

Challenges for Asian Energy Market As a Gravity Center of the World

Presentation at

Session 1, IEEJ 50th/APERC 20th Anniversary Joint Symposium

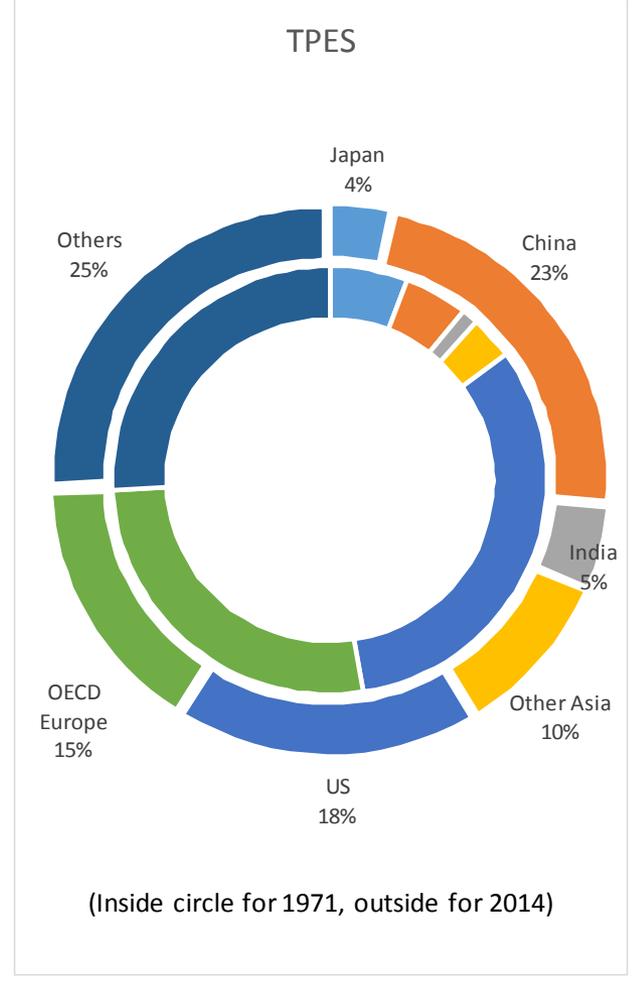
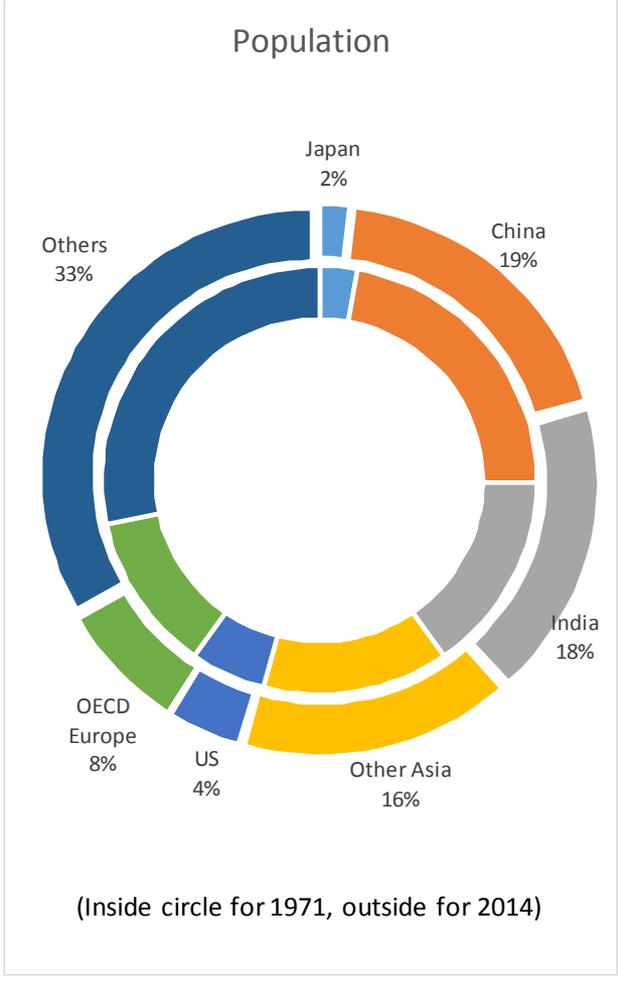
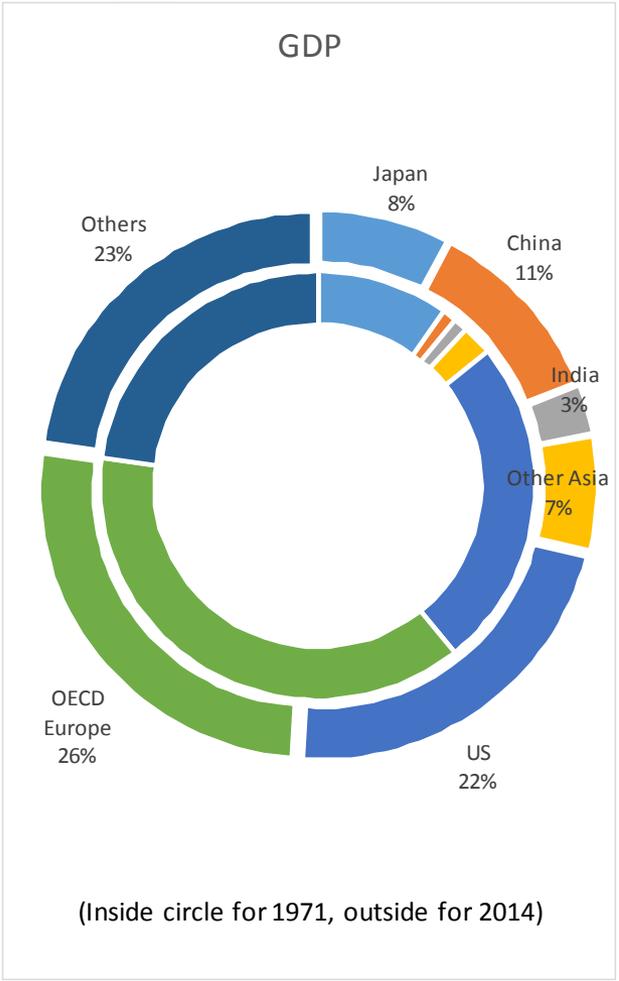
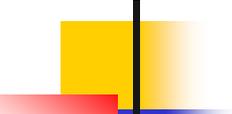
May 26th, 2016

