RENEWABLE ENERGY OUTLOOK FOR ASEAN

A REMAP ANALYSIS

23 September, 34th AMEM, Myanmar
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ASEAN’s 23% aspirational renewables target

October 2015 as part of ASEAN Plan of Action for Energy Cooperation

- 23% renewable energy share\(^1\) in total primary energy supply (TPES) by 2025
  - 2014 – 9.4%
  - 2025 BAU – 10%
  - 2025 Advanced Policy Scenario (APS) – 15.4%
- IRENA Reference Case – 16.9% (APS + latest country updates)
- 6% point gap to the 23% target

1) excluding traditional uses of bioenergy, including all hydropower

Please note that results are preliminary and may be revised ahead of the final report release.
Approach and country engagement

- IRENA’s REmap renewable energy technology assessment tool and approach
- ACE’s close working relationship with the 10 ASEAN Member States

Country engagement as the cornerstone of REmap

IRENA and ACE have engaged all ASEAN countries and +60 experts throughout 2016
- Two in-depth technical workshops:
  - March workshop in Manila
  - June workshop in Bangkok
- Three review webinars (April, May, September)
- 34th AMEM final Ministerial consultative meeting
- Report finalized by end of 2016
Rapid growth, pollution, CO$_2$ and imports

*The effects of rapid economic and industrialized growth result in the largest growth in GDP with almost a 70% increase*

*Energy demand soars 50%, with most demand covered by fossil fuels*

With this growth comes the impacts of increasing use of fossil fuels:

- **USD 225 billion per year**
  - Air pollution associated health and environmental costs

- **Energy-related CO$_2$ emissions 2.2 Gt/yr**
  - (~5% of all global emissions)

- **Rising imports** of oil and gas

Note: Results are preliminary and may be revised ahead of the final report release.
Drivers for a renewable revolution in the region

- The region has some of the best renewable energy resources in the world.
- Renewable energy is becoming increasingly cost-competitive:
  - Declines in the costs of renewable energy technologies
  - Increasing costs from import price volatility
- Health benefits, improved wealth distribution, especially in rural areas
- Renewable energy drives economic activity & creates employment

Note: reduced fossil fuel (FF) prices assumes lower average commodity prices for fossil fuels for coal (-10%), natural gas (-20%) and oil (-30%)

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Renewable energy share by sector 2014-2025

Renewable shares increase in all sectors, but mostly in end-use sectors

- **Power sector** – highest share of renewable energy at 34%
- **Buildings** – largest increase in share due to the substitution of traditional uses of bioenergy
- **Industry** – large untapped potential compared to the Reference Case
- **Transport** – largest growth in renewable energy use according to the Reference Case

Note: End-use sectors include the consumption of electricity sourced from renewables. Shares presented in figure exclude traditional uses of bioenergy.
Closing the gap: power sector

*Electricity generation will almost double from 2014 to 2025*

*The renewable energy technology mix differs significantly between the Reference Case and REmap*

- RE power additions include more than 50% hydropower in the Reference Case

**REmap Options**
- 50% solar PV
- 20% biopower (incl. biogas)
- 12% wind

![Bar chart showing renewable energy share in power generation from 2014 to 2025]

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Closing the gap: power sector

In REmap, power generation capacity grows almost by 240 GW to more than 400 GW

- Coal and natural gas will have the largest installed capacity
- Hydropower increases significantly in the Reference Case
- Largest growth in REmap is for solar PV

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Renewable energy share by country 2014-2025

The distribution of renewable energy use varies significantly by country with the renewables share ranging from 4% to 59% across the ASEAN.

<table>
<thead>
<tr>
<th>Country</th>
<th>TPES</th>
<th>Power</th>
<th>Buildings</th>
<th>Industry</th>
<th>Transport</th>
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<td>10%</td>
<td>11%</td>
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</table>

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Costs and savings of closing the gap

The REmap Options for closing the gap to 23% are represented by an incremental cost of USD 1.9 per MWh by 2025

- The REmap Options would result in slight incremental costs of USD 1.9/MWh or USD 0.7 billion per year in absolute terms
- Reduced externalities would outweigh costs. Savings exceed the cost:
  - 10x for outdoor air pollution
  - 6x for climate change
  - 38x for indoor air pollution (not shown in figure)
- ASEAN’s fossil fuel expenditures would be lowered by USD 40 billion per year by 2025

Note: Reduced externalities resulting from lower levels of indoor air pollution are excluded from the figure.

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Carbon dioxide emissions from energy

Energy-related CO₂ emissions will rise by 60% in the Reference Case. With the renewable energy target reached, growth is restrained to 47%

- Due to soaring energy demand many countries see significant growth in energy-related CO₂
- Realising the ASEAN renewable energy target can reduce this growth by one-fifth
- Besides renewables, energy efficiency plays a key role
- Energy intensity improvements are consistent with the region’s target of a reduction of 30% over 2005 levels by 2025

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Investment needs for realizing the target

The region will need to invest 1% of its GDP annually into renewable energy capacity to reach its 23% target

Average annual investment would total USD 27 billion

This is split equally between the Reference Case and REmap Options for closing the gap

One-third of the additional investment needed for REmap Options will be redirected from fossil fuels

Three-quarters of all renewable energy investment is for power sector

Note: Lao PDR sees significant investment in the Reference Case in hydropower, much of it meant for export

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Key Conclusions and areas for further work

- The regional target of 23% renewable energy is achievable with concerted efforts by all ASEAN countries.
- Savings related to reduced externalities resulting from increased renewables far exceed additional costs of those renewables.
- Investment in renewable capacity will need to double, and mobilizing finance will be key to achieving the target.
- Synergies between strengthened energy efficiency and renewable energy efforts should be explored further.
- Transmission and distribution grids across the region must be expanded and strengthened.
- Efforts need to be expanded for renewable energy uptake in the heating, cooking and transport sectors, with special attention for the potential of bioenergy and solar thermal.


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