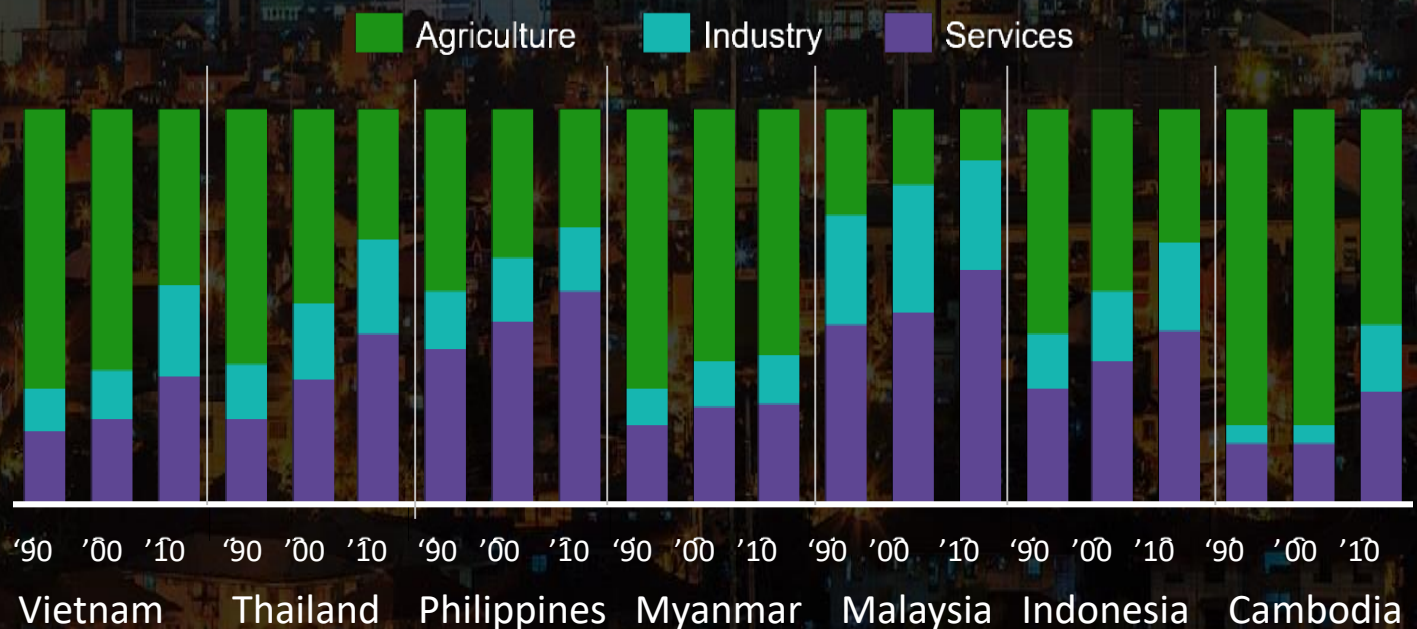


All ASEAN countries, with the exception of Brunei, experienced increasing levels of income over the past two decades, with most of the growth coming from the last ten years

Structural Transformation

Employment Composition by Sector
(% of total employment)

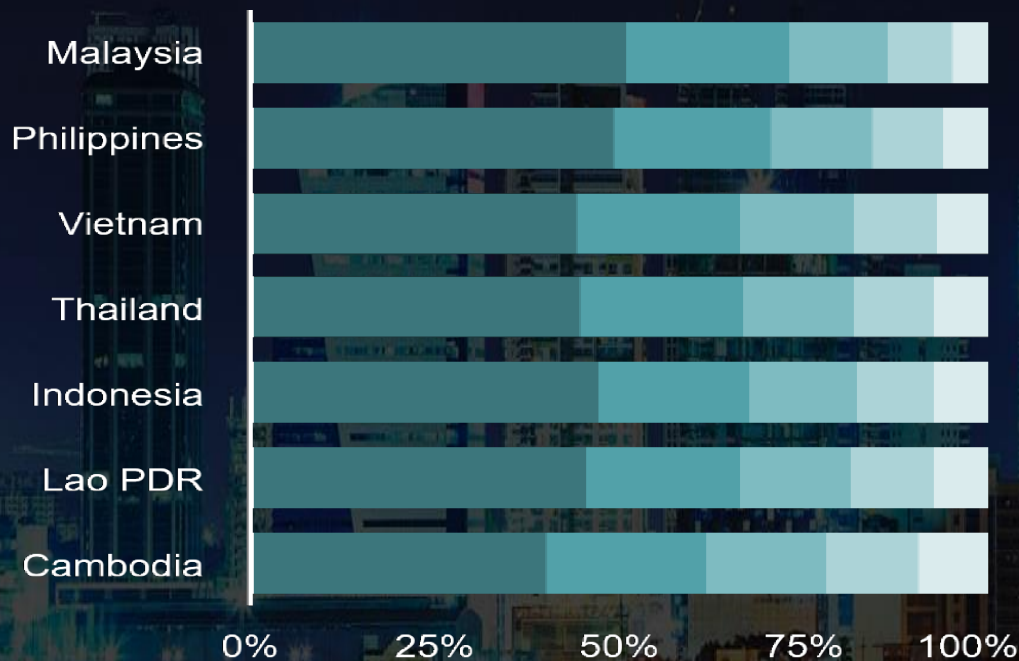
All of the countries in ASEAN have seen their labor force shift from mostly agricultural in 1990 to increasingly becoming more manufacturing- and service-oriented by 2010



Inclusive Growth (Economic)

Poverty and Inequality as a Persisting Challenge

Income Distribution by Quintile (2017)



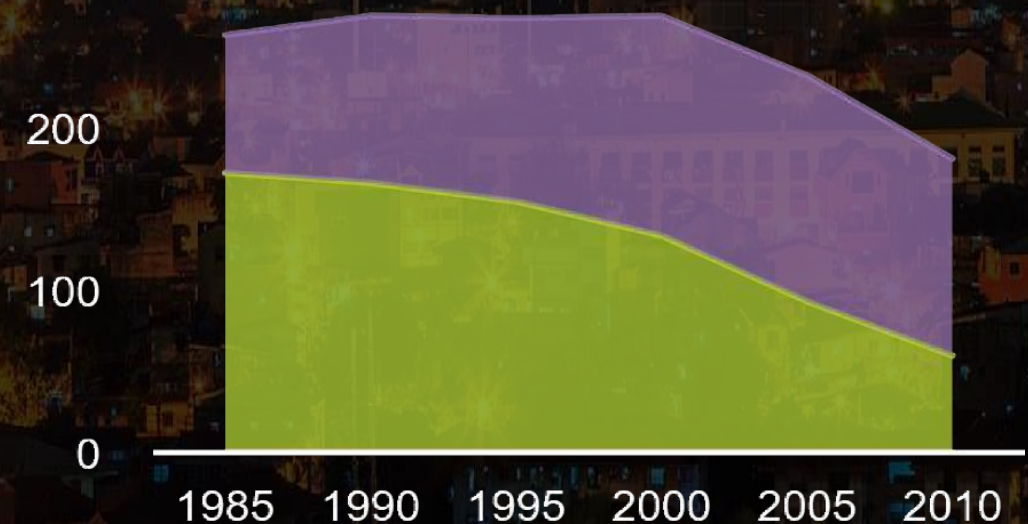
The top 20% of population accounts for more or less half of each of the countries' total incomes

This reveals a deeply rooted problem behind the stellar economic performance of ASEAN in recent years

Despite the dramatic improvement in percentage of poor people in ASEAN, the absolute number remains high.

