

Students' Workshop

6th GSDM International Symposium

Towards a Sustainable Energy Mix in Northeast Asia

Day 1: 16:00-18:30, 25th February 2019

Day 2: 9:00-11:00, 27th February 2019

SMBC Academia Hall, 4F International Academic Research Building, the
University of Tokyo.

Meet the students

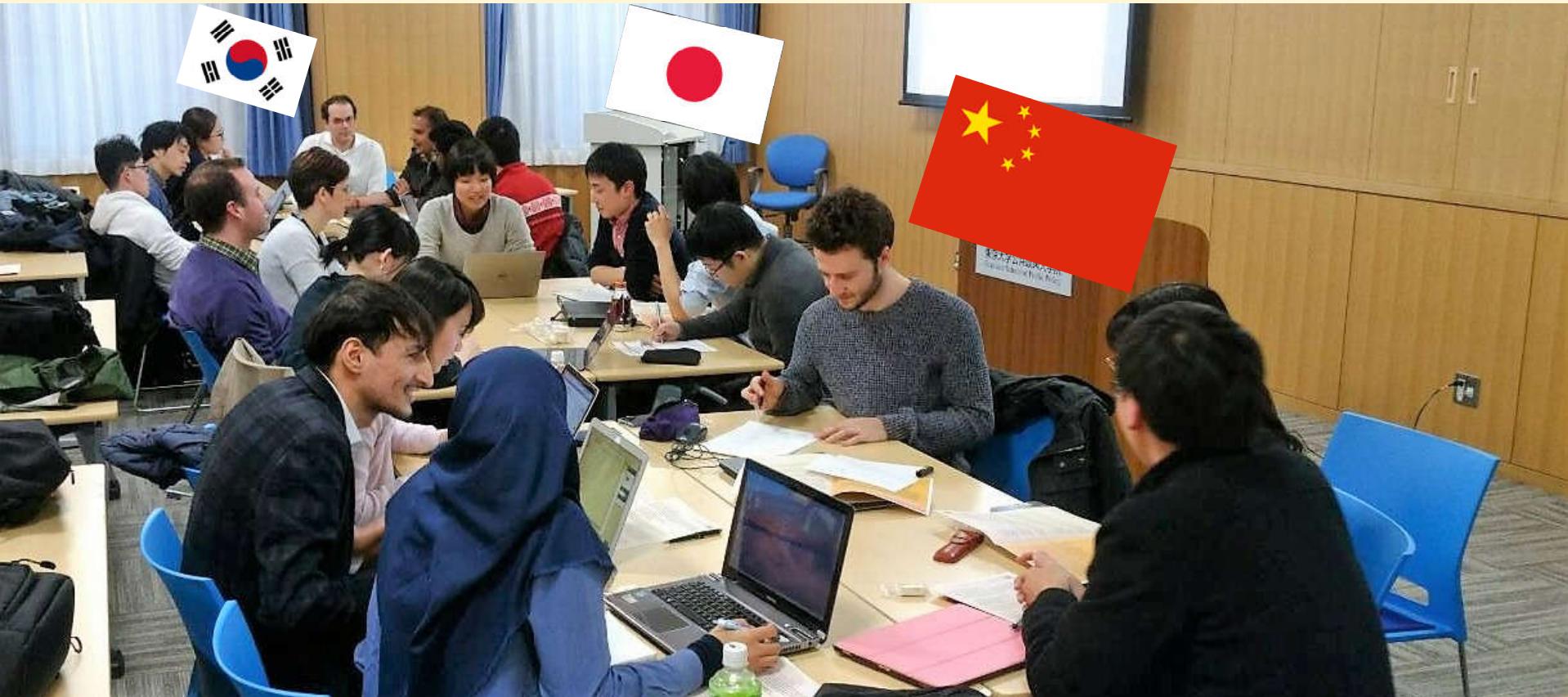


22 GSDM Students from:

Graduate School of Frontier Sciences: Department of Computational Biology and Medical Science.
Engineering: Civil Engineering, Aeronautics and Astronautics, Mechanical Engineering, Systems Innovation. **Graduate School of Public Policy.** **Graduate School of Agriculture and Life Science:** Agricultural and resource economics / Global Agriculture Science



Three Countries, Three Groups



Three definitions of “sustainable energy mix”

Japan Group:

An energy mix which produces zero carbon emissions through economically viable self-sufficient green technologies and the phased elimination of fossil fuel consumption.

China Group:

An energy mix which uses renewable energies to maintain China's regional economic supremacy through technological innovation while at the same time developing an environmentally-friendly society.

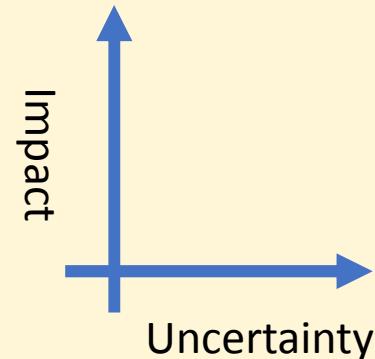
South Korea Group:

An energy mix that is socially acceptable, equitable, economically viable for the Korean people, and aligned with Korea's national security interests and goals of climate change mitigation.



