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# Highlights of the Economics of Climate Change in Southeast Asia: A Regional Review

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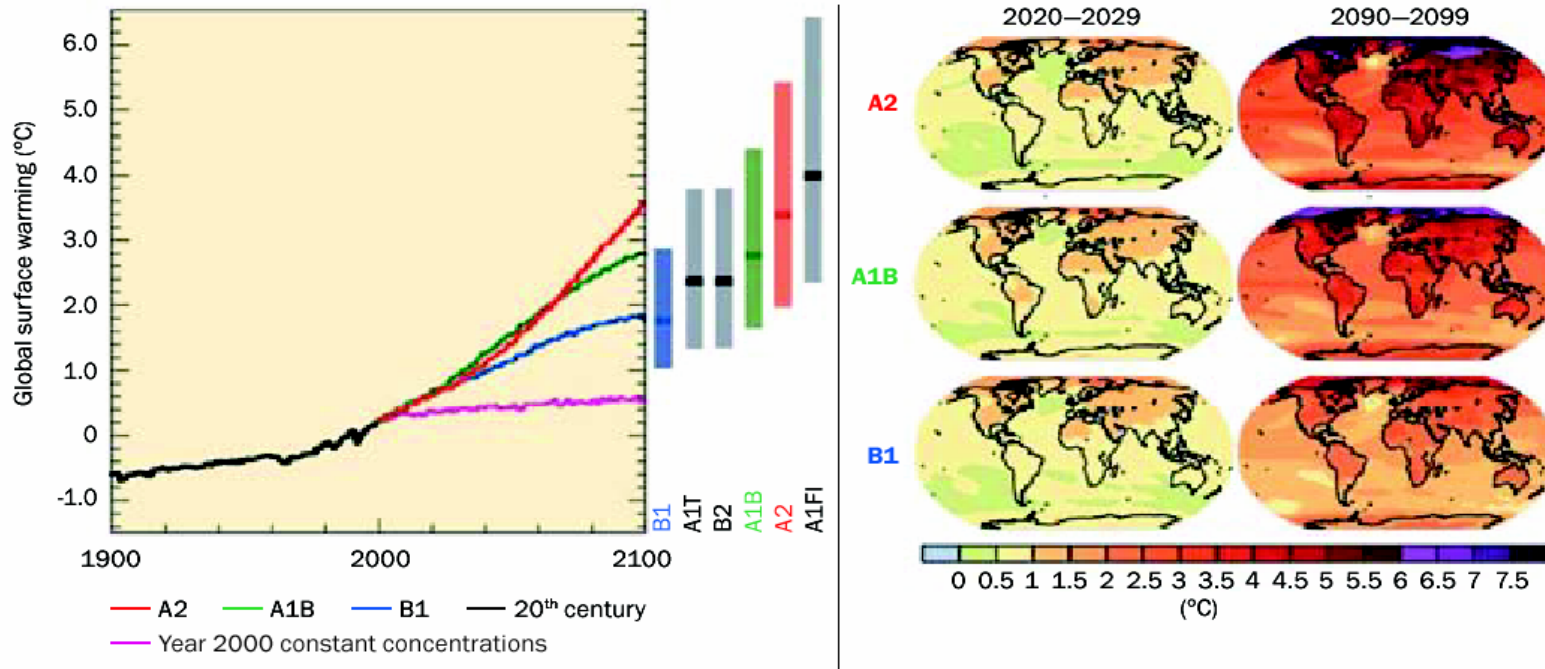


# Objectives of the Study

- ❑ Contribute to regional debate on economic costs and benefits of unilateral and regional actions on mitigation and adaptation
- ❑ Raise awareness about the urgency of climate change challenges and their potential socioeconomic impact on the participating countries, while informing other stakeholders of the same
- ❑ Indirectly support government and private sector actions in the region to mitigate and adapt to climate change



# Climate Change



Source: IPCC (2007).

Note: A1 scenario family describes a world of rapid economic growth and population that peaks in mid-century and declines thereafter. Within the A1 family, there are three scenarios characterizing alternative developments of energy technologies: A1FI (fossil fuel intensive), A1B (balanced), and A1T (predominantly non-fossil fuel). B1 scenario describes a world with rapid changes in economic structures toward a service and information economy, the introduction of clean and resource-efficient technologies, and the same population path as in the A1 family. A2 scenario describes a world with slower per capita economic growth, continuously increasing population, and slower technological change than in other storylines. B2 scenario describes a world with intermediate economic development, continuously increasing global population at a rate lower than A2, and less rapid technological change than in B1 scenario (IPCC, 2000).

