The study on Sustainable City and its Associated Energy System in Japan to 2030

Takashi Fujii
The Japan Gas Association
&
Yuichi Takeuchi
The Institute of Behavioral Sciences

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Contents (Study Flow)

What happens if urban design and energy systems are considered together?

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How do we make these dreams come true?

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1.View points for Sustainable City

~ Issues of the Japanese future city ~

1. Rapidly declining birthrate and growing of elderly people

2. Adverse effect of suburbanization (Decrease of green space, Heat island phenomenon)

3. Lack of safety and security

4. Chronic traffic problem

5. Global warming trends

★Urban regeneration to keep its vitality

★Reduction of environmental load

The fulfillment of Sustainable City is significant!

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1.View points fort Sustainable City

~ Trends and Challenges of energy consumption for the future ~

1. Significant growth in demand for private and transportation sector

2. Progress toward the energy consuming life style

3. Increasing energy consumption of private cars

4. Slight change of energy supply structure

★Review of energy consuming life style

★Review of excessive dependence on automobiles

★Proper energy supply and demand control

The feasible energy system to address these issues should be fulfilled while the urban regeneration is forwarded to Sustainable City.

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2-1. Sustainable Urban Image in 2030

~ The concept of a targeted sustainable urban image in 2030 ~

○High density

Effective use of resources and reinforcement of the community should be pursued, which will make the city more high densely populated. This doesn't mean to make the whole district highly populated but the different populated districts from medium to high should be located according to each district feature.

○Mix of use

→Each district should be reorganized with the advanced life support function such as an adjacency of residence and workplace, a help for parenting, and a welfare for elderly people within the walking area.

○Cluster composition

Even in the present urban area, the different featured districts exist. To enhance these features more clearly, the districts should be divided into the well-defined boundary.

"Compact city" should be identified as high densely populated, multiple functioned, and scattered area.

2-2.Energy System in 2030

~ Major features of future energy system ~

■Introduction of renewable energy in a big way

①Photovoltaic, biomass, unutilized city waste heat should be positively utilized on site for saving energy and GHG reduction.

②Waste heat from industrial firm, garbage incinerator, etc., should be integrated and normally used.

■Micro grid construction

③Micro grid should be well installed to make use of the power from renewable energy.

④SOFC will be connected to micro grid.

■Development of hydrogen supply infrastructure

⑤FC and hydrogen filling station should be organized for the large scale apartment and FCV.

⑥Hydrogen will be produced from city gas as well as by product hydrogen gas from firm.

■Upgrading of supply and demand control network system

⑦TEMS(Town Energy Management System) should be developed with IT.

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Development of “Energy Cluster” at each district

“Energy Cluster” should be defined as micro grids that provide electricity, heat, and hydrogen as a rule.

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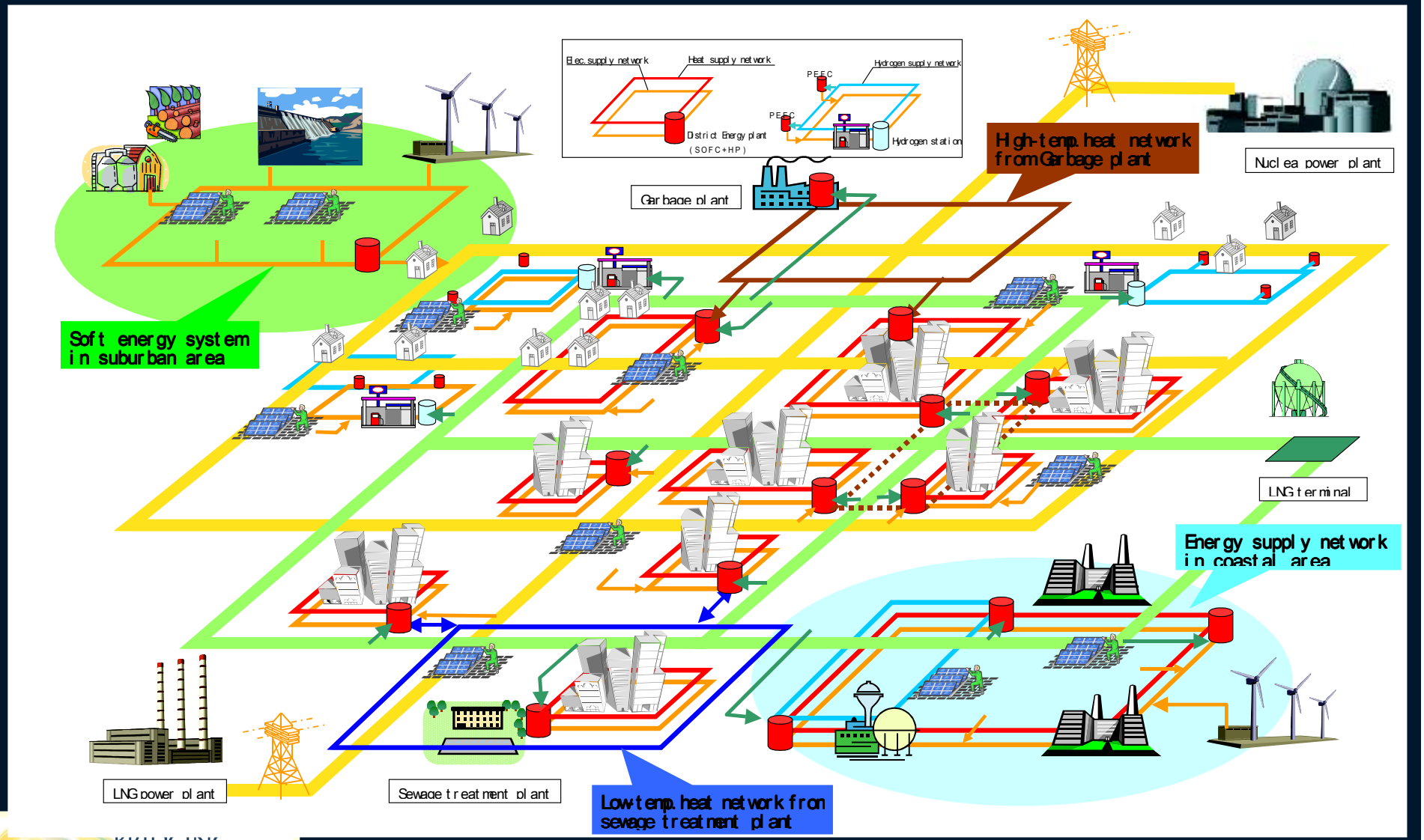
3-2.Energy System in 2030

~ Outline of Energy System in 2030 ~

Development of different scale energy network systems and their interconnections



3-3.Future Direction of Sustainable City and its Associated Energy System

"Compact City" where self-sustained district with well-defined boundary is located widely.

Phase-in of "Energy Cluster" which makes sure the best way of energy consumption

Features of "Compact City"
- **Intensive activity with high density and mix of use**
- **Various districts with well-defined boundary**

Features of "Energy Cluster"
- **Energy supplies on demand site**
- **Various energy source**
- **Well-managed supply and demand control**

Set up the energy source in the city!

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