Building a Low-Carbon Future
: Challenges and Opportunities

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COP15 and Results

- 2 weeks, 6 formal meetings, 40,000 registered delegates, 110 Heads of State(Obama, 温家宝‥）
- “It’s now time to launch the lifeboats from the Titanic”
- Everyone knows that there is very little time to reduce GHG emissions if we want to avoid major damages.
- But…..

Major decisions were expected

…but negotiation texts were complicated(and long)

…preceding 2 years of Working Group meetings had:

… documented/not decided the many options

… not tackled the “big” issues

… divided developed and developing countries on the fate of the Kyoto Protocol

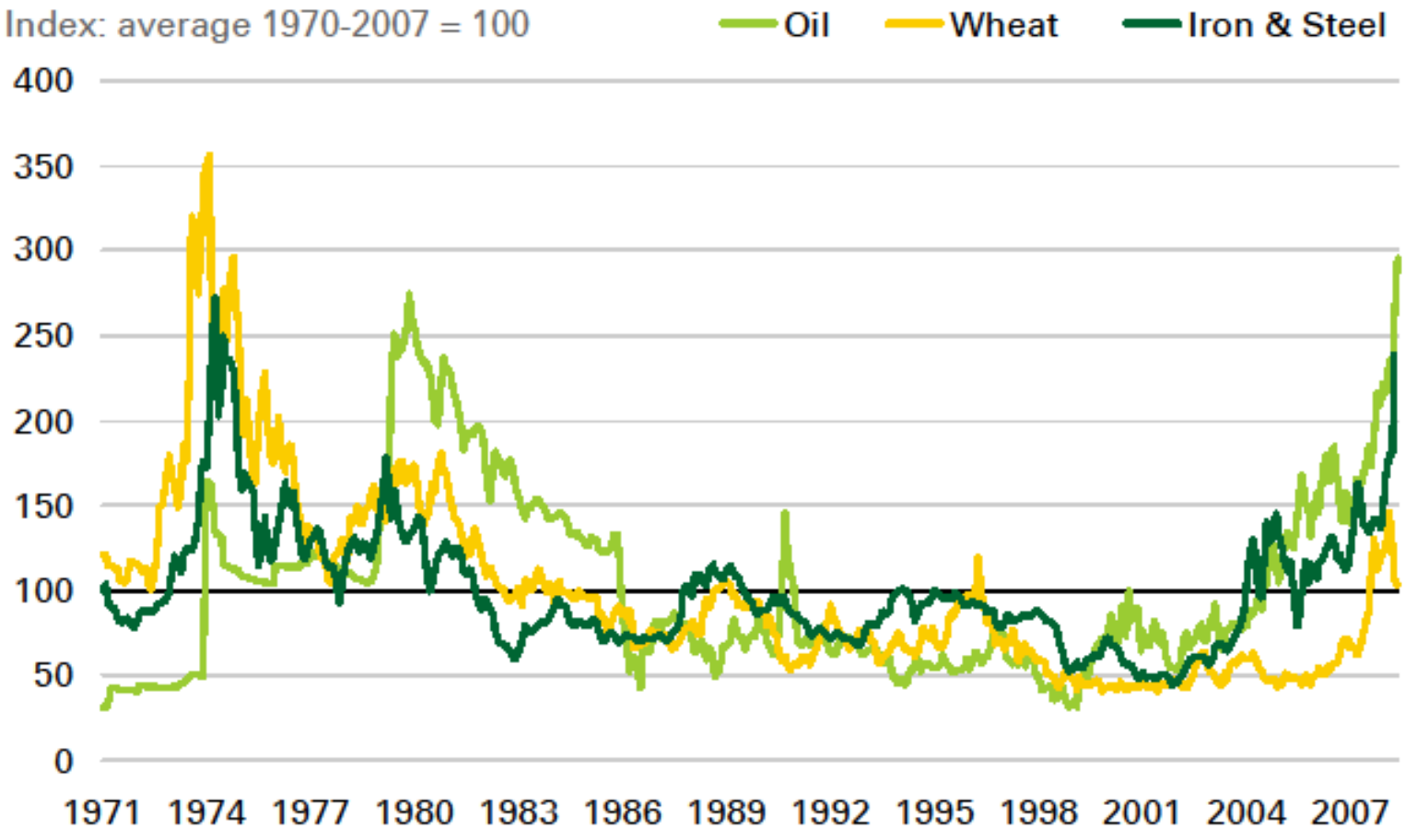
… not decided the “legal status/form” of any new long-term agreement to tackle climate change