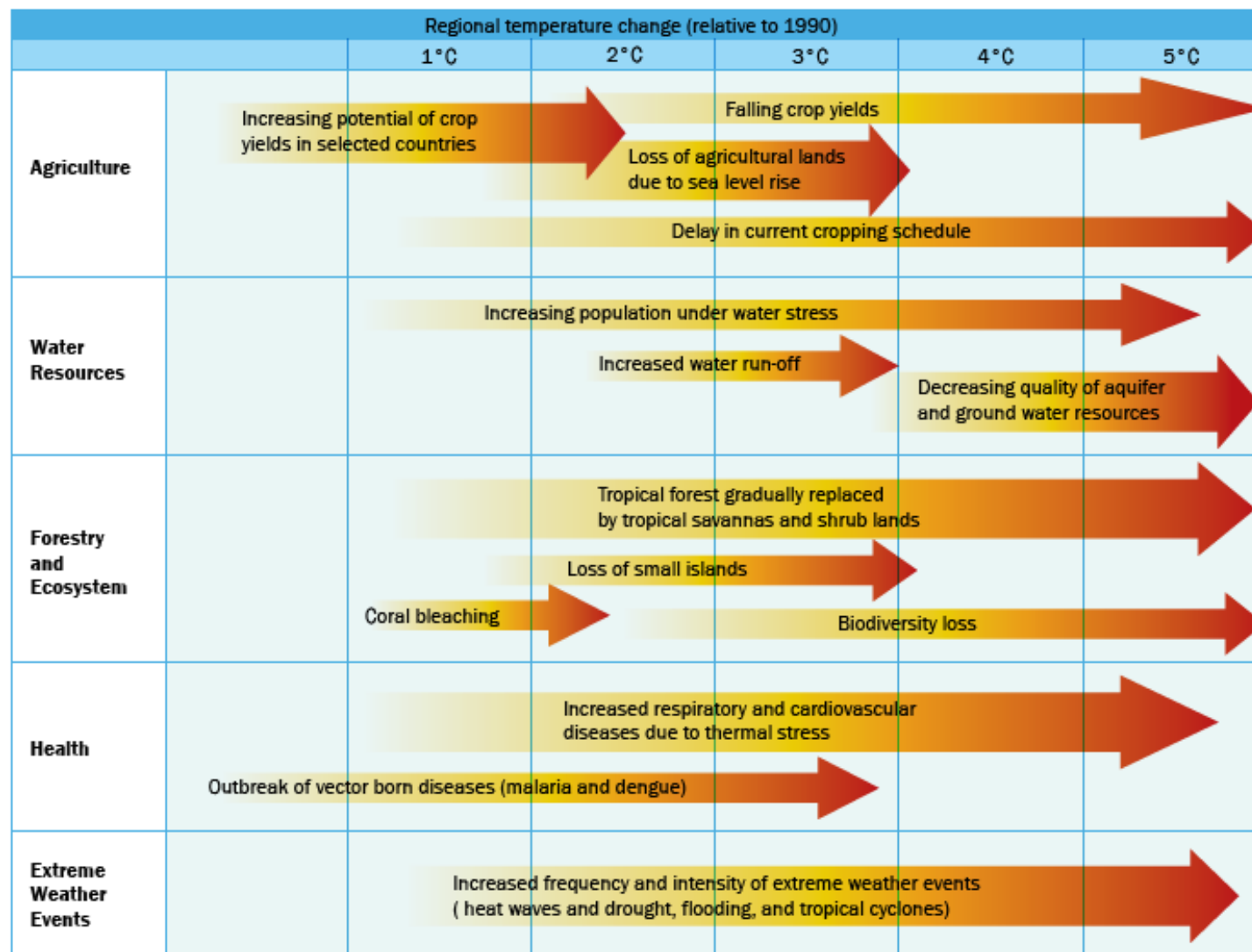
# Uniqueness of Southeast Asia (SEA)

- ❑ 574 million people:
  - 19% living below \$1.25/day
  - 44% living below \$2.00/day
- ❑ Fastest rate of urbanization:
  - Urban population growing at 1.6%–4.4%
  - Occurring mostly in coastal areas
- ❑ Ranks 3<sup>rd</sup> in the world in length of coastline
- ❑ Major producers and suppliers of grains, industrial crops, and forest products
- ❑ Total GHG emissions is 12% of the world in 2000
- ❖ SEA (4): Indonesia, Philippines, Thailand, Viet Nam

# Climate Change and Impact on SEA

- ❑ Temperature increased by 0.1–0.3°C per decade
  - By 2050: 1.30–2.32°C (IPCC, 2007)
  - By 2100: 2.4–5.0°C (this Study)
- ❑ Precipitation decreased in many parts
- ❑ Sea level is rising at 1–8 mm per decade
- ❑ Extreme events increasing  
(intensity and frequency)
- ❑ Almost all sectors are severely affected:
  - Often worth millions or billions \$
  - Large number of loss in life

**Figure H3. Potential Impacts of Climate Change on Key Sectors**



Source: Adapted from Stern (2007).