Ken Koyama, PhD

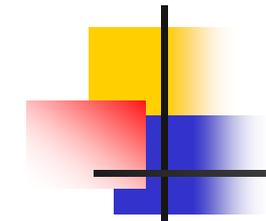
Chief Economist, Managing Director
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Asia, as a Gravity Center of the World

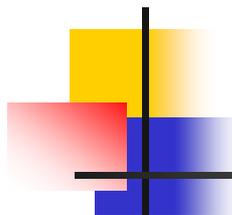


Impact of Economic Slowdown in Asia

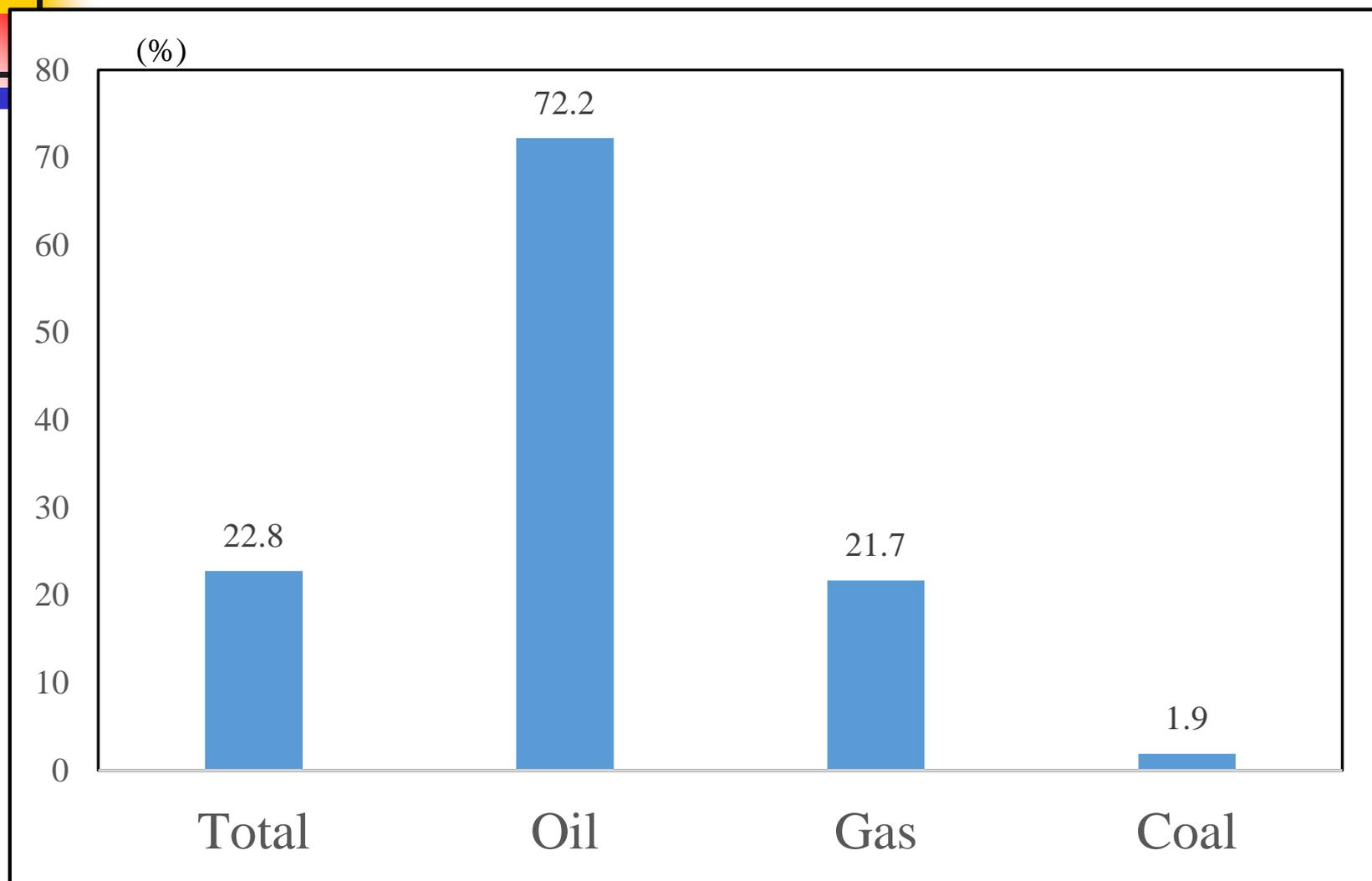


- **Asia, as a center of energy demand growth**
- **Recent economic slowdown, in particular in China, has become an important factor to ease the supply-demand balance in global energy markets and lower prices, together with several supply-side factors**
- **There remains some uncertainties over the possible economic downside risks in China**
- **What is going to happen in Chinese economy as well as other major Asian countries' economy will continue to be a key determinant of global energy market condition and energy prices**