AND, no leader emerged to drive the process to conclusion

Global Energy Risks

1. **World energy demand will be expanding at higher speed.**
2. **NEA is the world biggest energy market. In 2005, China overtook Europe in terms of energy consumption and will be, the world biggest energy consumer by 2015.**
3. **High dependency on fossil fuel in Asia may cause another oil shocks in near future.**

Real Commodity Prices



BP Statistical Review of World Energy 2008

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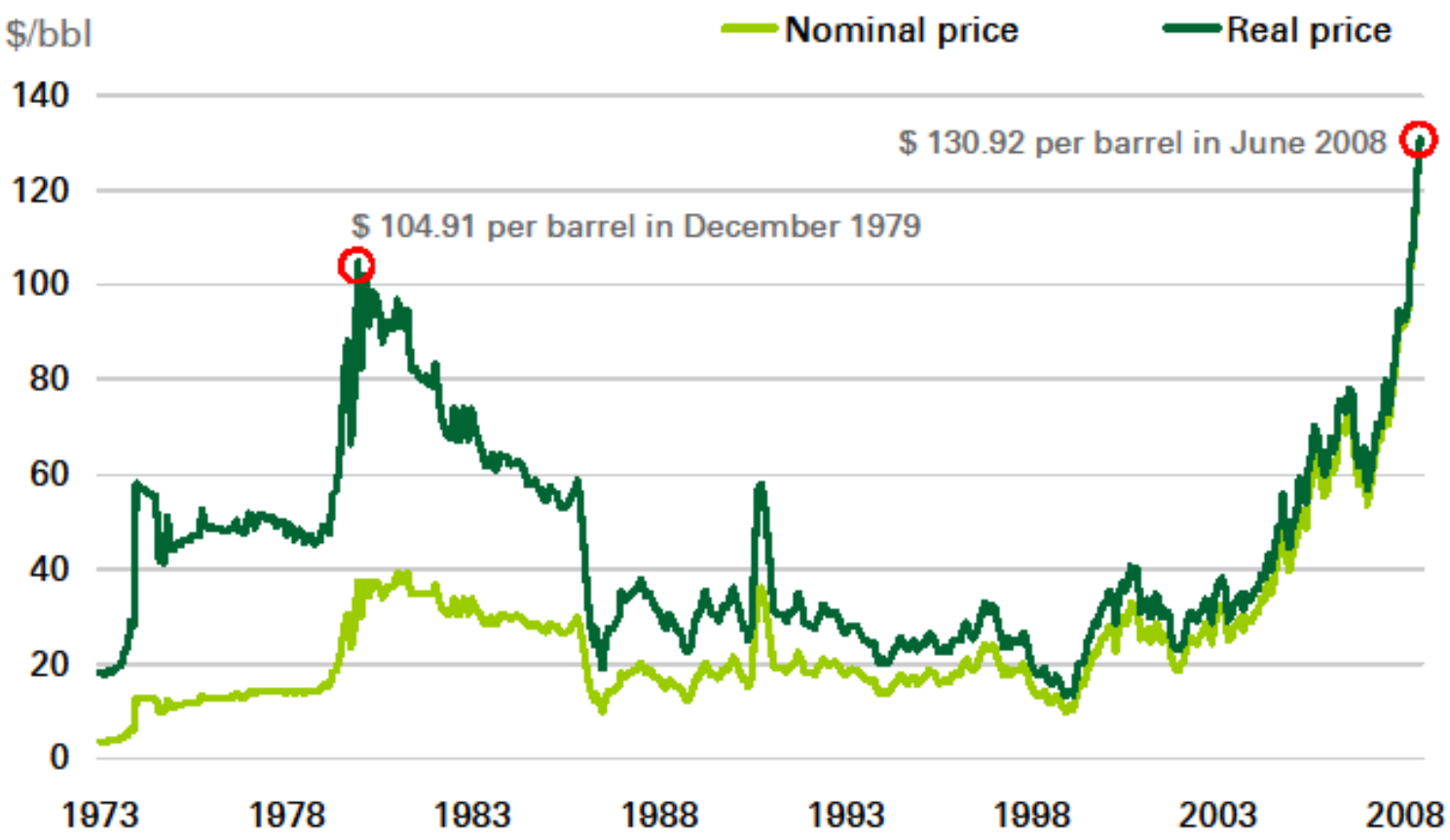
Real and Nominal Crude Oil Price