Moreover, fertility rates are higher in poorer households, resulting in deeper poverty

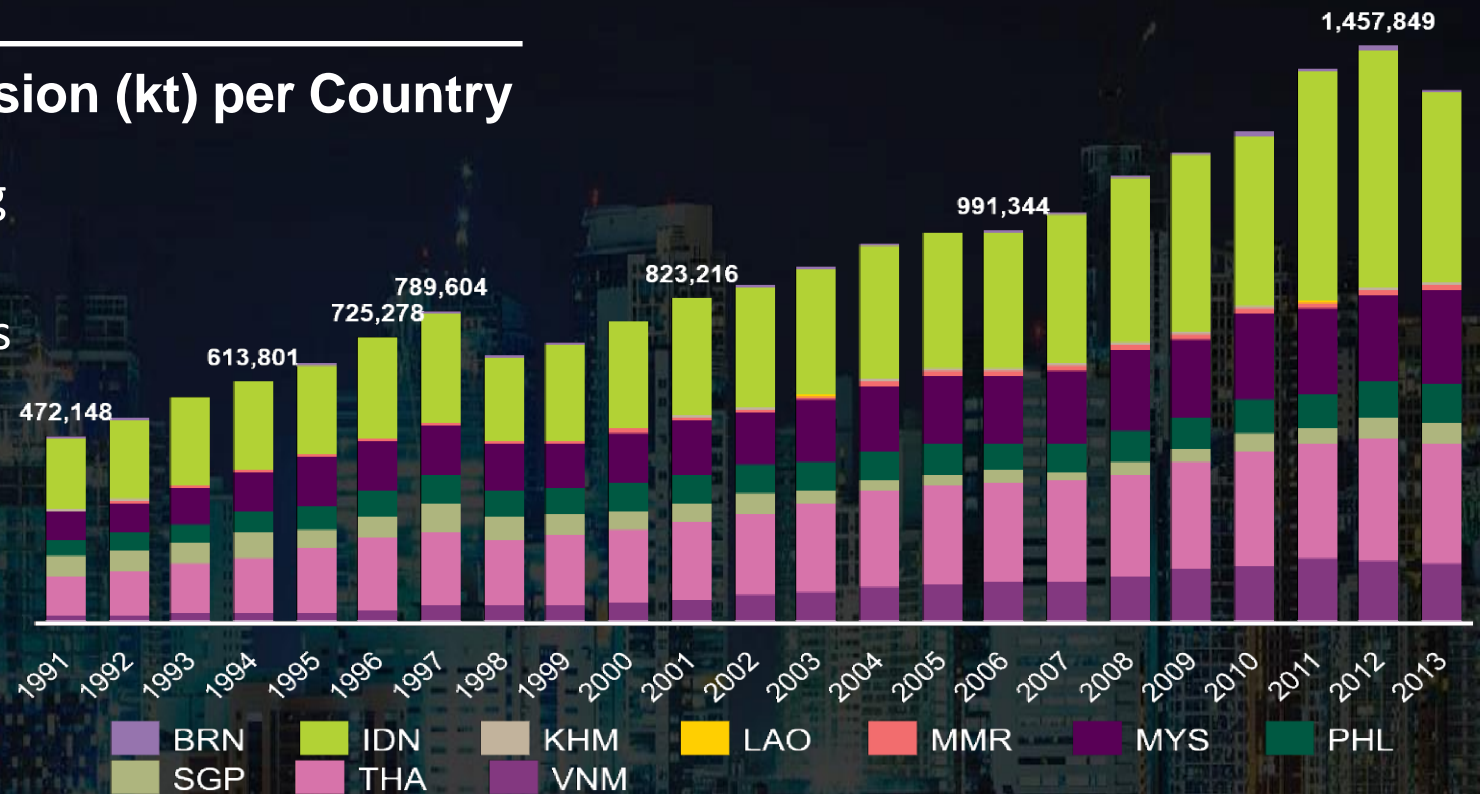
Number of Poor People based on the \$1.90 and \$3.90 (daily) PPP Poverty Line (ASEAN Total - in millions)



Green and Sustainable (Environmental)

Total Carbon Dioxide Emission (kt) per Country

There is generally an increasing trend in CO2 emissions from 1991-2013, with the exceptions of 1998 after the Asian financial crisis and 2013 following the mining export ban in Indonesia.



CO2 Emission Growth (in %) by Region

— ASEAN — East Asia — South Asia

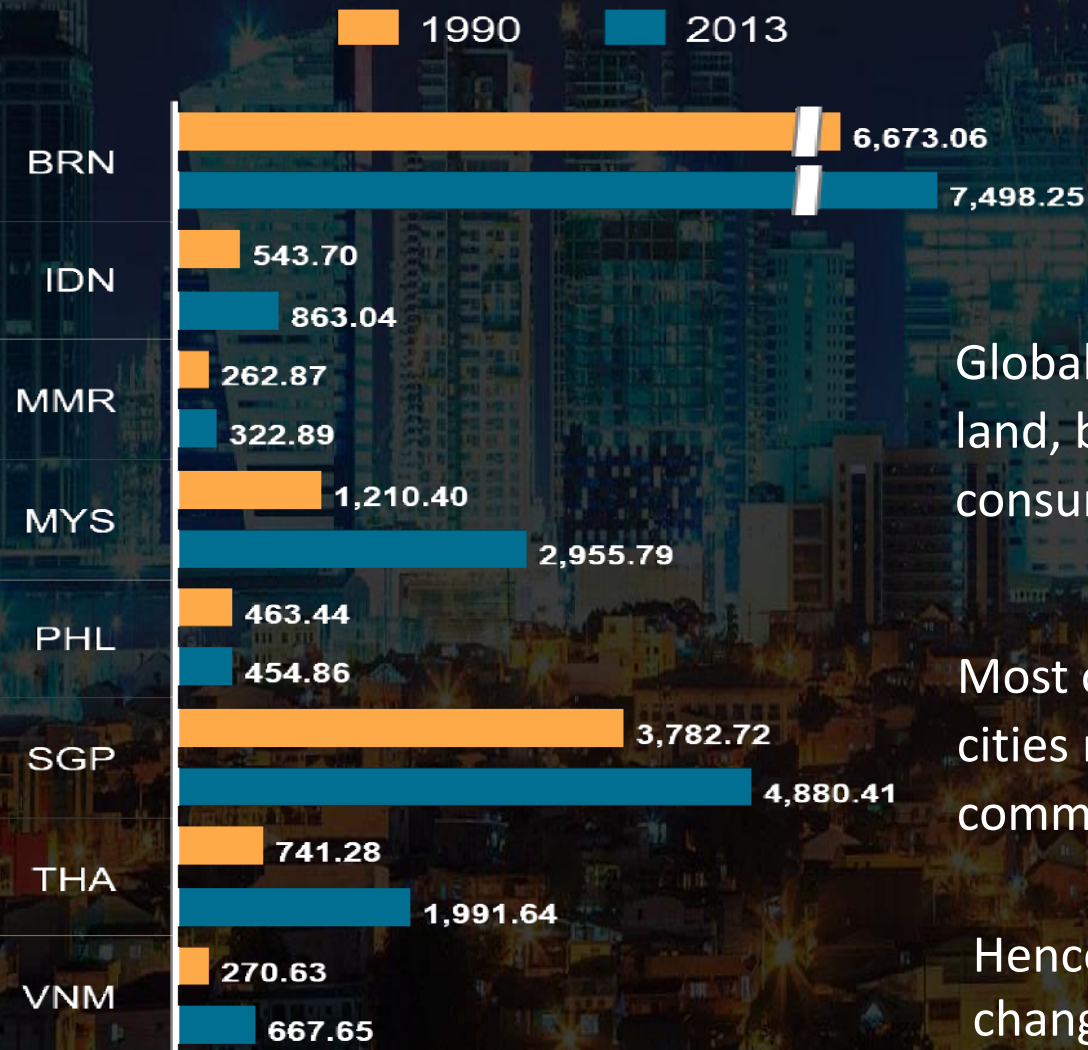


We can observe a dip in growth after 1997 due to the Asian Financial Crisis.