# Adaptation

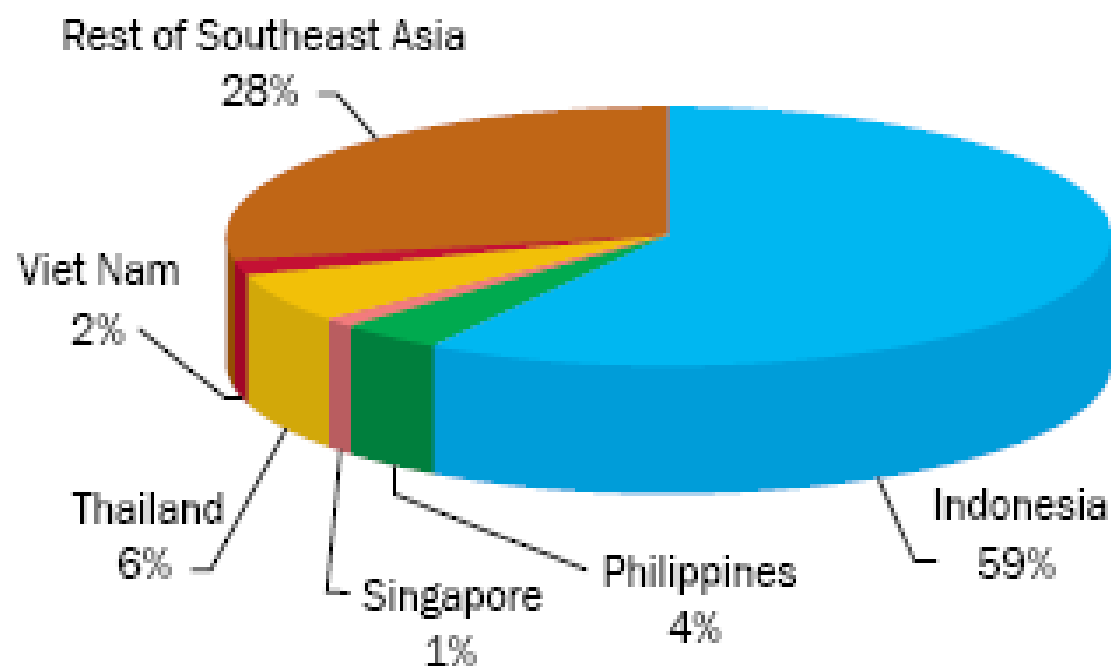
- ❑ SEA made significant efforts
  - ❑ So far, adaptations in SEA are mostly reactive
  - ❑ The current level of adaptation is still inadequate to cope with the future challenge
- There is an urgent need for SEA countries to develop and implement proactive climate change adaptation plans

# Mitigation

- ❑ Mitigation is high on the agenda in many SEA countries
- ❑ Options are available for major sources with high mitigation potential at low technology cost



**Figure H12. GHG Emissions in Southeast Asia (2000)**



Note: Total GHG emissions = 5,187 MtCO<sub>2</sub>-eq.

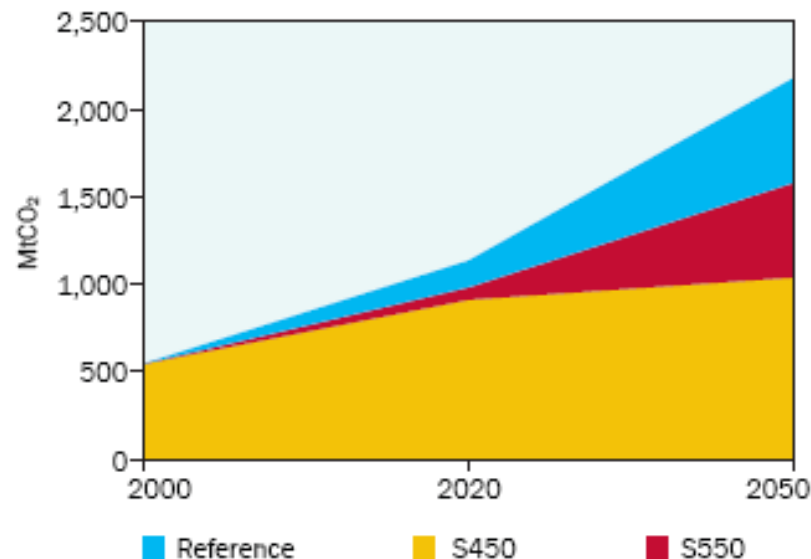
Source: CAIT Database, WRI (2008).

