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Substitute of Nuclear Energy Supply- A Strategic Policy Decision for Japan

(A preliminary assessment of Japanese energy market)

原子力エネルギー供給の代替 - 日本の戦略的政策決定
(日本のエネルギー市場の予備調査)

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Outline
アウトライン

- Background and research objectives
- Preliminary findings
- Way forward

Cross road of energy policy for Japan
日本のエネルギー政策の分かれ道

- Nuclear energy has become an important energy option for Japan.
- Energy supply security is increasingly becoming a major concern for Japan.
- Climate change and global warming deterring the sustained growth and development.
- Japan's nuclear accident at Fukushima is a lesson for all in Asia.
- Japan is now standing on a policy cross road. Which way to go?

Major objective of this study
本研究の主要な目的

- To estimate the impact of reduction and substitution of nuclear energy supply in Japan by renewable energy, energy efficiency and conservation and/ or by advanced technologies like CCS and IGCC.

Research questions of this study
本研究の問い

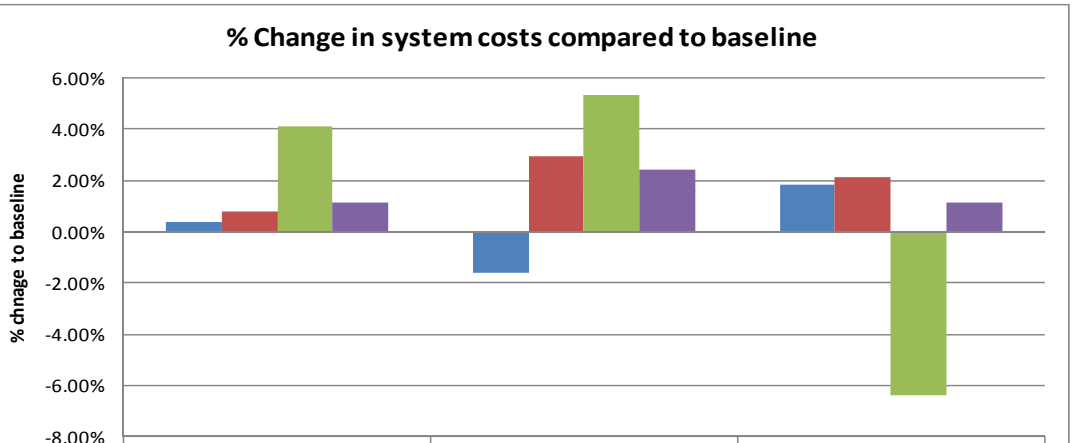
- What will be the total system cost?

  (Total net present value of the stream of annual costs discounted at the rate of 5% to the reference year of 2000)
- What will be the electricity generation cost in the country?
- What will be the electricity supply portfolio of the country?
- What will be the impact on GHG emissions reduction target?

Study scenarios
シナリオ研究

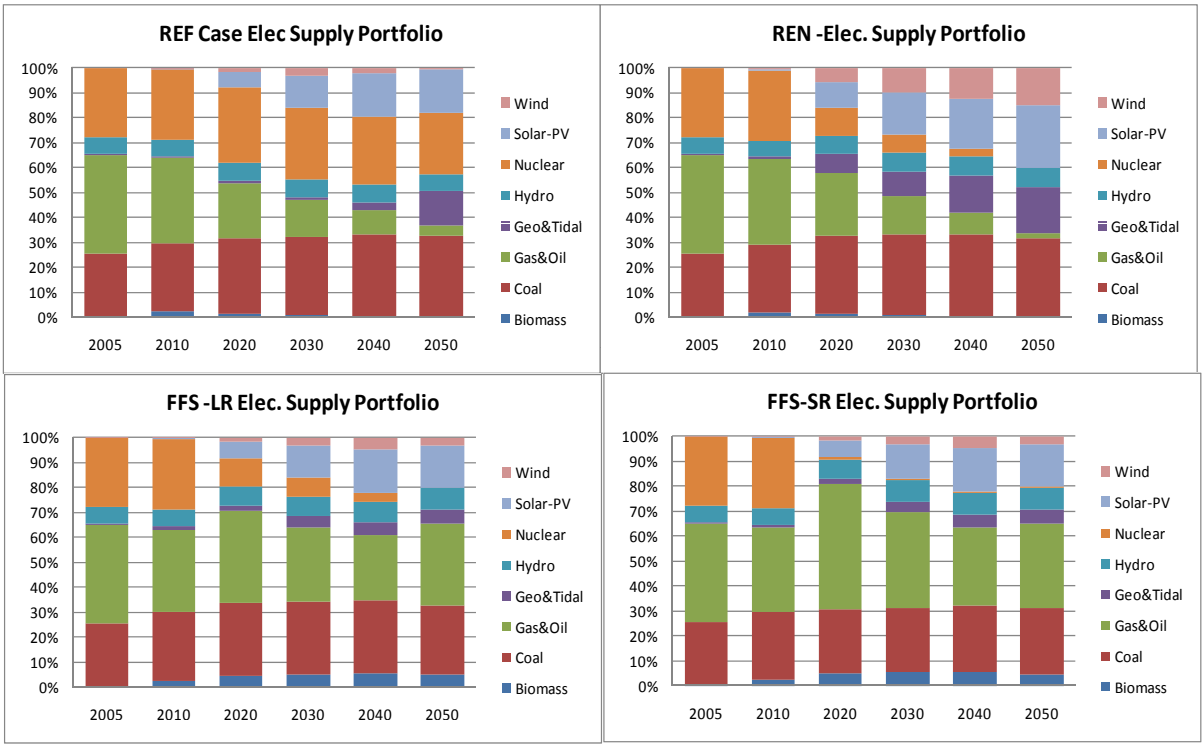
Policy Scenarios	Descriptions
1. Reference energy scenario (REF):	Represents the reference energy system calibrated to 2005 and projected until 2100. (no targets imposed)
2. Fossil fuel scenario – Long Run (FFS-LR):	Nuclear power supply gradually goes off from the supply mix by 2050 with no CCS/IGCC intervention.
3. Fossil fuel scenario – Short Run (FFS-SR):	Very aggressive cut off of all nuclear power supply by 2015 with no CCS/IGCC intervention.
4. Renewable Energy Scenario (REN)	Deliberate introduction of 15% wind and 25% solar energy supply of total electricity supply by 2050. Geothermal restricted to only 10% until 2050.