Listing the trends

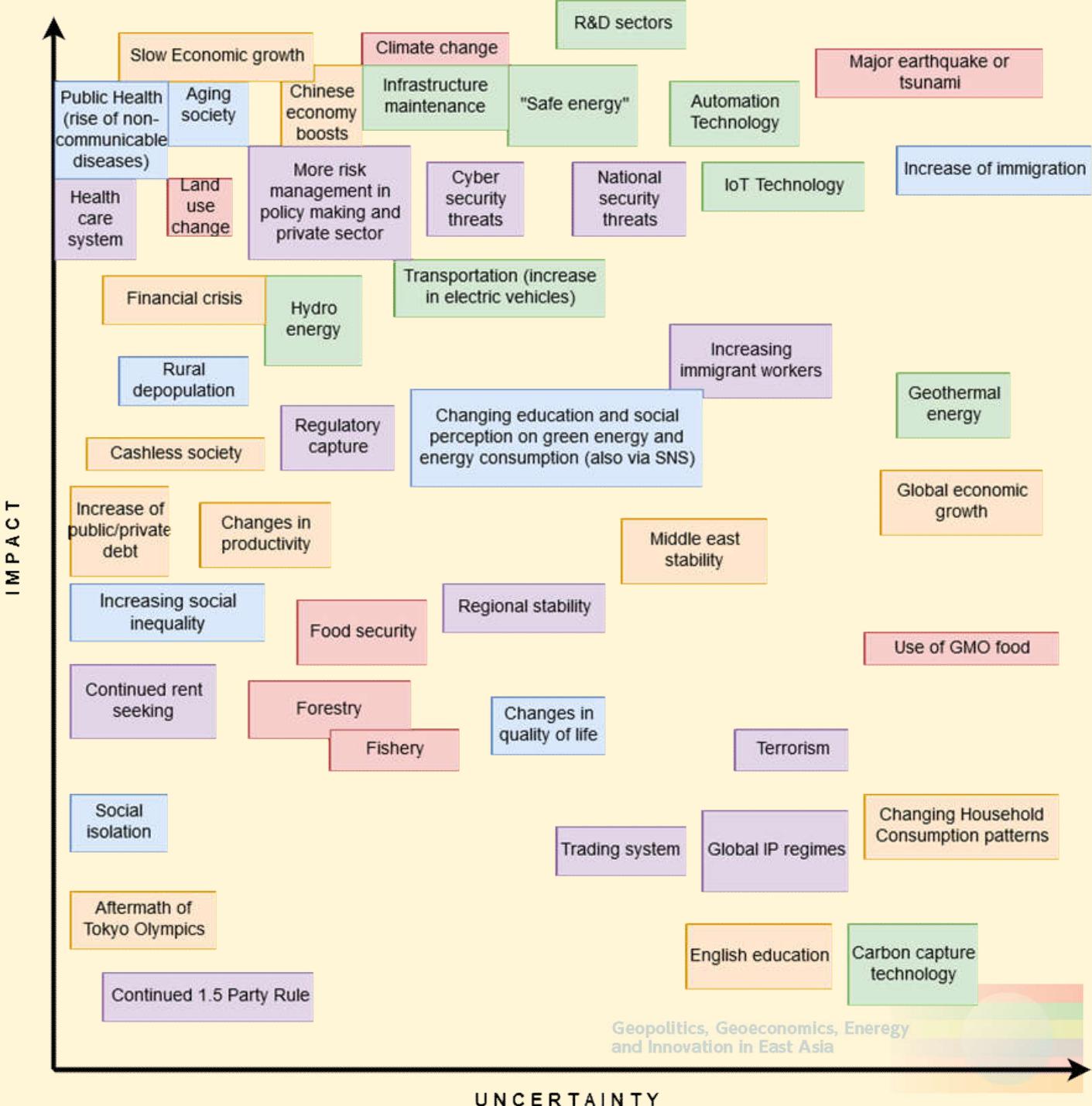
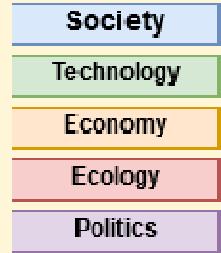
- S) Social factors, values and demography,**
- T) Technological development and innovation,**
- E) Economy and private sector,**
- Env) Environment and ecology,**
- P) Politics, laws and regulations.**



After having listed the trends, each group placed the trends on a two dimensional matrix based on potential impact and degree of uncertainty.