There is also a general trend of decline after 2010 as countries have become more aware of carbon's impact to global climate change

Green and Sustainable (Environmental)

Energy Use per Capita (in kilogram of oil equivalent per capita)



There is a strong correlation between a country's GDP per capita and energy use per capita. Highly urbanized countries also tend to have higher energy use per capita

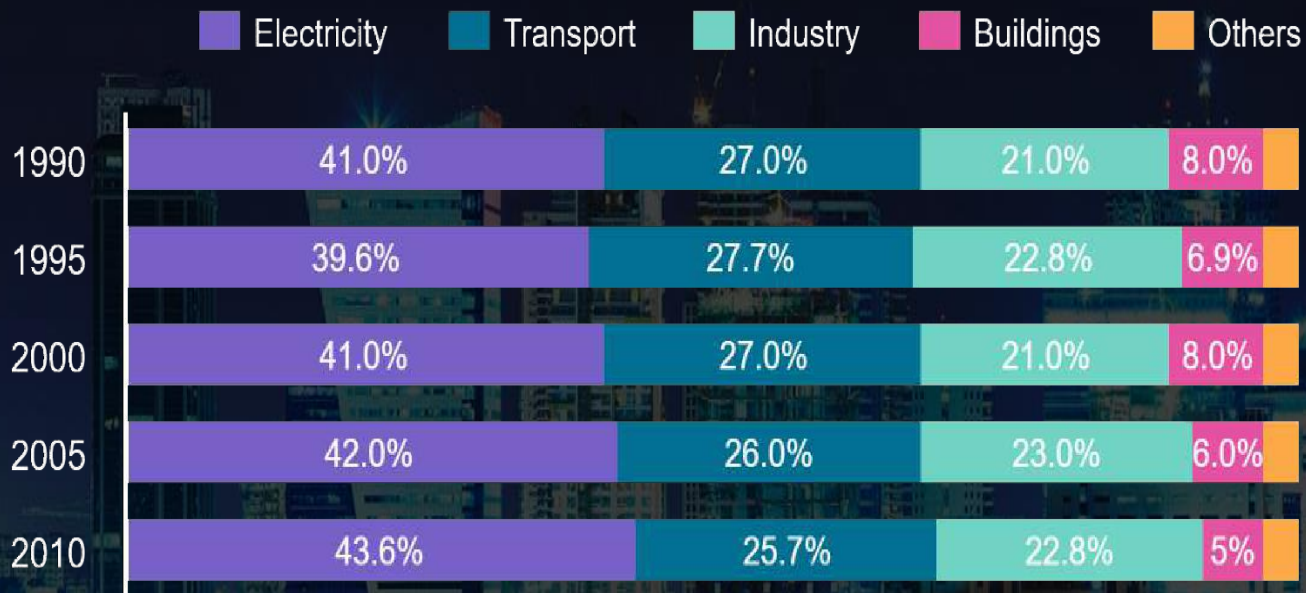
Globally, cities occupy just 3 percent of the Earth's land, but account for 60-80 percent of energy consumption and 75 percent of carbon emissions

Most of these emissions are attributable to the cities mainly because urban areas are centers of commerce and industry

Hence, cities are critical in addressing climate change and other environmental issues our generation is facing

Green and Sustainable (Environmental)

Sources of Carbon Emission by Sector (ASEAN)



Around 40% of ASEAN's carbon footprint is attributable to electric generation

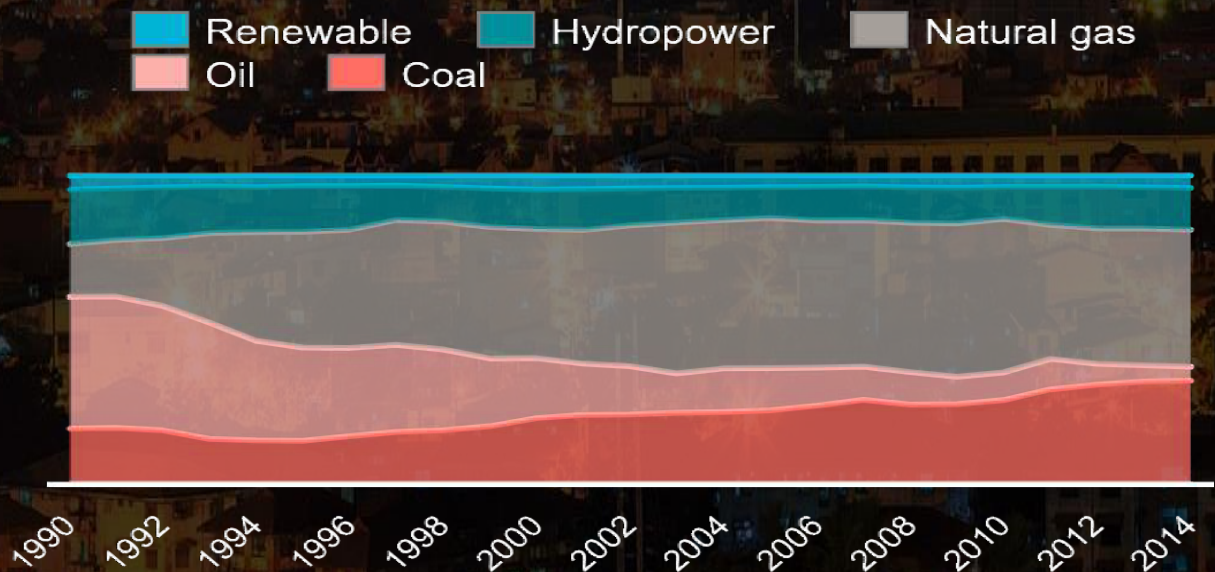
Nearly a quarter of total emission driven by industrial production and manufacturing

Transportation sector accounts for another quarter

It is important to note the dramatic shift from the use of oil and coal to natural gas. New and efficient natural gas power plant emits 50% to 60% less CO2 compared to a typical new coal plant.

Renewables remains stable in share, though expected to increase in the future due to its greater availability and lowering cost.