Preliminary findings: System Cost
予備調査結果：システム費用

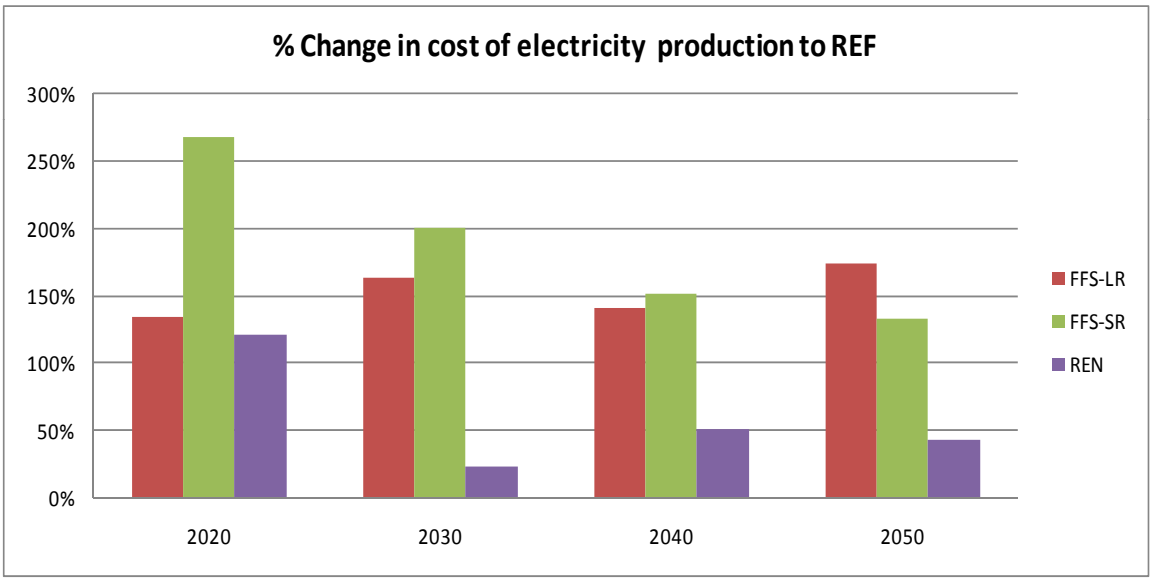


	JPN_FFS_LR	JPN_FFS_SR	JPN_REN_LR
FIX	0.35%	-1.60%	1.83%
INV	0.82%	2.93%	2.15%
VAR	4.10%	5.36%	-6.37%
Total	1.11%	2.41%	1.12%