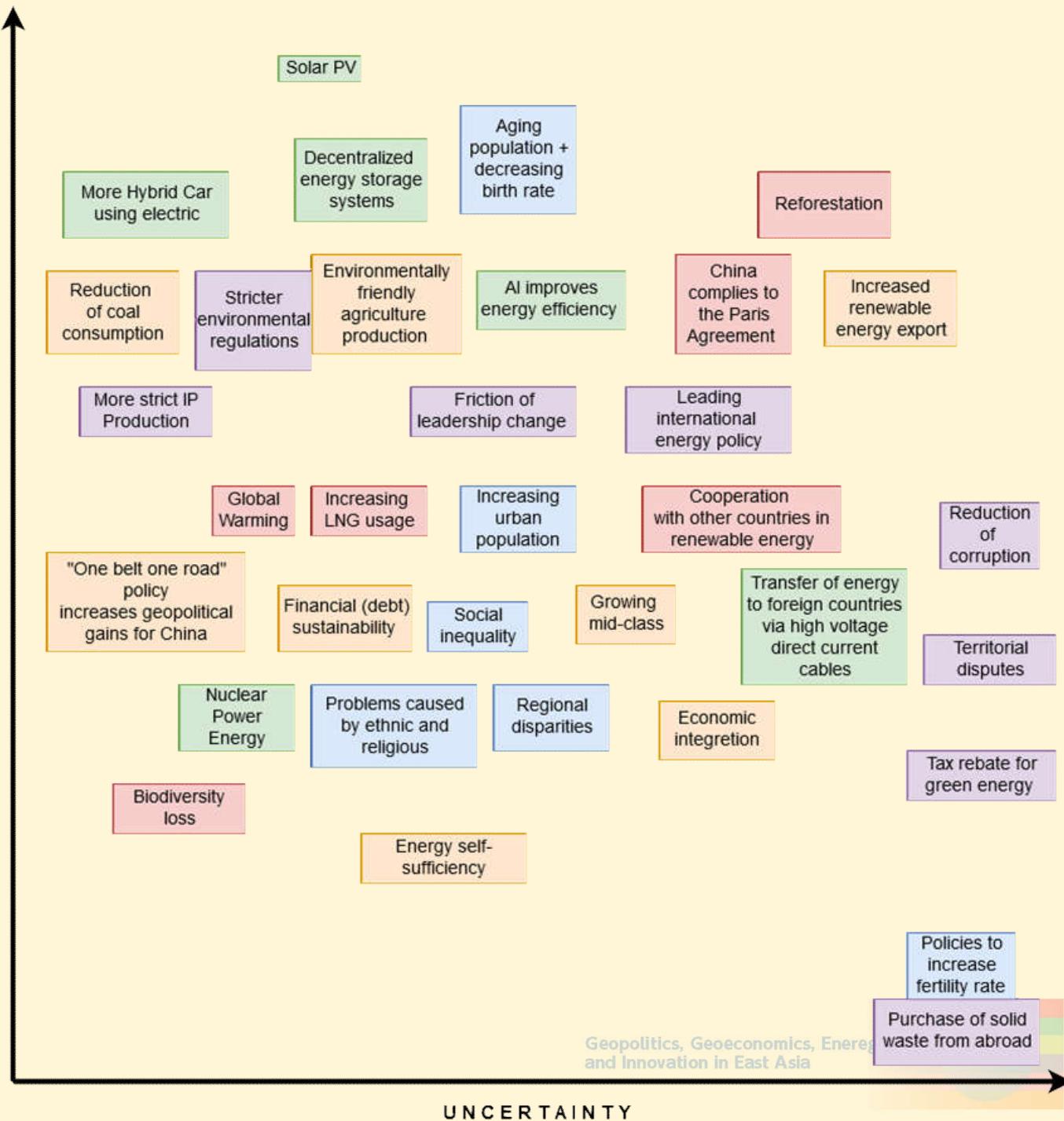
Japan 2040: List of Trends



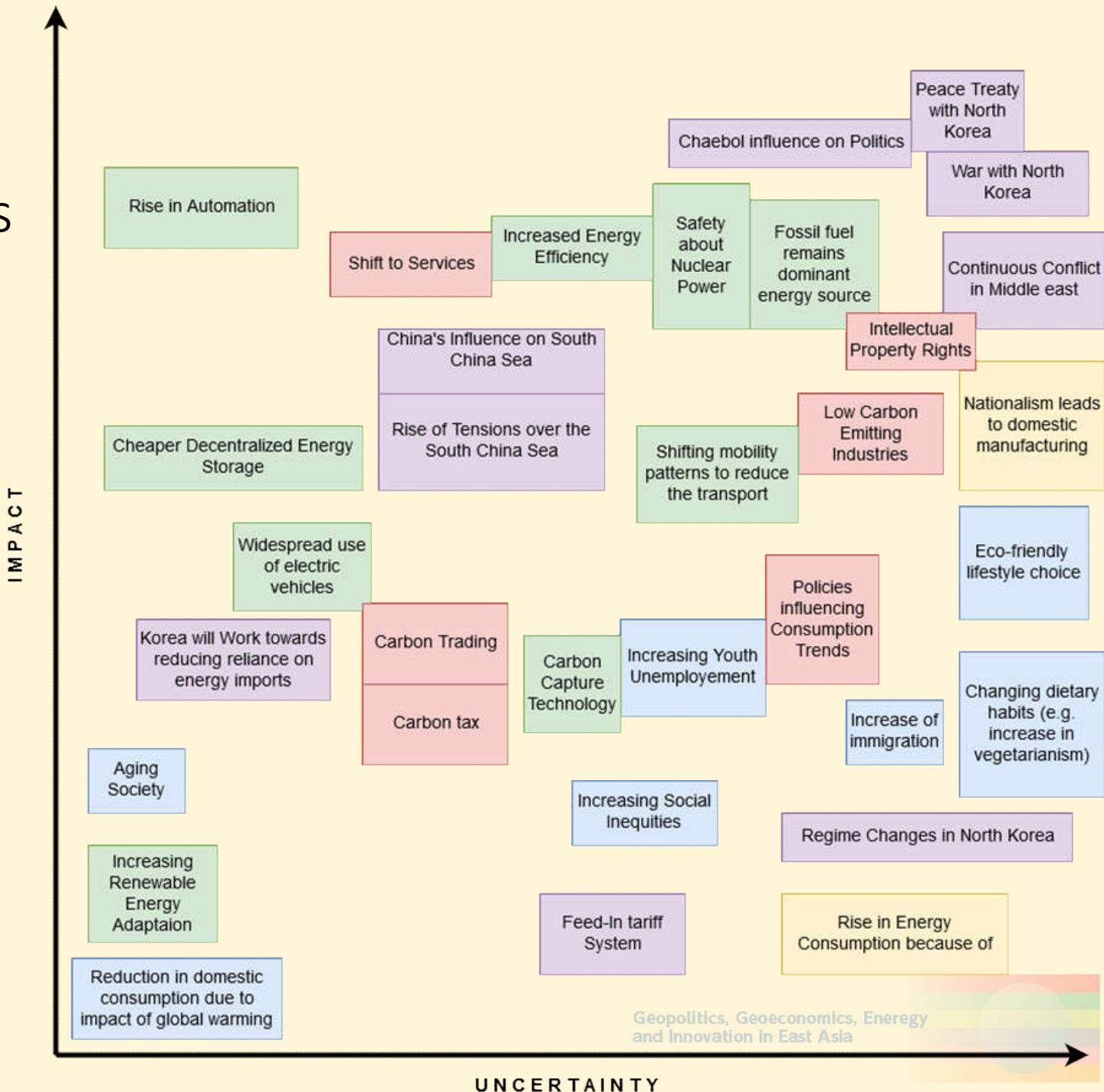
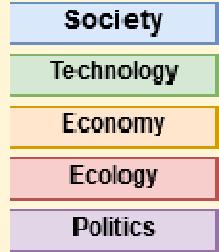
China 2040: List of Trends