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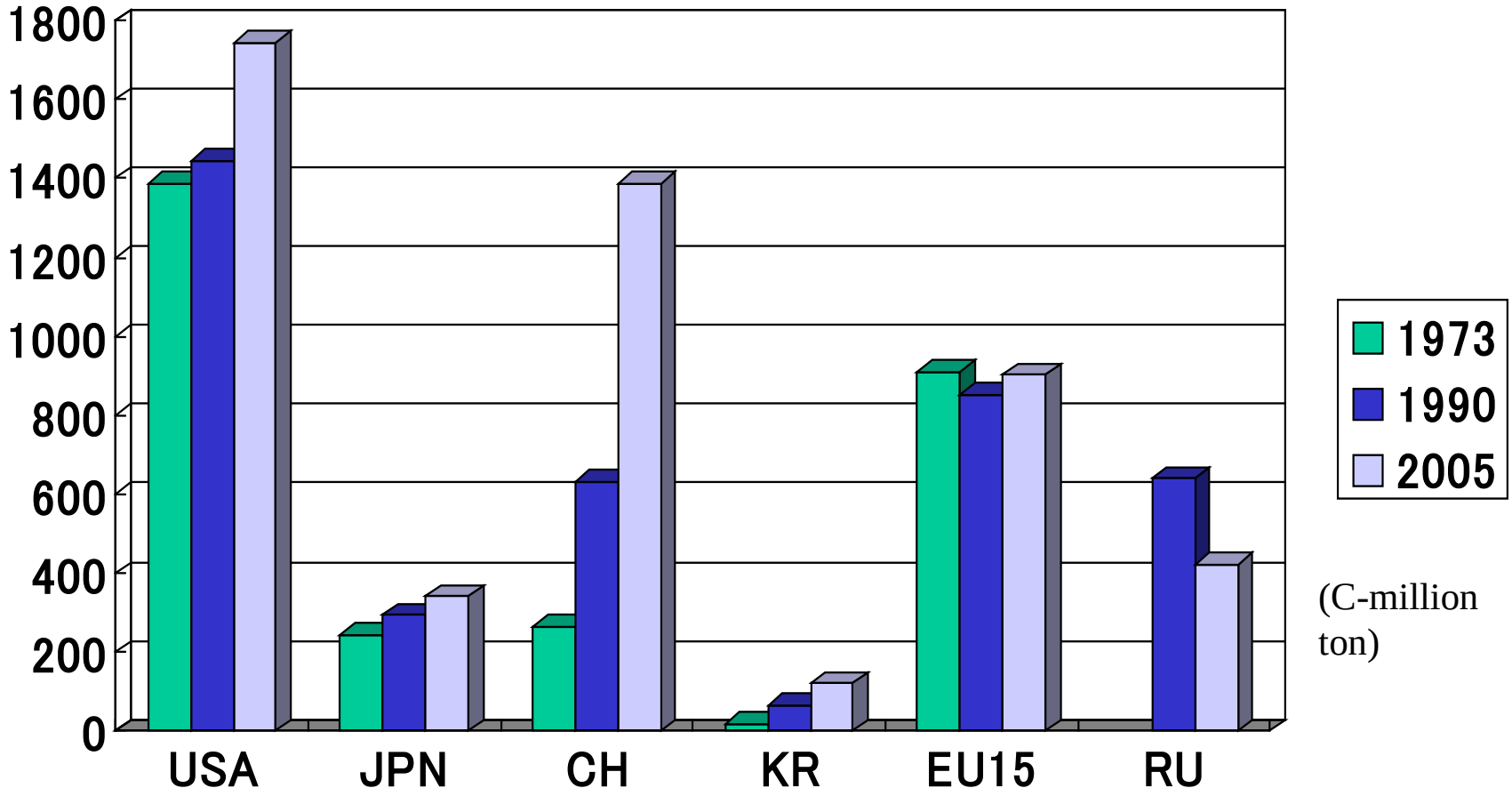
