Recommendation for Long Term Energy Policy in Ukraine

The 2nd Japan-Ukraine Energy Seminar

1 October, 2015
Kiev, Ukraine

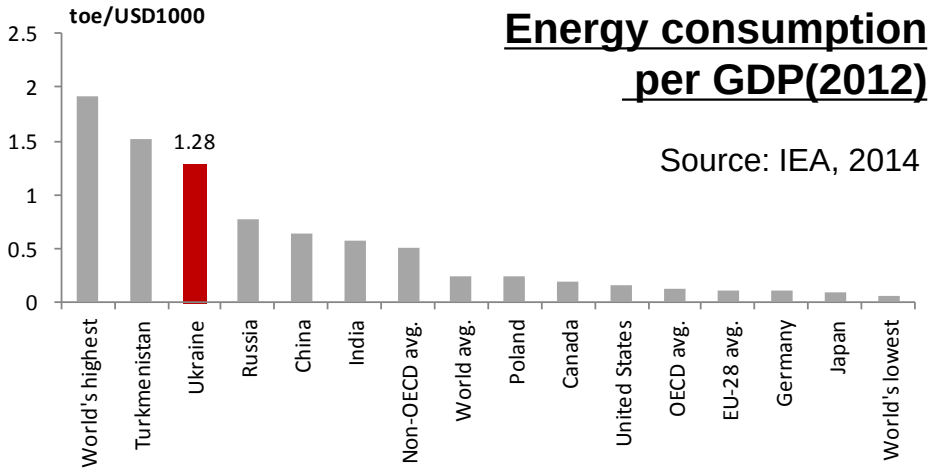
Ichiro KUTANI
The Institute of Energy Economics, Japan

Please visit, http://eneken.ieej.or.jp/en/

3 major challenges

Demand side weakness

- Low efficiency of energy use.

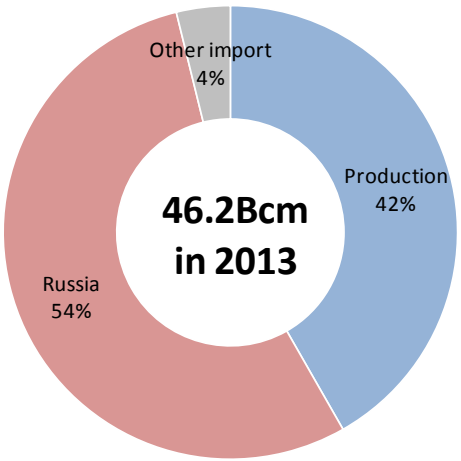


Energy consumption per GDP(2012)

Source: IEA, 2014

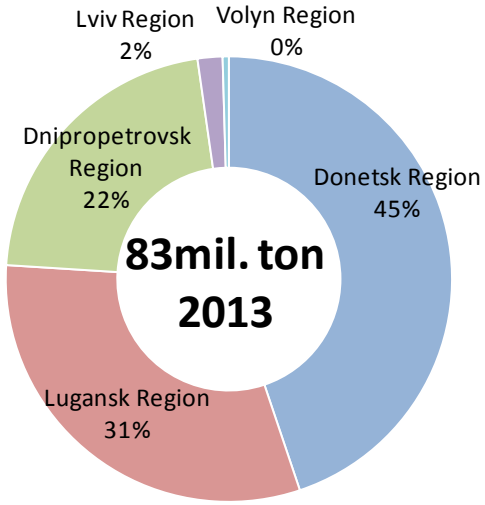
Supply side shock

- Conflict between Russia over gas import.
- Supply shortage of anthracite coal for power generation.