Society
Technology
Economy
Ecology
Politics

IMPACT



Korea 2040: List of Trends



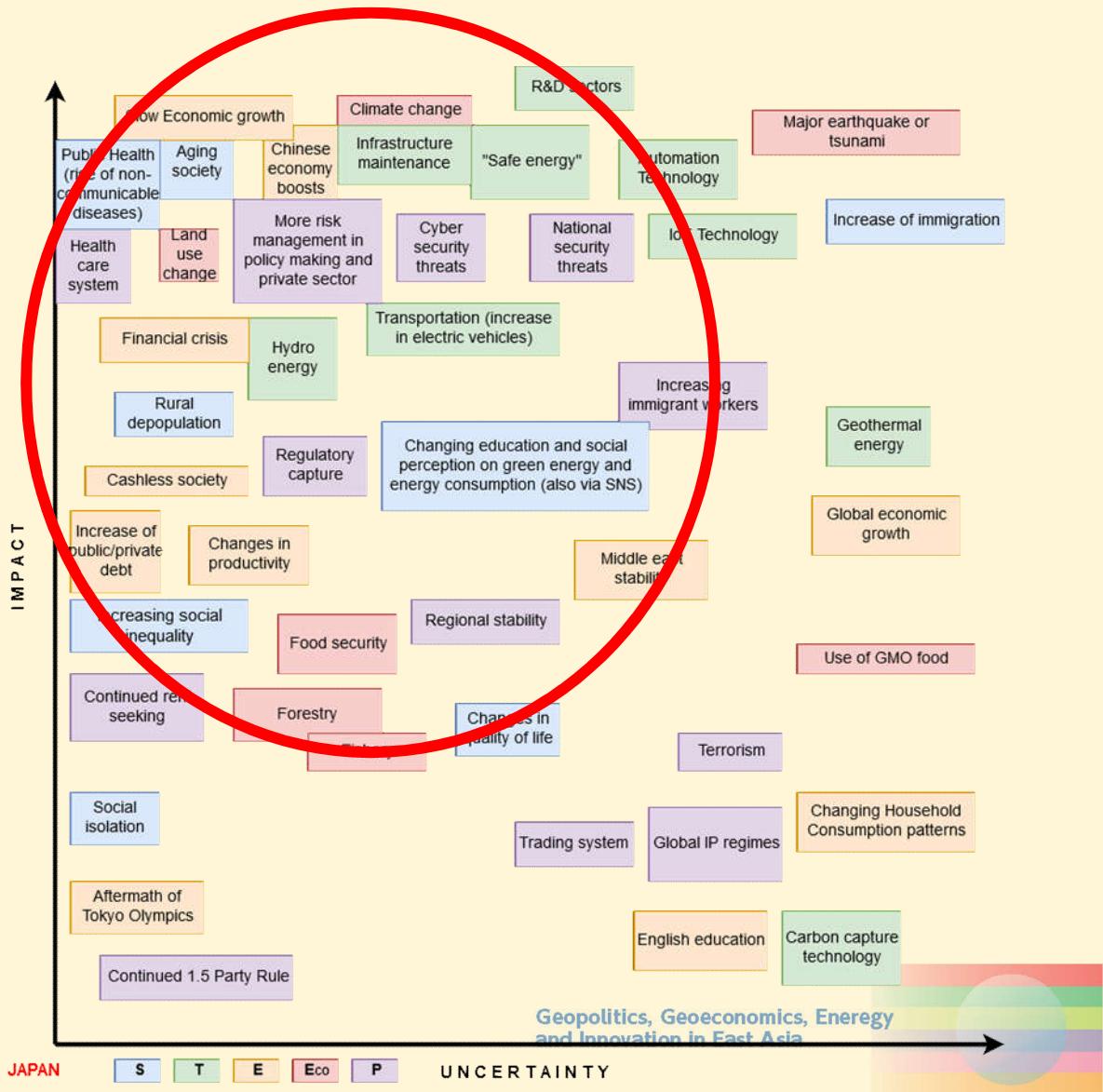
Day 2: This morning



“Symphony” Scenario

High impact and mid to low uncertainty trends.