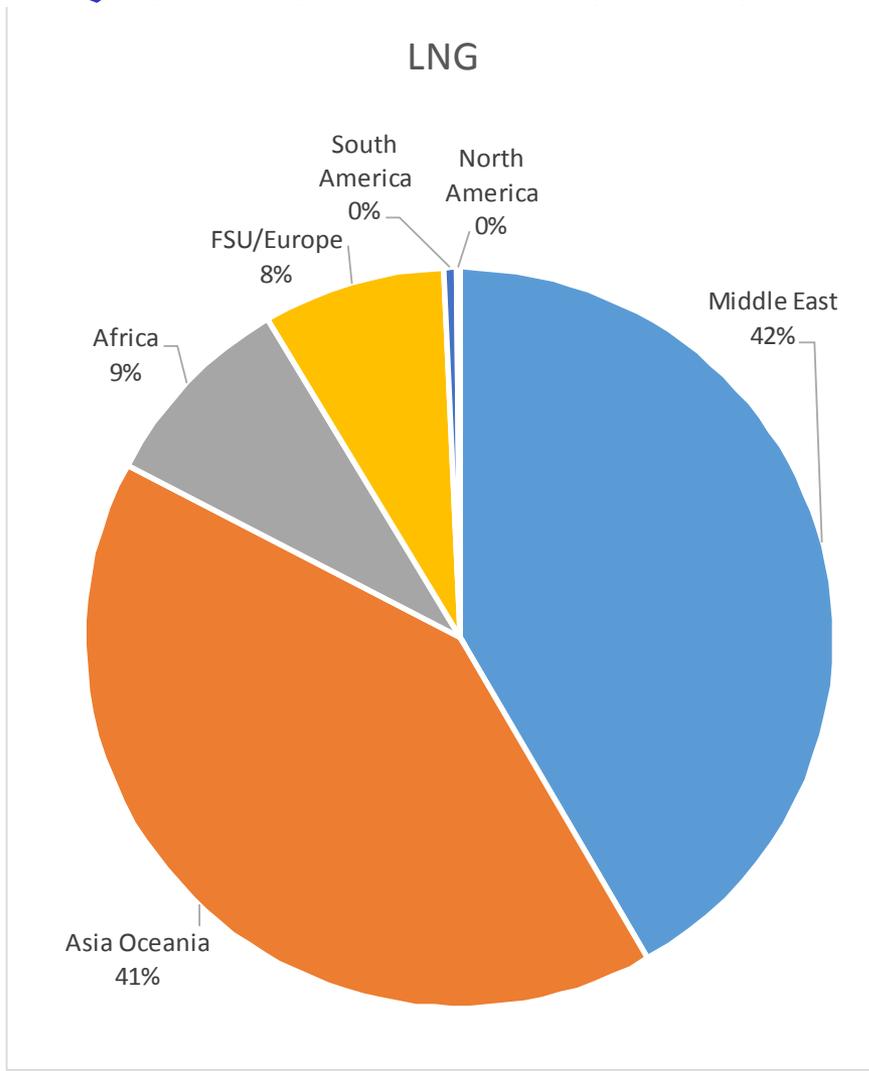
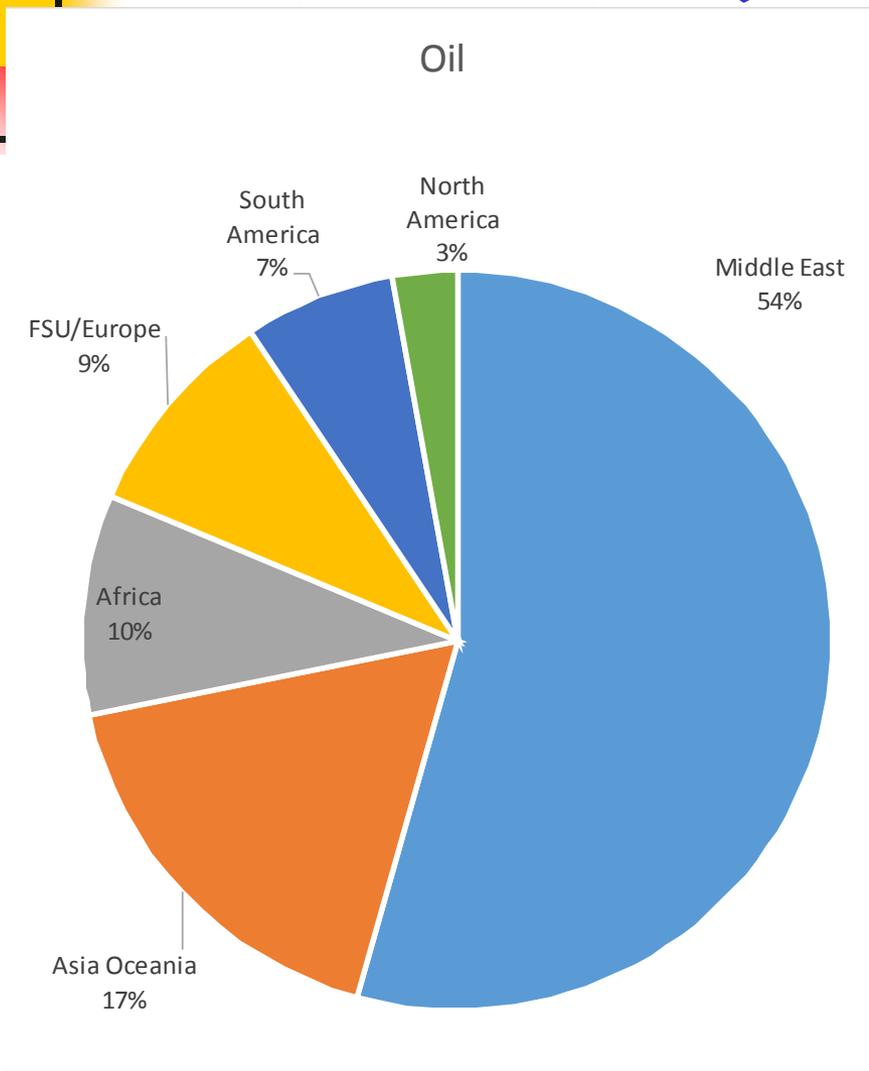
Asia's Challenges for "3E+S"

