

# **Winds of Change: East Asia's Sustainable Energy Future**

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East Asia, Sustainable Development

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## Structure of the Presentation

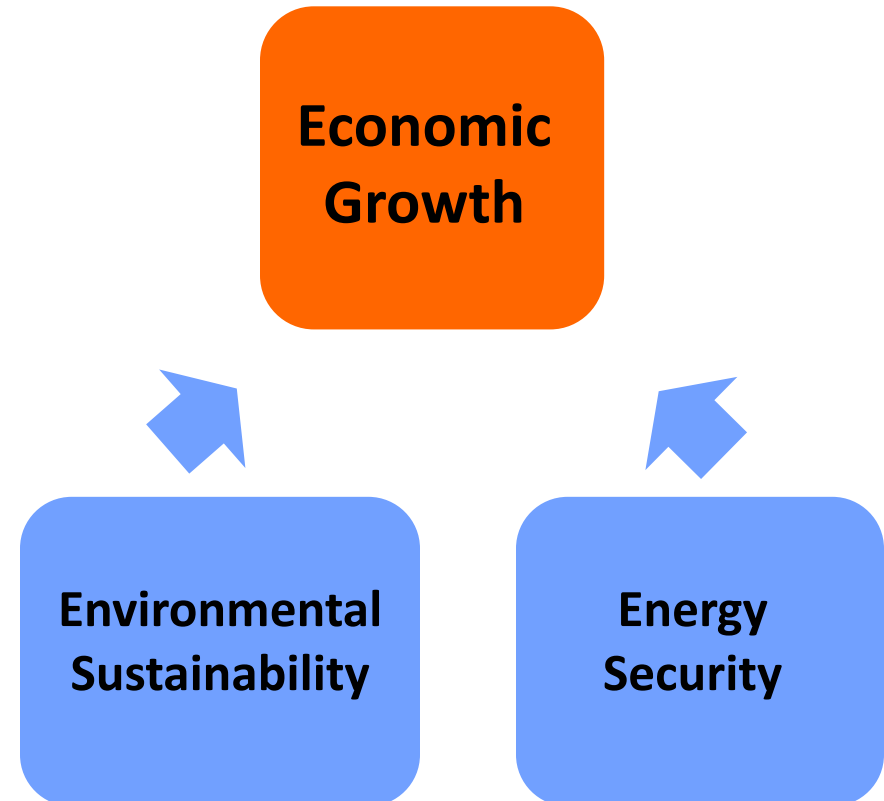
- **Baseline:** Unacceptable environmental damages and growing energy insecurity
- **Sustainable Energy Future:** Improved environment and enhanced security
- **Path to Sustainability:** Policy reforms and substantial financing required
- **Clean Energy Opportunities in East Asia:** Actions by the governments and the World Bank
- **One Goal Two Paths:** Access to electricity and clean cooking fuels

## Twin Energy Challenges: Environmental Sustainability and Energy Security

### East Asian Characteristics:

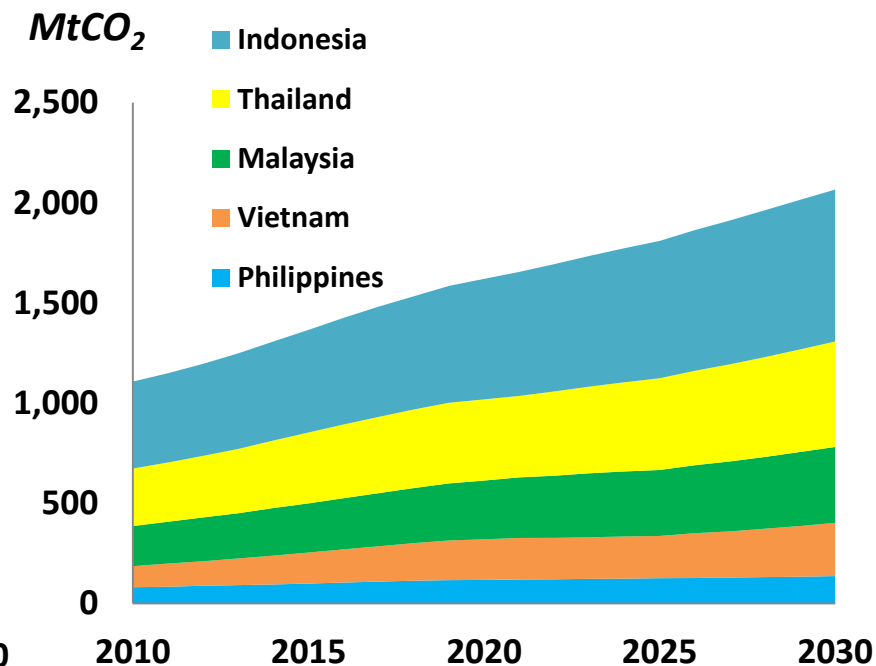
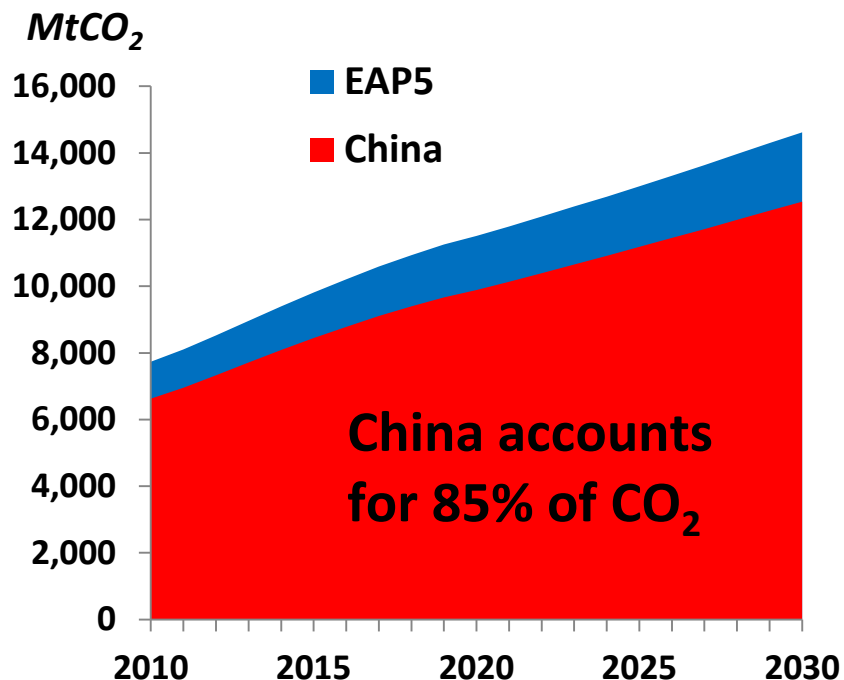
- Fastest Economic Growth
- Rapid Urbanization