Fossil Fuel Dependence of Electricity Production



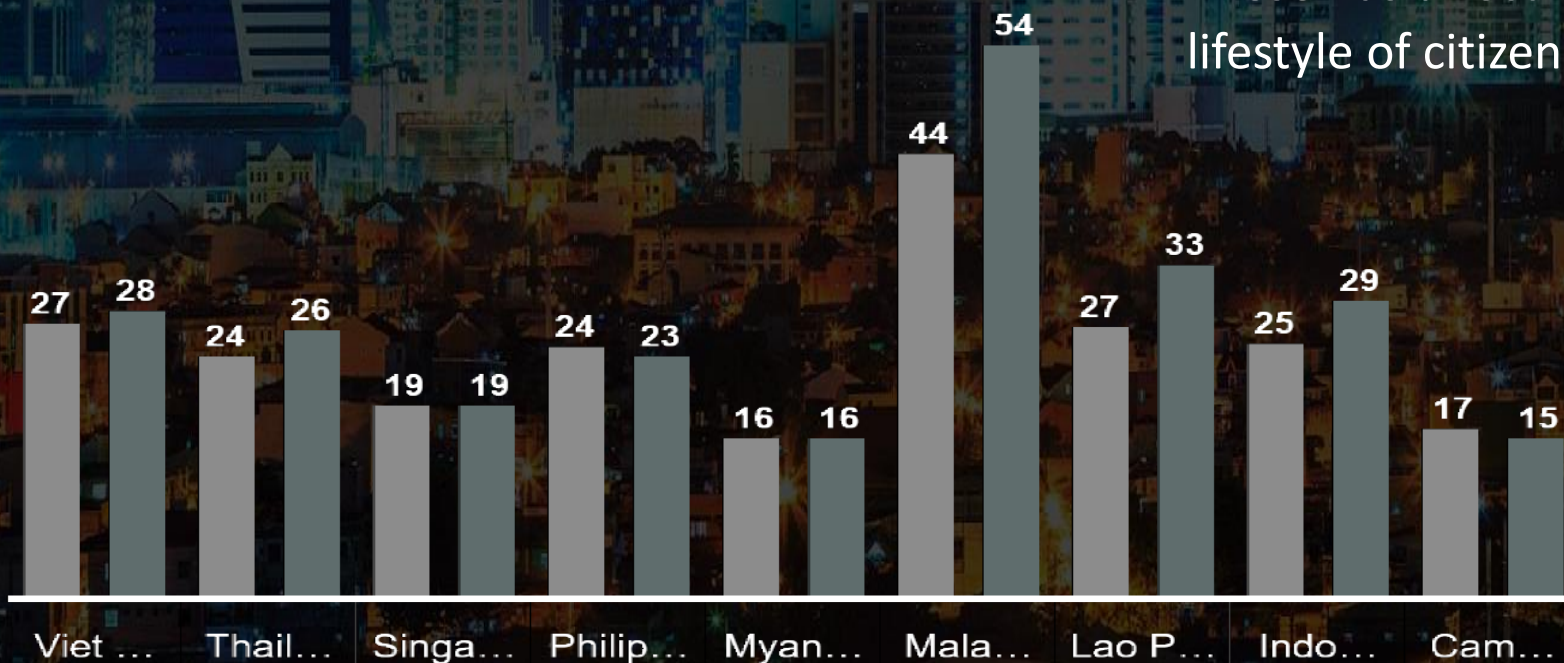
Green and Sustainable (Environmental)

Air Pollution

Mean Annual Exposure

Population-weighted exposure to ambient PM2.5 pollution

- 1990 Mean Annual Exposure
- 2015 Mean Annual Exposure



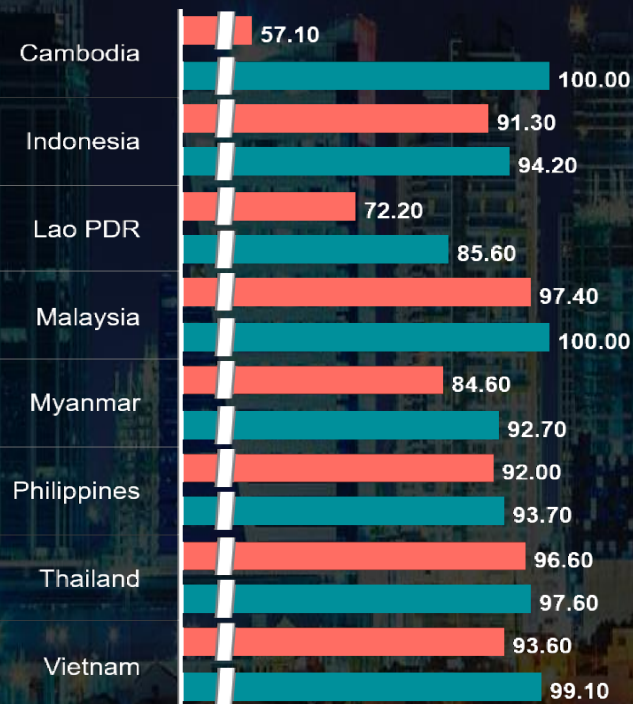
The worsening condition of air pollution in cities is increasingly becoming a major challenge for ASEAN. And according to a WHO report, respiratory diseases are some of the major causes of death in the world.

A major contributor to this alarming situation is the existence of inefficient transportation and the growing number of private motor vehicles in ASEAN. These have direct impact on the urban lifestyle of citizens in the city.

Safe and Resilient (Social)

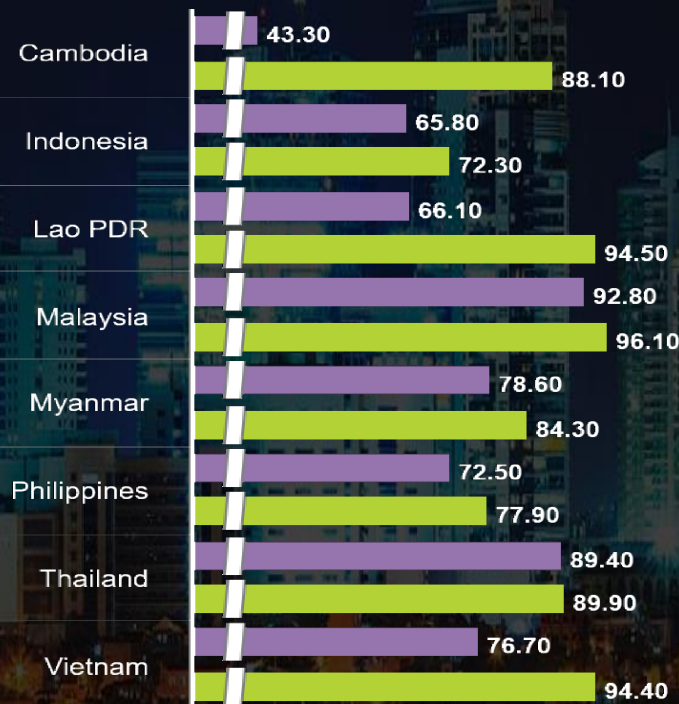
Improved Water Access (percentage of urban population)

■ Access to Improved Water Sources (2000 Urban)
 ■ Access to Improved Water Sources (2015 Urban)



Improved Sanitation Facilities (percentage of urban population)

