2nd International Conference on
Smart Energy Systems and 4th Generation District Heating
26-29 September 2016 · NORDKRAFT · Aalborg

4DH

4DH concept, reality and possibility in Japan

Sept. 28th 2016

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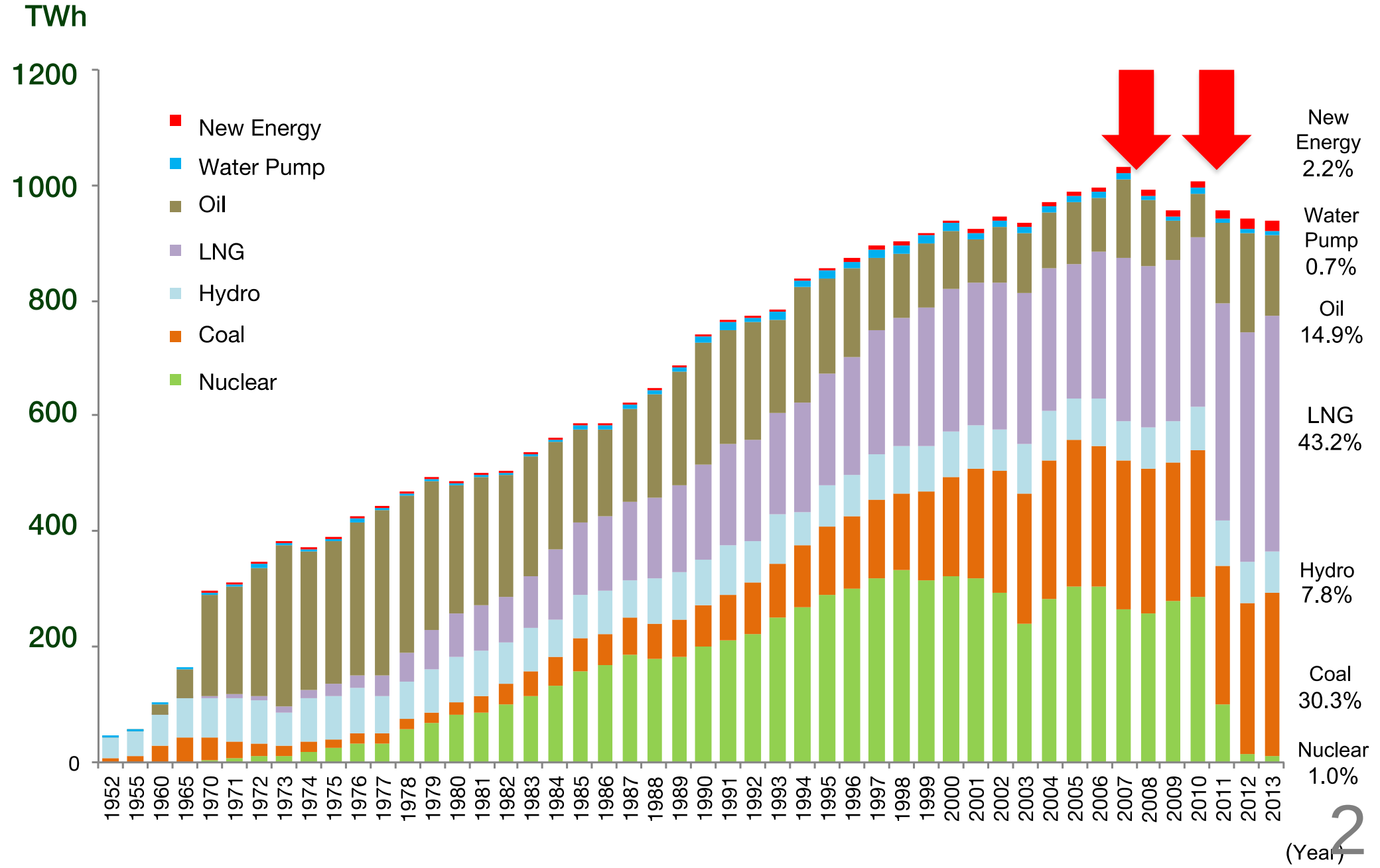
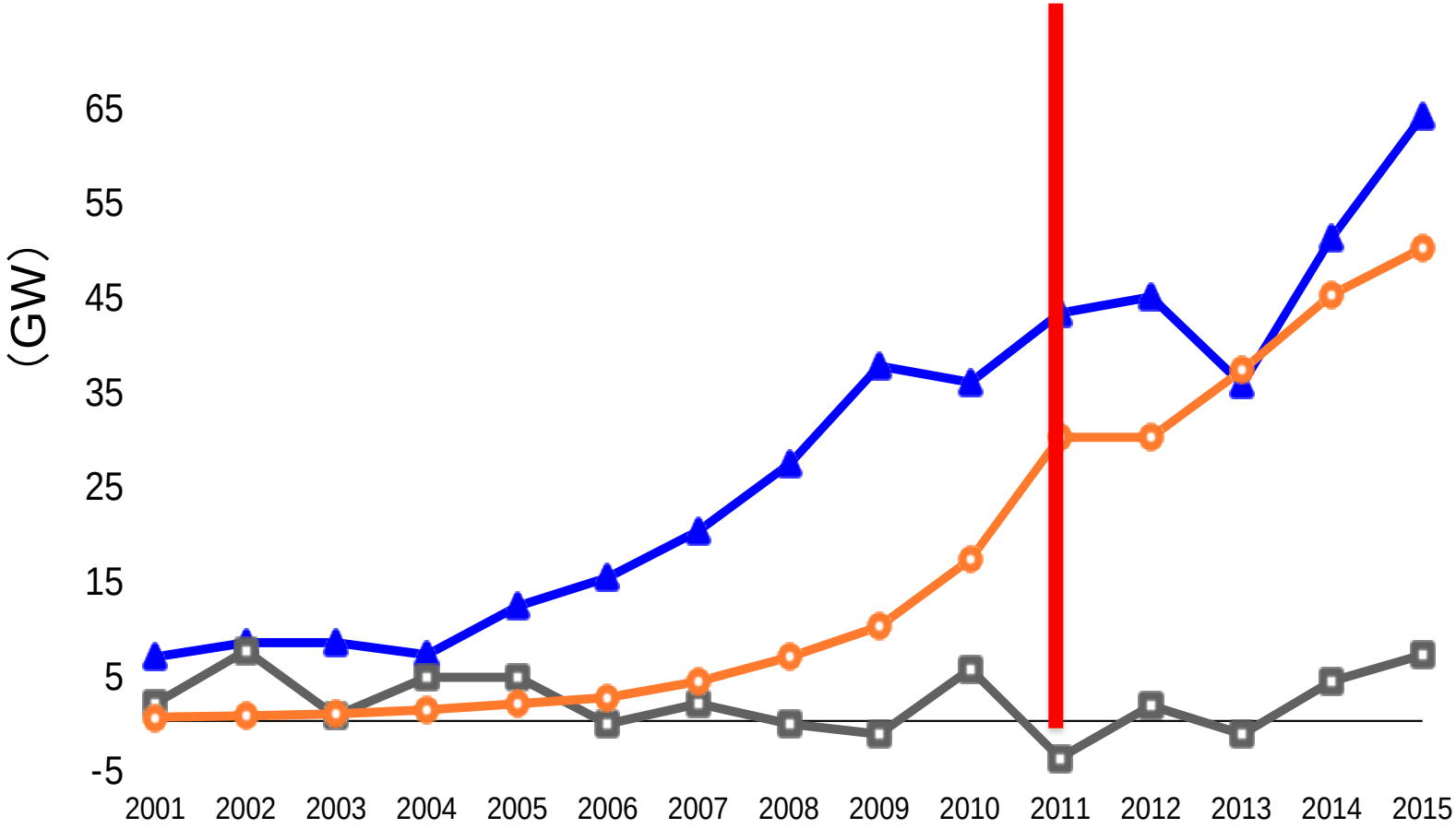
Japan's energy trend