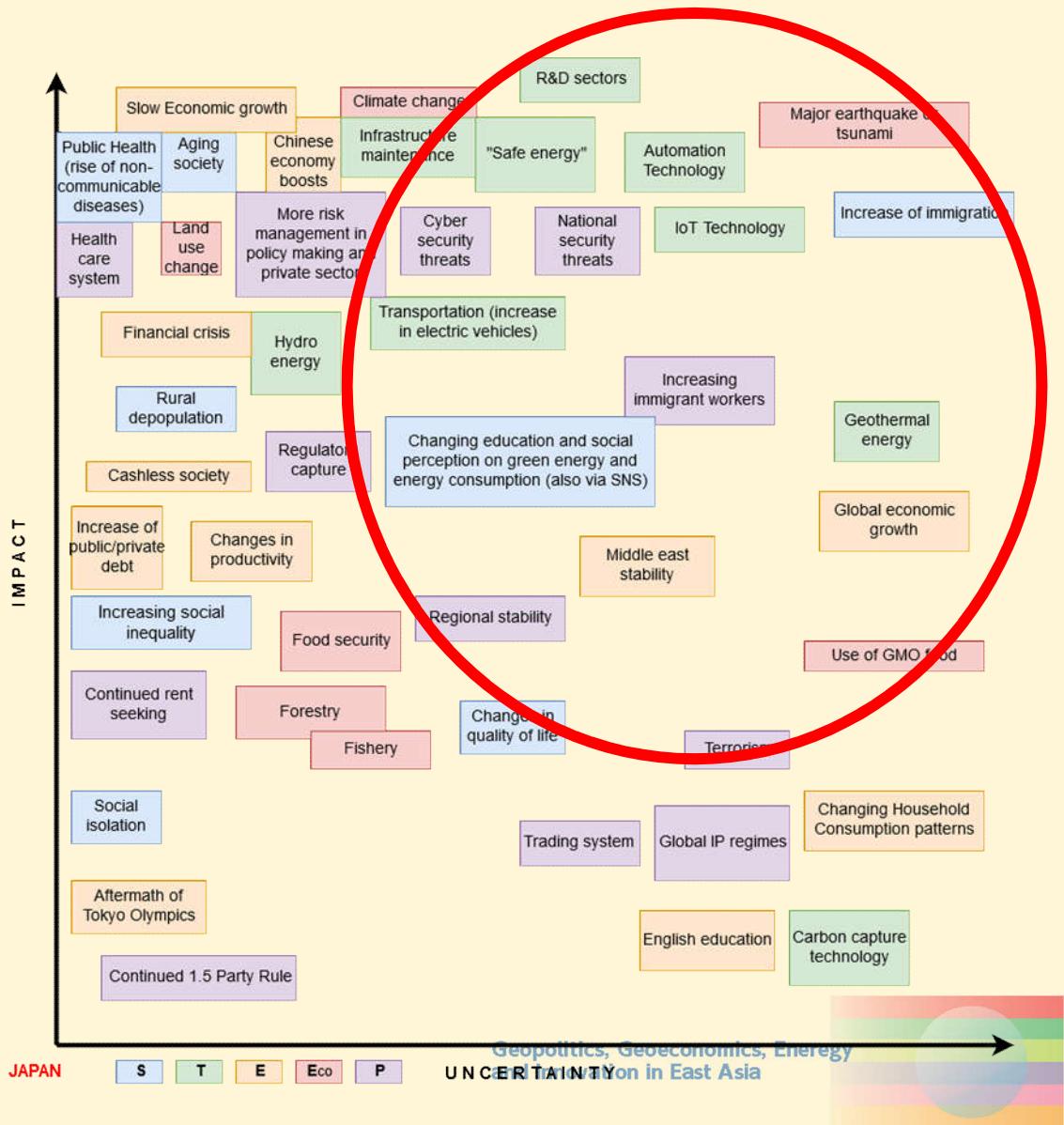
Predictable scenario.



“Jazz” Scenario

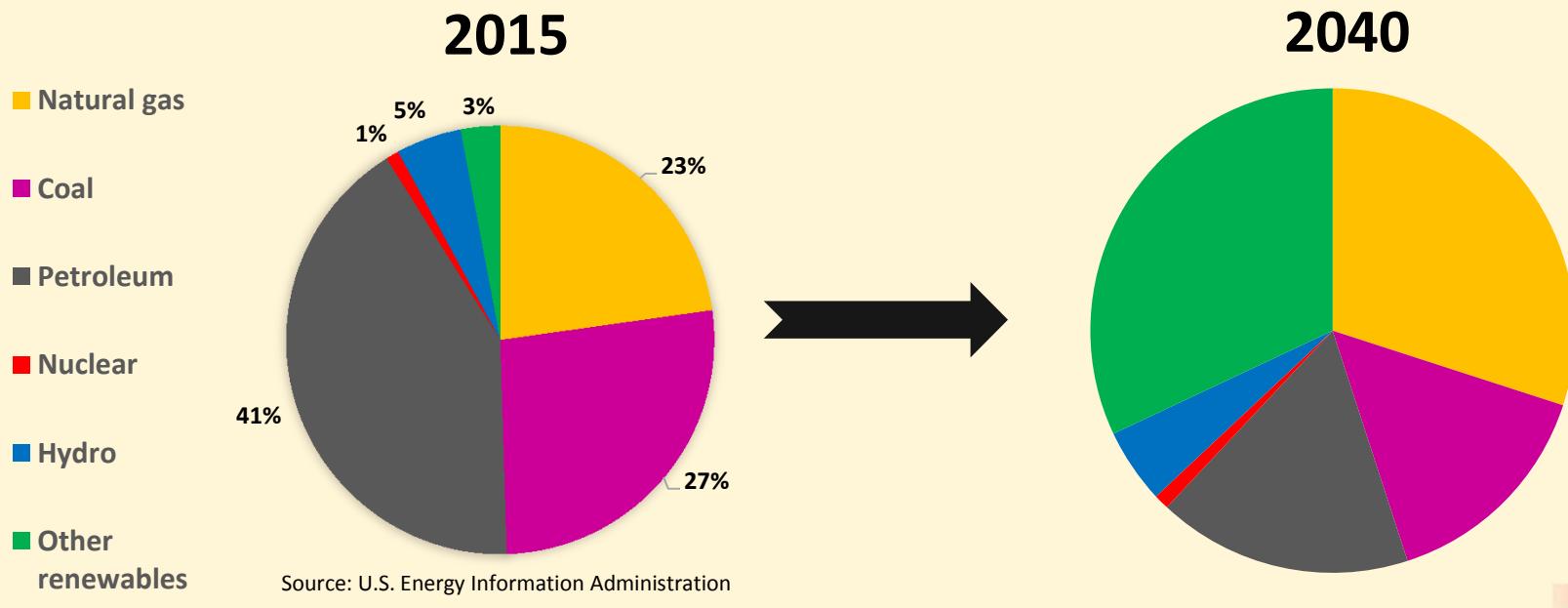
High impact and mid to high uncertainty trends.

Creative scenario.



Japan “Symphony scenario”

Innovations and investments in renewable energy may be attained through utilizing **green technologies**, perhaps leveraging the impacts of Japan's population decline such as **rural depopulation** in order to develop renewable energy farms. While **national security** and public concerns over safety (specifically nuclear) will incentivize the adoption of clean energy technology, **slow economic growth** and political sclerosis (particularly in regards to **rent seeking** and regulatory capture), will be significant drags on Japan's potential for achieving a zero-carbon energy mix.