### Objectives:



# Baseline: Unacceptable Environmental Damages

## CO<sub>2</sub> emissions will double for all countries by 2030

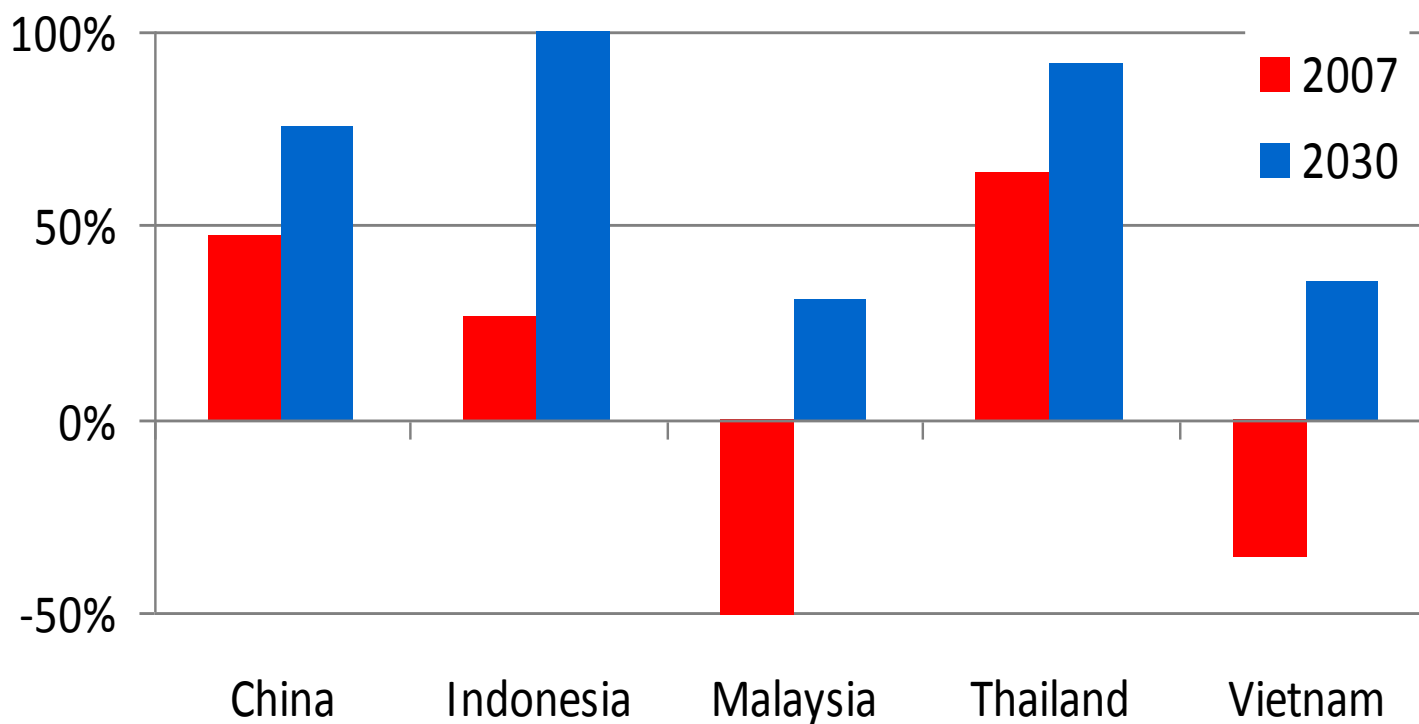


## Local air pollutants will also double by 2030

# Baseline: Growing Energy Insecurity

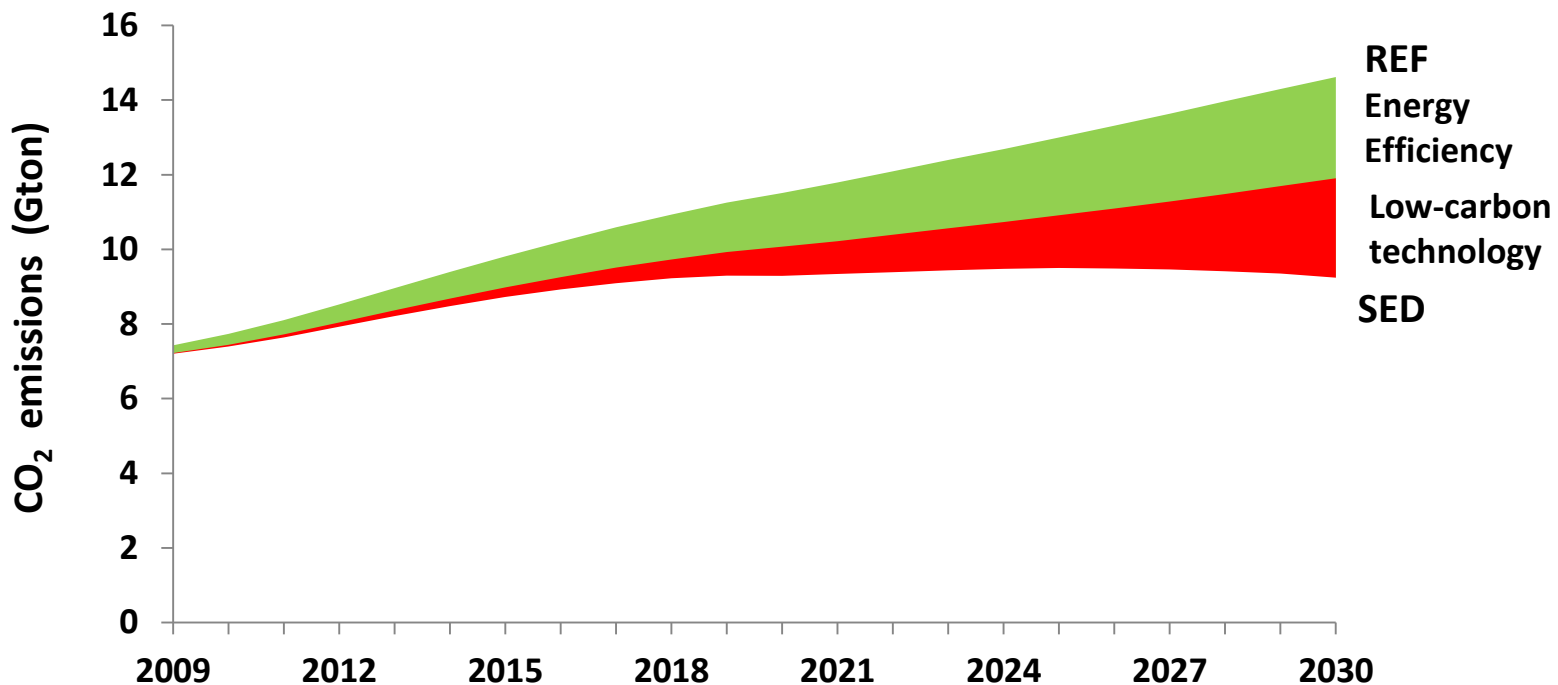
## Reliance on oil imports will grow

Oil imports/oil consumption