# CO<sub>2</sub> emissions from Energy Sector: SEA (4)

Reference Scenario: more than 2 Gt by 2050

450ppm Scenario: less than 1 Gt by 2050

Figure 8.2. Energy-related CO<sub>2</sub> Emissions



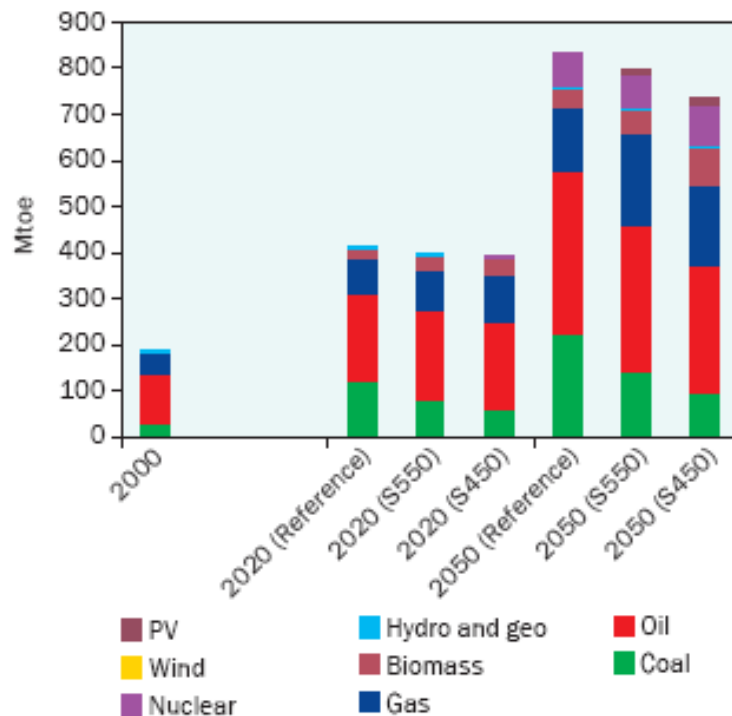
Note: Reference = business-as-usual without action; S450 = stabilization at 450 ppm; S550 = stabilization at 550 ppm.

Source: ADB study team.

# Primary Energy Consumption: SEA (4)

Fossil fuels are dominant, but by 2050 share of renewables and gas should be increased for 550ppm and 450ppm scenarios

Figure 8.3. Primary Energy Consumption



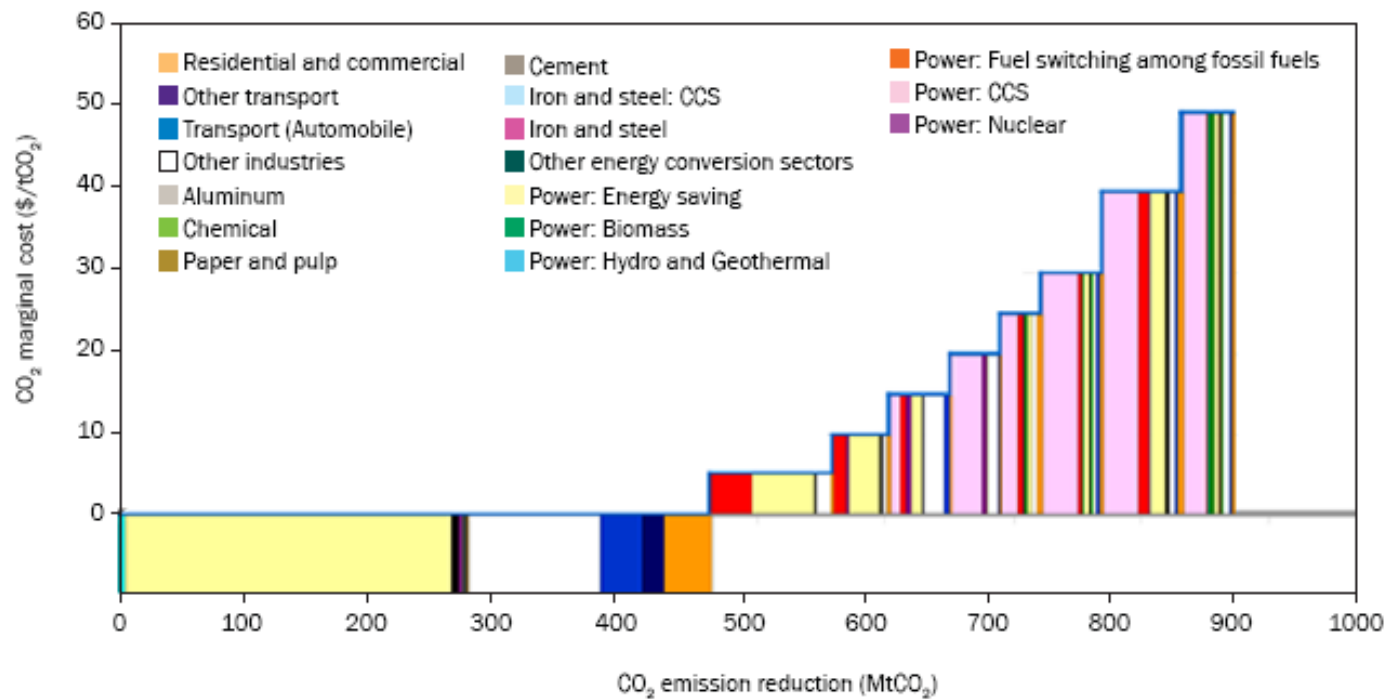
Source: ADB study team.