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- Rising import dependence and energy security
 - High oil import dependence. Gas import dependence rising
 - High Middle East dependence, Sea-lane dependence
 - High coal dependence and environment loads
 - Challenges for both climate change and pollution problems
 - Need for energy market reform
 - Japan leads the way. Reform for both energy market and NOCs
 - Challenges for nuclear power program
 - Impacts of Fukushima. Ambitious nuclear power program in China, India, etc, with challenges for safety and public acceptance

Energy Import Dependence in Asia (2014)



Asia's Middle East Dependence (2014)



Instability in the Middle East

Terrorist Attacks In Paris

Uncertainty over Middle East Peace issues

Gaza crisis

Impacts of "Arab Spring"

Growing Anti US sentiments in Arab and Islam society

Iraqi situations after the war

Immigrants to Europe

Russia-Turkey Tension

Syria, Yemen, Egypt...

Domestic challenges for existing rulers and regimes

Tensions on Iran Nuclear development

Post-sanction Iran?

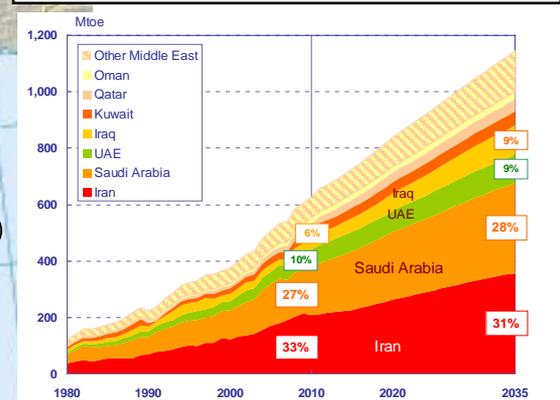
Tense Saudi-Iran Relations

Terrorism, threats to energy production and exports

Rising energy demand and its impacts



Outlook for energy demand in Middle East



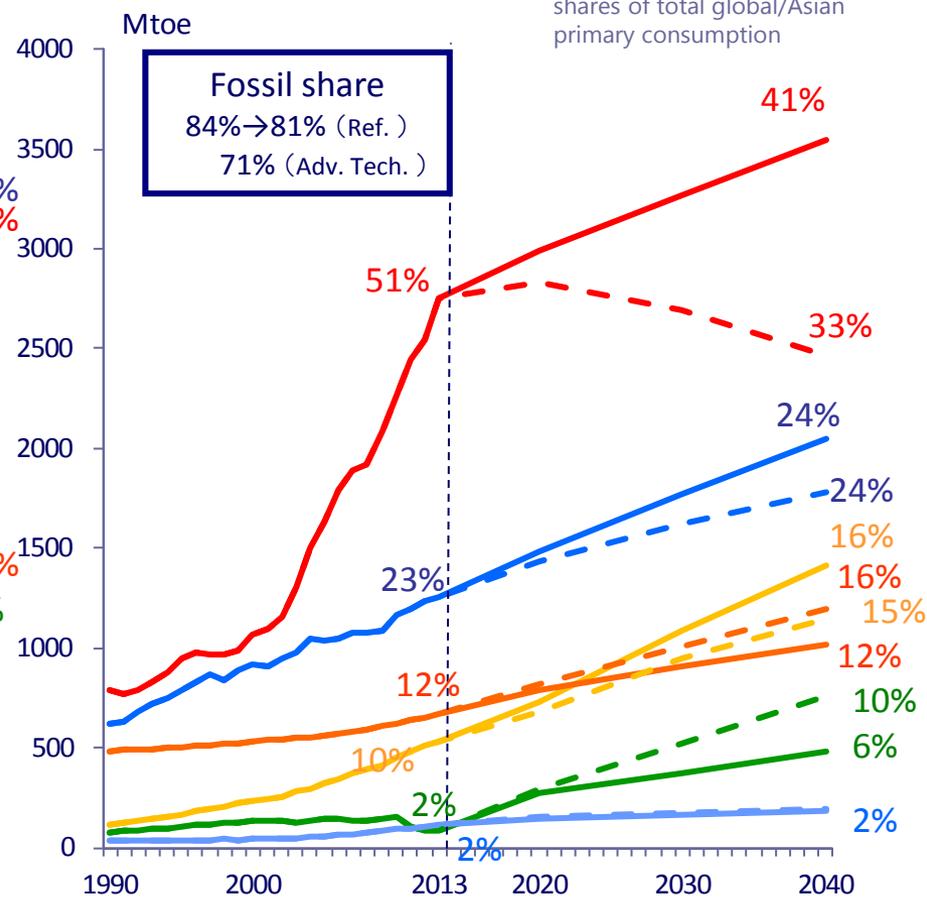
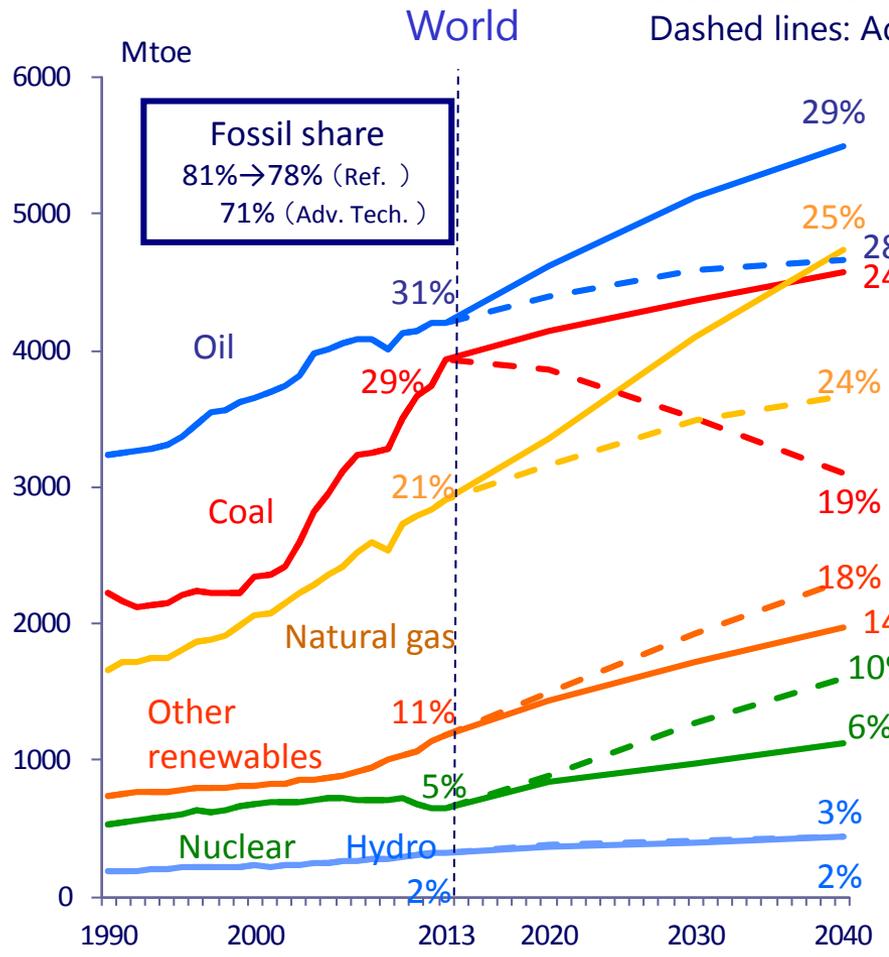