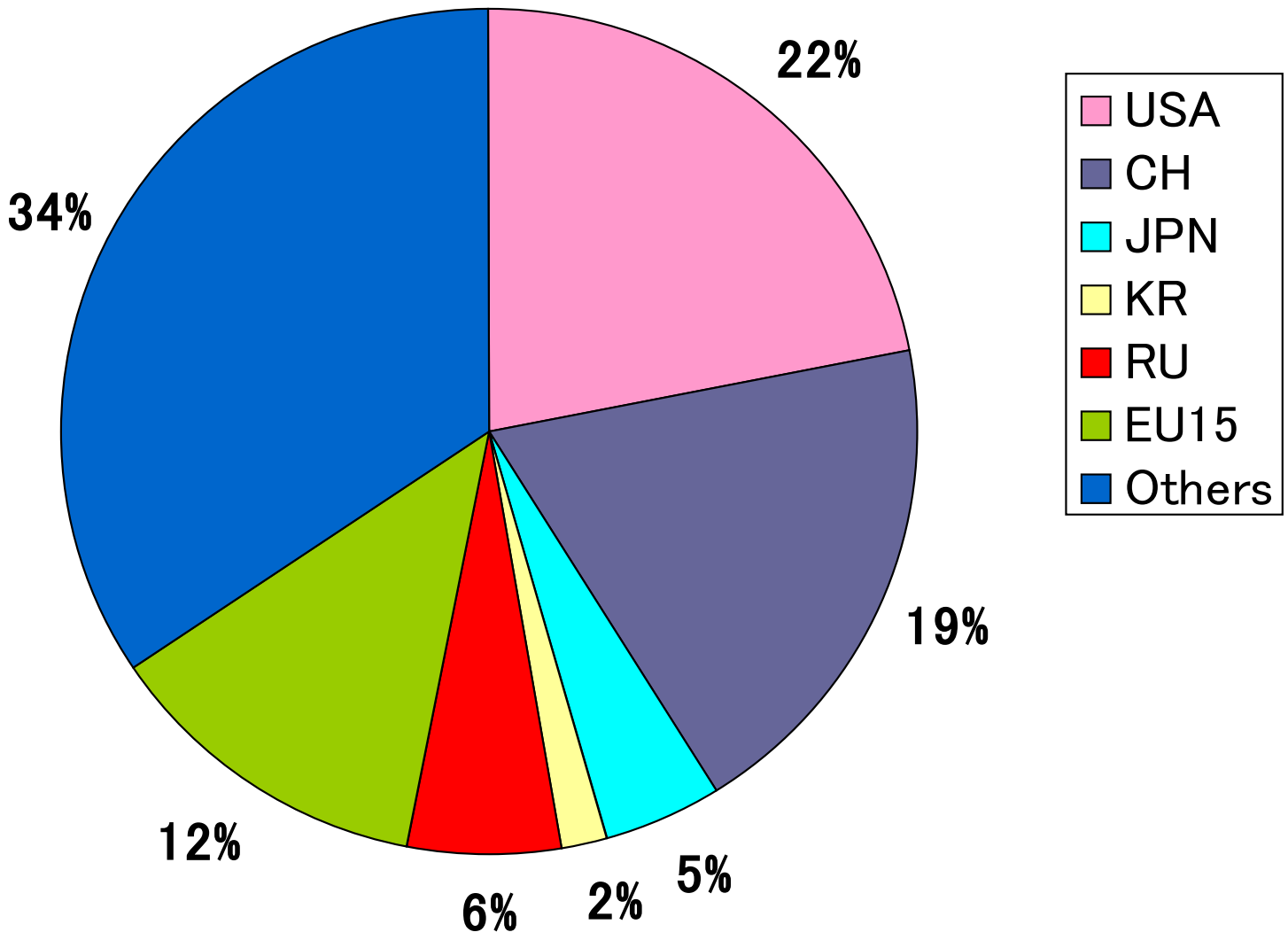
World CO2 Emission



