

### What can we do together for Energy Security & Sustainability In the 21st Century?

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### A Time of Unprecedented Uncertainties.

- Will global economic crisis continue?
- Will political unrest in producing regions make oil market tighter?
- Is Golden age of Gas a solution for security?
- How about mainstreaming of Renewable Energy for security?
- Climate Change Mitigation: what does this mean for energy security?
- Growing Asian economies will shape the global energy future – where will their policy decisions lead us ?
- What is the implication of Fukushima Nuclear accident to the global energy security?

# Asian emerging economies continue to drive global energy demand

Growth in primary energy demand

### **IEA WEO 2011**



Global energy demand increases by one-third from 2010 to 2035, with China, India and other Asia accounting for two thirds of the growth

# Natural gas & renewables become increasingly important

World primary energy demand



Renewables & natural gas collectively meet almost two-thirds of incremental energy demand in 2010-2035

**IEA WEO 2011** 

# Changing oil import needs are set to shift concerns about oil security



US oil imports drop due to rising domestic output & improved transport efficiency: EU imports overtake those of the US around 2015; China becomes the largest importer around 2020

**IEA WEO 2011** 

### Asian demand for gas grows much faster.

Figure 2.18 • Natural gas demand and the share of imports by region in the New Policies Scenario, 2009 and 2035 800 bcm Imports 700 Domestic production 600 -500 **IEA WEO 2011** 400 -300 -200 -100 0 -2009 2035 2009 2035 2009 2035 2009 2035 2009 2035 2009 2035 United States Japan **European Union** China India Other Asia

Note: Other Asia had net natural gas exports of 56 bcm in 2009.

China's demand is 97 BCM in 2009, same as Germany, In 2035 it grows to 502 BCM same as Europe as a whole in 2009

### Power investment focuses on low-carbon technologies but it is costly.

Share of new power generation and investment, 2011-2035



Renewables are often capital-intensive, representing 60% of investment for 30% of additional generation, but bring environmental benefits & have minimal fuel costs

### The door to 2°C is closing, but will we be "locked-in"?

### WORLD ENERGY OUTLOOK



Without further action, <u>by 2017</u> all CO<sub>2</sub> emissions permitted in the 450 Scenario will be "locked-in" by existing power plants, factories, buildings, etc

### Second thoughts on nuclear would have far-

### reaching consequences in Security

### **IEA WEO 2011**

- "Low Nuclear Case" examines impact of nuclear component of future energy supply being cut in half
- Gives a boost to renewables, but increases import bills, reduces diversity & makes it harder to combat climate change
- By 2035, compared with the New Policies Scenario:
  - coal demand increases by twice Australia's steam coal exports
  - > natural gas demand increases by two-thirds Russia's natural gas net exports
  - Renewables power increases by 550TWh = 5 times of RE in Germany
  - power- sector CO<sub>2</sub> emissions increase by 6.2%
- Biggest implications for countries with limited energy resources that planned to rely on nuclear power. Japan needs to import 30 BCM of gas and 50kbd of oil if all nuclear power stations stop. (It means \$40 Billion .)

## Germany may needs much more Gas to phase out Nuclear by 2022



Germany needs to import 16 BCM of gas to achieve electricity mix with 10% demand reduction, no nuclear, 35% renewables and CO2 at the target level

## **Power grid in Europe**



Source : IEA "Electricity Information 2010" Indicative value for Net Transfer Capacities (NTC) in Continental Europe

## Power grid in Japan



Source: Agency for Natural Resources and Energy, The Federation of Electric Power Companies of Japan, Electric Power System Council of Japan, The International Energy Agency

### **Energy mix as Energy Security Mix**



Nuclear is an important option for countries with limited indigenous energy resources (low energy sustainability).

### **Does current IEA system continue to work?**



#### IEA stockholding cover of global oil demand

#### Growing share of non-OECD oil demand results in declining global demand cover from IEA oil stocks

### Russia's focus will move to the East



An increasing share of Russian exports go eastwards to Asia, providing Russia with diversity of markets and revenues

#### Current and Future routes of China's Importation of Oil and Gas



Overseas Investments by Chinese National Oil Companies: Assessing the Drivers and Impacts

## Connecting MENA and Europe: Desertec as "Energy for Peace"



### **Existing and proposed ASEAN Power Grid** Interconnections



The boundaries and names shown and the designations used on maps included in this publication do not imply official endorsement or acceptance by the IEA.

### Energy for Peace in Asia? A New Vision



Presentation by Mr. Masayoshi SON

One cannot enhance energy security by risking someone else 's: EU and Japan can work together for,,,

-Energy Security for the 21st Century must be Comprehensive Electricity Supply Security with Diversified sources, such as oil, gas, renewables, cleaner coal and safer nuclear, under sustainability constraints.

-EU Model of Collective Energy Security can be applied to the growing Asia.

•Enlarge IEA's oil emergency preparedness to Asia and other fuels

Develop Regional Power Grid interconnection & Gas Pipelines

-Deploy a green growth paradigm by Efficiency, decentralized Renewables, EVs, Smart Grids, Storage, etc.

-New technologies help; hydrogen economy, Methane-hydrate, 4G Nuclear power, Super-conductivity grid, CCUS, etc.

-Develop unconventional gas resources and infrastructure.

-For coal to remain the backbone of power supply, CCS readiness & highly efficient power plants are needed.

-Japan's role after Fukushima: Share the lessons learned for safer Nuclear Power deployment in neighboring Asia.

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### **Low Nuclear Case**

### **IEA WEO 2011**

 Table 12.3
 Key projections for nuclear power in the New Policies Scenario and the Low Nuclear Case

	Low Nuclear Case			New Policies Scenario		
	OECD	Non-OECD	World	OECD	Non-OECD	World
Gross installed capacity (GW)						
in 2010	326	68	393	326	68	393
in 2035	171	164	335	380	252	633
Share in electricity generation						
in 2010	21%	4%	13%	21%	4%	13%
in 2035	9%	5%	7%	21%	8%	13%
Gross capacity under construction (GW)*	14	54	69	14	54	69
New additions in 2011-2035 (GW)**	6	84	91	111	167	277
Retirements in 2011-2035 (GW)	176	42	218	71	36	107

\*At the start of 2011. \*\*Includes new plants and uprates, but excludes capacity currently under construction.

### \$39 Trillion and more Investment is needed for energy Infrastructure IEA WEO 2011

**Figure 2.21** • *Qumulative investment in energy-supply infrastructure by region in the New Policies Scenario, 2011-2035* 

![](_page_22_Figure_2.jpeg)