Primary Energy Demand by Source

Solid lines: Reference
Dashed lines: Adv. Tech.

Asia

The percentages indicate the shares of total global/Asian primary consumption

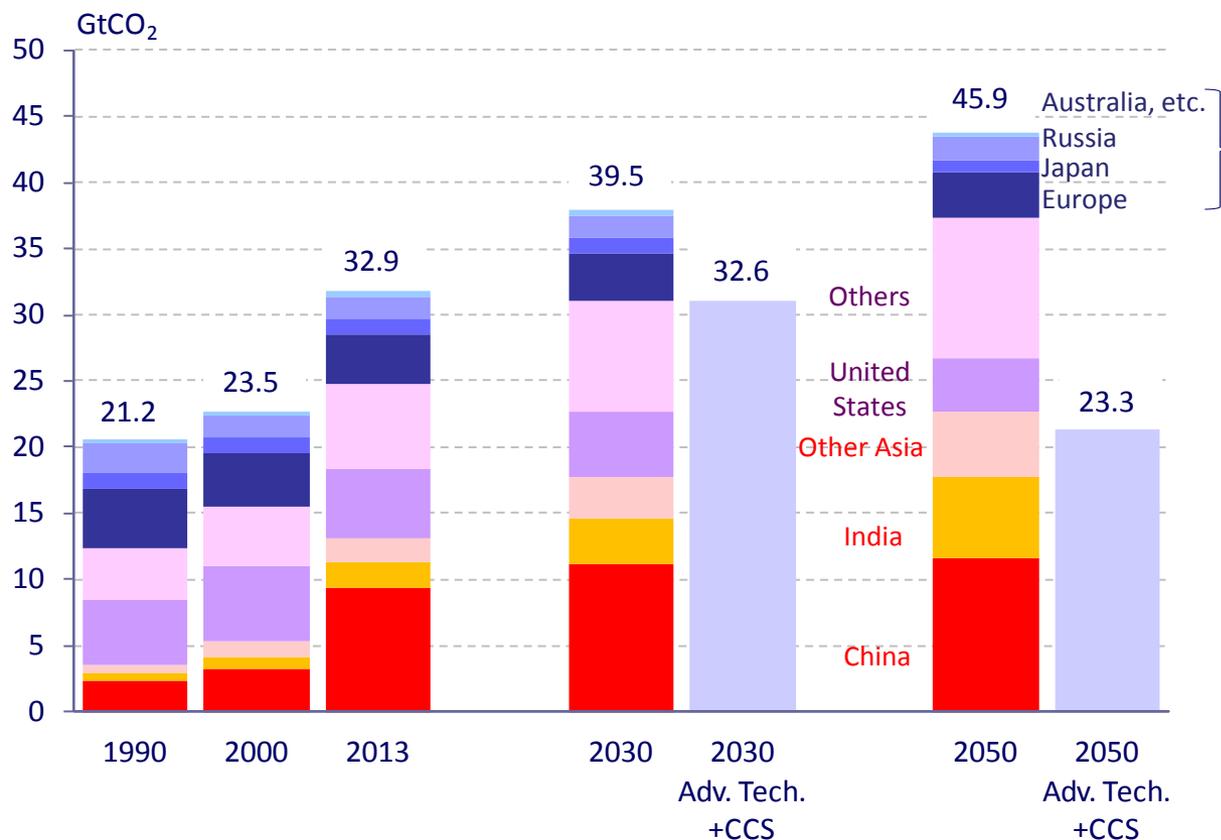


- In both the Reference and Advanced Technologies Scenarios, oil continues to be the largest share of primary energy consumption and remains a major energy source up to 2040.
- In Asia, coal remains the largest share among energy sources. In the Advanced Technologies Scenario, coal consumption declines substantially while retaining the largest share among energy sources.
- Share of fossil fuel declines until 2040, while maintaining the 70% in the Advanced Technologies Scenario.