CO2 Emission (2005)



Global Environmental Risks

1. **World CO2 emission will increase more than double by 2050.**
2. **More than 80% of the incremental demand will occur in developing countries.**
3. **China has already overtaken EU and will overtake USA soon in terms of CO2 emissions and NEA share of CO2 emissions will be more than half of the world**

Energy policy in 21st century will be driven by the triple challenge of

- making substantial reduction in emissions of greenhouse gases, such as CO2
- while ensuring a secure supply of energy
- all at reasonable cost to the economy for promoting economic competitiveness

Effectiveness of policies

- Depends on:
  - national circumstances
  - policy design
  - interaction/ complementarity
  - stringency
  - implementation
- Four criteria:
  - environmental effectiveness
  - cost-effectiveness
  - equitable
  - institutional feasibility

Climate change policies

- Regulations and standards(renewable energy obligations, appliance efficiency standards)
- Taxes and charges(CO2/energy tax)
- Tradable permits(ETS)
- Financial incentives(feed-in tariffs, producer subsidies)
- Voluntary agreements
- Information instruments(energy labeling)
- Research and development

Giving CO2 a price is important

- Policies that provide a real or implicit price of carbon create incentives for producers and consumers to significantly invest in low-carbon products and technologies

- Such policies include economic instruments, government funding and regulation

- Not all actors react to price signal

Selected policies, measures and instruments for energy supply sector

Policies, measures and instruments	Key constraints or opportunities
Reduction of fossil fuel subsidies	Resistance by vested interests may make them difficult to implement
Taxes or carbon charges on fossil fuels	
Feed-in tariffs for renewable energy technologies	May be appropriate to create markets for low emissions technologies
Renewable energy obligations	
Producer subsidies	

Selected policies, measures and instruments for transport sector

Policies, measures and instruments	**Key constraints or opportunities**
Mandatory fuel economy, bio-fuel blending and CO2 standards for road transport	Partial coverage of vehicle fleet may limit effectiveness
Taxes on vehicle purchase and registration and road and parking pricing	Effectiveness may decrease with higher incomes
Influence mobility needs through infrastructure planning	Particularly appropriate for countries that are building up its transportation systems
Investment in attractive public transport facilities	

Selected policies, measures and instruments for building sector

Policies, measures and instruments	**Key constraints or opportunities**
Appliance standards and labeling	Periodical revision of standards needed
Building codes and certification	Attractive for new buildings
DSM programs	Need for regulations so that utilities may profit
Public sector procurement	Government purchasing may expand demand for energy-efficient goods
Incentives for ESCOs	Access to third party financing

Climate policy alone will not solve the climate change problem

- Macro-economic policy : taxes, subsidies, other fiscal policies
- Government procurement policy : low carbon product preference
- Trade policy : removing barriers for low-carbon products
- Energy security policy : efficient energy use
- Air quality policy : clean fuel
- Bank lending policies : lending for efficiency/renewables
- ETC

The Road to Reduce CO_2 Emission

CO_2=(CO_2/ENERGY)(ENERGY/GDP)(GDP)