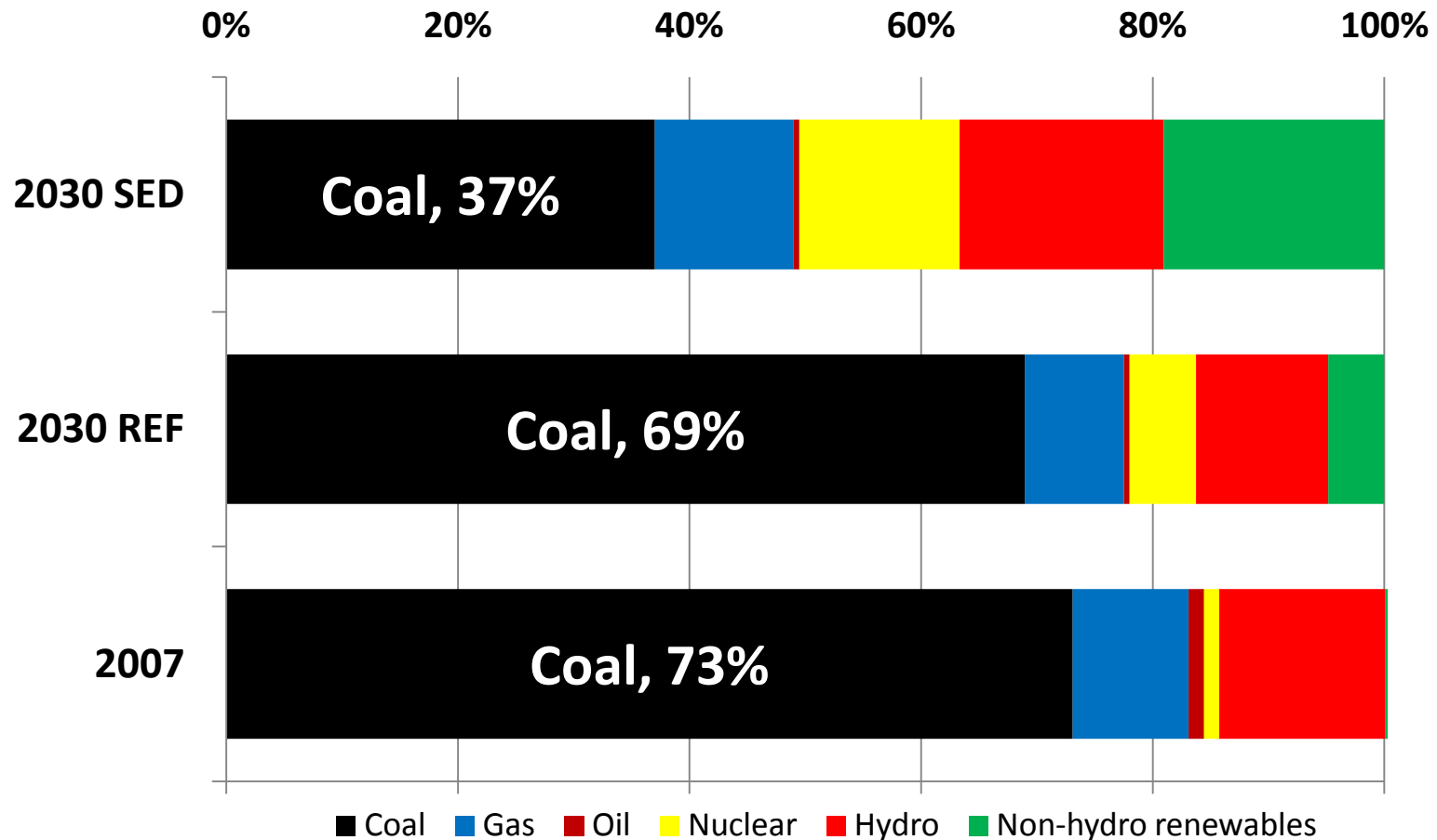


## Achievable: CO<sub>2</sub> Emissions Peak in 2025

- **Sustainable energy path**: emission reduction 37%
- **Energy efficiency** makes the largest contribution
- Major expansion of **low-carbon technologies** also needed



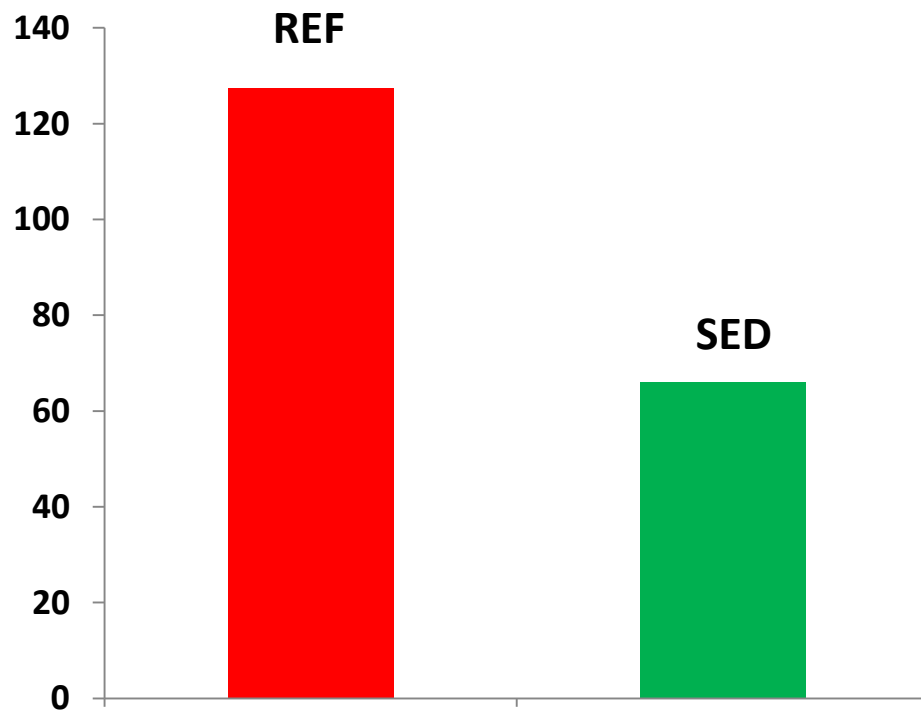
# Low-carbon technologies: meeting half of the power demand in 2030