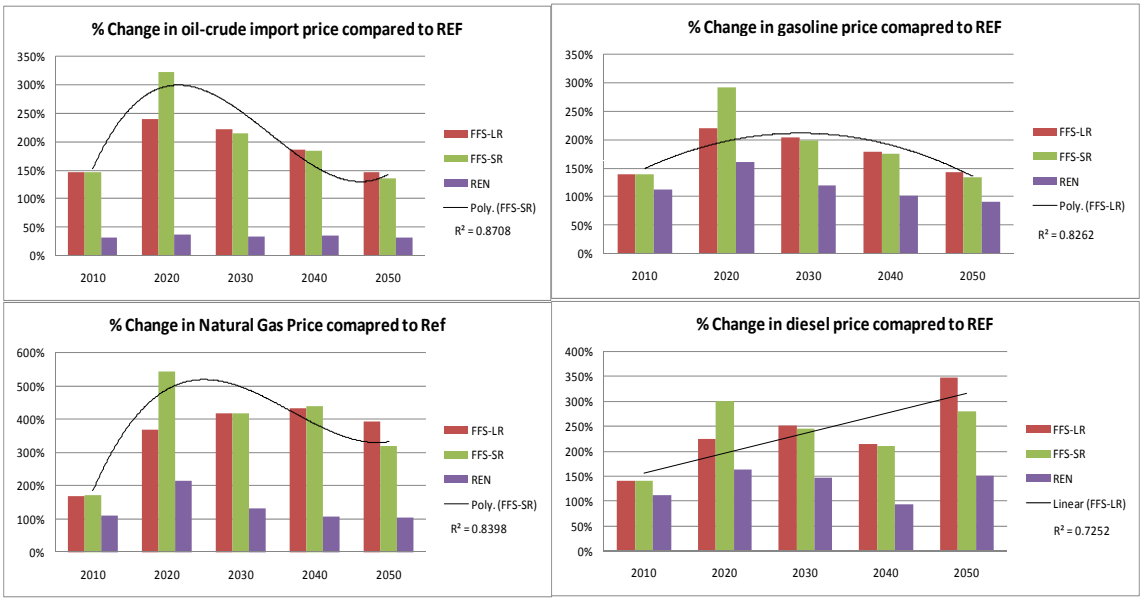
Preliminary findings: Electricity Supply Portfolio
予備調査結果：電力供給ポートフォリオ



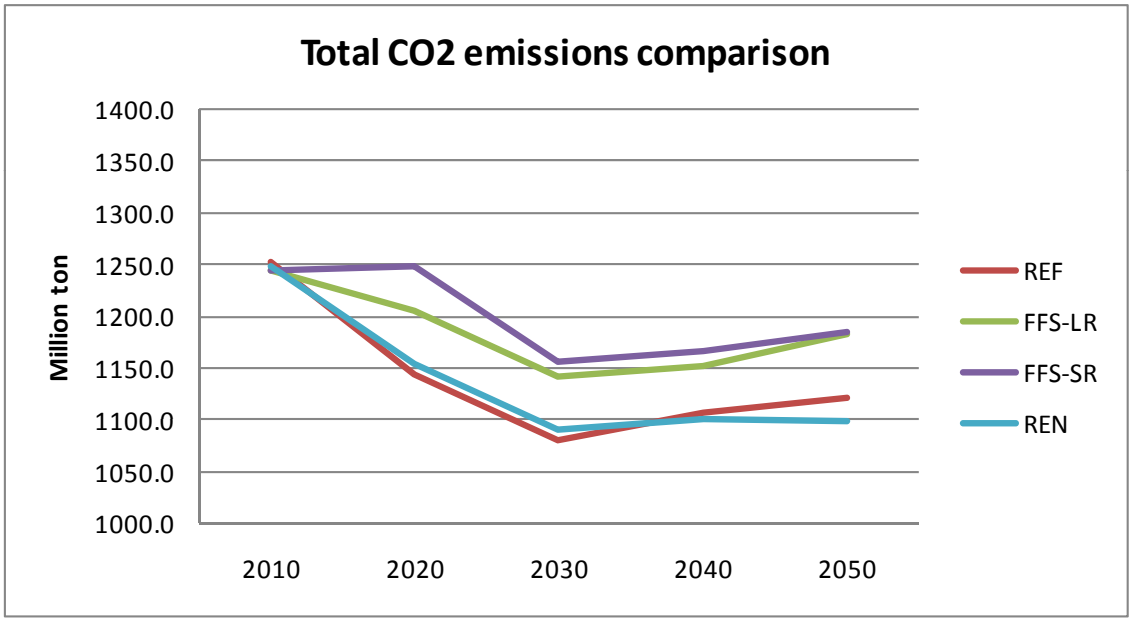
Preliminary findings: Electricity production cost
予備調査結果：電力 生産コスト



Preliminary findings: Fuel price changes in the market
予備調査結果：燃料価格は市場で変動



Preliminary findings: CO_2 Emissions
予備調査結果：二酸化炭素排出



Conclusions
結論

❖ Japan may go forward with no-nuclear option but the financial burden of system development will be generated. It appears that use of existing facilities to full capacity can reduce the additional investment burden in the short run. Renewable energy scenario is expected to have much lesser financial impact.

❖ Japan needs to develop its base load alternatives like geothermal and tidal to substitute nuclear. Solar and Wind appears intermittent compared to nuclear power supply. More aggressive renewable energy policy is required.

❖ Retail power price is expected to increase under both the scenarios. Fossil fuel scenarios will increase the crude and gas import burden and subsequent cost of supply.

❖Japan needs to restructure and deregulate its electricity market to bring in more flexibility in supply.

Thank you for your kind attention!

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