# Win-Win Options

## Energy Efficiency Improvement: SEA (4)

475 MtCO<sub>2</sub> with negative cost

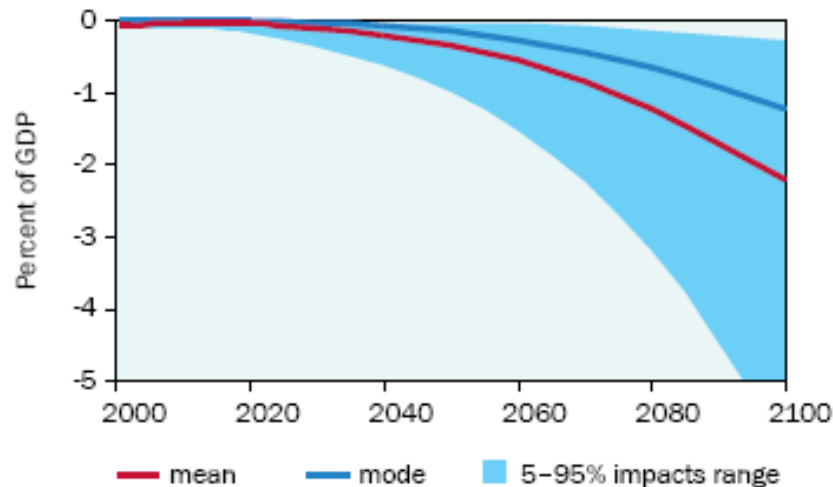
Figure 8.12. Marginal Abatement Cost Curve for the Four Countries (2020)



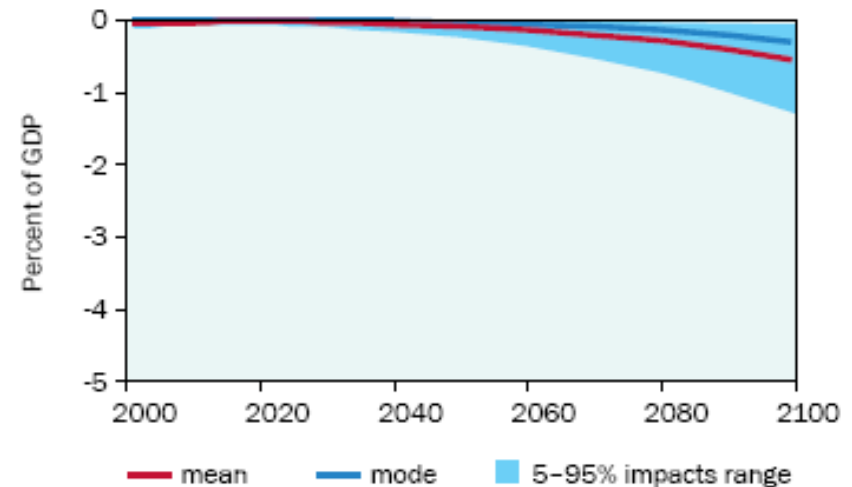
Source: ADB study team.

# SEA (4) is projected more vulnerable than the global average

**Figure H7. Loss in GDP (market impact only) in the Four Countries**



**Figure H8. Global Loss in GDP (market impact only)**



Note: The results are based on the A2 reference scenario without action. 'mean' indicates the average outcome of the simulations, 'mode' indicates the most likely outcome, and the range of estimates from the 5th to the 95th percentile is shaded area.

Source: ADB study team.

SEA (4) could lose 6.7% of GDP by 2100, if non-market impacts and catastrophic risks are also taken into account.