Source: IEEJ, "Asia/World Energy Outlook 2015"

CO₂ Emissions by region

Note: Total figures include international bunkers.



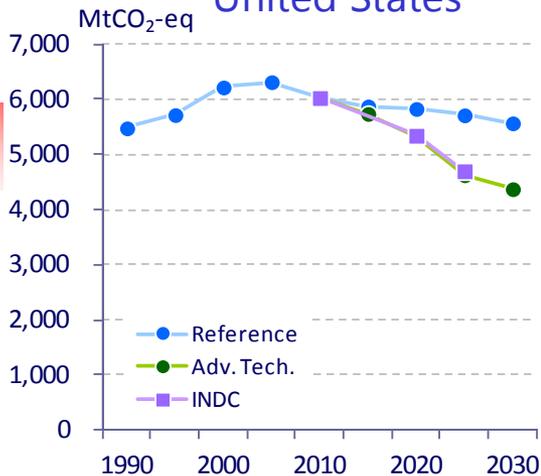
- Global energy-related CO₂ emissions will increase 1.4 times from 2013 to 2050. The expansion is especially rapid in India and other Asian countries, as well as Africa, the Middle East and Latin America.
- The share of the ANNEX I countries with reduction obligations under the Kyoto Protocol was 40% in 1990. It declined to 22% in 2013, and will decline further to 15% by 2050.