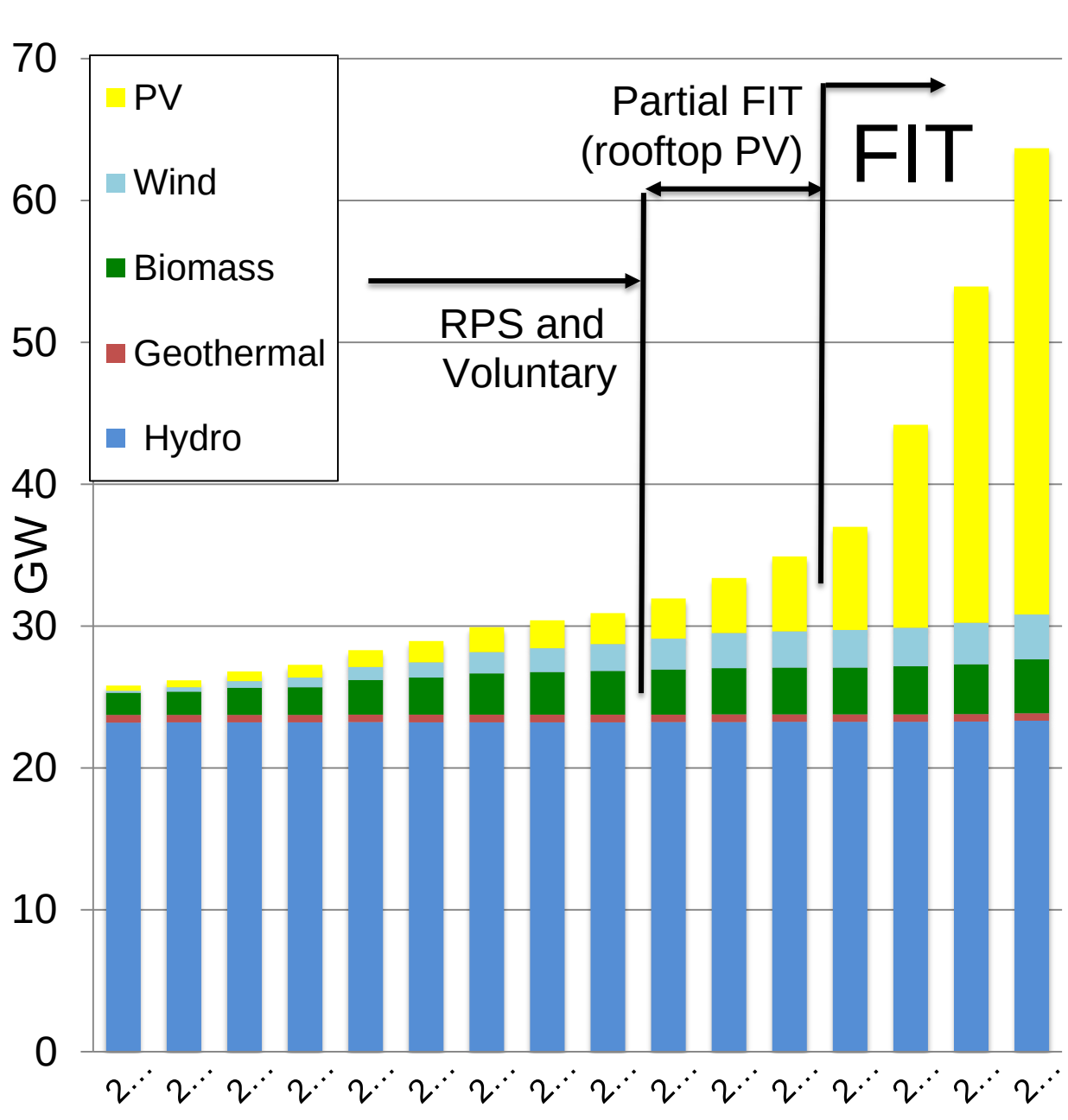
5 yeas after 3.11 Fukushima

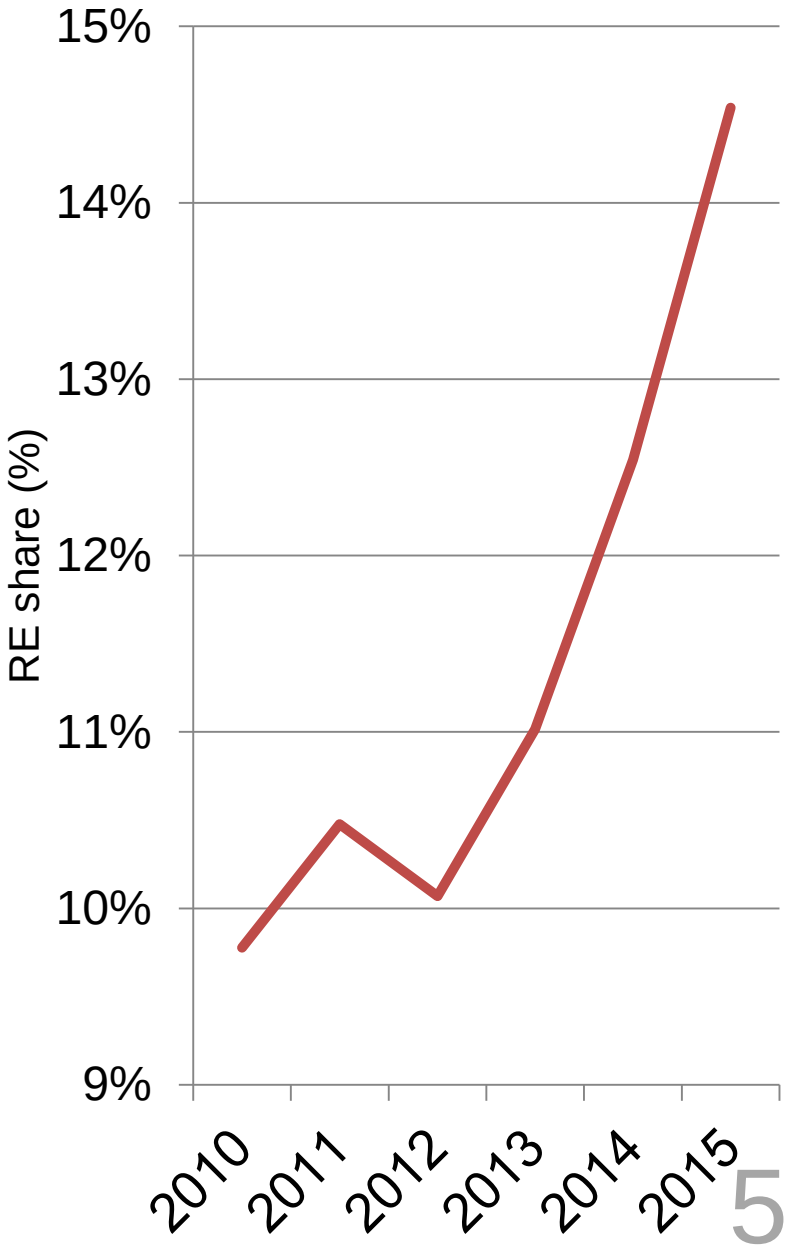
Rinsing renewables power and 3.11 Fukushima disaster



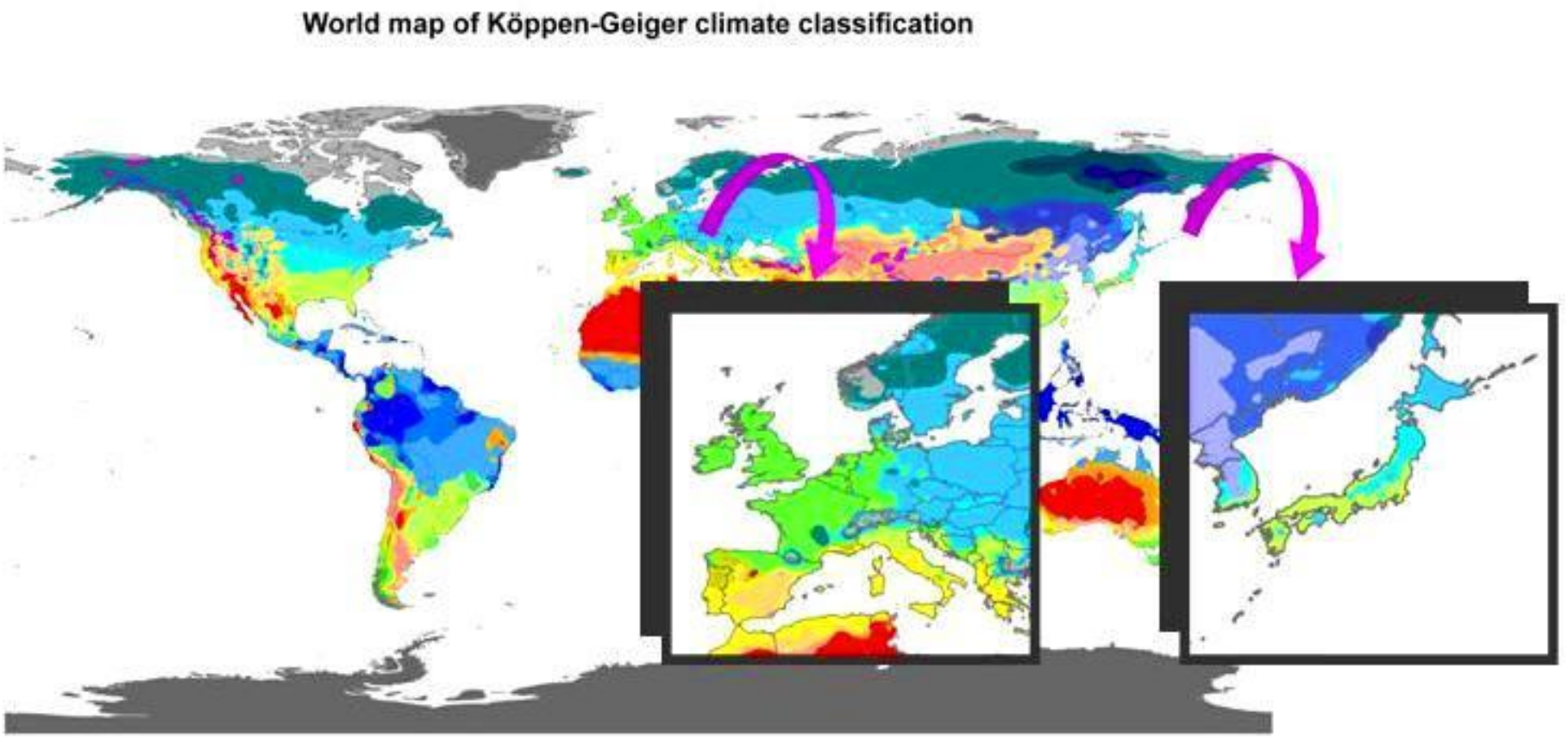
Data from: GWEA, IAEA, Photon, Platts,

3.11 Fukushima disaster and Energy Policy in Japan



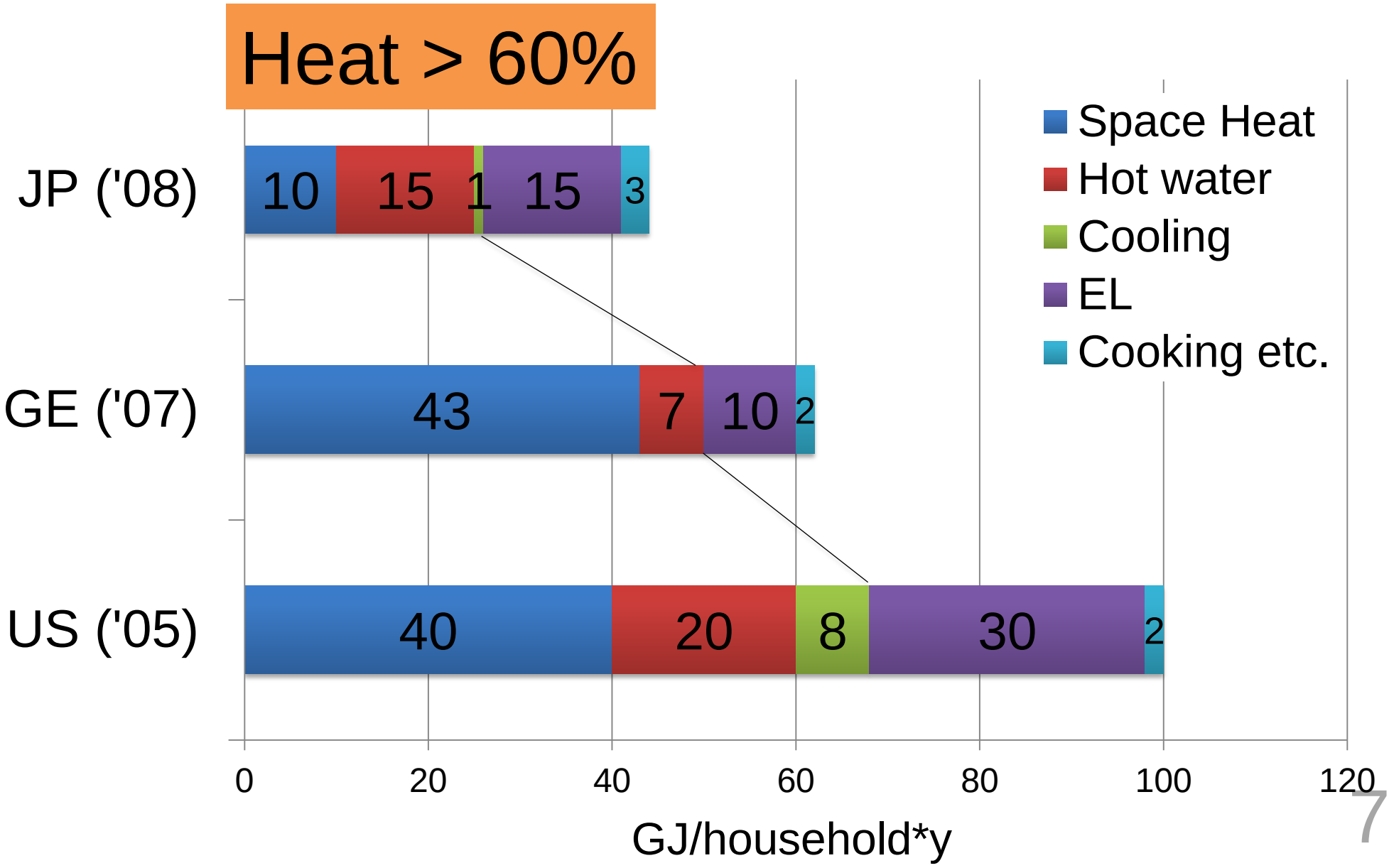


Heat “market” in Japan



THE UNIVERSITY OF MELBOURNE

Energy efficient ?