Natural gas supply in Ukraine

Source: BP 2014

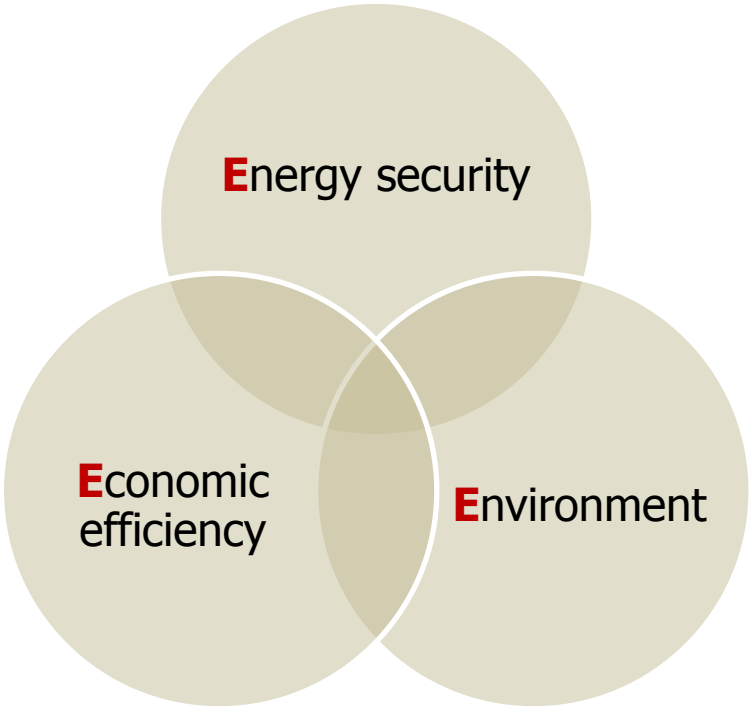


Coal production by region

Source: MECI

Principle of long term energy policy

3 pillars of energy policy



Role & Position of each energy

Coal	- Domestically available cheap energy - Continue to use as a major fuel for power gen. - Reduce emission by efficiency improvement
Oil	- Difficult to substitute by the others in transport sector - High import dependency - Reduce demand as much as possible
Natural gas	- Domestically available cheaper & cleaner energy - Continue to use as a major fuel for heat gen. - Reduce import by efficiency improvement
Nuclear	- Quasi-domestic, cheap, and clean energy - Continue using proactively while ensuring safety
Hydro Biomass	- Domestically available clean energy - Utilize with due considerations to its economics
Wind Solar PV etc.	- Domestically available clean energy - Low priority in a short term as it is intermittent and expensive

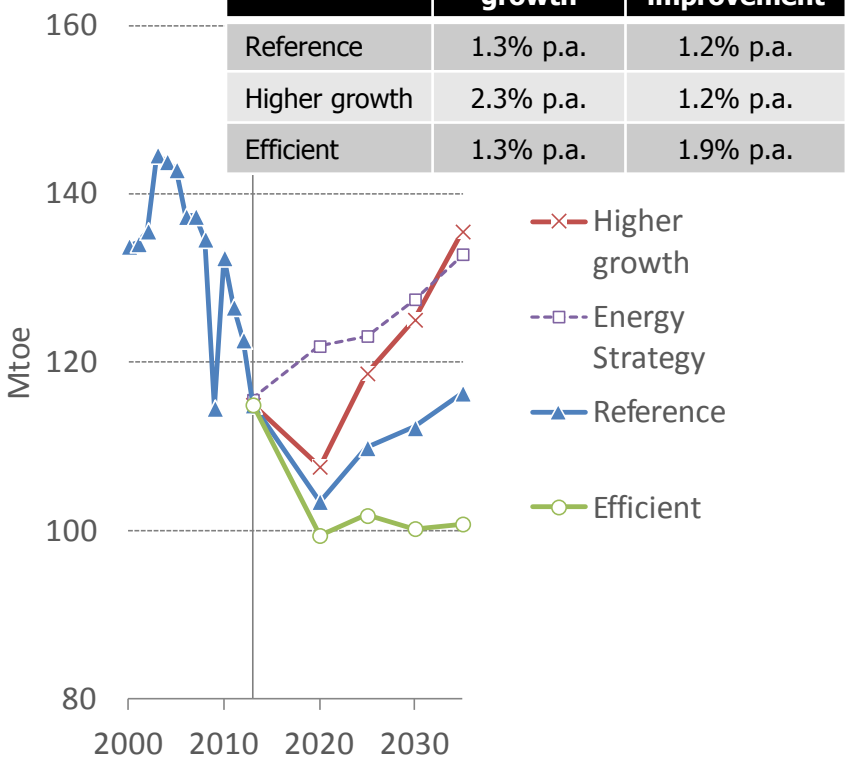
Efficiency improvement will benefit a lot