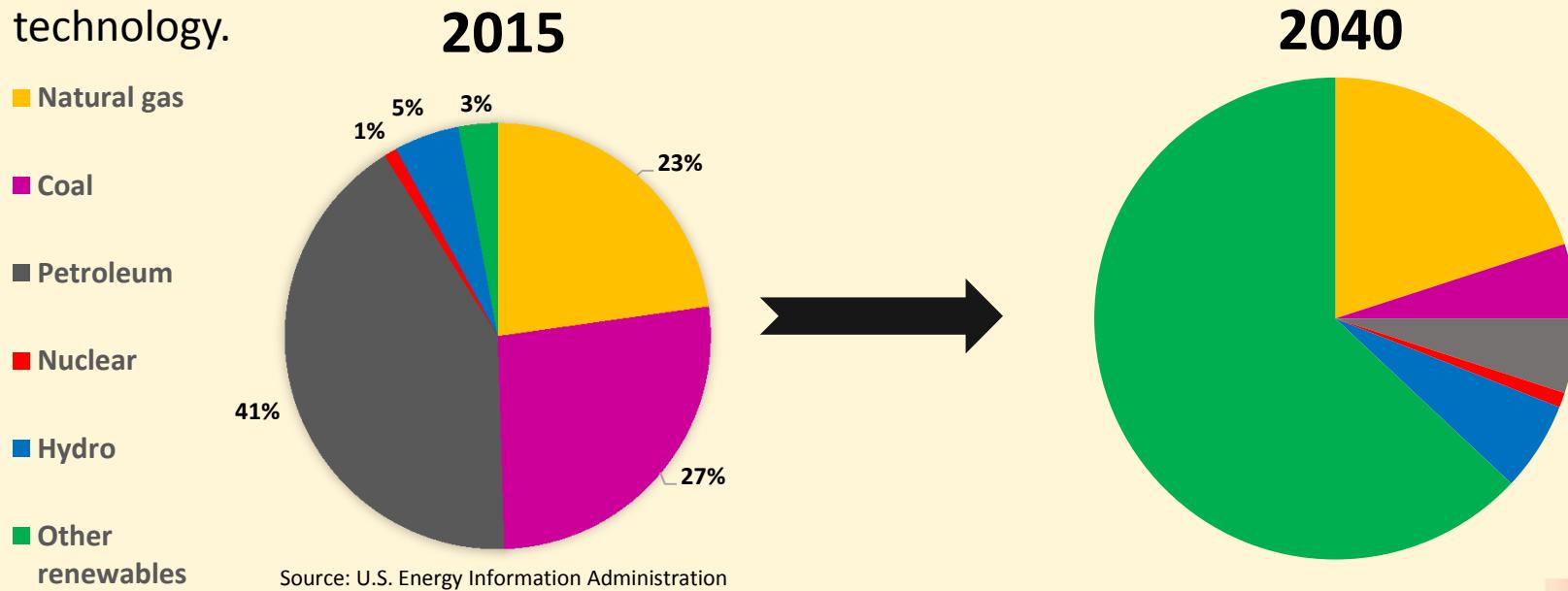


Geopolitics, Geoeconomics, Energy
and Innovation in East Asia



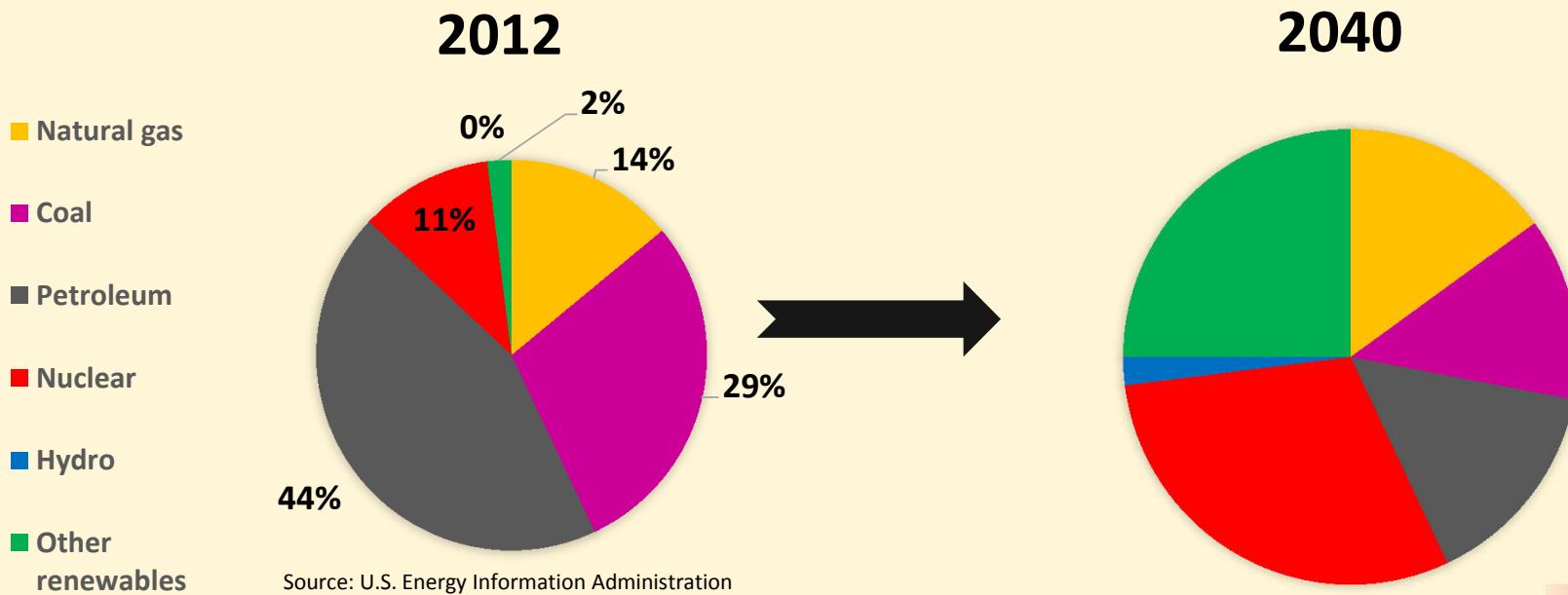
Japan “Jazz scenario”