# Sustainable energy path: local air pollution and energy security improved

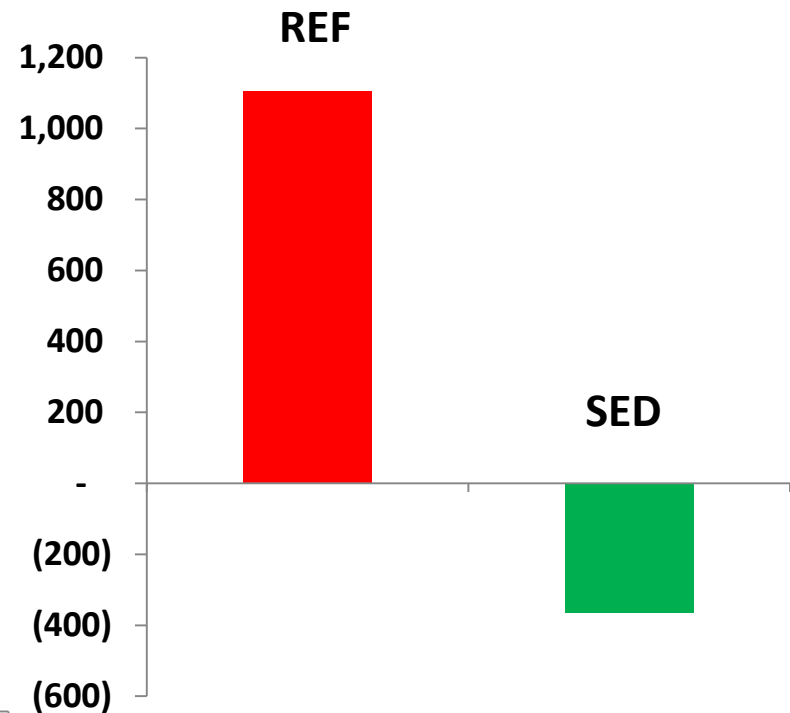
Reduced local environmental damage costs in 2030