Efficiency improvement can reduce;
(reference vs. efficient, 2035)

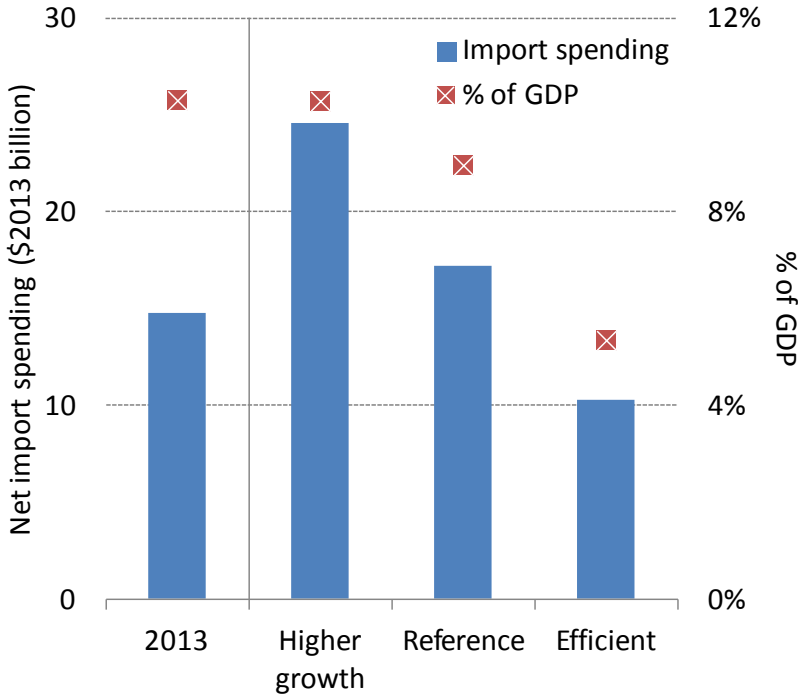
- Energy demand -13%
- Gas import amount -31%
- Import dependency -5%
- Import spending -40%
- CO_2 emission -22%

Total primary energy demand

Scenario	GDP growth	Efficiency improvement
Reference	1.3% p.a.	1.2% p.a.
Higher growth	2.3% p.a.	1.2% p.a.
Efficient	1.3% p.a.	1.9% p.a.



Net import spending of fossil fuel and its share of GDP (2035)



Key policy areas for efficiency improvement

Rationalize energy price	• Raise tariff to 'cost plus' level • Avoid wasteful use
Visualize consumers' own energy use	• Install individual meters • Usage based individual billing
Renovate aging electricity supply system	• Coal-fired power plant, sub stations • Reduce coal demand
Improve efficiency of heat supply system	• Stop water leakage in the pipes • Reduce gas demand, reduce gas import dependency
Curb the oil demand increase	• Improve fuel economy of car • Avoid using private car