Massive events such as **natural disasters** – including those that are climate-induced – as well as large-scale **immigration** will have significant impacts on Japan’s potential to achieve a zero-carbon future. Climate-induced natural disasters may increase **public awareness** of **climate change** and concurrently public demand for a clean-energy future. While high-skilled immigrants may contribute to **Japan’s R&D** base, low-skilled immigrants will be needed for rebuilding efforts following natural disasters and constructing climate-adaption **infrastructure**. Both will induce **social dislocations** that may fracture the political system to induce more extreme reactions to policy questions such as energy, increasing the political space to adopt clean-energy technology and the **regulatory regimes** to disseminate clean technology.



China “Symphony scenario”

Due to an **ageing population** and **decreasing birth rate**, China needs more efficient technology to maintain **economic vitality**. AI, solar PV and **hybrid electric cars** will be the core focus of China's renewable energy mix strategy to **reduce environmental degradation** and pollution. On the other hand, the **share of coal** and **natural gas** consumption will remain high due to its importance to the economy. However, China will put more focus on safe **nuclear energy** and **stricter environmental regulations**, in part to compensate for the **reduction in the share of petroleum** in energy consumption.



China “Jazz scenario”

In radically breaking away from the status quo energy mix, the Chinese state will retreat, and the private sector will take the lead in renewable energy. The government will be a channel for **leading international renewable energy policy**, while the private sector will spearhead technological innovation. Many small private players will produce energy in a distributed grid, connected across the country by **high-voltage interconnect lines** built by the state. **Private sector involvement** in renewables will boost the economy, accelerated by new e-commerce platforms. The private sector will become a key player in **solving social problems** such as **regional inequalities** by reducing **ethnic tensions**, using regional renewable sources in a balanced and connected way. This may induce a power shift away from the government towards the private sector, and economic democratization.