Figure H9. Mean Impact in the Four Countries

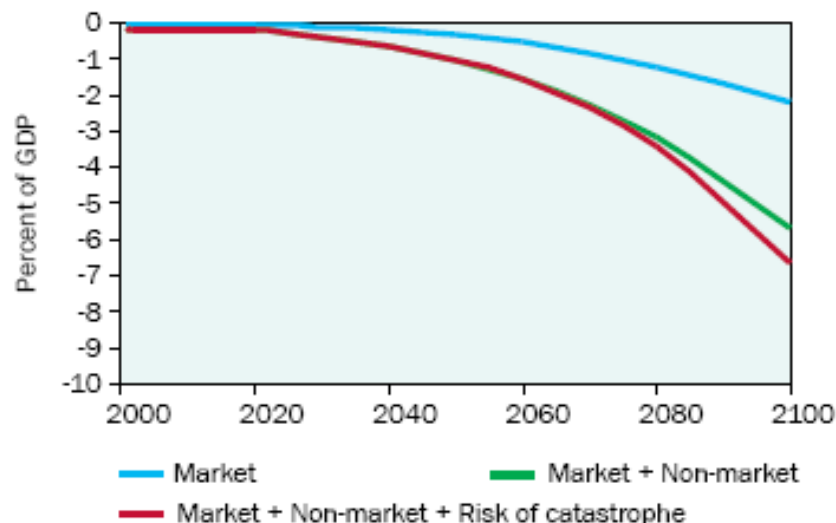
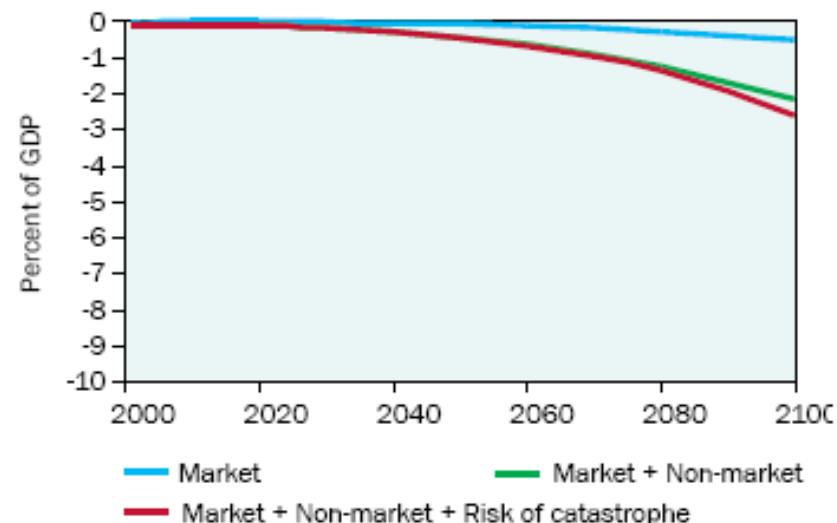