\$ billion



Reduced energy imports in 2030

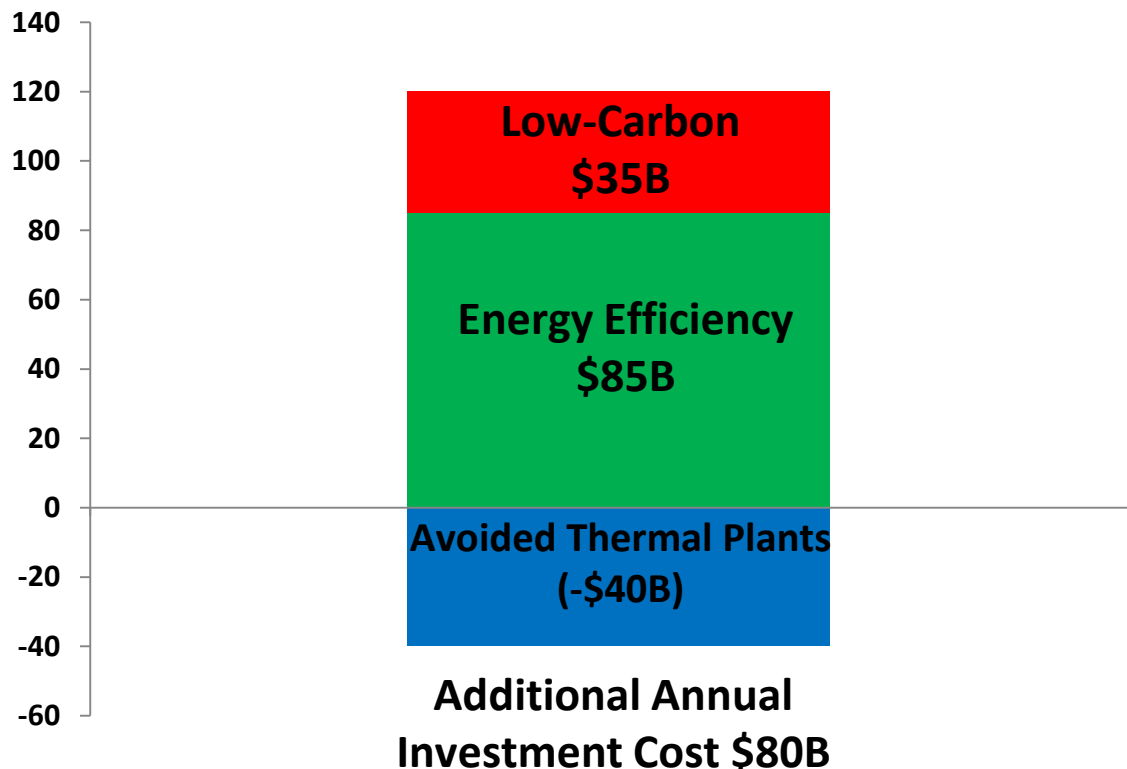
Mtoe



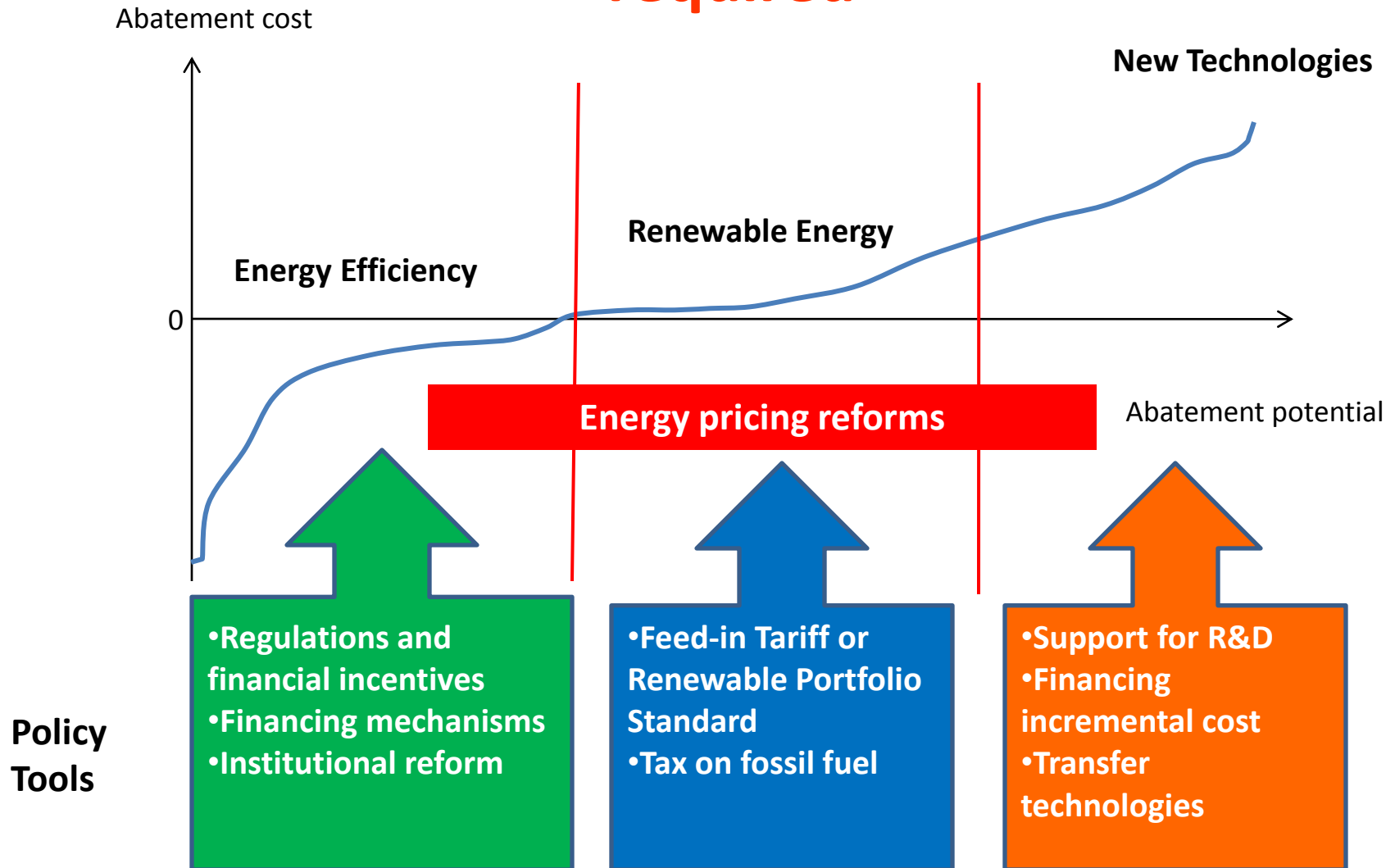
## Sustainable energy path: affordable but facing major financing challenges

- Annual additional capital investments: \$ 80 B
- But it can be offset by energy savings

Investment (\$ billion)



# Sustainable energy path: major policy reforms required



## Many EAP countries have adopted ambitious EE and RE targets

### China

- **Carbon intensity reduction:** 40-45% 2005-2020
- **Energy intensity reduction:** 20% 2006-2010 and 16% 2011-2015
- **15% non-fossil fuel** in primary energy by 2020

### Thailand

- **Energy intensity reduction:** 20% 2005-2030
- **20% RE** in final energy demand by 2022



### The Philippines

- **Doubling RE capacity** by 2030

### Indonesia

- **GHG emission reduction:** 26% in 2020
- **EE improvement:** 30% by 2025
- **17% RE** in primary energy by 2025

## China: Remarkable Progress in Reducing Energy Intensity

- **Chinese government set ambitious EE target, and primarily relies on administrative tools to achieve the target**
  - Allocation of **provincial targets**
  - Agreements with **Top 1000 industrial enterprises**
  - Industrial, building, appliances, and vehicle **standards**
  - Government **financial support**: *\$20 billion* from 2006 to 2009
- **World Bank introduces market-based mechanisms: delivery models and financing schemes:**
  - Piloting **ESCOs**: growing from 3 to 500 with \$3 B in EPCs in 10 years
  - Providing **guarantees** to ESCOs: \$22M GEF grant **leveraged** \$140M investments by 42 ESCOs
  - Mainstreaming **EE lending** in the **banking sector**: WB loan (\$300M) & GEF TA grant: **on-lend** to 3 domestic banks for industry EE investments, with **1:4** leverage ratio, and substantially increased participating banks' interests, capacity, and confidence in EE lending