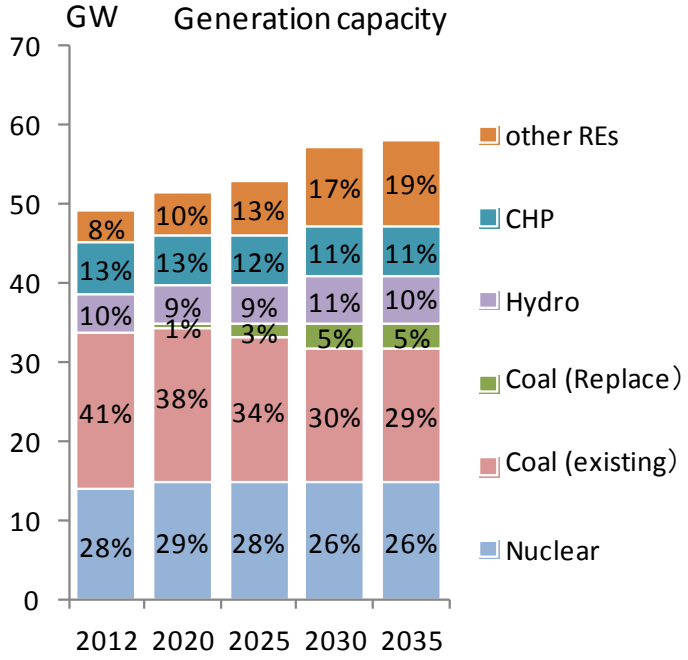
Recommendation: electricity supply

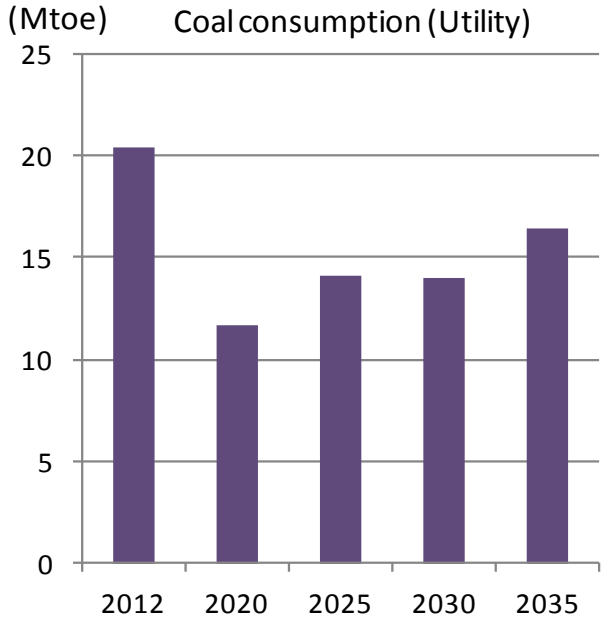
Maintain nuclear capacity as a base load fleet

- Life extension + new build at least 2GW (Khmelnitski 3 & 4)
- Offset emission from Coal-fired Power Plant.

Replace aging anthracite power plant to high efficient steam coal-fired power plant

- Reduce coal consumption and CO2 emission.
- Replace deteriorated CPP to high efficiency one





Left)
Power generation capacity outlook
(reference scenario)

Right)
Coal demand outlook for power utility
(reference scenario)

Recommendation: coal supply

Scrap & build of existing coal mines

Establish support program for displaced workers

- Improve efficiency of coal production.
- Comprehensive program is required to avoid social instability.

Divers coal supply and its usage

- Materialize large lignite potential. (mine mouth power plant, gasification)
- Enhance use of steam coal (bituminous, sub-bituminous) as it has wider choice of import and cheaper compare to anthracite.
- Utilize 'Coal Mine Gas' as a fuel.

Japan's experience for displaced coal mine workers

Coal mines lose competitiveness against import

Scrap & build of coal mines

Over 200,000 workers lose their job

Establish new law
to support displaced coal mine workers

Comprehensive support program include;

- Job placement for other industry, region (provide job training, housing support)
- Job placement for other coal mine
- Provide un-employment allowance (max. 3 yrs)
- Create public organization for the purpose

Recommendation: heat supply

Diagnosis and renovation of district heating system

- Identify water leakage spot (may be able to apply non-destructive inspection)
- Broaden and foster good practice of renovation in Kiev to other cities and towns.

Steady implementation of heat meter and price reform

- Change to usage based individual billing.

Reshape heat supply system

- Change to individual heating where district heating is inefficient.
  (smaller number of customer, lower housing density, remote from heat generator)
- Stronger integration of heat supply plan into urban design.
  (Higher urban density thus higher heat demand density, closer distance of heat generator and demand)