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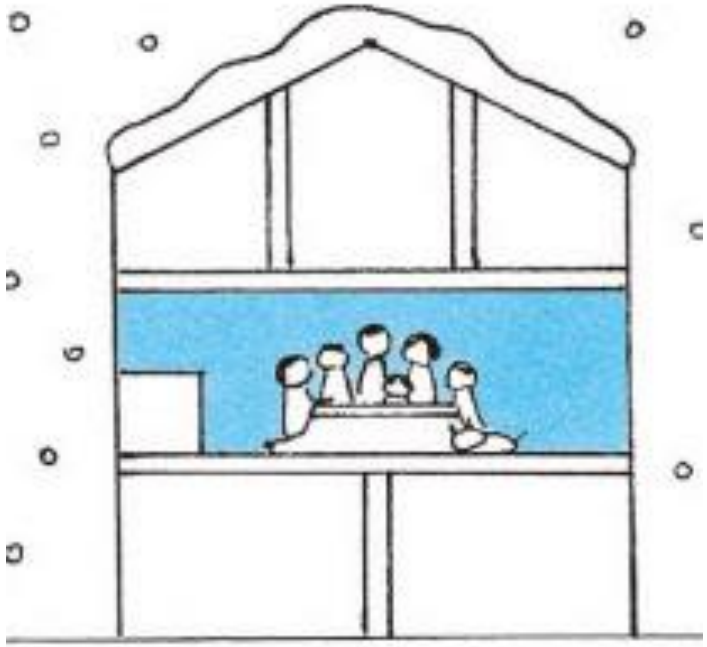
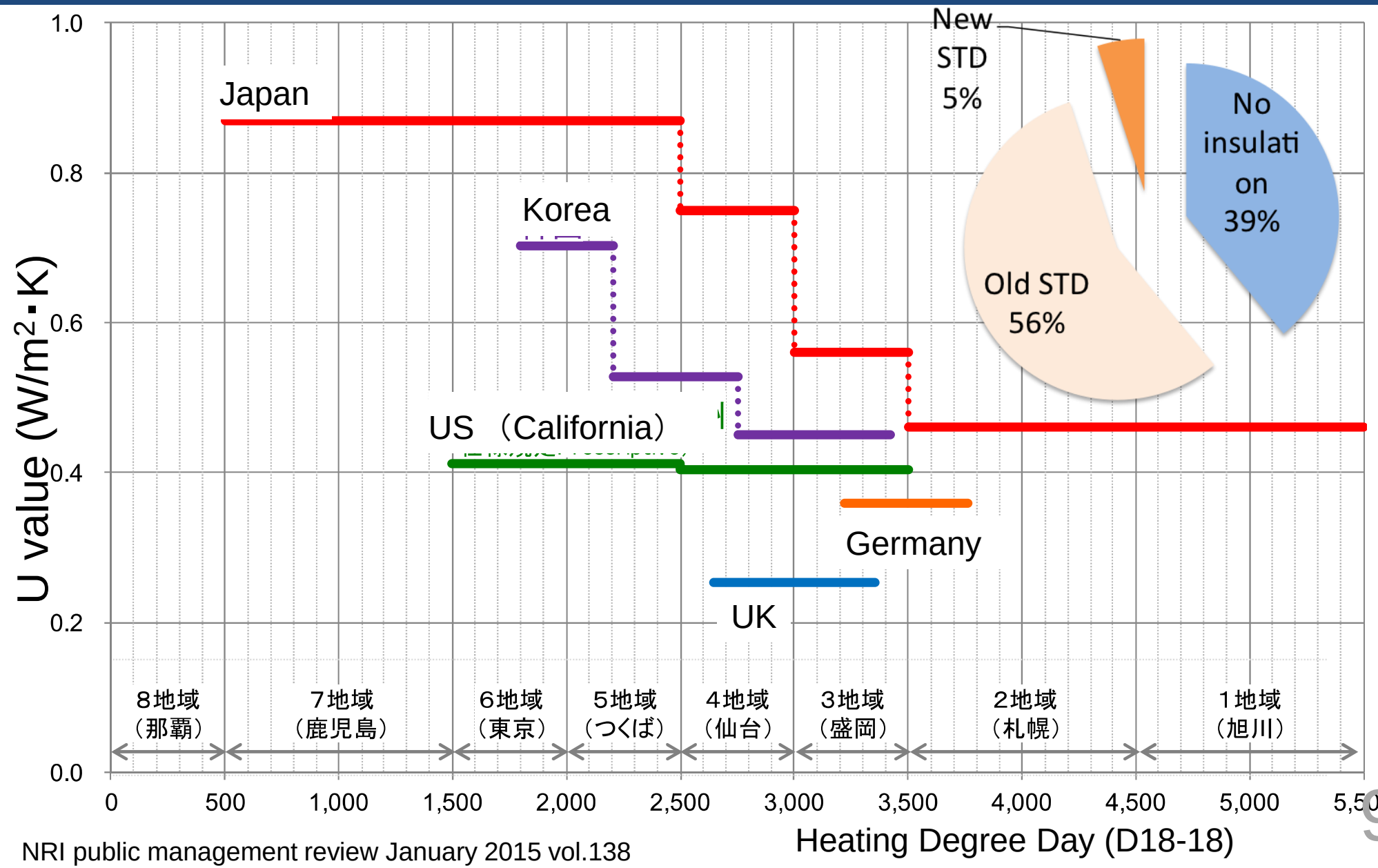


Poor insulation regulation, poorer reality



NRI public management review January 2015 vol.138

Oil and electricity dominant

25millions (ca. 50%)

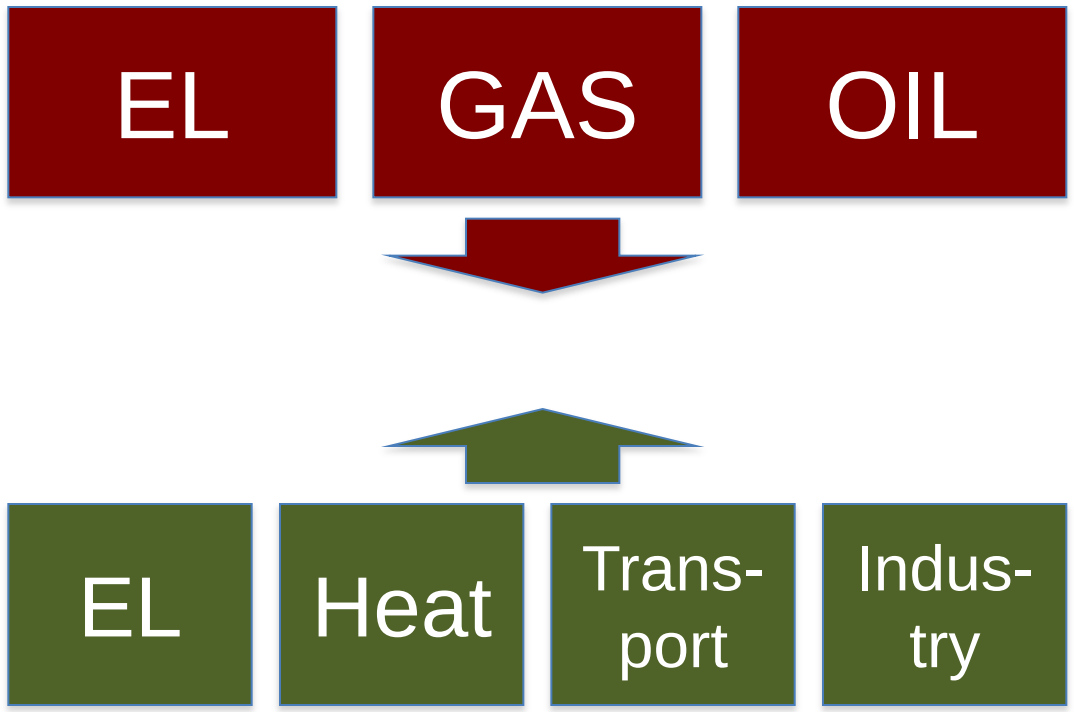
- declining but still dominant
- 89 killed (’05-’10)

45millions (ca. 90%)

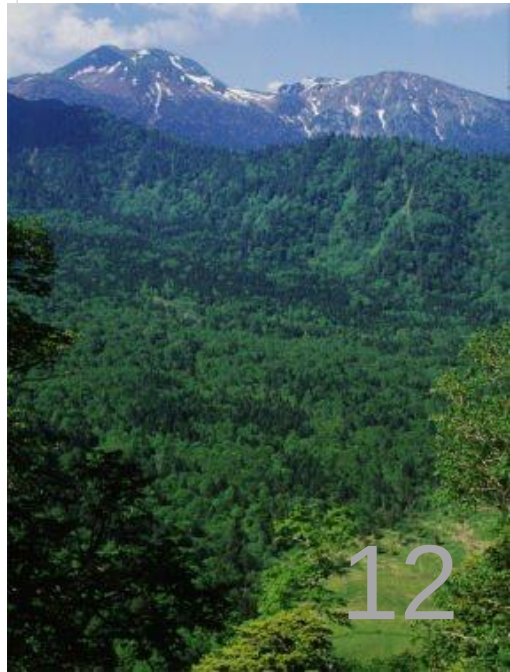
- increasing with electrification

Structural background of poor RE heat market

a. Historical absence of “heat” in energy policy
b. Top-down structure & view in energy polity
c. Giant energy industry dominant in heat market
d. Poor or no consumer education