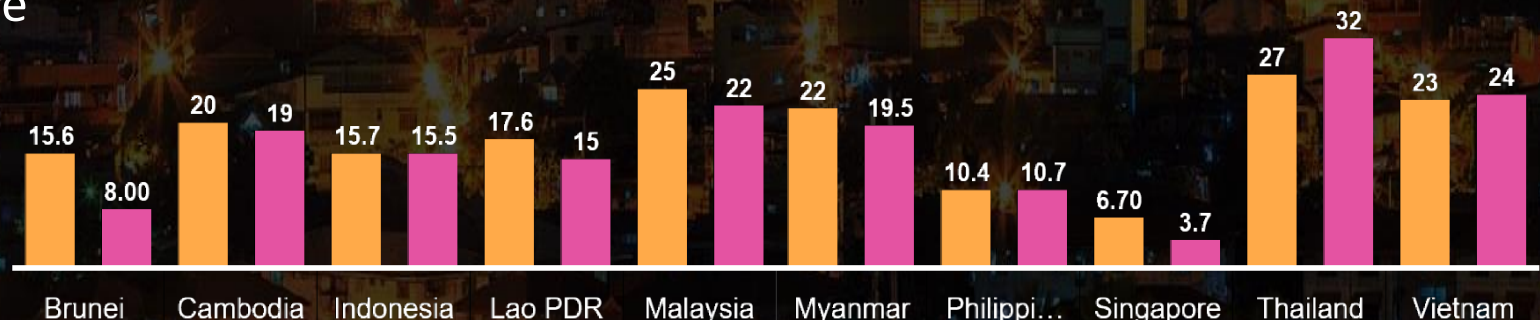
■ Improved Sanitation Facilities (2000 Urban)
 ■ Improved Sanitation Facilities (2015 Urban)



In general, access to basic social services has been improving in urban areas across ASEAN. These include access to the electric grid, improved water access, better sanitation facilities, health, and education. However, access to these basic services remains a challenge in rural areas.

In terms of traffic safety, results are mixed for ASEAN countries with some achieving improvements while some saw increased deaths by traffic injuries.

■ Mortality (2000)
 ■ Mortality (2015)



Mortality caused by traffic injury (per 100,000 people)

Safe and Resilient (Social)

DISASTER RISK RESILIENCE

Droughts, Floods, and Extreme
Temperatures

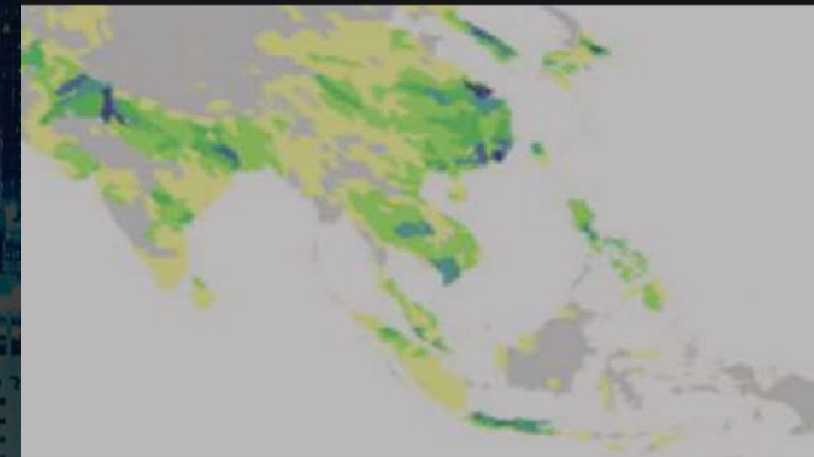
6.6 million

Number of people affected annually
in ASEAN
(average 1990-2009)

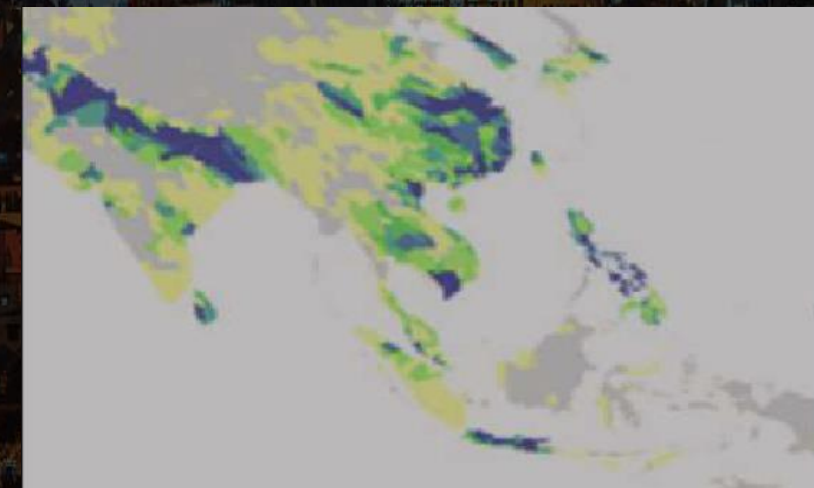
Source: OFDA/CRED International
Disaster Database

Urban land within the high- frequency flood zones

Source: Changing global patterns of urban
exposure to flood and drought hazards (Liu
2015)



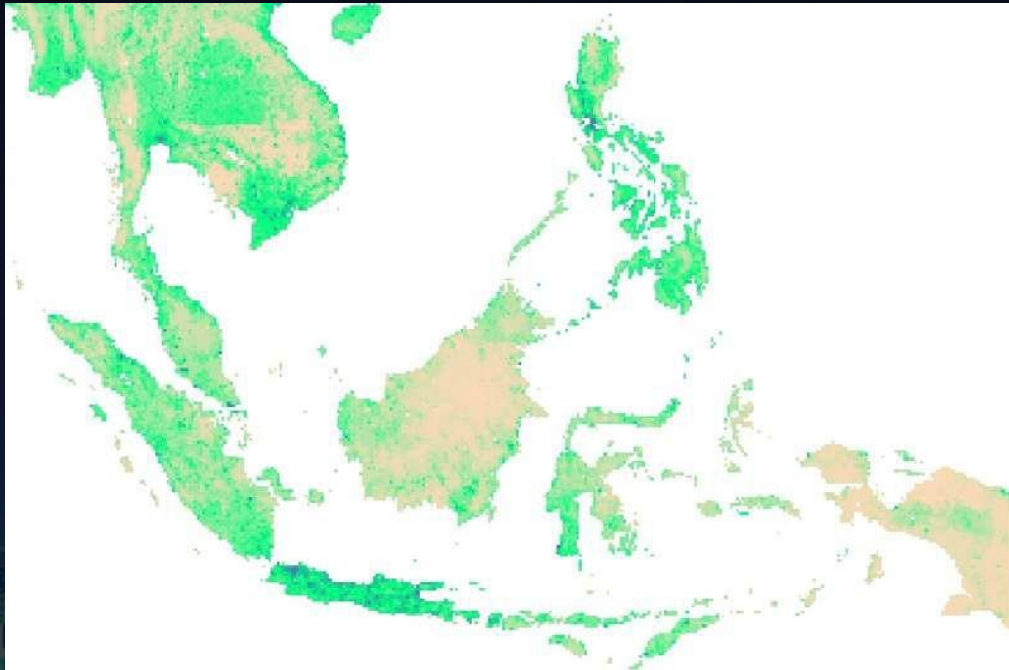
2000 Flood Hazard Map



2030 Flood Hazard Map

Safe and Resilient (Social)

Gridded Population of the World



Vulnerability to 6-meter sea level rise



Data Source: WorldPop Project and Columbia University – CIESIN (visualization by the team)

Number of People Living in Low-Elevation [5-meter] Coastal Urban Areas (ASEAN)

1990	4,467,850
2000	6,105,148
2015	8,262,479

As we can see from the maps, those areas where vulnerability to hazardous risks is high are also the areas which are densely-populated. Cities are typically located in coastal areas where trade can flourish and natural resources are high in abundance.

