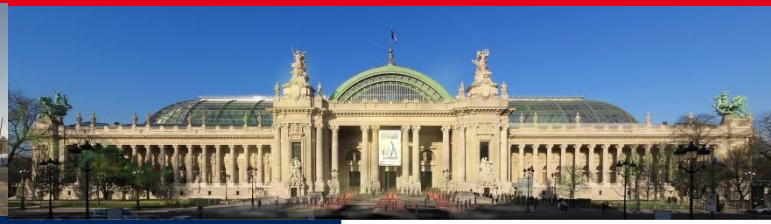
26th World Gas Conference

1 – 5 June 2015, Paris, France



SP 4

Current Status of Applying LCA Approach in Japanese Gas Industry

Mr. Yoshihiko Kimata
Chairman, Osaka Gas Singapore Pte Ltd

IGU
WGCPARIS2015
WORLD GAS CONFERENCE

Agenda

1. Current status of energy policy and global warming countermeasures in Japan

2. LCA approach as a strategic decision tool in the Japanese natural gas business

   2-1. Objectives of the LCA : Value for stakeholders

   2-2. Examples of LCA approaches

3. Challenges for the future

Osaka Gas Singapore Group provides industrial customers with energy/cost saving services in Singapore and Thailand

Osaka Gas (Thailand)

NS-OG EnergSolutions (Thailand)

OSAKA

THAILAND

SINGAPORE

Osaka Gas Singapore

City-OG Gas Energy Services

Energy policy and global warming countermeasures in transition

- **“Basic Energy Plan” (2010)**
  - Reduce GHG emissions by 25% in 2020 compared with 1990
  - De-carbonize entire society to achieve the target
    - -Increase nuclear up to 50% and expand introduction of renewables
    - -Introduce further energy-saving measures to lower the demand

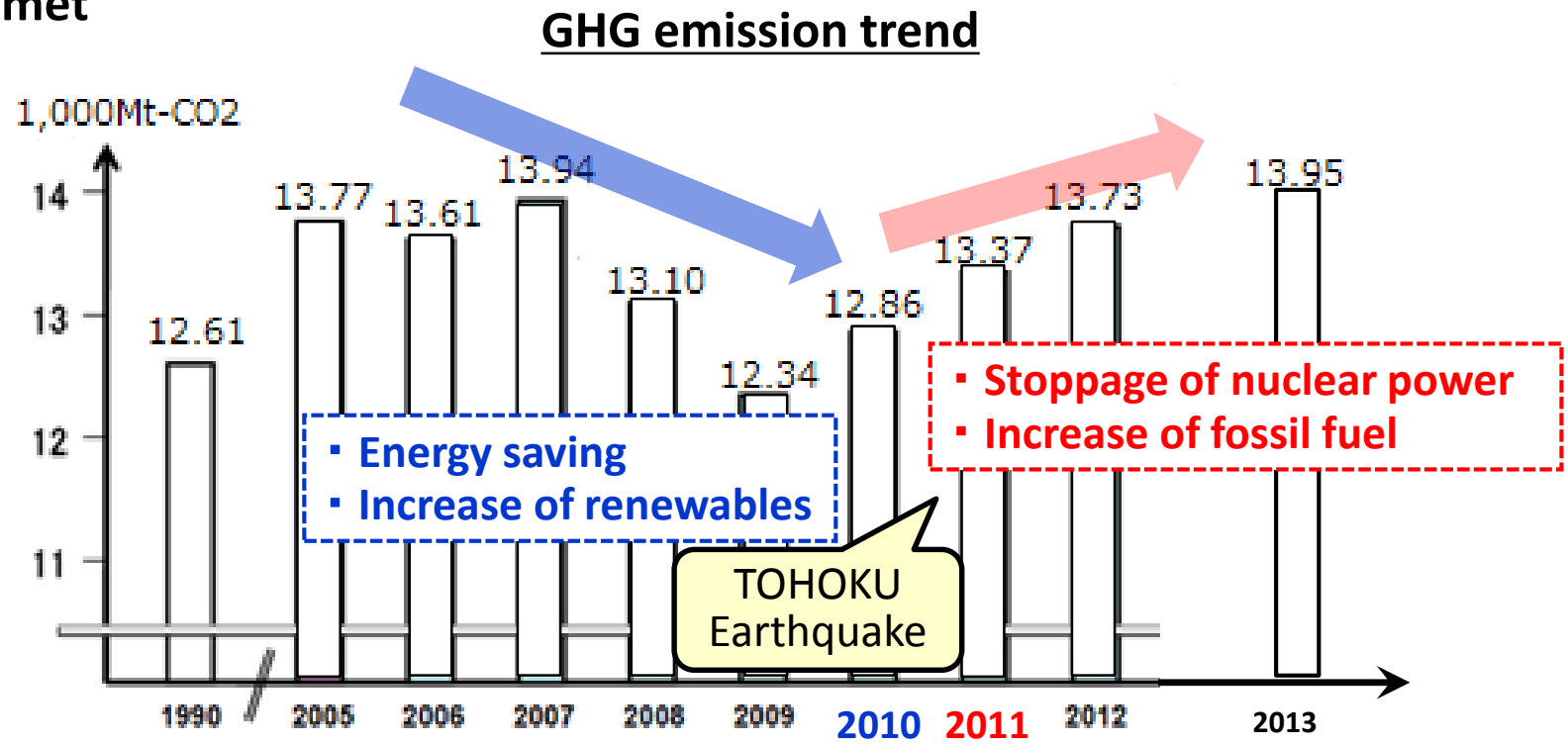
TOHOKU Earthquake (2011)