2012

■ Natural gas

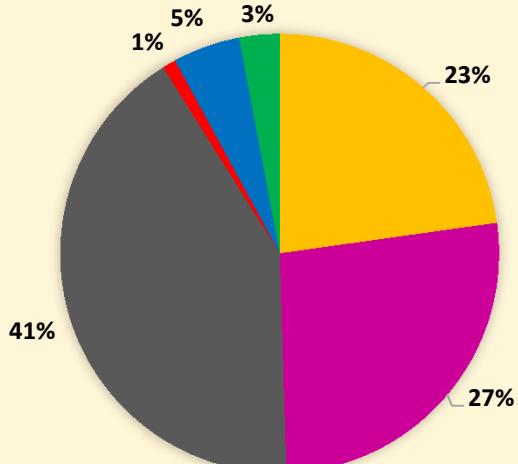
■ Coal

■ Petroleum

■ Nuclear

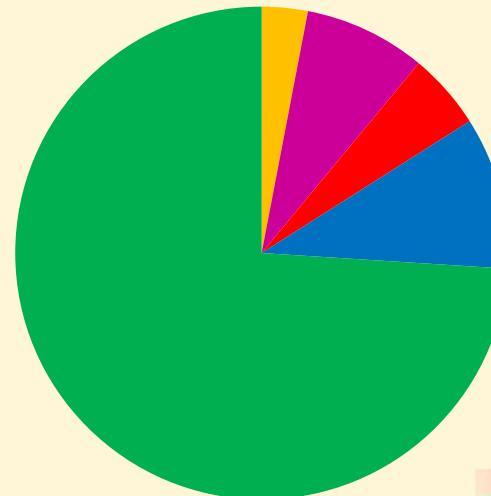
■ Hydro

■ Other
renewables



Source: U.S. Energy Information Administration

2040

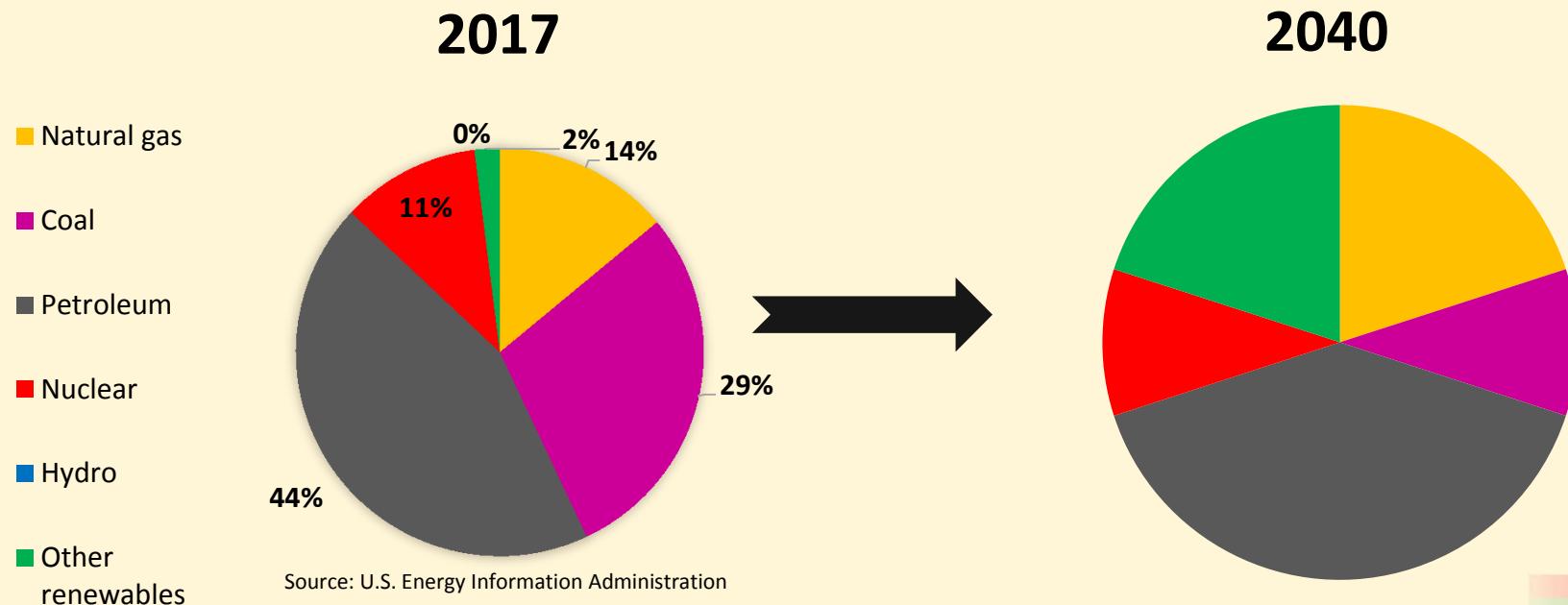


Geopolitics, Geoeconomics, Energy
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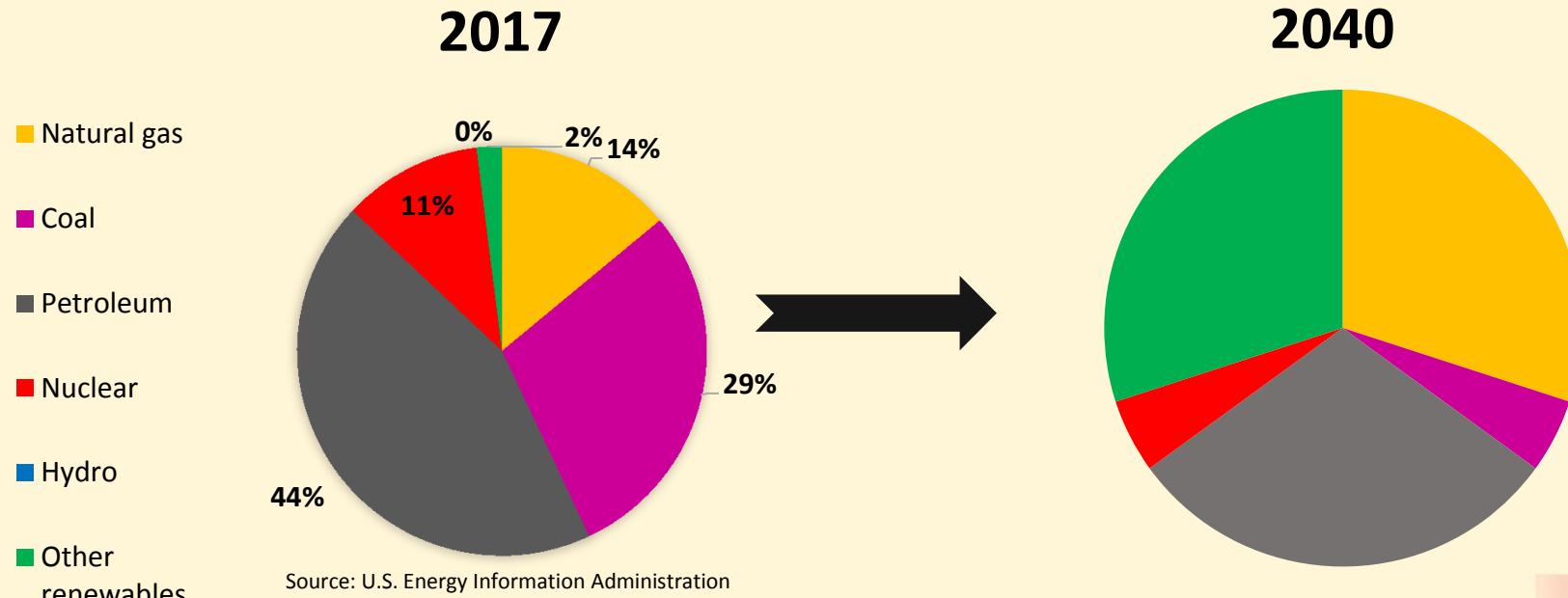
South Korea “Symphony scenario”

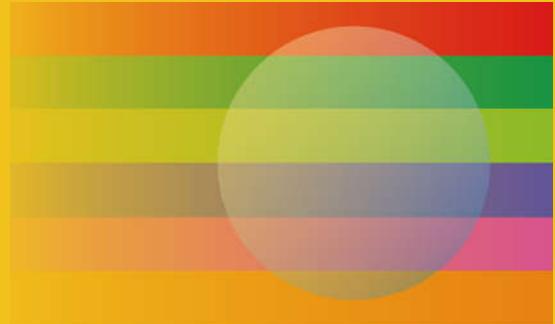
Given that Industry and Transport sectors are among the largest energy consumers for South Korea, we expect that **Rising Automation** will lead to **efficient industrial energy usage**, as well as **cheaper decentralized energy storage** will lead to an **equitable distribution** of energy. Promotion of renewables is in alignment with Sustainable energy mix for South Korea, and focus on **domestic efforts for R&D** as well as **collaboration with China and Japan** is the way to go.



South Korea “Jazz scenario”

We see the **peace in Korean peninsula** would significantly impact the sustainable energy mix of South Korea. If the **reunion with North Korea** happens it will surely open new avenues for energy access from **Russia** (Trans-Korea Gas Pipeline) and **China** (through Super grid ·). This would help South Korea in **diversifying its energy reliance**. However, the **unstable relationship with North Korea** can put this plan into jeopardy at any time. Assuming these trends to hold true and given that **rise in protectionism**, South Korea should focus on developing **domestic means** to meet its energy needs through **R&D** and realizing **renewable energy at scale**.





Thank you for listening