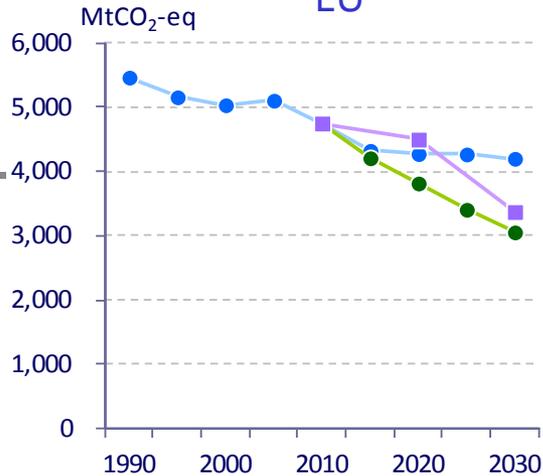
INDCs and IEEJ Outlook by country



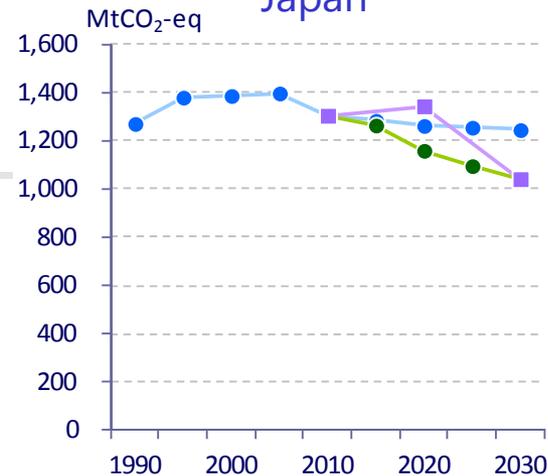
United States



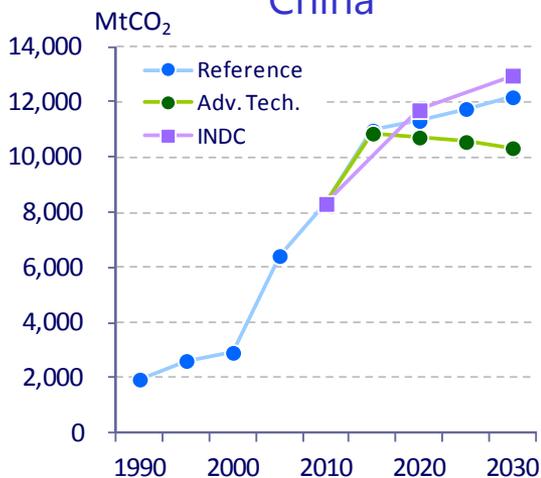
EU



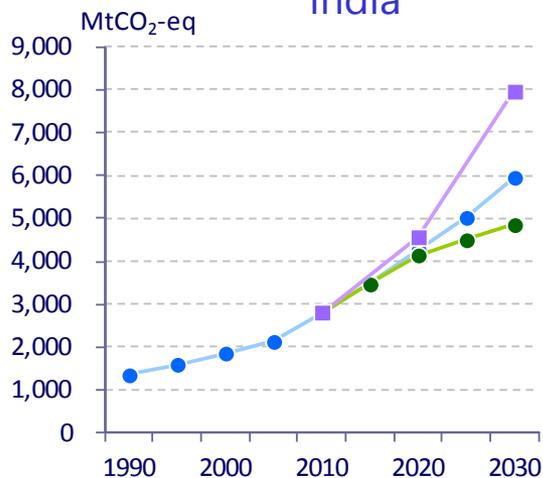
Japan



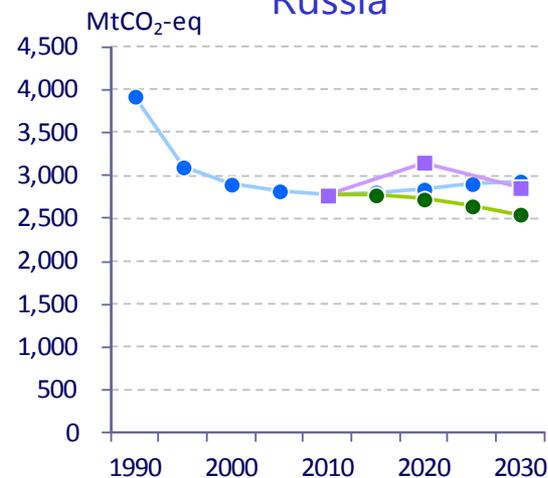
China



India



Russia



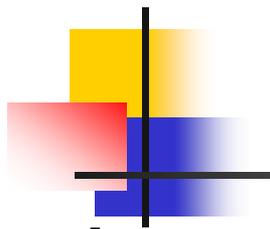
- The INDC targets of the United States and Japan are as ambitious as the Advanced Technologies Scenario. The target of EU is also positioned near the ATS.
- The targets of China and India exceed the Reference Scenario in terms of CO₂/GHG emissions.

Note: Japan's 2020 target does not include reduction by nuclear power. China's target is for CO₂, while others are for GHG.

Air Pollution in China

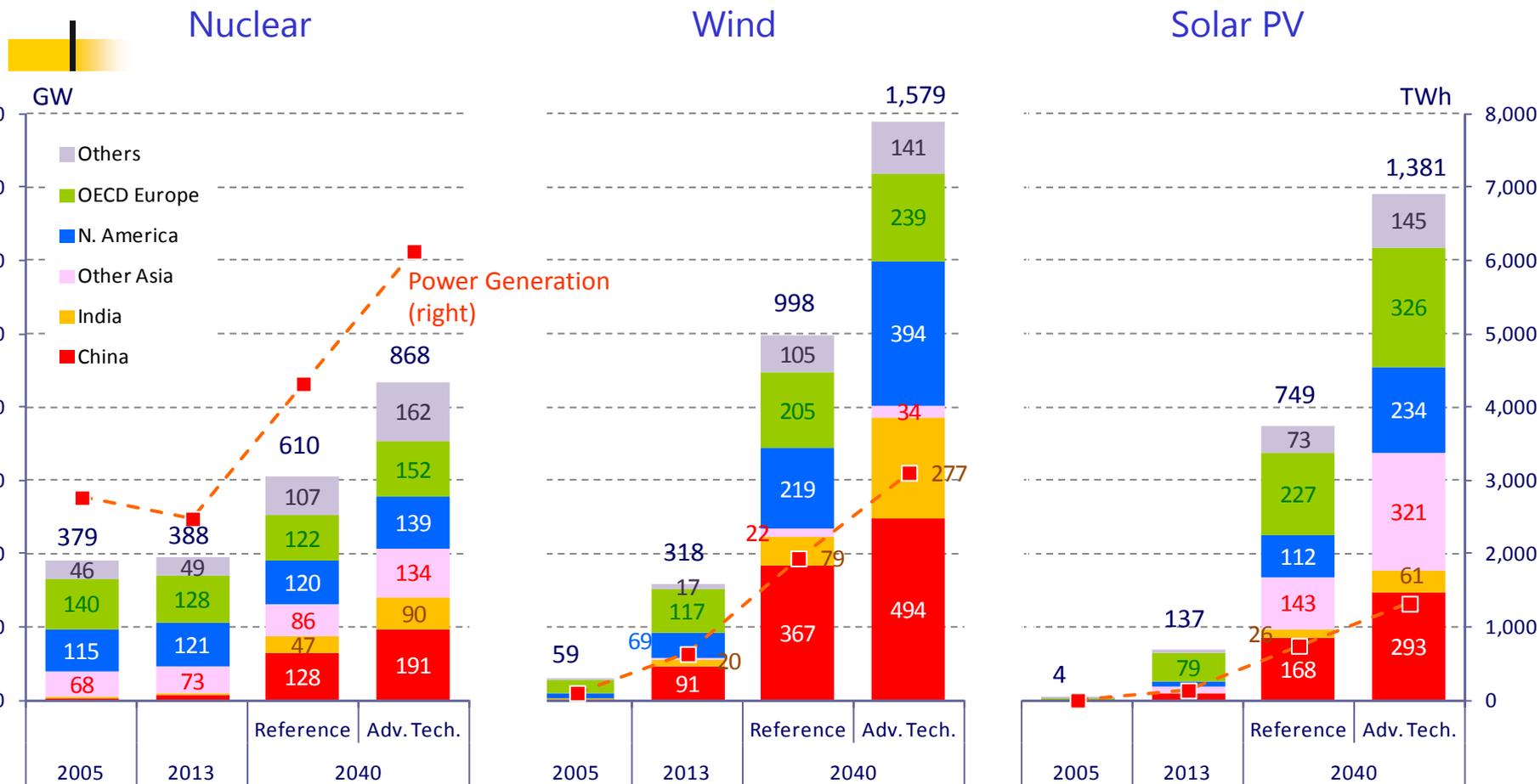


Energy Market Reform in Asia

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- **Japan leads the way, as the country is heading for full scale liberalization of power and gas markets**
 - **Many Asian countries will also need energy market reform, though the respective situations differ greatly.**
 - **The way forward in Asia in this respect includes:**
 - **Reform of state energy enterprises**
 - **Reforms of energy market structure**
 - **Reform of energy price regulations including subsidy rationalization, etc.**
 - **Efficient energy market is important not only for individual domestic market. A well-functioning regional market (for example, for LNG) will be required for Asia as a region.**