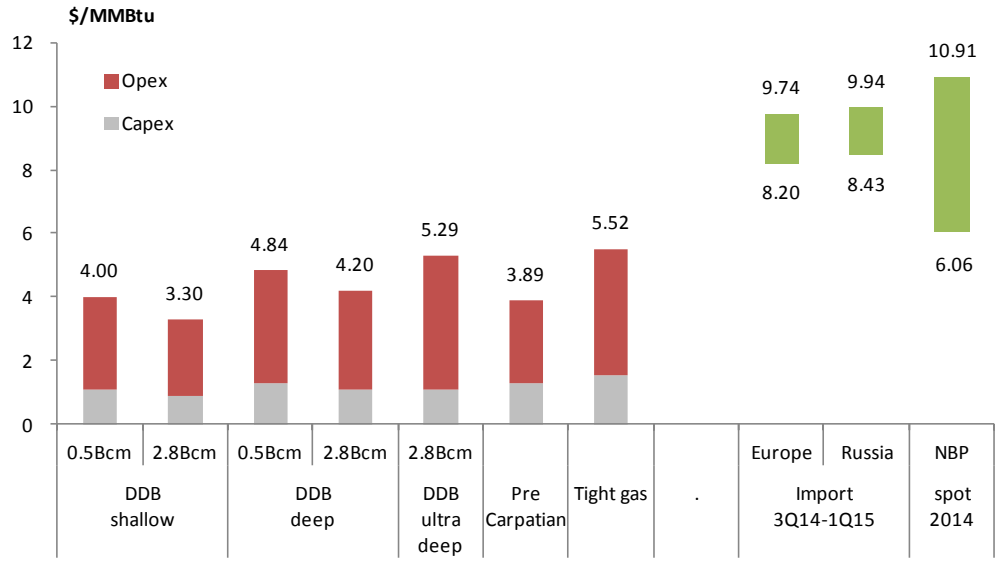
Utilize un-used energy

- Heat generation from waste, sewage sludge, subway, and so on.
- Heat pump technology can be possibly competitive in a life-cycle cost.

Recommendation: natural gas supply

Enhance domestic gas production

- Seems competitive enough against import.
- Create favorable investment climate (tax regime) for private E&P companies.



Comparison of natural gas production/import cost

DDB=Dnipro-Donetsk Basin

Source: IHS (domestic production), Naftogaz (import), World gas intelligence (NBP spot)

Reduce import dependency on a single supplier through;

- Increase physical reverse flow capacity from Europe.
- Direct LNG import in a long term.

Maximize use of storage capacity

How to finance it?

Better investment climate

- Create better climate for private company.

Change to cost reflective tariff

- Enable energy company to recover cost and re-investment.

Special purpose tax or surcharge

- Collect small money from all the beneficially.

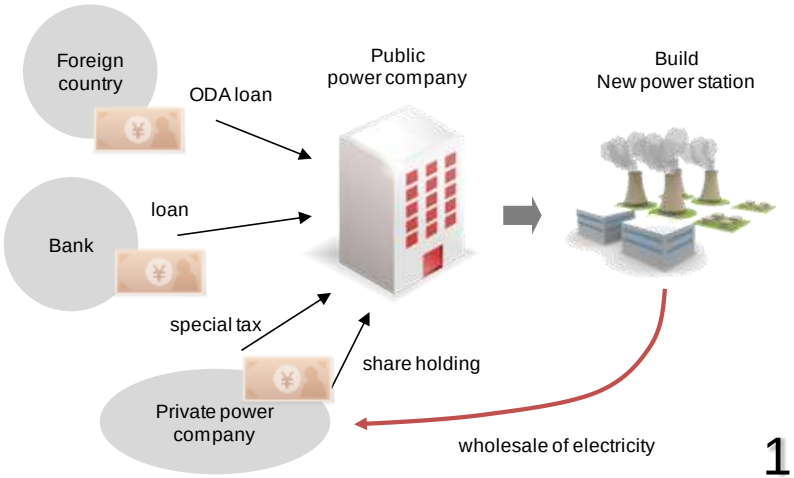
Example;
UAH 0.01/kWh × all consumer = UAH 1.47 bil./y
UAH 1/bill/month × all household = UAH 78.6 mil./y