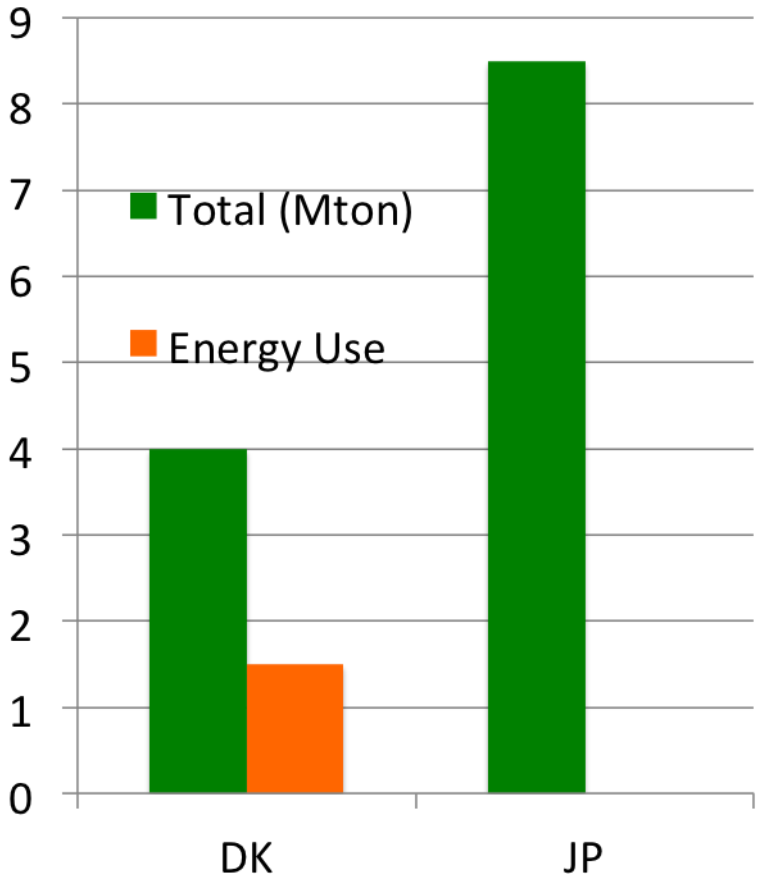


Renewable heat market in Japan

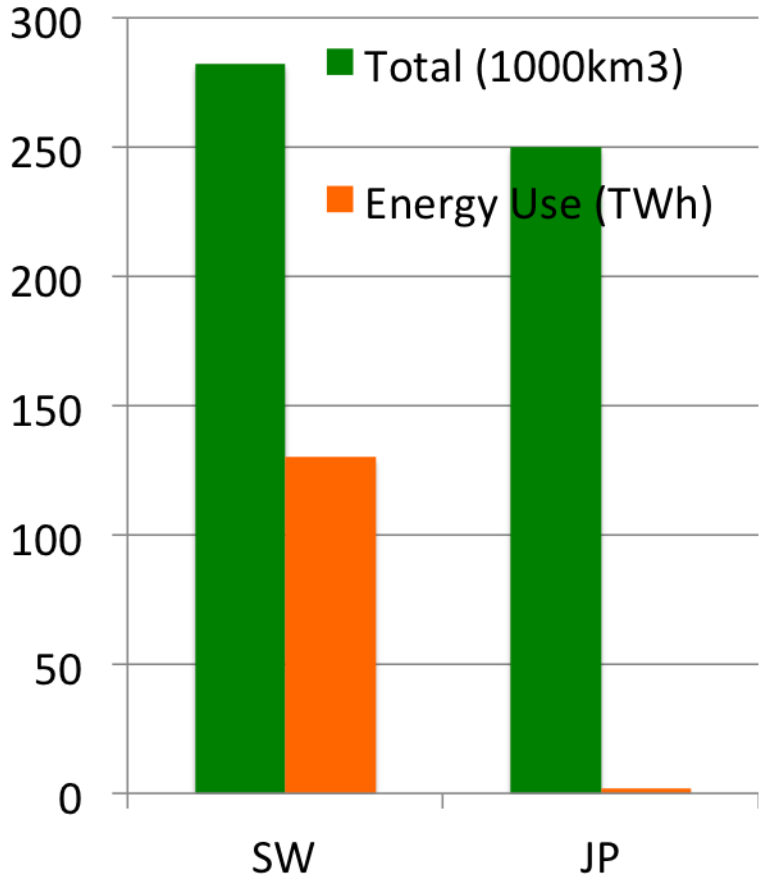


3.11 Fukushima disaster and Energy Policy in Japan

Straw



Forest



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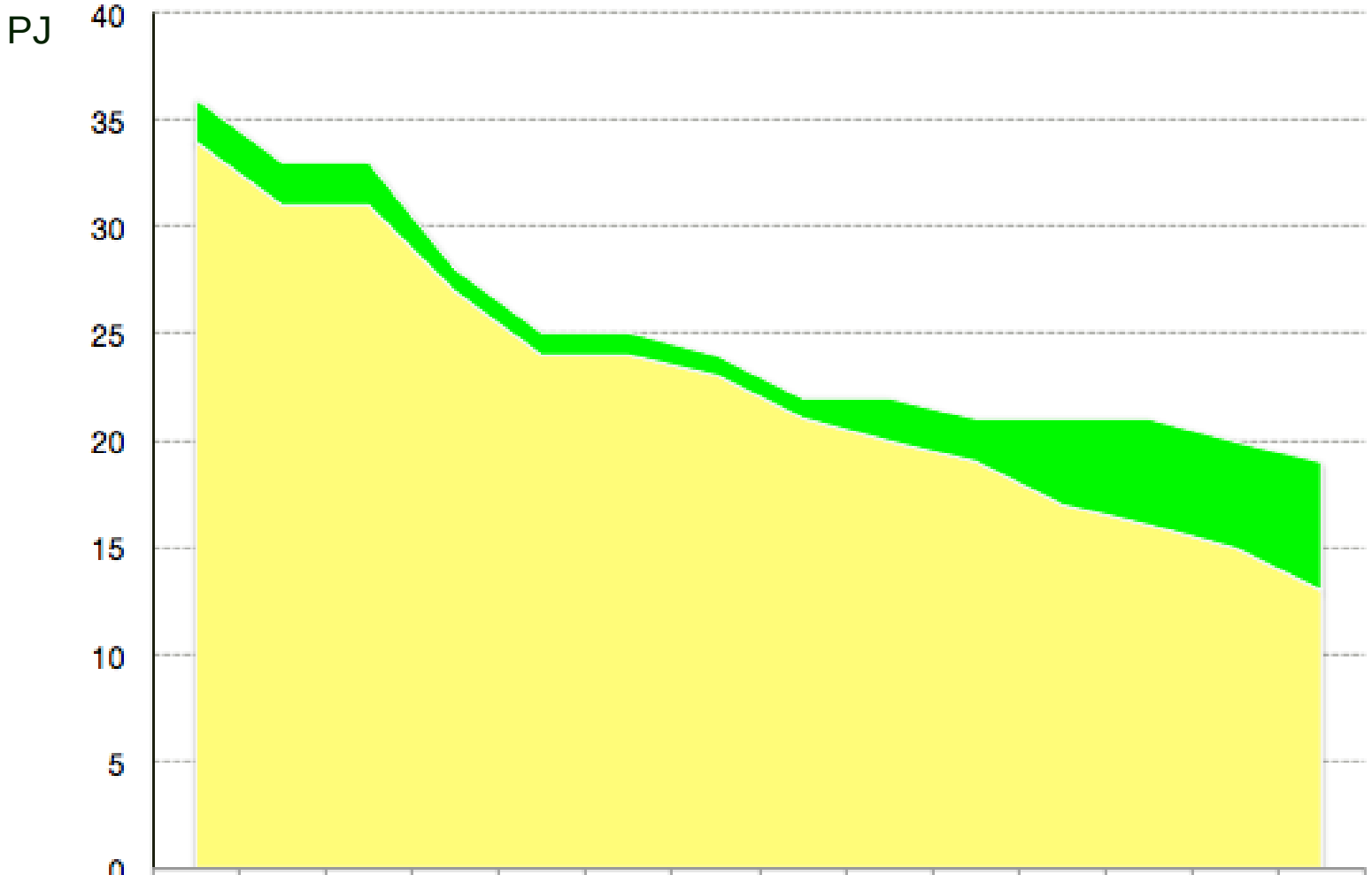


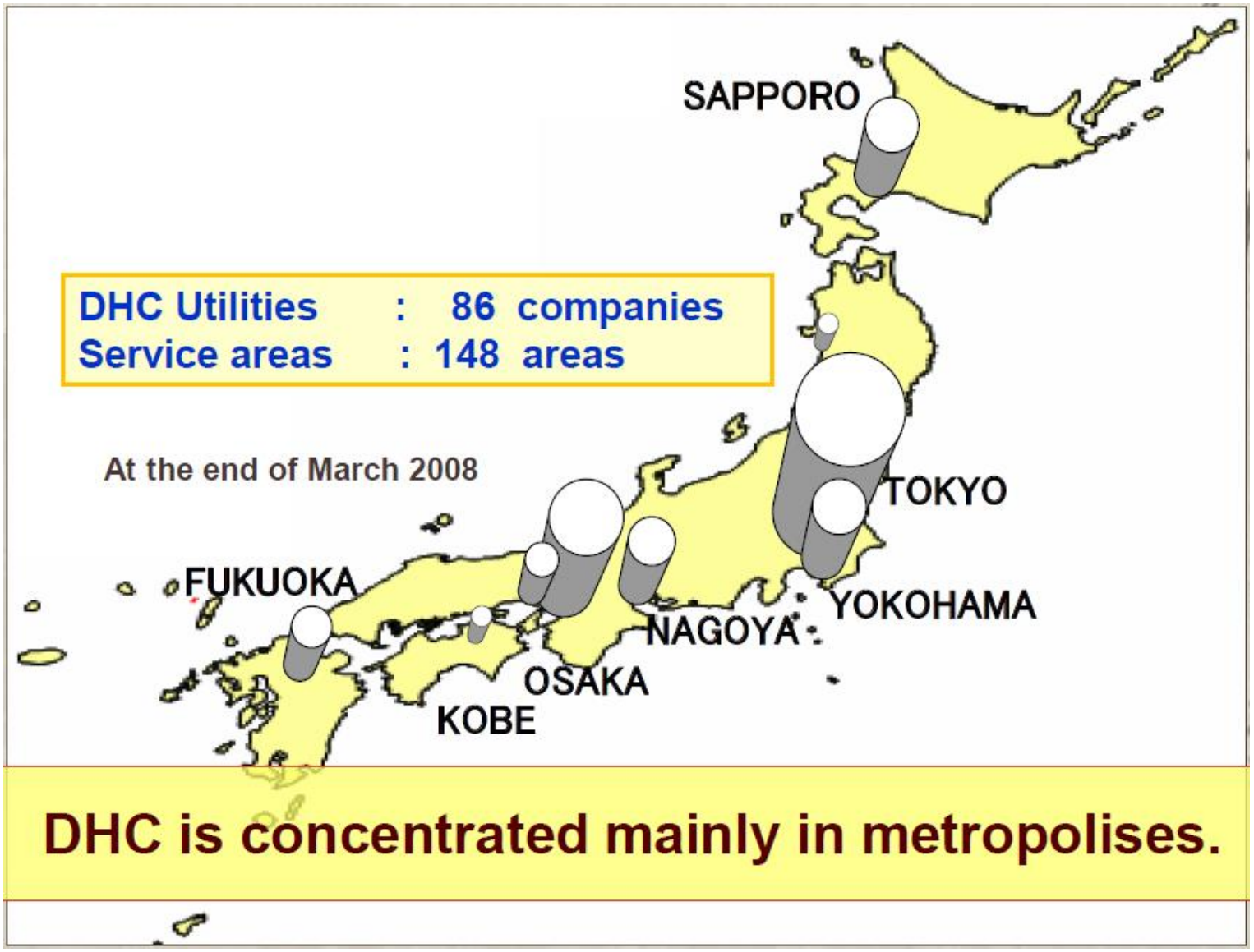
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
bioenergy	2	2	2	1	1	1	1	1	2	2	4	5	5	6
solar thermal	34	31	31	27	24	24	23	21	20	19	17	16	15	13