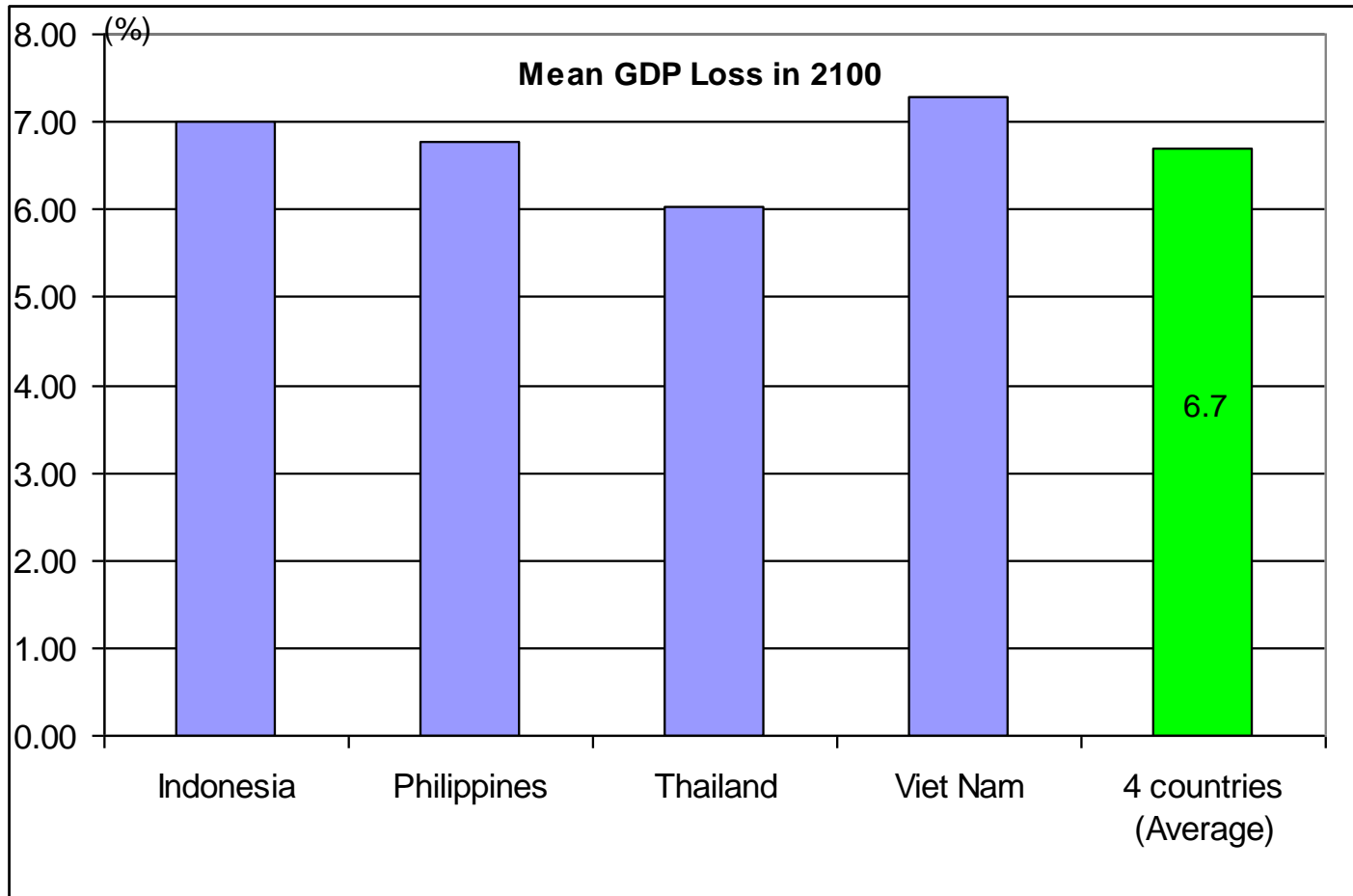
Figure H10. Global Mean Impact



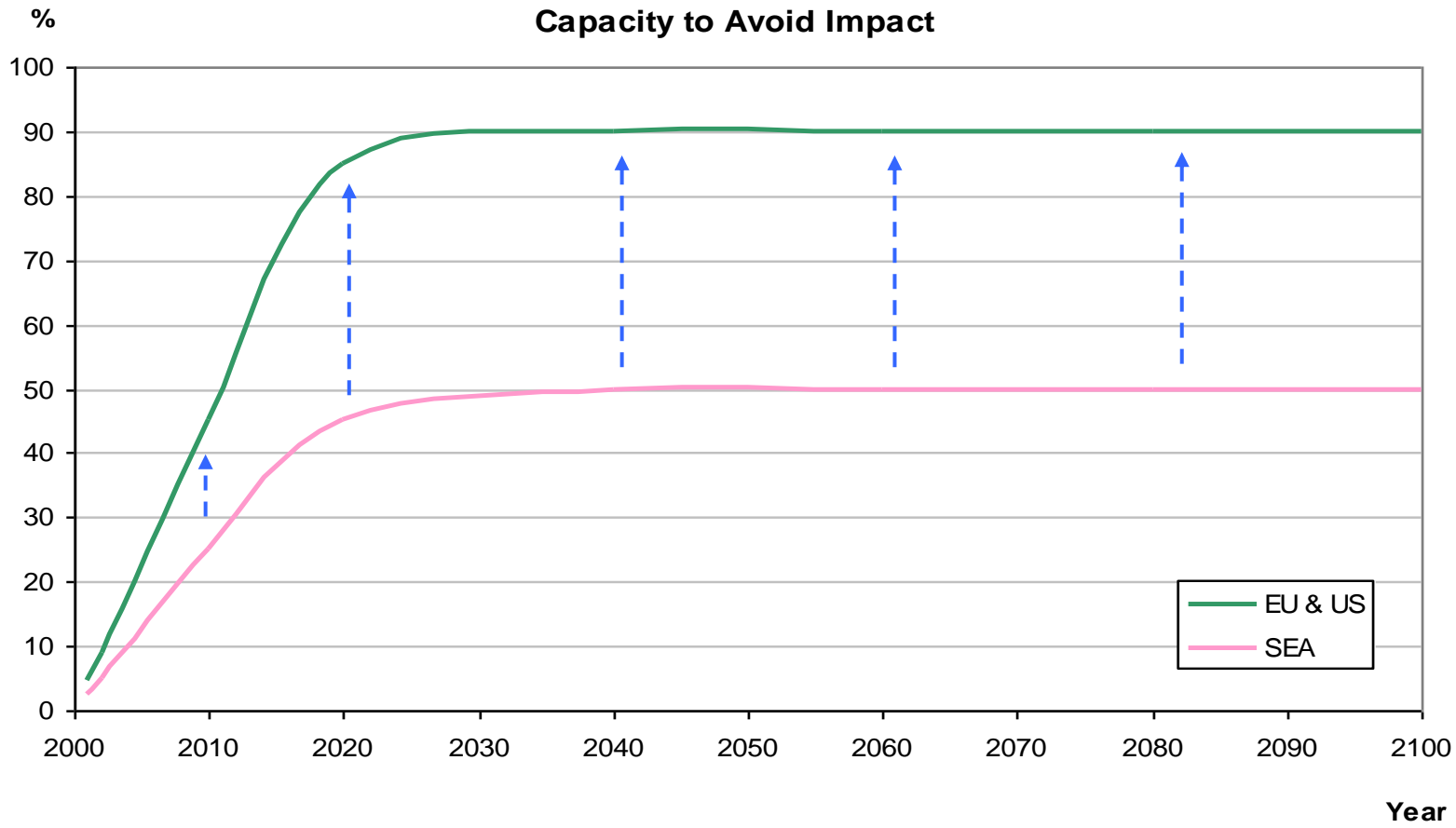
Note: The results are based on the A2 reference scenario without action.