## Vietnam: Major Cut in Energy Intensity, but Indonesia, Malaysia and Thailand: Rising Trend of Energy Intensity

### ■ Vietnam:

- National **Energy Conservation Law** and Program launched, but **implementation** is the key
- The **industrial sector** offers the largest energy savings

### ■ Thailand:

- **Energy Efficiency Development Plan** launched, with the largest energy savings from the **transport and industrial sectors**
- Need to increase the use of **pricing and fiscal measures** and **performance-based** energy-saving targets
- **Institutional coordination** is the key to success

### ■ Indonesia:

- Energy conservation regulations issued, but deepening **pricing reform** and increasing the use of **mandatory regulations** needed

- **The Philippines:** Energy conservation is a cost-effective short-term measure to address **power crisis**

## Renewable Energy: Effective Policies Are Key Success Factor

### Three magic bullets for successful RE policies:

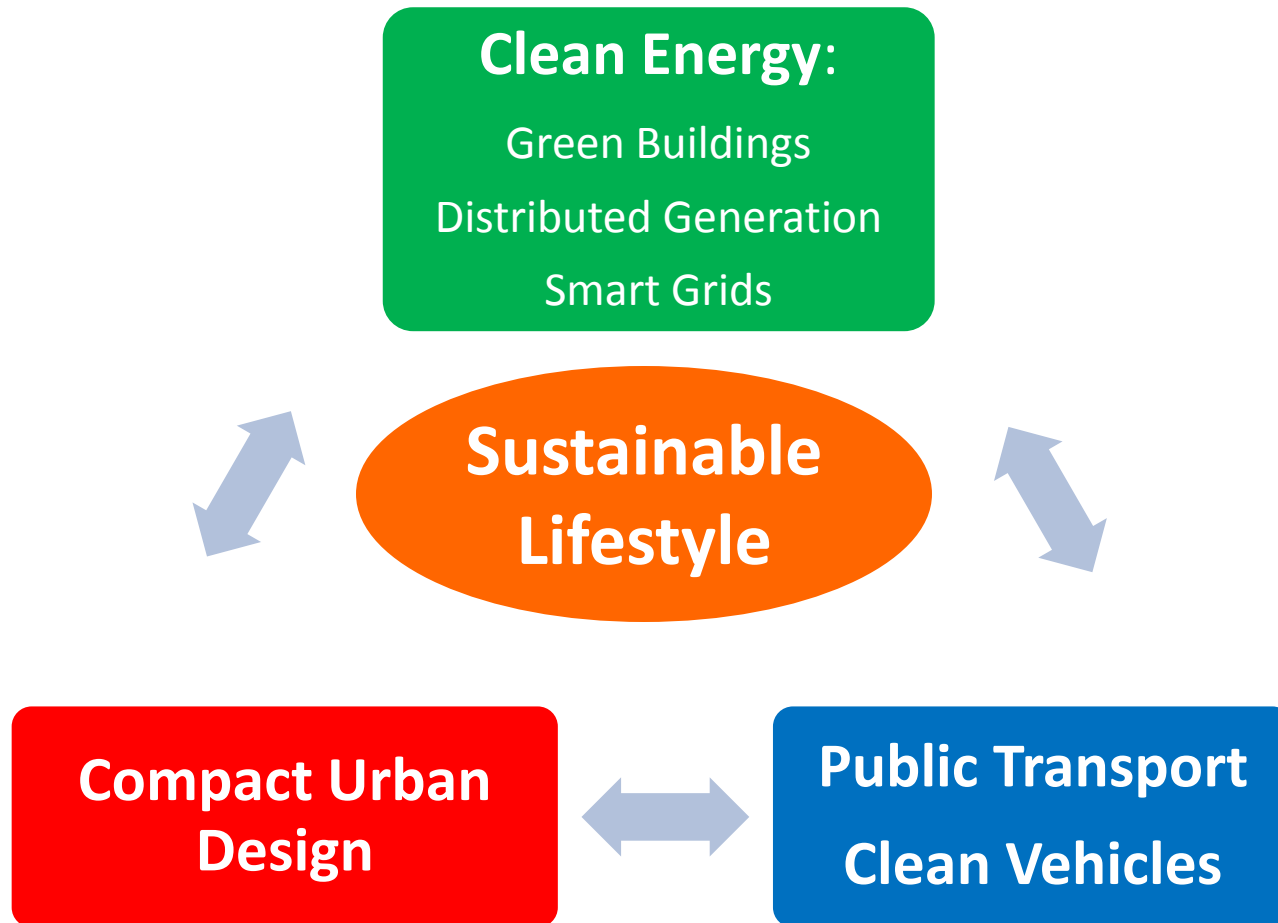
- **Adequate tariff** levels with long-term PPAs:
  - ***Mandate Price -- Feed-in Tariff***: Highest penetration rates in a short period, and most favored by the private sector, but the tariff needs to be periodically and wisely adjusted
  - ***Mandate Quantity – Renewable Portfolio Standard (RPS)***: favor least-cost technologies, and complex to design and administrate
  - ***Competitive Tendering Mechanisms***: Effective at reducing cost, but most signed contracts are not realized
- **Mandatory access** to the grid
- Someone has to pay for the **incremental costs**