DHC in Japan

1) Marginal and decreasing < 1% (7 TWh of total 1000 TWh)
2) DHC : Cooling demand larger than heating
3) City center and large scale building, than local area distribution
4) 1st & 2nd Generation DH dominant

   steam and high temperature water (> 100 ℃)
5) Renewable resource use is limited
6) Absence of “4DH” concept yet
7) Technologies under development

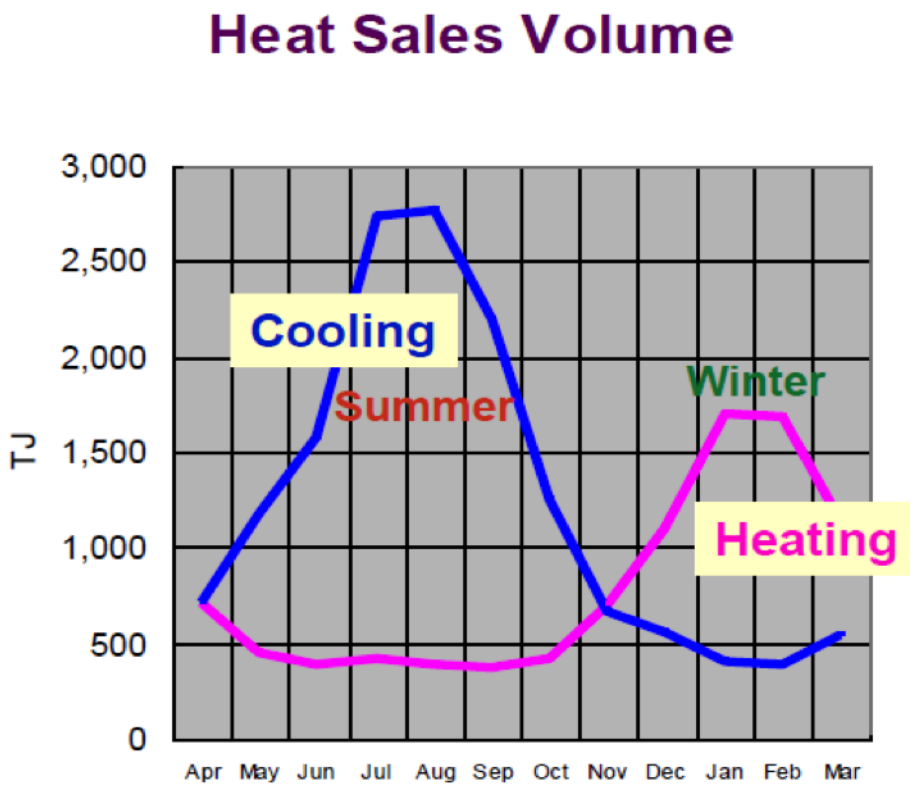
DHC and Area energy network in Japan



Kawabata, T. Sustainable Energy for Japanese Cities

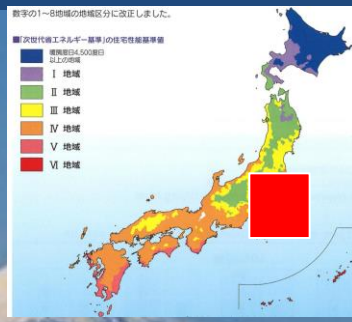
DHC and Area energy network in Japan

- Heat sales volume :
  - Heating 15,400 TJ/yr
  - Cooling 9,600 TJ/yr
  - Total 25,000 TJ/yr
- Annual turnover :
  - 1.53 billion USD



Kawabata, T. Sustainable Energy for Japanese Cities

District heating in Japan – case in Tokyo



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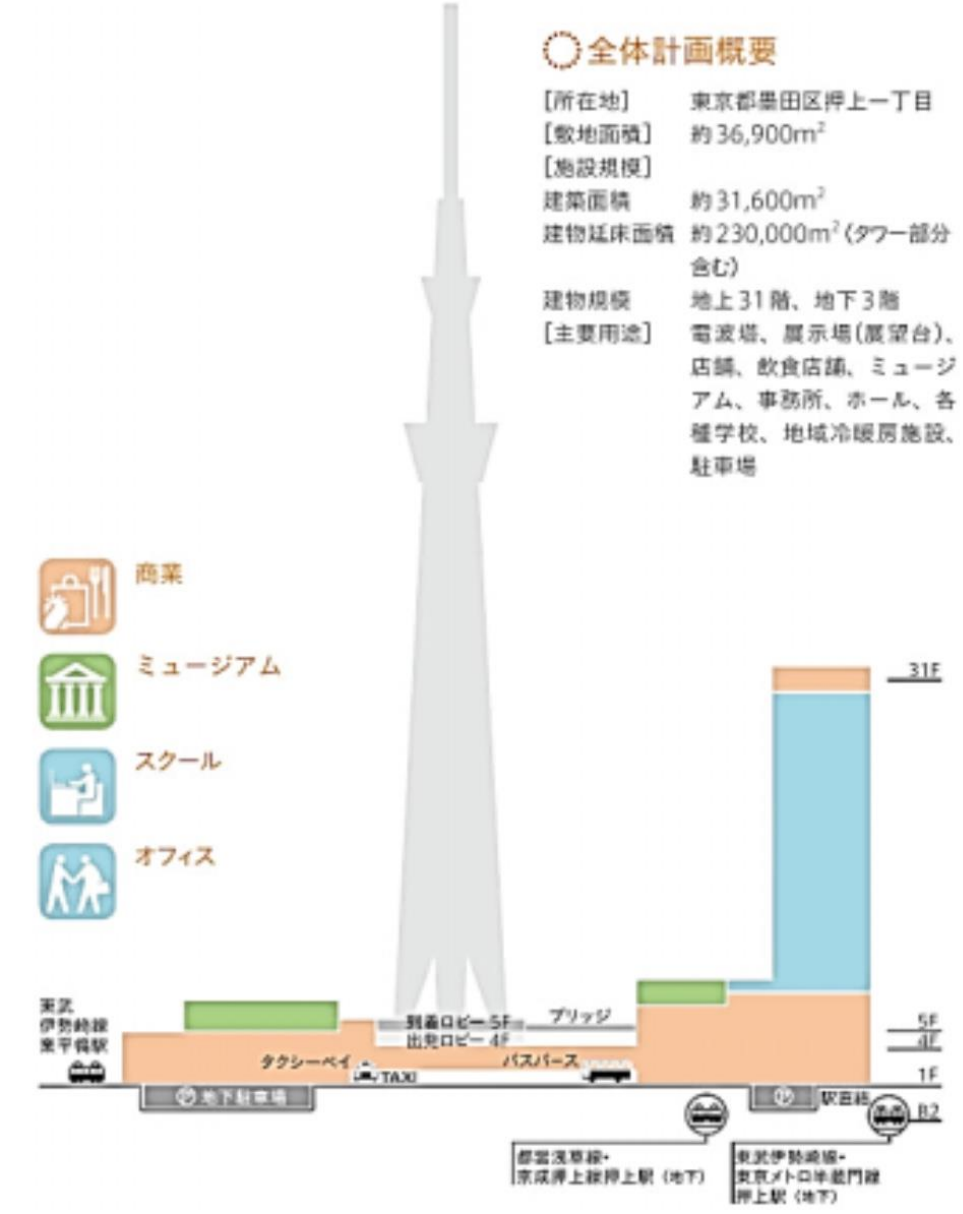

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District heating in Japan – case in Sapporo

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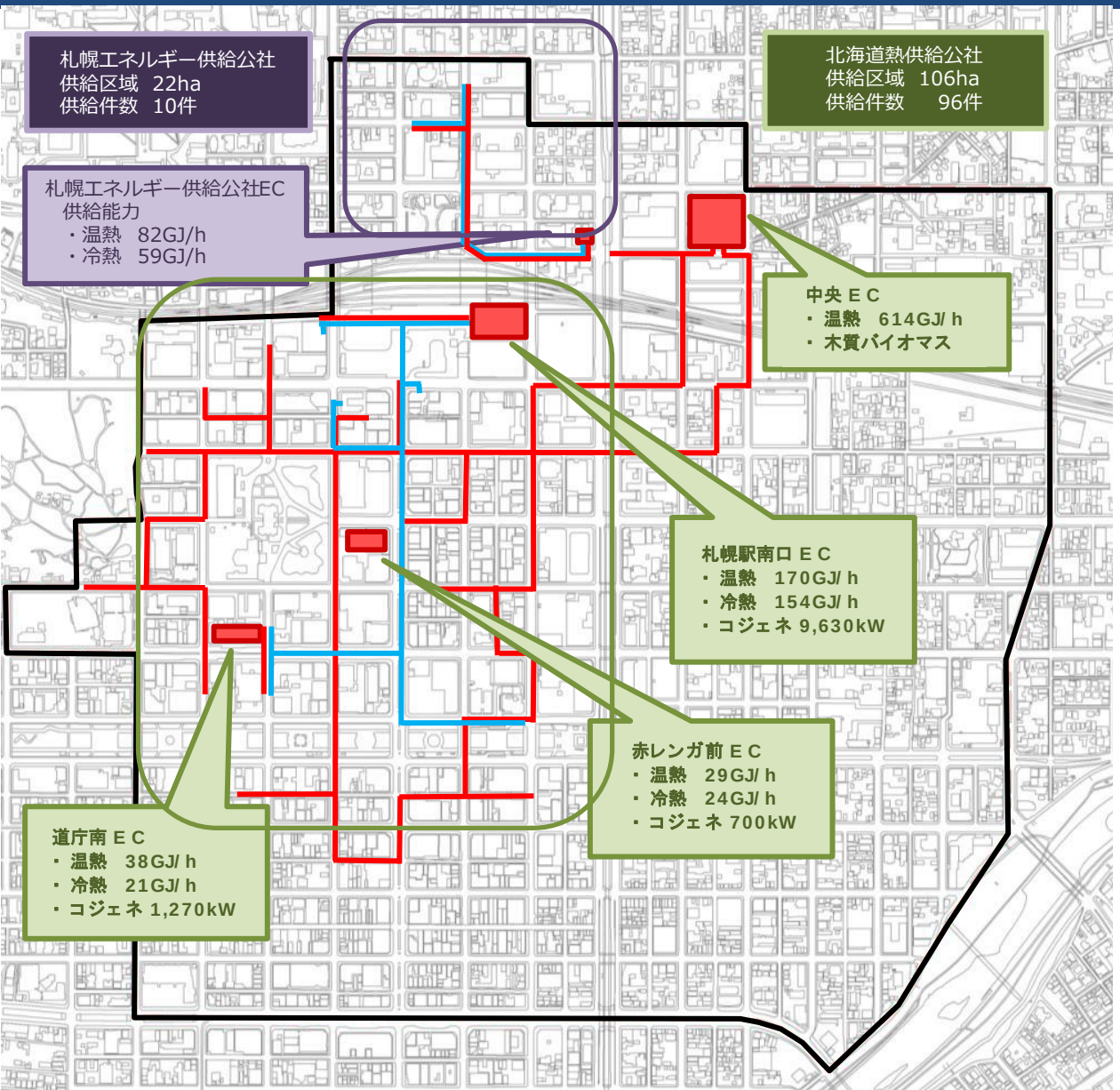
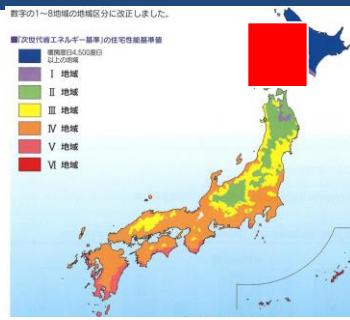