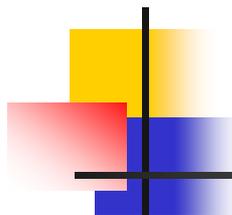


Outlook for nuclear and renewable power capacities

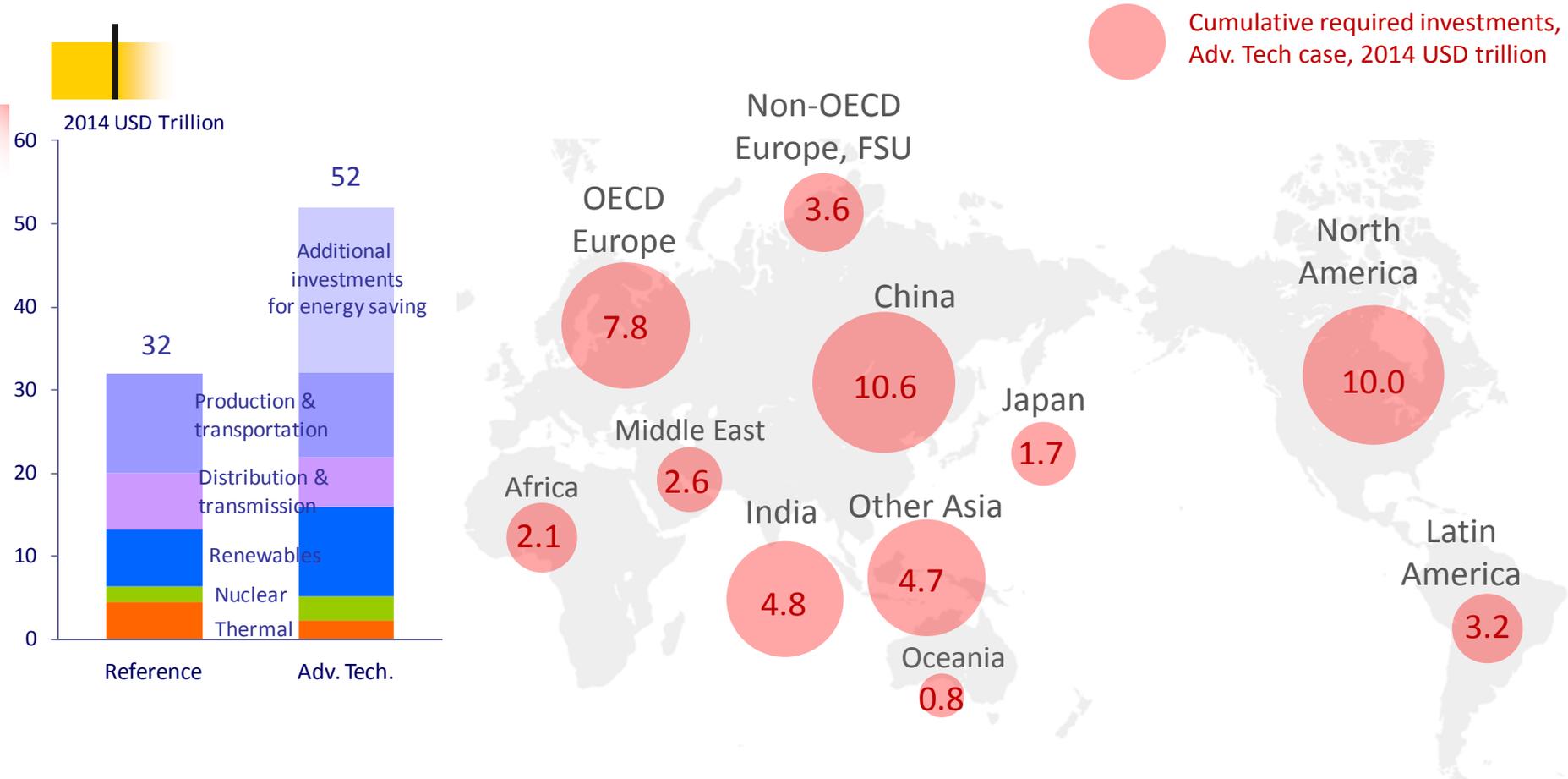


- In the Reference Scenario, global nuclear, photovoltaic generation capacity, and wind power expand 1.6-fold, 3.1-fold, and 5.5-fold, respectively, from 2013 to 2040. In the Advanced Technologies Scenario they are 2.2-fold, 5.0-fold, and 10.1-fold, respectively.
- In particular, expansions in Asia are significant and China and India account for nearly half in all technologies in the Advanced Technologies Scenario.

Importance of “3S” in Asia’s Nuclear

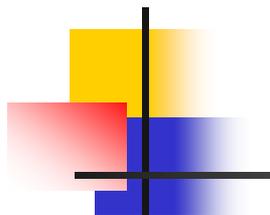
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- Importance of the impact of Fukushima accident in Asian countries.
 - Enhancement of safety and issues related to public acceptance will be a common challenge for all Asian countries with existing nuclear reactors as well as those with constructing and planning new capacity.
 - But nuclear security as well as safeguard will also be very important elements for the development of nuclear power in Asia and the world

Required Capital Investment (cumulative up to 2040)



- On the supply side, while energy supply decreases in the Advanced Technologies Scenario, investments on renewable energy (etc.) expand and the cumulative investments up to 2040 are the same level as the Reference Scenario.
- On the demand side, additional investments of over 20 trillion USD are required for energy savings. Asian countries, including China and India, account for 42% of the additional investments.

Conclusion

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- **Asia's presence and importance in global energy market is expected to continue to rise**
 - **Asia faces multiple energy-environment challenges.**
 - **Asian countries are embarking on full-fledged energy-environment strategy to address the challenges.**
 - **Domestic energy-environment strategy is a key building block for individual country.**
 - **International strategy including energy cooperation is expected to play an important role as a complement to individual and unilateral strategy**
 - **Long term investment is indispensable, with challenges and opportunity for all the stakeholders**