SOLUTIONS

Physical Infrastructure



LAND USE AND URBAN PLANNING

- **Innovative Land Use and Zoning Policies**

Increase the sustainability of cities through increasing density

Shift from single-use zoning towards mixed-use zoning

- This type of planning is used by highly-urbanized areas like Japan
- This can be used by cities as a primary tool for increasing density by expanding vertically and avoiding sprawl

Regulations and incentives should be put in place

- Zoning laws which regulate specific areas of land and dictate how they can be used, as opposed to simply planning land-use that broadly guides development

SOLUTIONS

Physical Infrastructure

TRANSPORTATION

- **Greener Transport Infrastructure**

Transport systems account for about a quarter of ASEAN's carbon emission, hence, it is important to address the transport problem by minimizing its climate impact

- Construction of new infrastructures such as electric-powered subways and trains will contribute to less carbon footprint

Currently, available modes of public transport in ASEAN are characterized as old and inefficient, causing air pollution in the city

- The shift in transport preference from these inefficient vehicles to trains and subways would materialize once the more eco-friendly and more reliable modes of transportation become available



SOLUTIONS

Physical Infrastructure



TRANSPORTATION

- **Changing Driving Behavior**

Private cars account for most cars in the city. With the rise of middle class in ASEAN, we can expect that more people will have the capacity to own cars.

- This will put more pressure to the existing road network infrastructure
- Moreover, changing the public's attitude and behavior towards using private vehicles will be more challenging

The availability of electric vehicles and more reliable public transport can provide a better alternative to owning and driving a typical car. Also, the structure of the city is a major factor in changing the way we use transport.

The increasing prevalence of teleworking can also contribute by reducing the demand for transport to work.

SOLUTIONS

Physical Infrastructure

ENERGY

- **Innovative Residential Solar Financing**

If a typical household wanted solar panels installed in their roof to power their house, it would cost them tens of thousands of dollars.

- This initial cost problem can be addressed with innovative residential solar financing system, such as the model of companies like SolarCity in the United States, to encourage more households to use clean and renewable energy.
- This works by making households go solar-powered with the system leased to them, which can help them lower their electricity bills, and at the same time, helping their communities reduce their carbon footprint.





SOLUTIONS

Soft Infrastructure

SOCIAL SERVICES

- **Affordable Basic Services**

Provision of basic services is necessary for poor and vulnerable household to escape from poverty. However, quality, affordability, and sustainability are major challenges, even in those areas where services are available.

ASEAN can learn from what Multilateral Investment Fund (MIF) has done in Latin America and the Caribbean, which focuses on developing market-driven business models, with a focus on partnerships and sustainability.

- **Health:** partnerships with microfinance institutions and cooperatives to offer health services and education in low-income communities
- **Water & Sanitation:** offered microcredit products to help thousands of families gain access to water, improve water quality and their sanitation services
- **Waste Management:** initiatives such as awareness campaigns and capacity building on waste-to-energy solutions, recycling and waste value chains



SOLUTIONS

Soft Infrastructure

SUSTAINABLE LIVELIHOOD

- **The “Graduation” Program**

In an MIT study published in the journal *Science*, an anti-poverty program tested across several countries was shown to be effective and long-lasting.

The program features a combination of productive asset transfer, consumption support, skills training, life coaching, access to savings, and health services.

It aims at moving people out of extreme poverty and into sustainable livelihoods.

The results show that even with the variety in geographic and institutional context, statistically significant effects were observed across key outcomes such as income, consumption, assets, and mental health. Moreover, the impact on poor households lasted even years after the end of the intervention.

Despite the relatively expensive cost of the program, the combination of activities is necessary and sufficient to obtain persistent impact. The extra earnings, even on discounted terms, exceed the program cost proving the intervention cost-effective.



SOLUTIONS

Soft Infrastructure

HOUSING POLICY

- **Incentive Mechanism for Low-cost Housing**

ASEAN countries can institute policies and incentives to address the issue of housing for those living in slums and informal settling.

- One such policy is Low Income Housing Tax Credit (LIHTC) adopted in several countries. The purpose of which is to promote the construction housing for low-income households. Developers can apply for tax credits/benefits, making real estate development for low-cost housing more attractive.
- Since this incentive is business-based rather than a direct subsidies, the LIHTC develops the housing market resulting to long-term viability.
- On the part of the households, comprehensive house financing support and targeted fiscal incentives for those who lack financial security can also be provided to facilitate home ownership or rental.



SOLUTIONS

Soft Infrastructure

DISASTER RISK RESILIENCE

- **Targeting Risk Reductions**

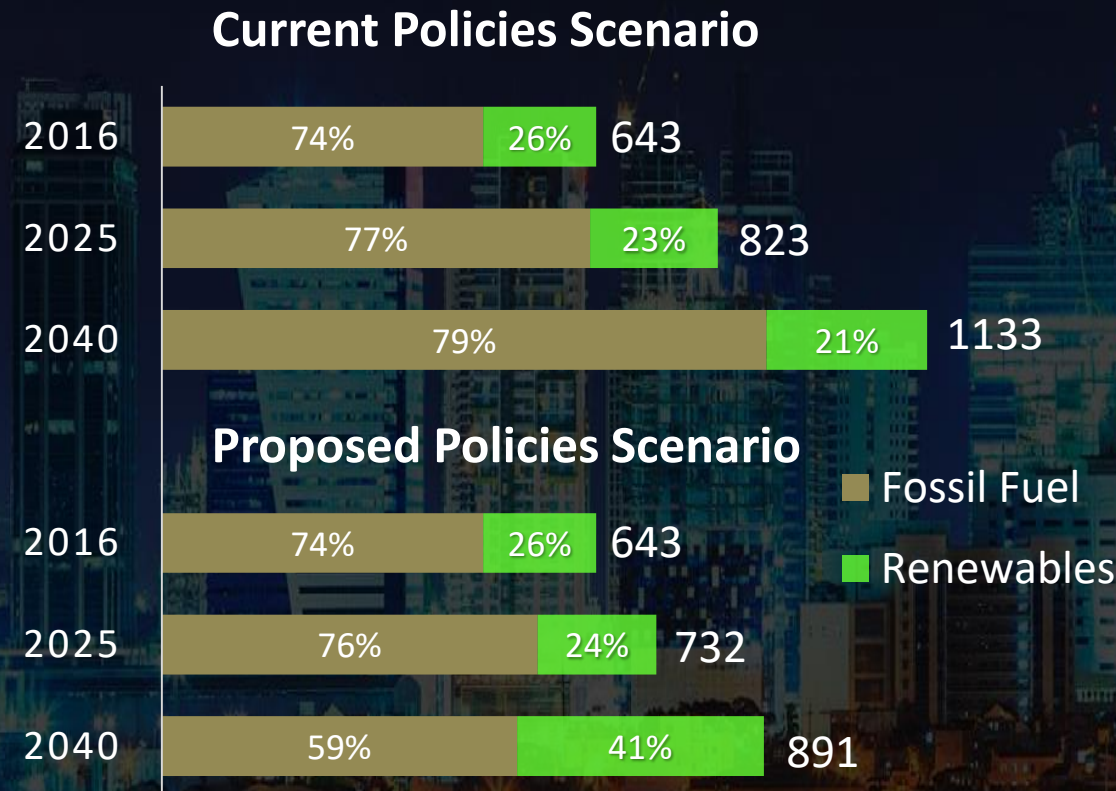
A project initiative by the World Bank for Indonesia, InaSAFE, can be used to produce realistic natural hazard impact scenarios for better planning, preparedness and response activities.