## Most East Asian Countries Adopted Renewable Policies

- **China:**
  - Passed **Renewable Energy Law** in 2005: **Feed-in tariffs** for wind, biomass, and solar PV
  - **World's largest RE capacity**, 8% of primary energy; **Wind** capacity reached 31 GW, **No. 2 in the world**
  - **World Bank:** China Renewable Energy Scale-Up Program (CRESP)
- **Thailand**
  - Implemented **RE adder**, and RE power target oversubscribed
- **The Philippines**
  - 30% RE in power mix, and **world leader in geothermal**
  - **RE law passed:** RPS and feed-in tariff co-exist
  - **World Bank:** Rural power Project and Clean Technology Fund
- **Indonesia**
  - **Tendering scheme** for geothermal, but mandatory grid access needed and someone has to pay for the incremental costs
  - **World Bank:** Geothermal project with CTF, and Pump Storage Project
- **Vietnam:**
  - Government: aggressive plan to develop **hydro**
  - **World Bank:** Hydro Project and Renewable Energy Development Project for small hydro

# Urgent action: to contain urban energy growth

- Urban forms last for a century or more
- Reducing urban energy requires integrated approaches



# New Frontier: Low-Carbon Cities, Advanced Technologies, and Natural Gas

## ■ Low-Carbon Cities:

- **China:** Planned investments in Beijing, Tianjin, and Shanghai
- **Southeast Asia:** Studies in Cebu, DaNang, and Surabaya

## ■ Advanced Technologies

- **IGCC/CCS:** Technical assistance in China
- **Electric vehicle:** Studies in China
- **Smart grids and energy storage**

## ■ Natural Gas

- **LNG:** Studies in the Philippine and Vietnam

## One Goal Two Paths: Both Dramatically Improve Quality of Life

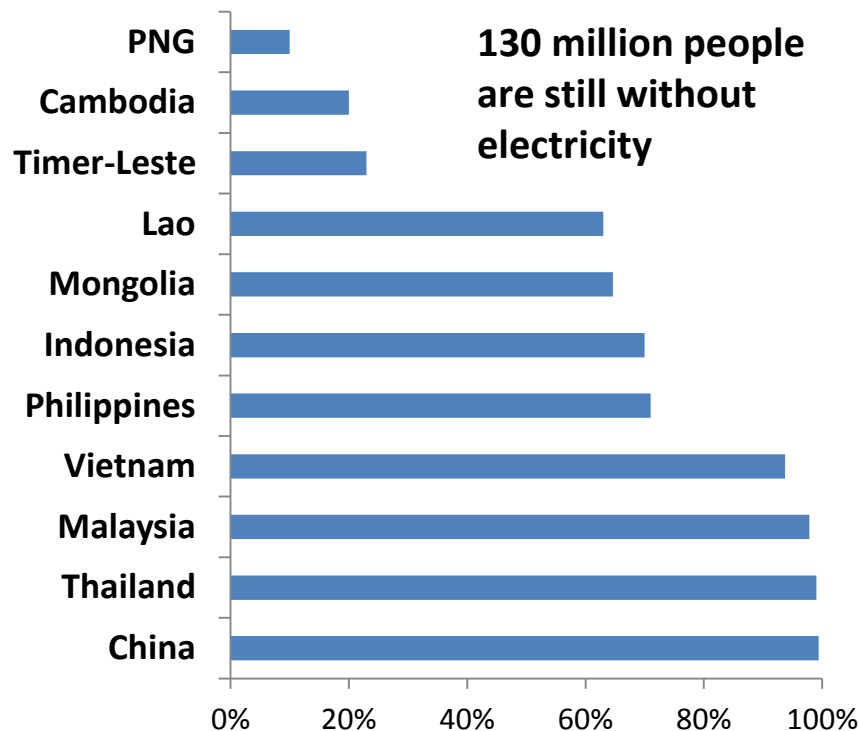


### Implications

- Women and children are released from domestic drudgery
- More time available for productive use
- International advocacy important as the magnitude of the challenge has not been fully realized by the development community

## Electricity Access: Huge Success in Vietnam and Lao, but Reaching Dispersed Population Is the Future Challenge

Energy access: major achievements but still an unfinished agenda



Universal access by 2030 is within reach

- **Vietnam:** Increased electrification rate from 50% to 96% in a decade. WB Rural Electrification Projects
- **Lao:** Increased electrification rate from 30% to 70% in a decade. WB Rural Electrification Projects
- **Indonesia and the Philippines:** The largest un-electrified population in EAP. Reaching dispersed population in remote islands is the challenge.
- **The Pacific Islands:** Very low electrification rate. Secure govt. and donor commitment for an Access Action Plan. Support grid and off-grid RE

# Take Away Messages

Energy efficiency and low-carbon technologies can stabilize CO<sub>2</sub> emissions by 2025, and improve local environment and energy security without compromising economic growth

## EAP Governments

- Immediate action to transform the energy sector towards sustainability

## Developed countries

- To provide substantial financing and technologies

## World Bank Group

- EAP to scale up policy advice, knowledge sharing, and financing in sustainable energy