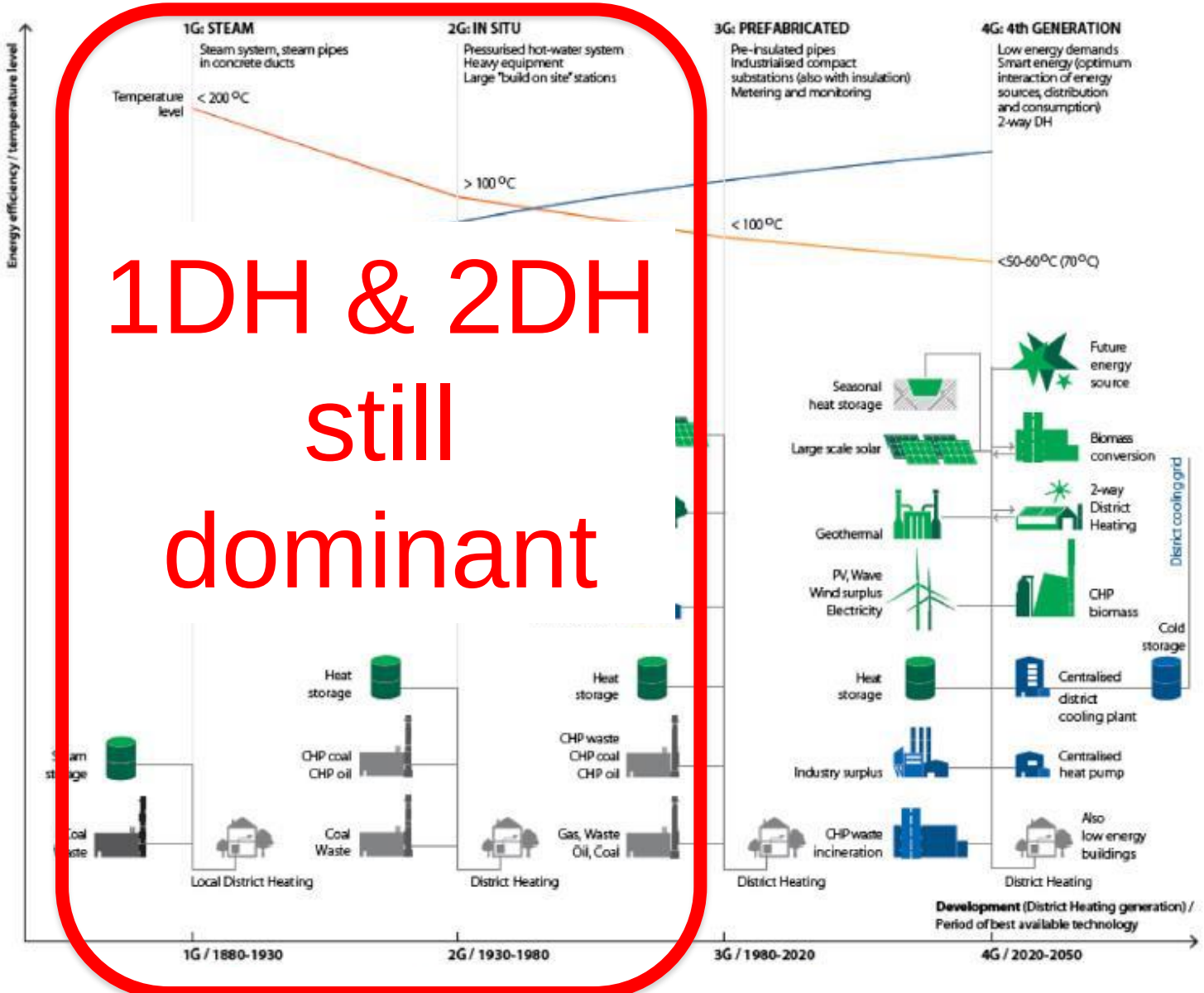
Steam

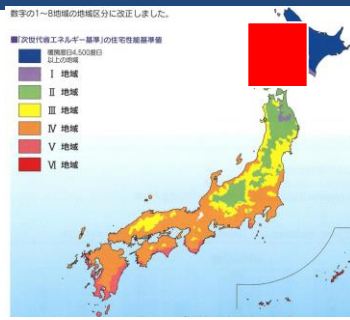
Hotter water (180℃)

Hot water (80℃)

Cooling (6℃)

District heating in Japan – case in Sapporo

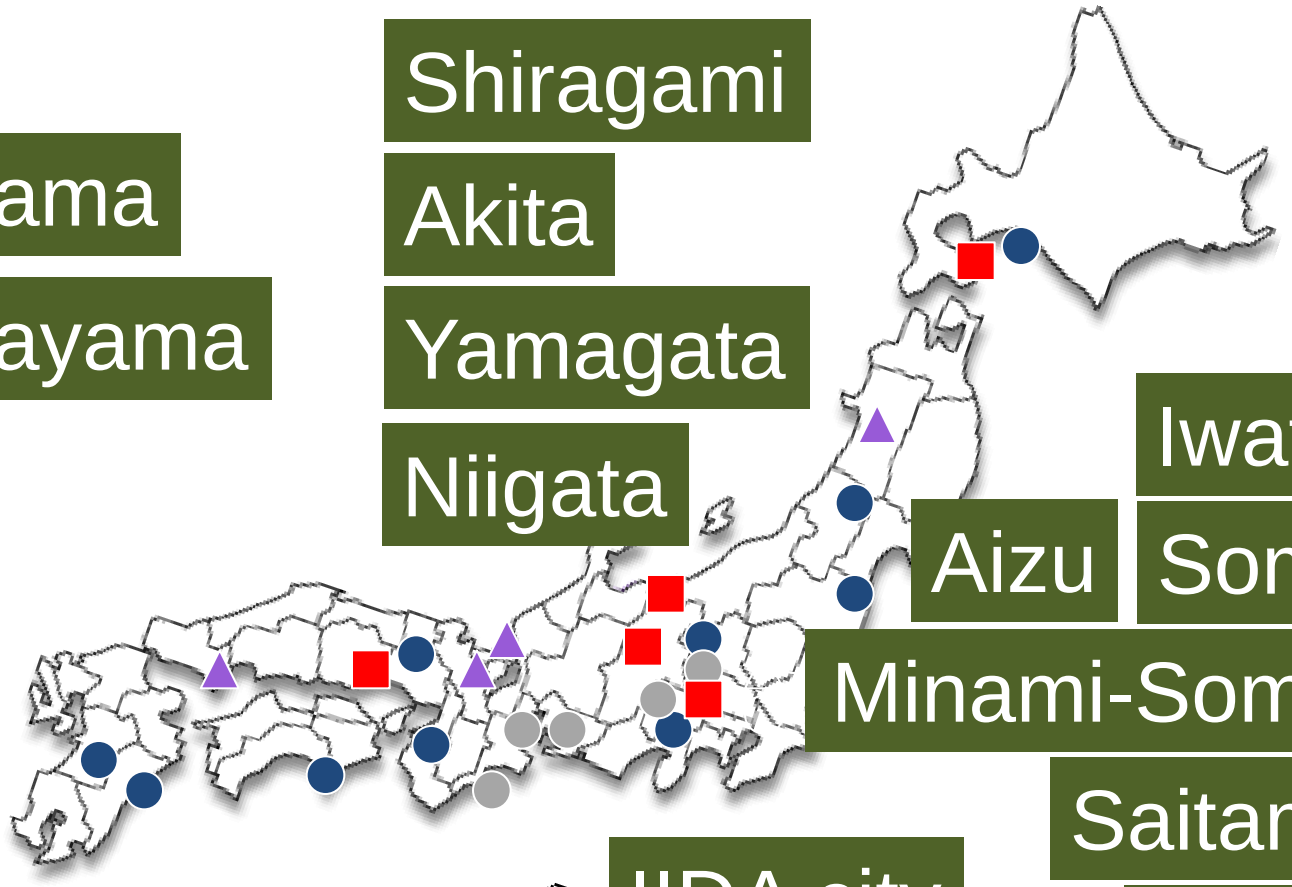




District heating in Japan – case in Sapporo

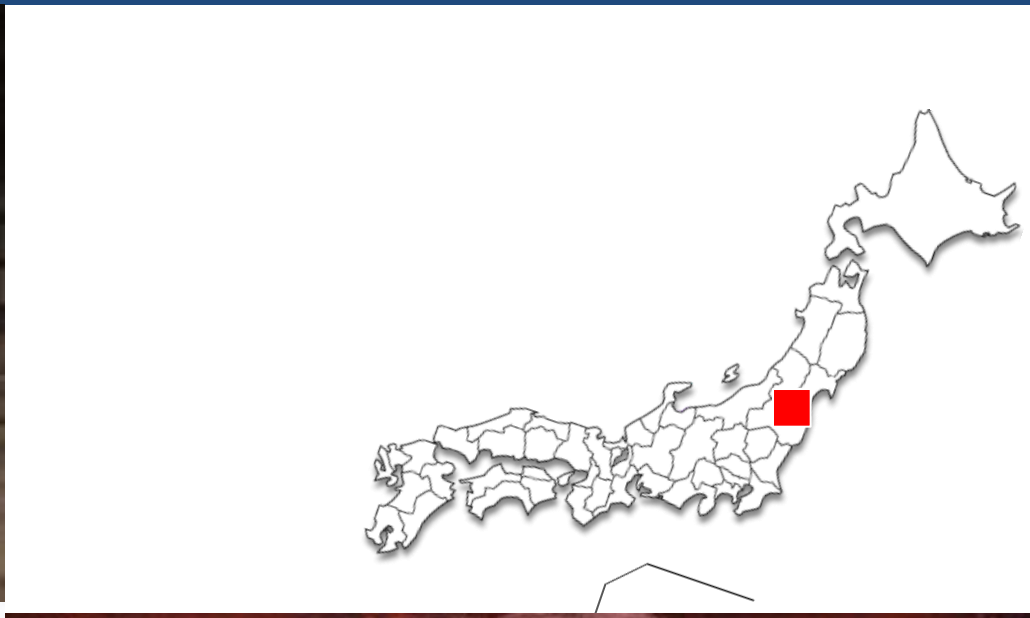
Rising community power in Japan

Niceko
Obihiro
Kyotango
Toyama
Takarazuka
Takayama
Bizen
Hiroshima
Yamaguchi
Obama
Kumamoto