- **“Innovative Strategy for Energy and the Environment” (2012)**
  - Reduce dependence on nuclear and expand introduction of renewables

- **Reconsideration of the policy (2013—)**
  - Revision of GHG emission reduction target for 2020 (-3.8% compared with 2005)
  - Revised “Basic Energy Plan” approved by the LDP Cabinet (2014)
  - Optimal energy mix and post-2030 GHG emission reduction target being discussed (-26% compared with 2013)

GHG emission trend in Japan

- **Target for the First Commitment Period (2008-12) under the Kyoto Protocol was met**

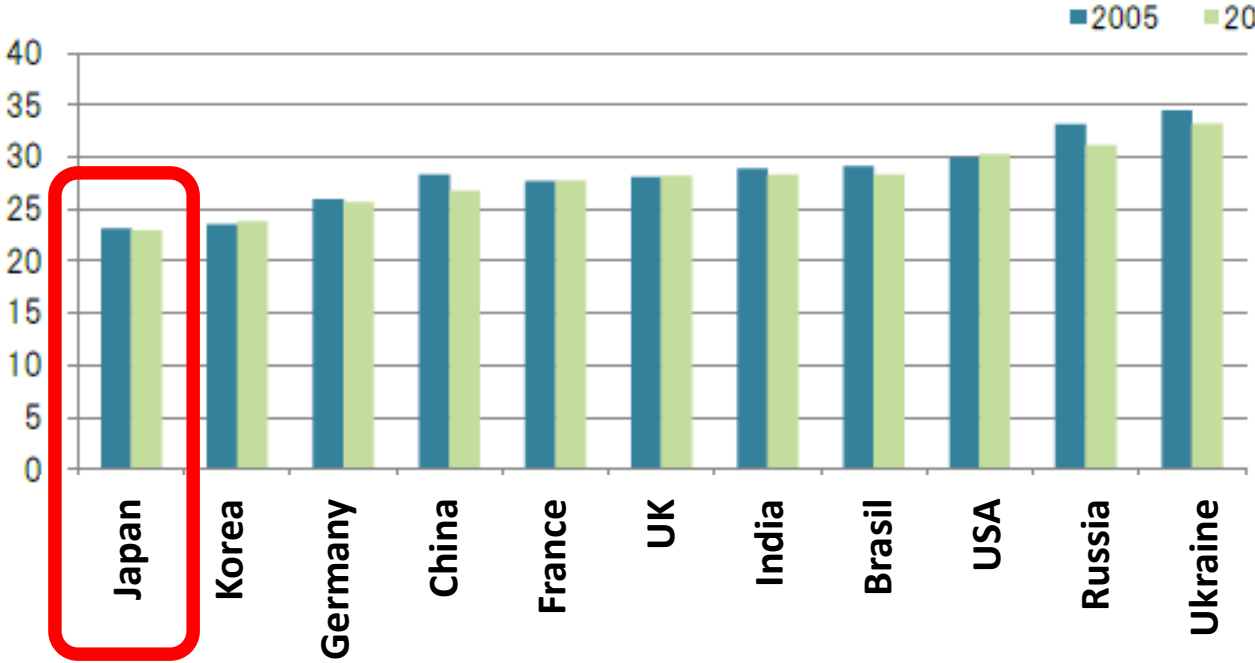


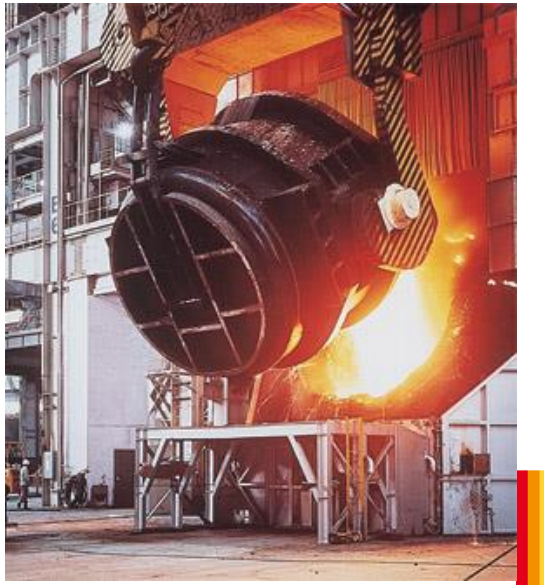
(Source) Ministry of the Environment

Energy efficiency level in Japan

Among the highest in the world

e.g. Primary energy consumption unit for steel furnace (GJ/t-steel)





(Source) Research Institute of Innovative Technology for the Earth

Goals of Japan's energy policy after FUKUSHIMA disaster

No easy Jigsaw puzzle to complete

"Safety"

"Security" of Supply

"Economic" Efficiency

"Environment" Protection

No

Single

Solution

Everybody

Endorses

Goals of Japan's energy policy after FUKUSHIMA disaster

No easy Jigsaw puzzle to complete

"Safety"

"Security" of Supply

"Economic" Efficiency

"Environment" Protection

Yes !

Society with

Sustainable

Energy &

Environment

Measures

1. Formulate optimal "energy mix"
2. Develop innovative technology, engineering and marketing
3. Implement energy market reforms in phased steps