Role of public company

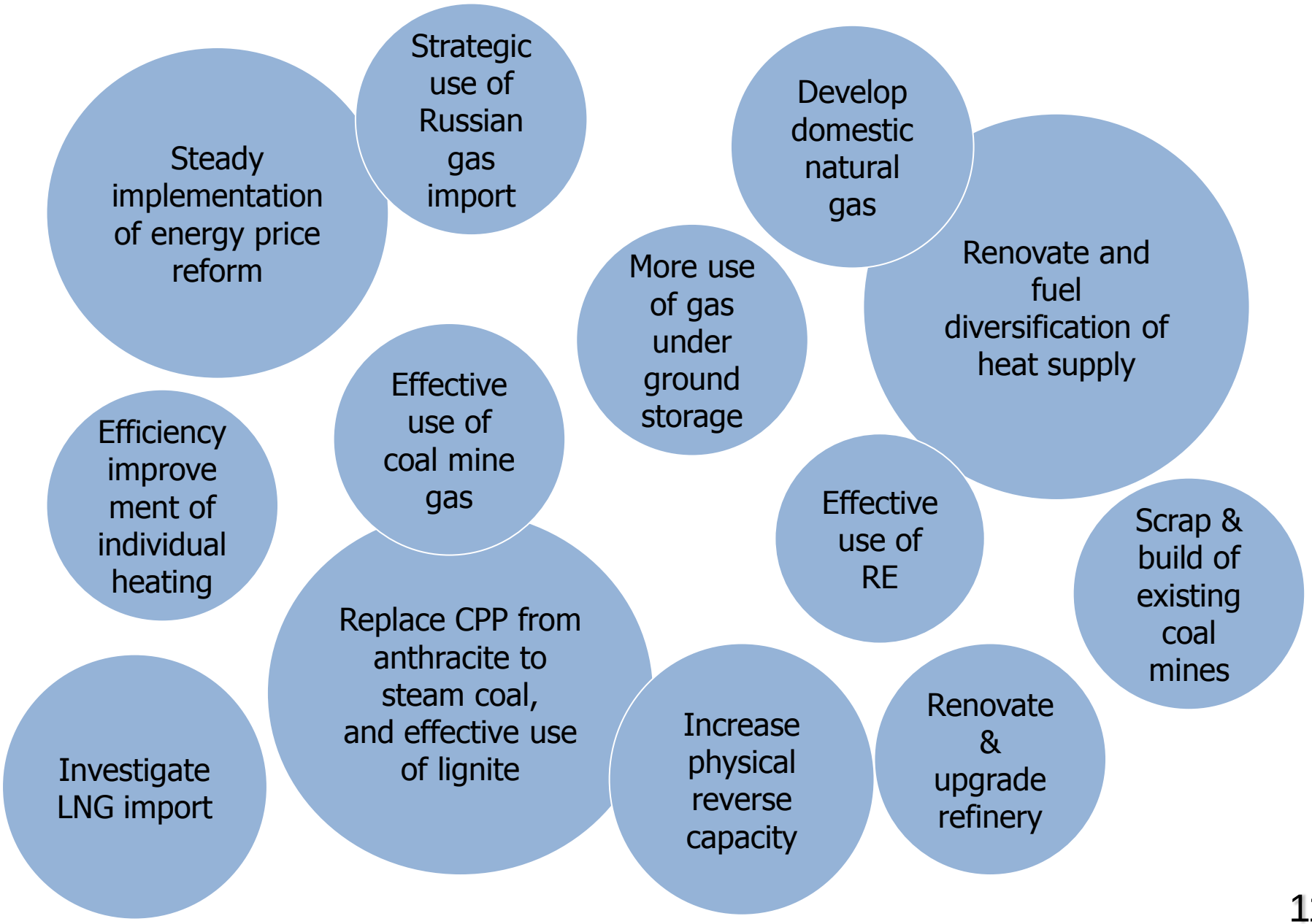
- Utilize pubic company as a vehicle of financing.

Advantage of public company

Smoother policy implementation	Government can directly control investment strategy
More stable operation	Higher credit rating underwritten by government
Easier financial arrangement	Available lower interest rate loan (include ODA) because of higher rating



What would be a priority area?



Lessons from experiences in Japan

Lesson 1

Concentrate limited resources into a few key areas

- Available resources (material, human, finance) are limited
- Select and focus on a few key areas to inject precious resources.

Japan's experience)

- ✓ In a post-war recovery era, Japanese government selected coal industry and iron & steel industry as priority areas where they can enjoy prioritized support.
- ✓ This policy aimed to utilize limited resources effectively and efficiently.

Lesson 2

Public sector can play a leading role during recovery period

- Public sector can play an leading role when;
  - ✓ A country need immediate action in line with policy.
  - ✓ A country need huge amount of investment.
  - ✓ Private sector cannot mobilize sufficient amount of resources, including money, to execute necessary investment.

Japan's experience)

- ✓ In a post-war recovery era, Japanese government created new public company to mobilize resources for developing new power plants.
- ✓ The company largely contributed to develop sufficient electricity supply capacity for economic development which was not able to be achieved solely by private companies.

Thank you for your attention