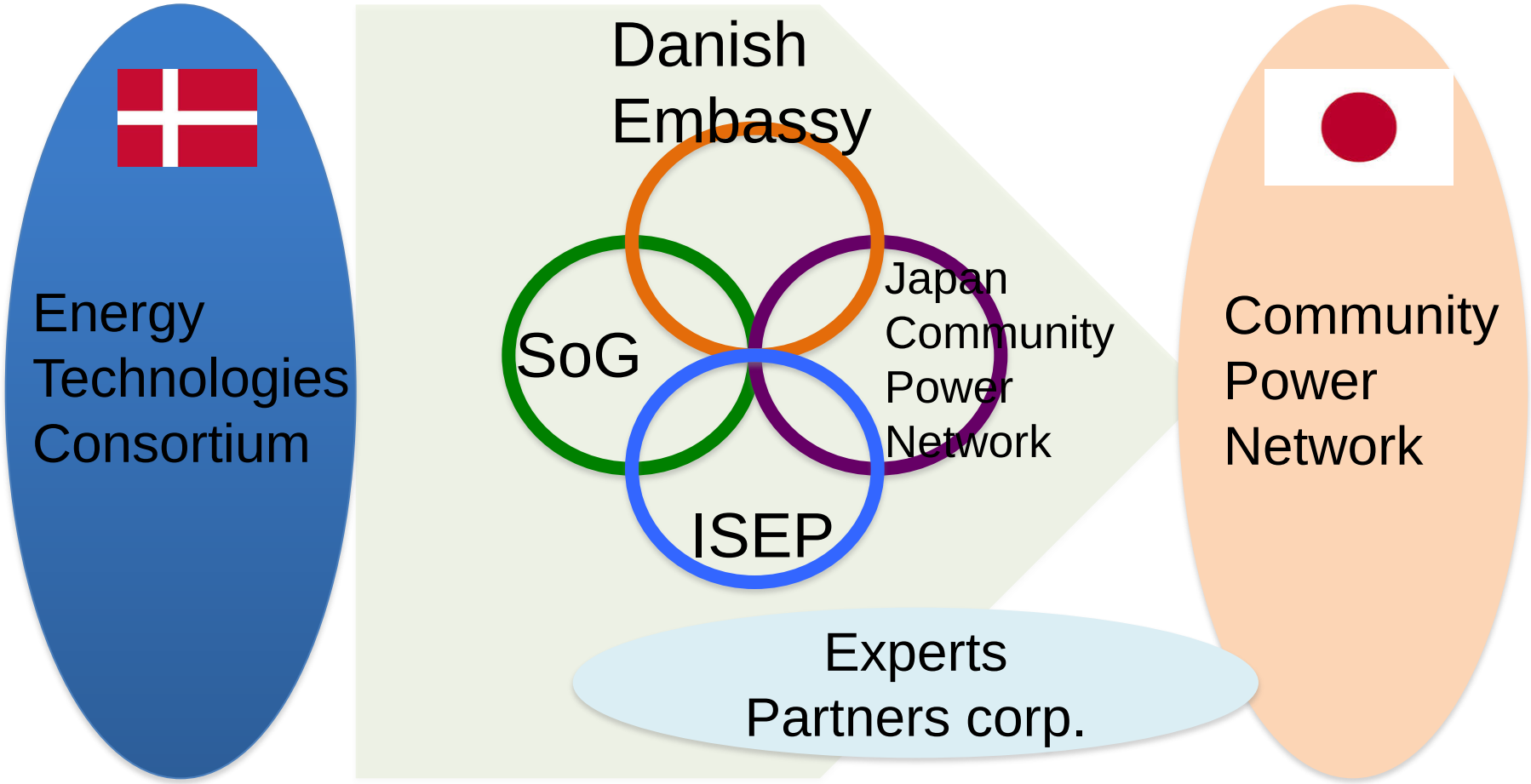


Shiragami
Akita
Yamagata
Niigata
Iwate
Aizu
Soma
Minami-Soma
Saitama
IIDA city
Chofu
Shizuoka Odawara Nagano
Setagaya

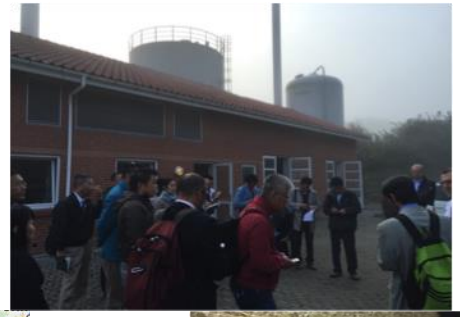
Community power in Fukushima

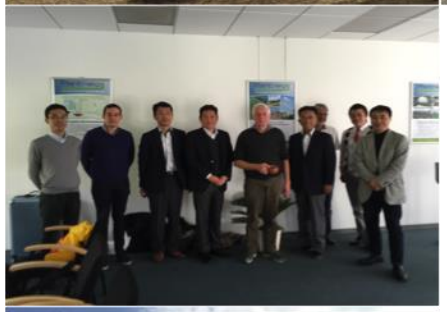


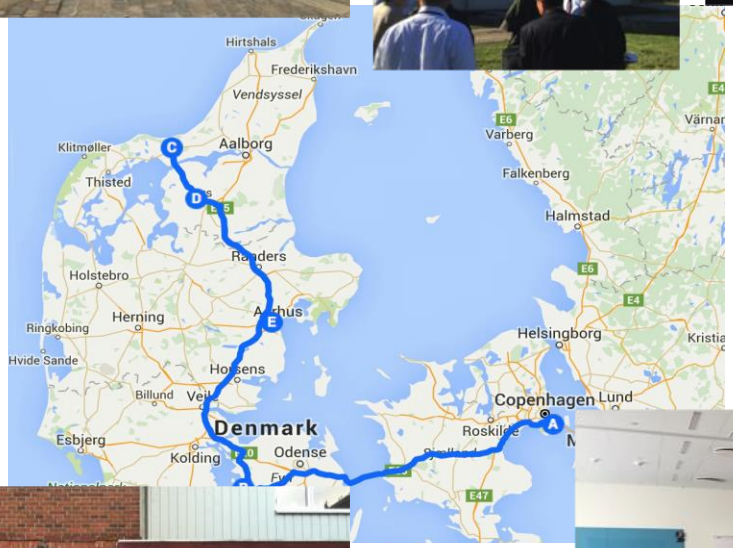
Danish-Japan Technology Transfer program
Overall scheme



Study visit to Denmark since 2014



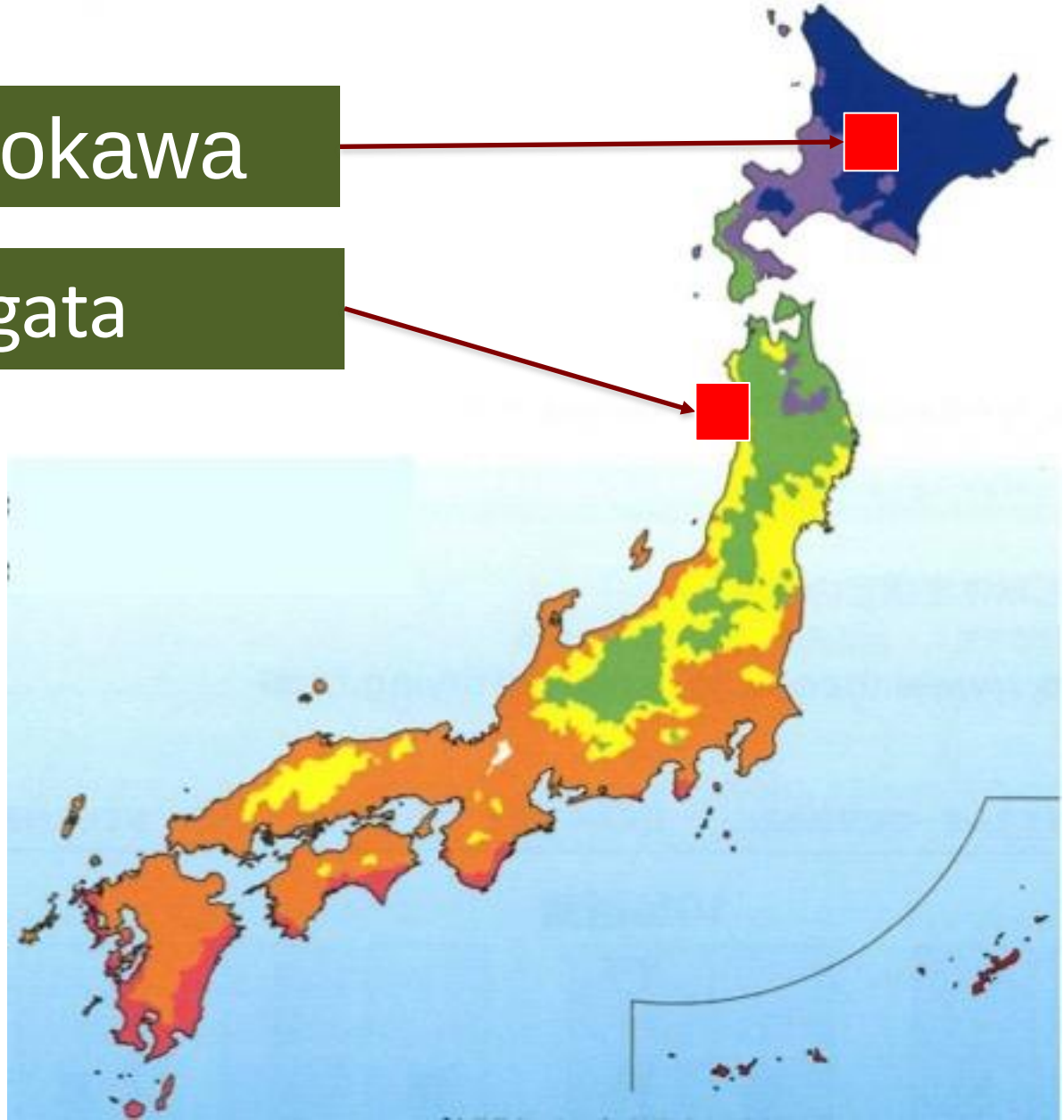




Dual strategy for developing RE heat market in Japan

Shimokawa

Ogata



Planning Local Biomass and District Heating

Ogata Mura

Area 1:
Hotel, Polder Spa, Welfare and Nursing Home

Area 2:
Village–run Housing

Area 3: Public facilities
Village Office, Village Center, Clinic, Health Center, Schools, Public Hall

Area 4:
Individual Housing 731 units.