- It was put to test in the 2012 flood season in Jakarta, and its successes provoked a rapid and widespread interest from the international community.
- This project, is an open, easy-to-use tool for creating impact assessments for targeted risk reduction. The assessments are based on how an impact layer – such as a tsunami, flood, or earthquake – affects population, etc.
- Furthermore, users of InaSAFE can generate maps and statistical information that can be easily disseminated and even fed back into projects like GeoNode for simple, open source sharing (Kyte, 2014)

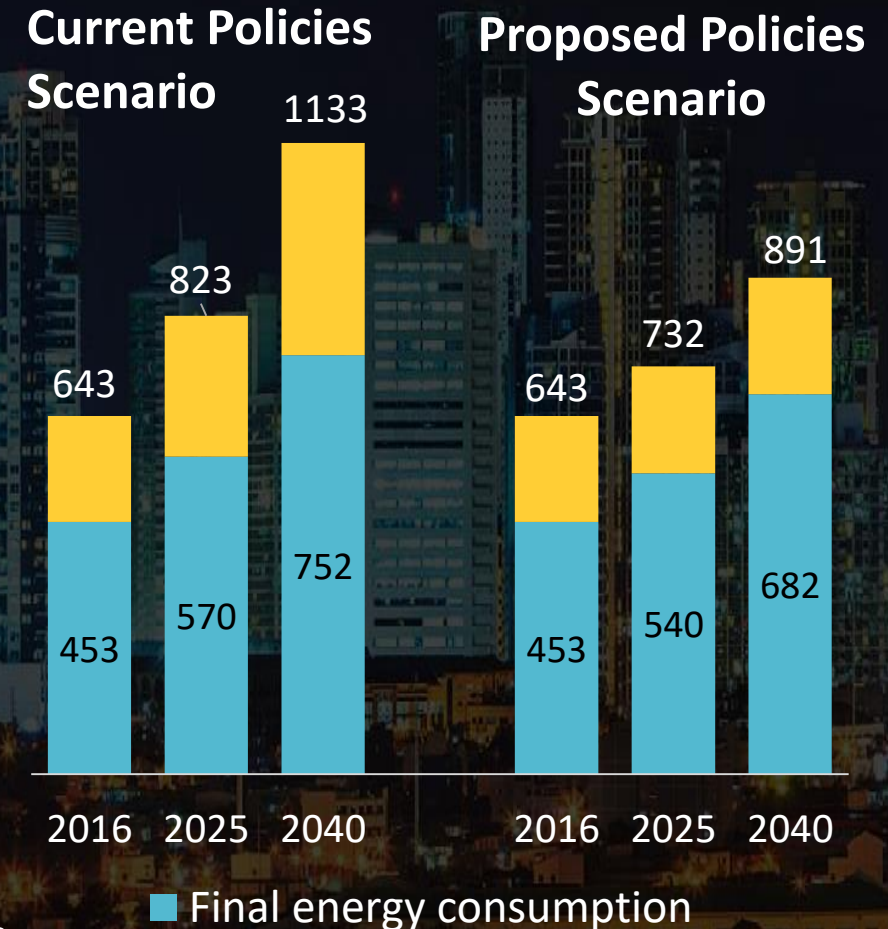
What-IF Analysis

Addressing the Environmental Challenge

Primary Energy Demand Mix (million ton of oil equivalent)



Final Energy Consumption* (million ton of oil equivalent)



With our solutions on greener transportation modes, reduced need for mobility due to higher density in urban areas, and residential solar financing, together with the trend of increasing government support for renewables, we can expect more efficiency and reduced carbon intensity of energy use.

*Final energy consumption refers to total energy consumed by end users, such as households and industry. It is the energy which reaches the final consumer's door and excludes that which is used by the energy sector itself (e.g. transformation, distribution, generation, transmission, and other losses). [Eurostat]

What-IF Analysis

Addressing the Poverty Challenge

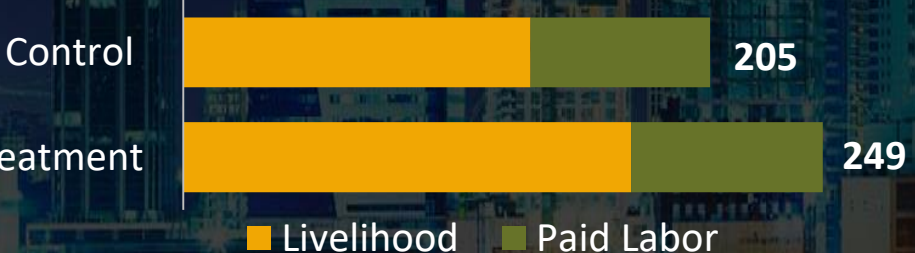
Impact of the "Graduation" Program to the Lives of the Poor

HIGHER INCOME (monthly, in US\$ PPP)

2 years after the intervention



3 years after the intervention

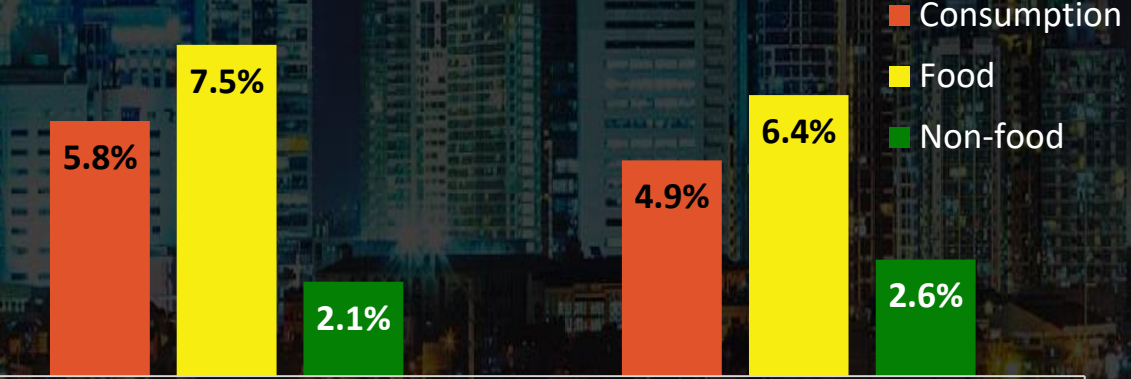


■ Livelihood ■ Paid Labor

Between 75% and 98%

of participants graduated from extreme poverty, with lending and technical assistance to expand financial inclusion in more than 70 countries