Global warming countermeasures taken by the business sector

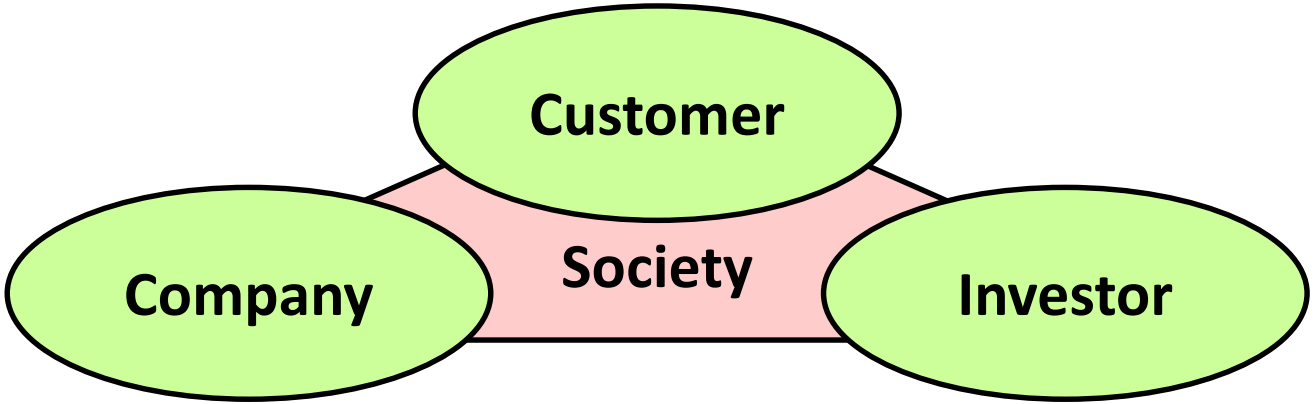
- To develop and commercialize innovative technology and achieve the world's highest energy efficiency level,

- We need to seek into the product and service phase as well as the production phase.

- LCA approach which looks into GHG emission throughout the lifecycle is most effective.

Objectives of the LCA : Value for stakeholders

Emphasize the value of "avoided emissions" by low-carbon products/services

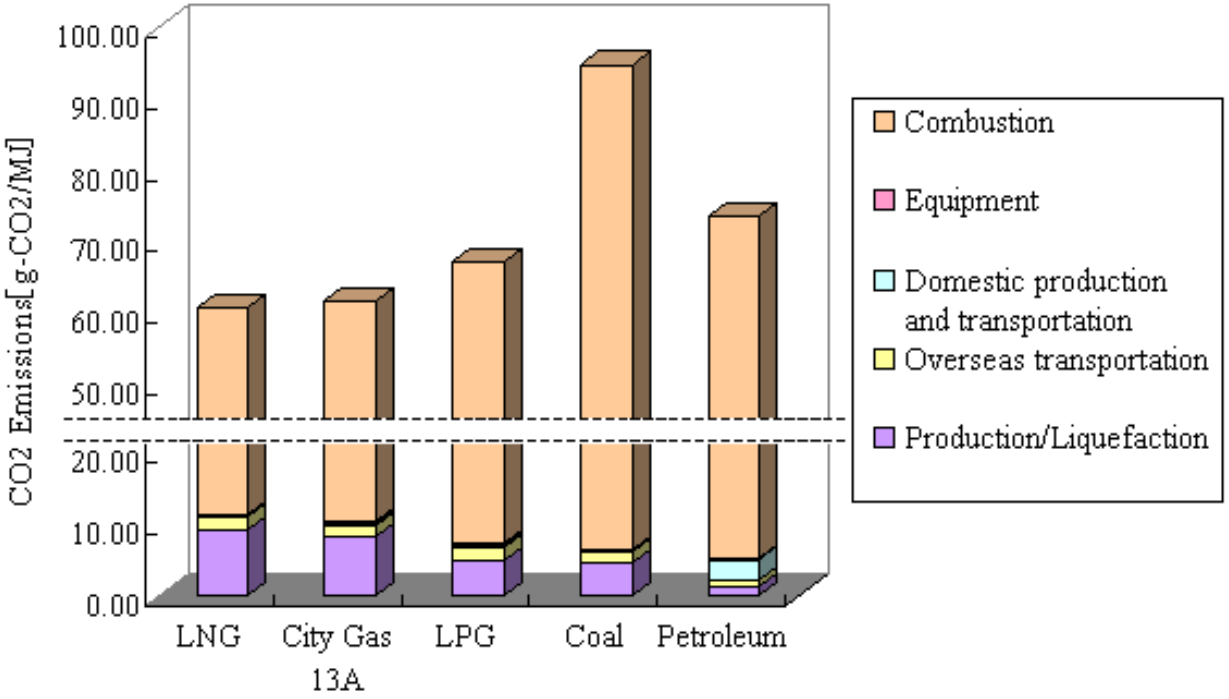


Manage "business costs" by controlling environmental impacts across the entire supply chain