Source: ADB study team.

# Mean GDP Loss in 2100: SEA (4)



# Enhancing Adaptation Capacity





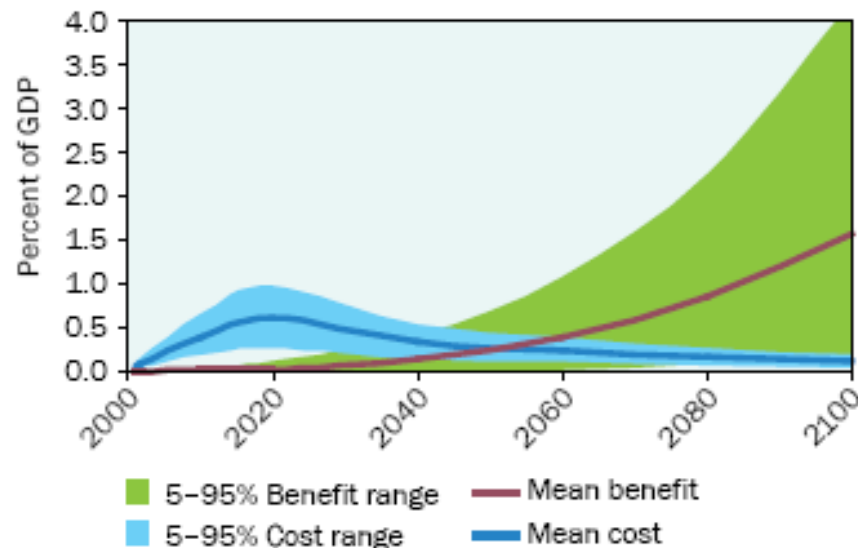
# Adaptation makes economic sense:

by 2100, Benefit: 1.9% of GDP

Cost: 0.2% of GDP

GDP: Combined GDP of SEA (4)

**Figure H13. Cost and Benefit of Adaptation**



Note: 'mean' indicates the average outcome of the simulations and the range of estimates from the 5th to the 95th percentile is shaded area. Benefit in terms of avoided damage is based on A2 scenario.

Source: ADB study team.

# Policy Implications

- Both adaptation and mitigation are necessary—  
identify win-win options
  - Planting mangroves sequesters carbon and buffers the effects of storm surges on infrastructure near the coast
  - Water storage can be beneficial for flood risk reduction, drought response, and clean energy generation (hydro)
  
- Essential to enhance adaptive capacity
  - R&D/technology: drought and saline resistant crops, efficient irrigation techniques, water conservation technologies, improved farming systems/practices
  - Infrastructure: climate-proofed, strengthen risk and vulnerability assessment
  - Weather data collection and forecasts, early warning systems, knowledge development and dissemination

# Key Messages (1)

- ❑ Climate change is already affecting SEA, and the worst is yet to come. Keeping "business-as-usual" could leave the region to suffer damages equivalent to more than 6% of GDP by 2100, more than two times as high as the global average. There is no time to delay actions to combat climate change.
- ❑ Combating climate change requires a global solution that is built on a common but differentiated responsibility. SEA should contribute to the global solution, by implementing both adaptation and mitigation measures.

# Key Messages (2)

- ❑ While adaptation is the region's priority, SEA should make greater mitigation efforts since low carbon growth also brings significant co-benefits, in particular, by reducing emissions from deforestation and degradation, implementing win-win mitigation options in the energy sector, and exploring mitigation potential of the agriculture sector.
- ❑ International funding and technology transfer are essential for the success of adaptation and mitigation actions in SEA. The region should enhance its capacities to make better use of the existing and potential international funding sources.

# Key Messages (3)

- ❑ Regional cooperation offers effective means to deal with many cross-boundary issues (such as water resources management, forest fires, extreme weather events, and outbreak of diseases) as well as for learning and knowledge sharing.
- ❑ Climate change issues cut across many sectors, and SEA countries should strengthen policy and planning coordination among different ministries and levels of government.
- ❑ There is an urgent need in SEA for more research to better understand climate change challenges, in particular at the local levels, and cost effective adaptation and mitigation solutions.

# Key Messages (4)

- ❑ Green Stimulus: Investment in climate change adaptation and mitigation can serve as effective fiscal stimulus.
- ❑ SEA countries could address the dual threats of climate change and the global financial crisis by introducing “green stimulus” programs that can simultaneously strengthen economies, create jobs, reduce poverty, lower emissions, and help prepare for the worst effects of climate change.

Thank you!



Main Report and Highlights are available.

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