Jens Birch Jensen
PlanEnergi

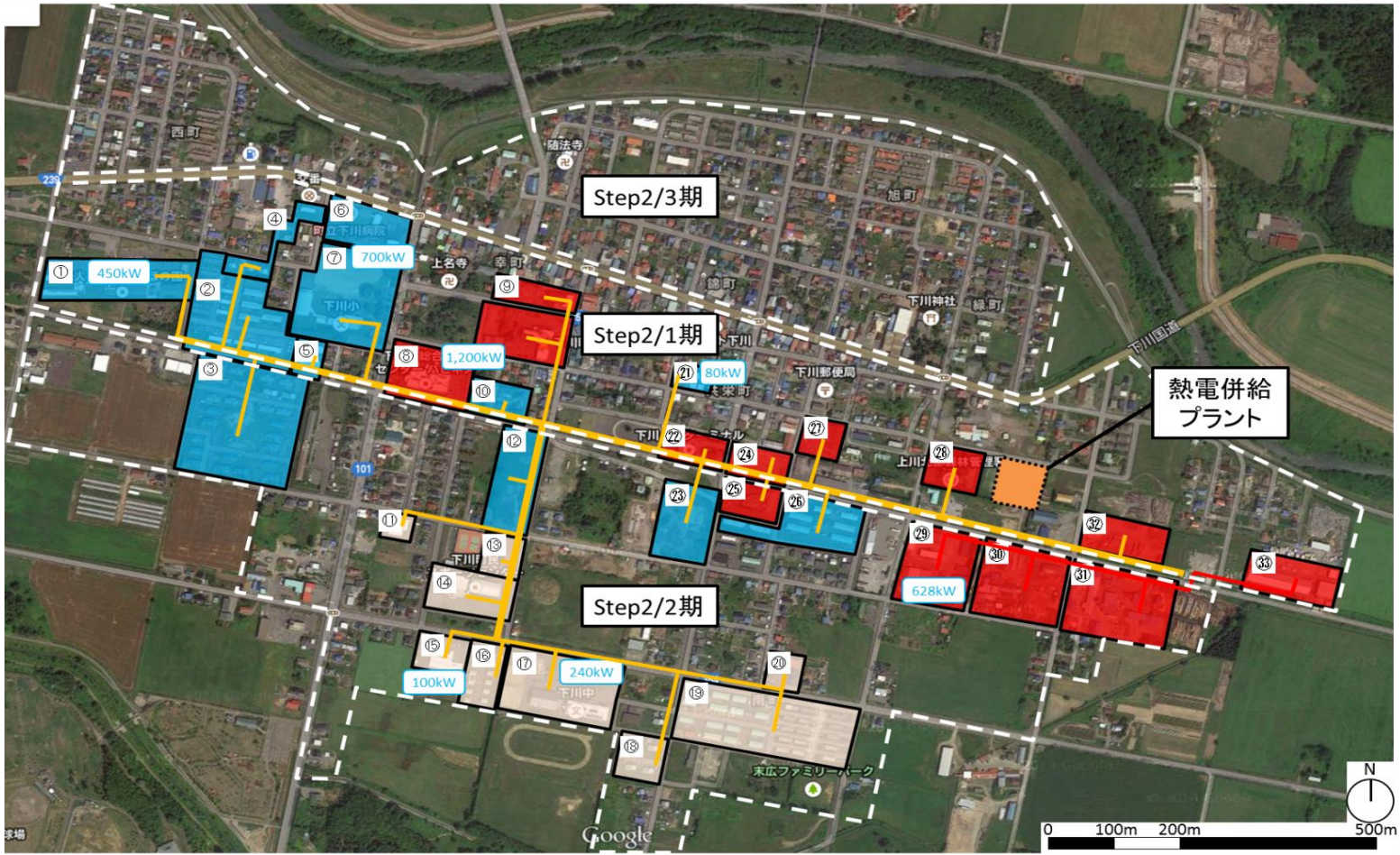
Project balance (1)Project schedule

■Set project schedule separately in Step1 and Step2.

・Conduit improvement takes about three years in Step1, and the supply will start accordingly.

・In Step 2, it will take 10years to improve the conduits, and supply will be expanded to the whole area once Step 1 has finished.

年度	H27	H28	H29	H30	H31	H32	H33	H34	H35	H36	H37	H38	H39	H40	H41	H42
発電			試験運転	発電開始												
熱供給				Step1 1期供給	2期供給	3期供給	Step2 順次供給									全面供給
工事	実施設計	プラント工事 導管工事（1期）		導管工事 （2期）	導管工事 （3期）	プラント増設 導管工事（Step2/1期）			導管工事 （Step2/2期）			導管工事 （Step2/3期）				



：Step1/1期

：Step1/2期

：Step1/3期

：Step2

：既設バイオマスボイラ

：温水メイン配管

：温水枝配管

：蒸気配管

Opportunities- new installment

- Japanese Government has programs to particularly promote investment into heat utilization infrastructure

"Decentralized Energy Infrastructure Project"

28 municipalities with plans to install new heat infrastructure

"Biomass Industrial Towns"

34 (out of total of 44) municipalities have plans to implement heat use from biomass

Opportunities- renewal of existing infrastructure

- existing infrastructure is mainly operating on steam or high temperature hot water and in order to realize an efficient heat distribution system

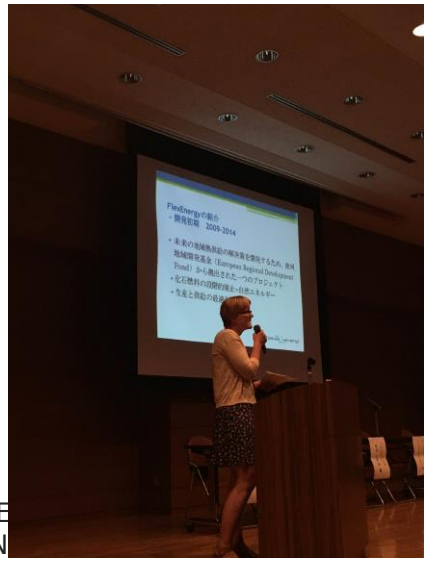
External competence is needed!

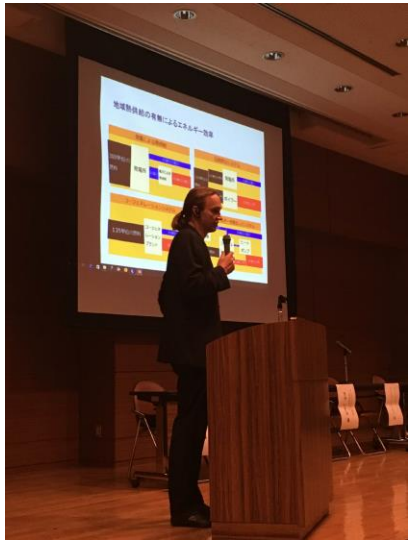
Our activities so far

- A **market visit** by DK companies- resulting in consulting projects on DH
- **Numerous presentations/lectures and booths** at trade shows etc. to introduce and raise awareness on Danish forte in the field

- **Numerous Japanese delegation to DK** to learn 4DH practices
  - Leaders from municipalities
  - Businesses involved in regional energy development
  - Industrial associations and its member companies working with heating

- Fleks Energi's **analysis of the market**
- Extensive work with Japanese Institute for Sustainable Energy (ISEP) and Japan Community Power Network to **network with local municipalities aiming for a decentralized energy system**





DANISH ALLIANCE ON HEAT AND DISTRICT HEATING FOR JAPAN

- **Assigned project manager** in Tokyo, with continuous business development for the alliance for 2016
- **Insight into existing potential projects** in Japan
- Further information on **concrete identified project opportunities** analysed to be relevant for Danish competences

DANISH ALLIANCE ON HEAT AND DISTRICT HEATING FOR JAPAN

kamstrup

LOGSTOR

PlanEnergi

C.F. Nielsen

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ACTIVITIES 2016

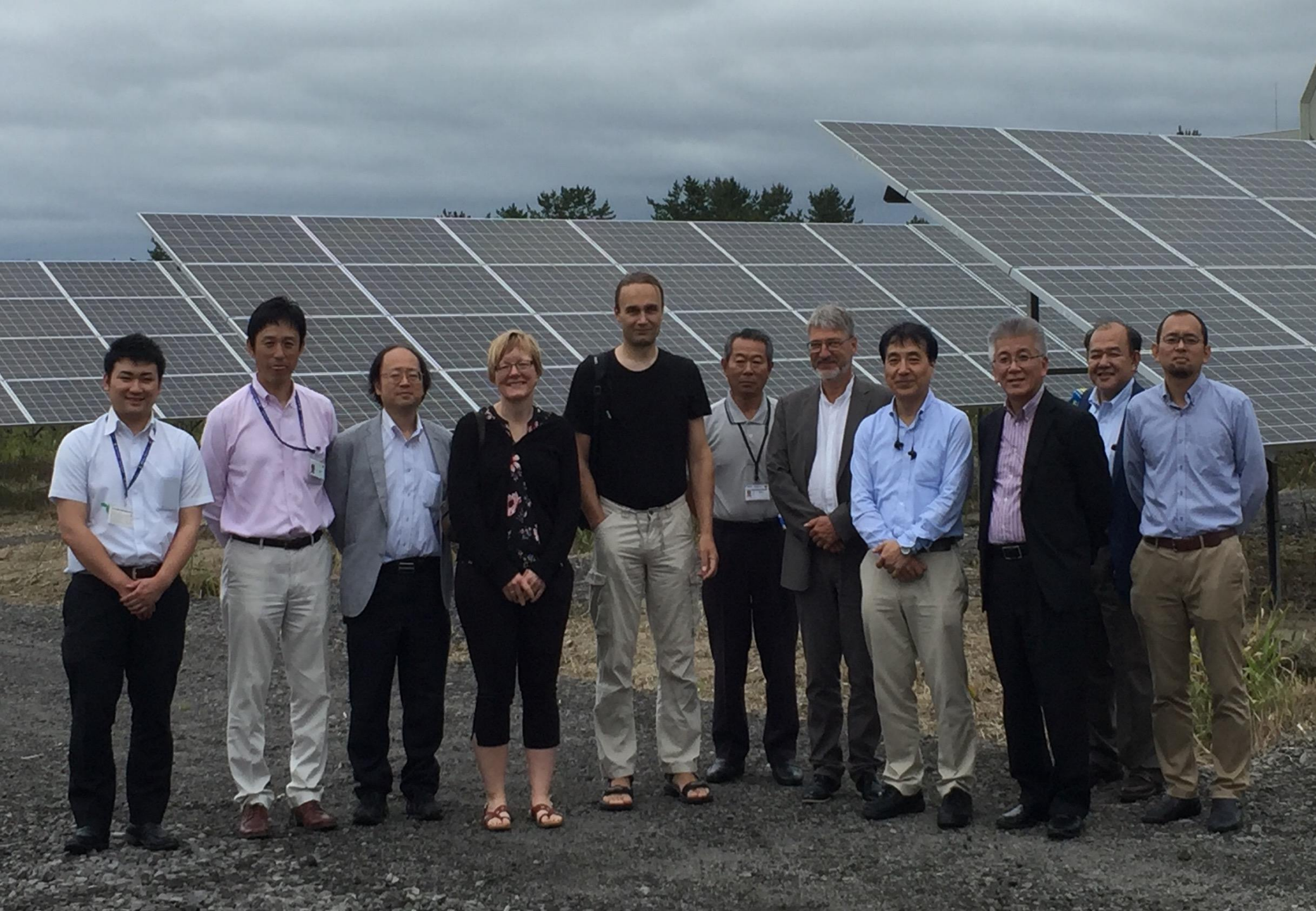
- To be presented at Renewable Energy Industrial Fair in Fukushima in 19-20 October (by project manager)
- Visit to Japan to Attend EcoPro 2016 8-10 Dec including a seminar
- Sight visit to municipalities planning DH and with existing non-4DH district heating

INTERVENTION OF THE MARKET HAS STARTED

PlanEnergi

Institute for Sustainable energy policies isep 認定NPO法人 環境エネルギー政策研究所

Working on the designing of DH in municipalities of Ogata and Shimokawa



4DH in Japan?