Enhance the corporate value by the disclosure of actions mitigating global warming

Customer: LCA outcome for Marketing tool

LCA comparison of GHG emissions among fossil fuels



Prof. Mr. Yoshida, Tokyo University (2004)

Company: Environmental impact of natural gas value chain

(Osaka Gas)

Procurement

mining → liquefaction → transport

4.7Mt-CO_2

(19.3%)

Raw material

Gasification & Transmission/Distribution

Gasification → Transmission

0.1Mt-CO_2

(0.5%)

Consumption

- Industrial
- Commercial
- Residential

19.5Mt-CO_2

(80.2%)

Demand-side efforts are critically important!!

(Source) Osaka Gas Co. data

Examples of solution for GHG reduction at demand-side

Industrial market

- Fuel conversion from oil to natural gas
- Combined Heat and Power system

Commercial market

- Combined Heat and Power system
- Gas Air Conditioning System

Residential market

- "ENE-FARM" fuel cell CHP system (often coupled with PV system)
- Condensing boiler

Line-up of CHP (gas engine and fuel cell)

Commercial market

Miller cycle gas engine 300-800kW

Residential market

ENE･FARM (Fuel Cell) ECOWILL (gas engine)

700W

1kW

Industrial market

GENELIGHT

5kW

6kW

9.9kW

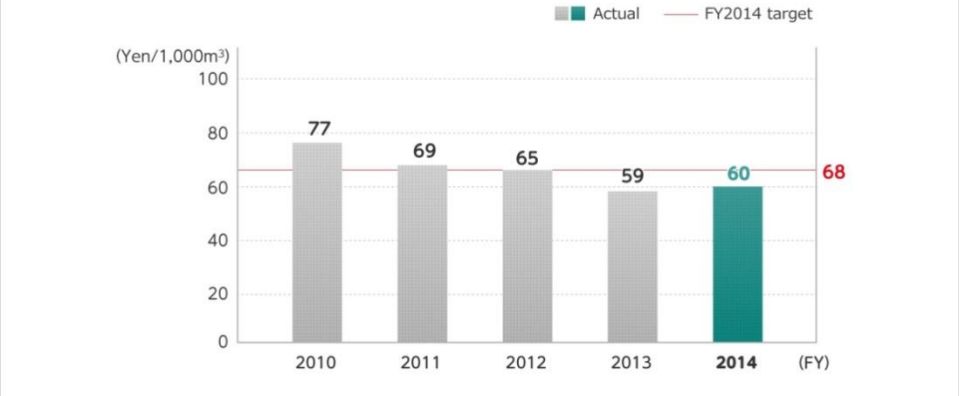
25kW

Investor: Environment Management Indicator by Osaka Gas

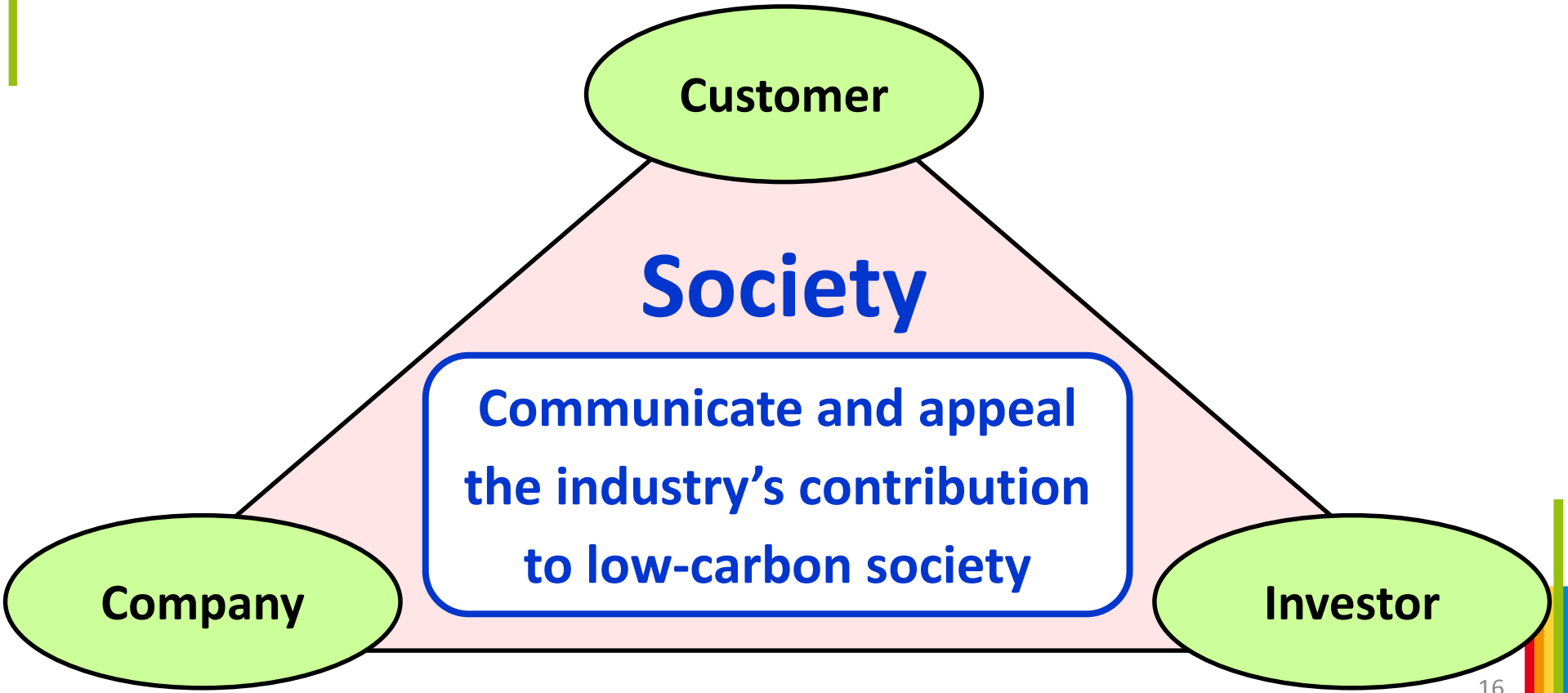
- **Total monetary value of seven environmental impacts per gas sold**
- **Quantitative measure how much we reduce environmental impacts**

[Legend] Environmental inpacts

CO_2 emissions	COD : Chemical oxygen demand	Final disposal of excavated soil	Water (Waterworks・sewer)
NOx emissions	Final disposal of industrial and general waste	Chemical emissions	



Society: Objectives of the LCA : Value for stakeholders



Challenges for the future

- **To make LCA a socially established approach, further measures and incentives need to be sought.**

  e.g.

  - **PR activities for higher public acceptance**
  - **User friendliness**
  - **Standardization**
  - **Expansion of Scope of LCA toward international market**

We are ready to cooperate with IGU members for the better LCA !!

Appendix

Innovative technology arising from LCA outcome

CHP

CHP

Fuel cells for residential use: Ene-Farm

Improvement of the efficiency of gas appliances

Eco-Jozu

Regenerative burner

Developments towards a hydrogen-based society

Developing a next-generation energy system

Hydrogen station

Smart energy network

Conversion from oil to natural gas to meet industrial heat demand

Heat processing

Glassblowing

Natural gas air-conditioning system

Manage energy consumption

Combined use of natural gas and renewables

Solar power, solar thermal, biogas