GREATER ACCESS TO FOOD



% Difference from Control

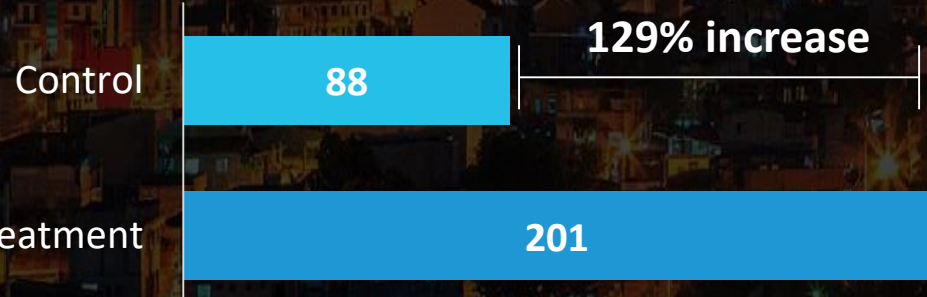
After 2 years

% Difference from Control

After 3 years

FINANCIAL INCLUSION

Savings Account Average Balance



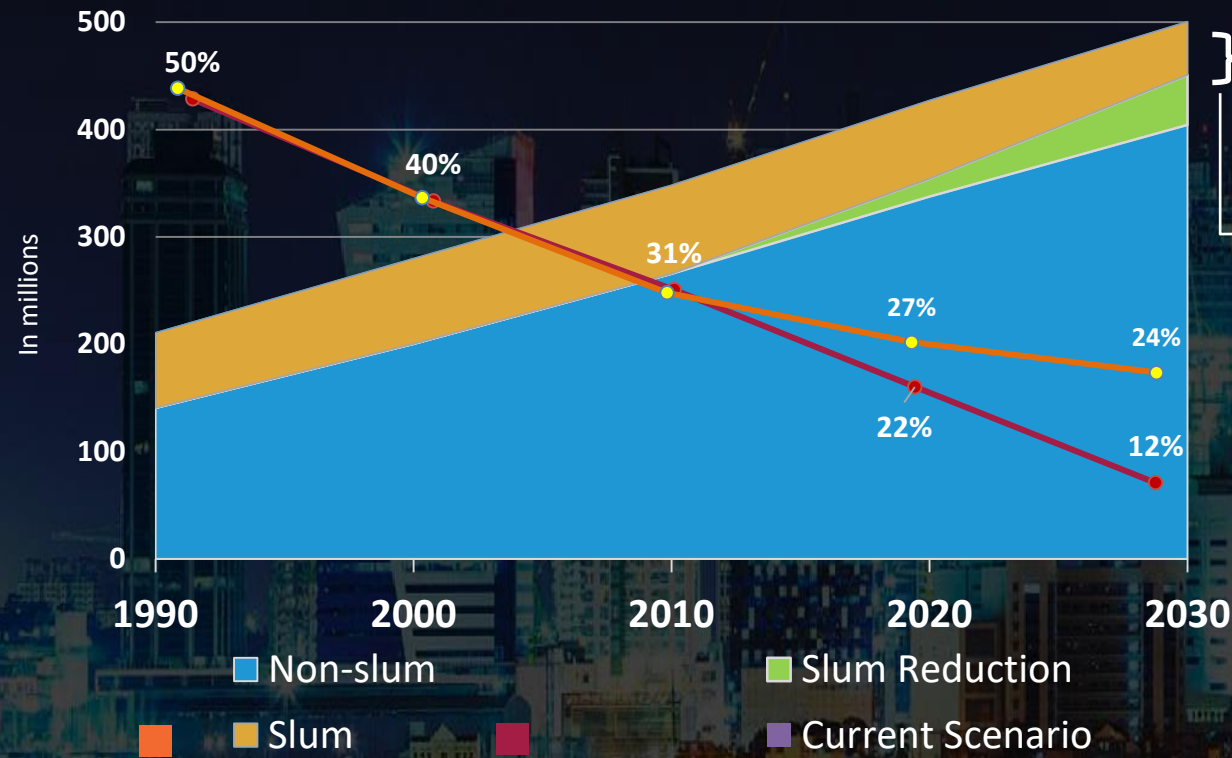
In addition to these effects, recipients of the program saw improved physical and mental health. They also reported higher levels of overall self-rated "happiness".

*Impact evaluations through randomized control trials were done in Peru, Honduras, Ghana, Ethiopia, India, and Pakistan. Source: Banerjee, A., Duflo, E., Goldberg, N., Karlan, D., Osei, R., Pariente, W., Shapiro, J., Thuysbaert, B. and Udry, C. (2015). *A multifaceted program causes lasting progress for the very poor: Evidence from six countries.*

What-IF Analysis

Addressing the Housing Challenge

Absolute Number of Urban and Share of Urban Slum Population in ASEAN



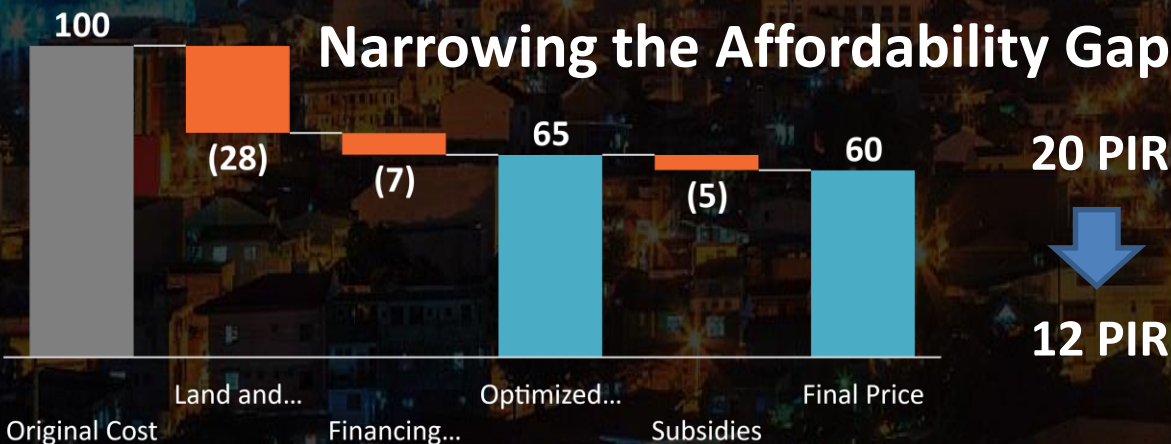
Urban slum condition without action

With our proposed recommendation

Even with the declining trend of the percentage of urban populations living in slums, there is still a need to address the rising number of urban poor.

One major component of this solution to address the housing backlog is the promotion of affordable housing through supply and demand side support.

Narrowing the Affordability Gap



Price-to-Income Ratio* of Selected ASEAN and East Asian Cities



*Price-to-income ratio pertains to the ratio of median home prices and median family income in a given area.

References

DATA REFERENCES:

World Bank – World Development Indicators 2017 Update
UN Population Division – World Urbanization Prospects 2014
WorldPop Project – Gridded Global Population Mapping
UN Habitat; World Economic Forum; International Monetary Fund
International Energy Agency, McKinsey Global Institute

REFERENCE LINKS FOR SOLUTIONS:

<http://www.fomin.org/en-us/HomeOld2015/Projects/AccessToBasicServices/BasicServices.aspx>
<http://projects.worldbank.org/P067770/sustainable-livelihoods-project?lang=en&tab=overview>
http://ceap.org.ph/upload/download/20135/312932646_1.pdf
<http://blogs.worldbank.org/eastasiapacific/philippines-shattering-myths-it-s-not-tough-build-green>
<http://www.mass.gov/hed/housing/affordable-rent/low-income-housing-tax-credit-lihtc.html>
<http://www.sustainablecitiesinstitute.org/topics/land-use-and-planning/land-use-and-planning-sustainability-strategies>
<https://www.treehugger.com/renewable-energy/9-energy-innovations-make-future-brighter.html>
<http://www.worldbank.org/en/news/feature/2014/03/19/field-guide-explores-open-data-innovations-for-disaster-risk-and-resilience>

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