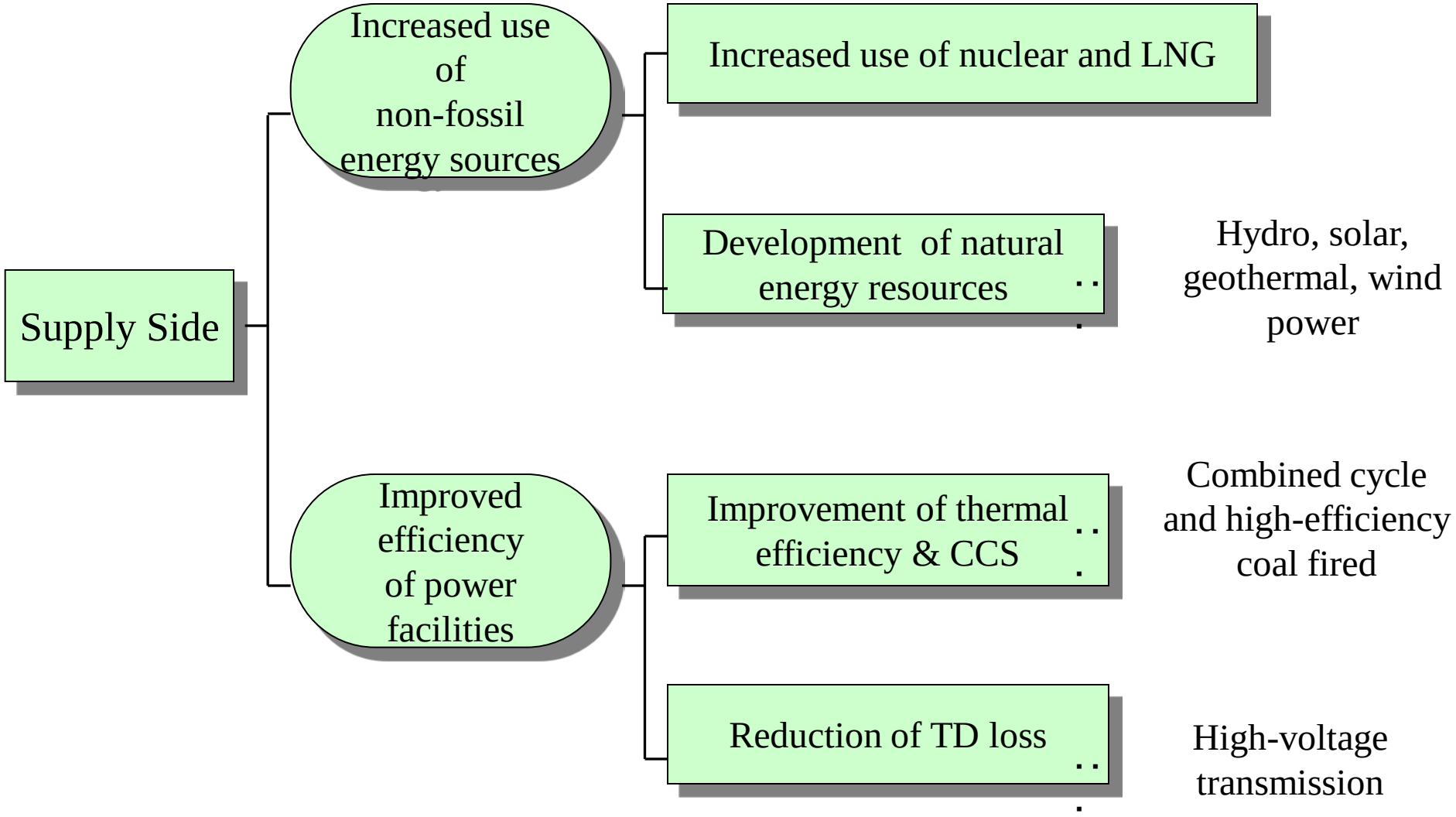
↓

1. Energy Efficiency Up →Fuel Efficiency & Industrial Structure
2. Fossil Fuel Dependence Down→Fuel Choice → Natural Gas & Nuclear & RES
3. Economic Growth Down

Electricity is expected to play very important roles to solve the triple challenge

- on the supply side, potential advances in power generation technology and CCS
- on the demand side, advances in efficient electro-technologies such as heat pumps and the potential of electricity in transport, such as shinkansen, light rail, EV etc
- both will help to reduce carbon emissions and boost energy supply security

CO2 Control Measures by Power Sector



A carbon-neutral power supply delivered through a properly functioning competitive energy market will be a key part of the solution to the great energy climate challenges.

We need to investigate the impact of different demand- and supply-side policies and technologies through quantitative modeling and scenario building, so that we can create a roadmap to a carbon-neutral power supply by mid-century, taking account of time scales for expansion of RES uptake, deployment of CCS and further use of nuclear power.

Natural gas : a quick way to cut CO2 emissions and to secure energy in NEA

- RES, such as solar and wind power, unstable supply: careful evaluation of its impact of RES integration on power market, smart grid is final solution?
- Huge gas fields are close by NEA, such as Russia Far East, Australia, SEA and CA
- Almost the entire power generation fleet in

JPN and KR will need to be replaced. Conventional coal-fired to be replaced by latest gas combined cycle to cut CO2 emissions by more than half.

Climate change is a long-term issue, which will need to be tackled over the next 50 years or more.

But if we delay our actions, our cumulative emissions will require steeper reductions and lead to higher costs.

Any actions to tackle with the challenge needs huge investment and international cooperation.

Global energy-climate challenges require a global approach