



TOHOKU  
UNIVERSITY

# **Design for a sustainable cities with the value of energy**

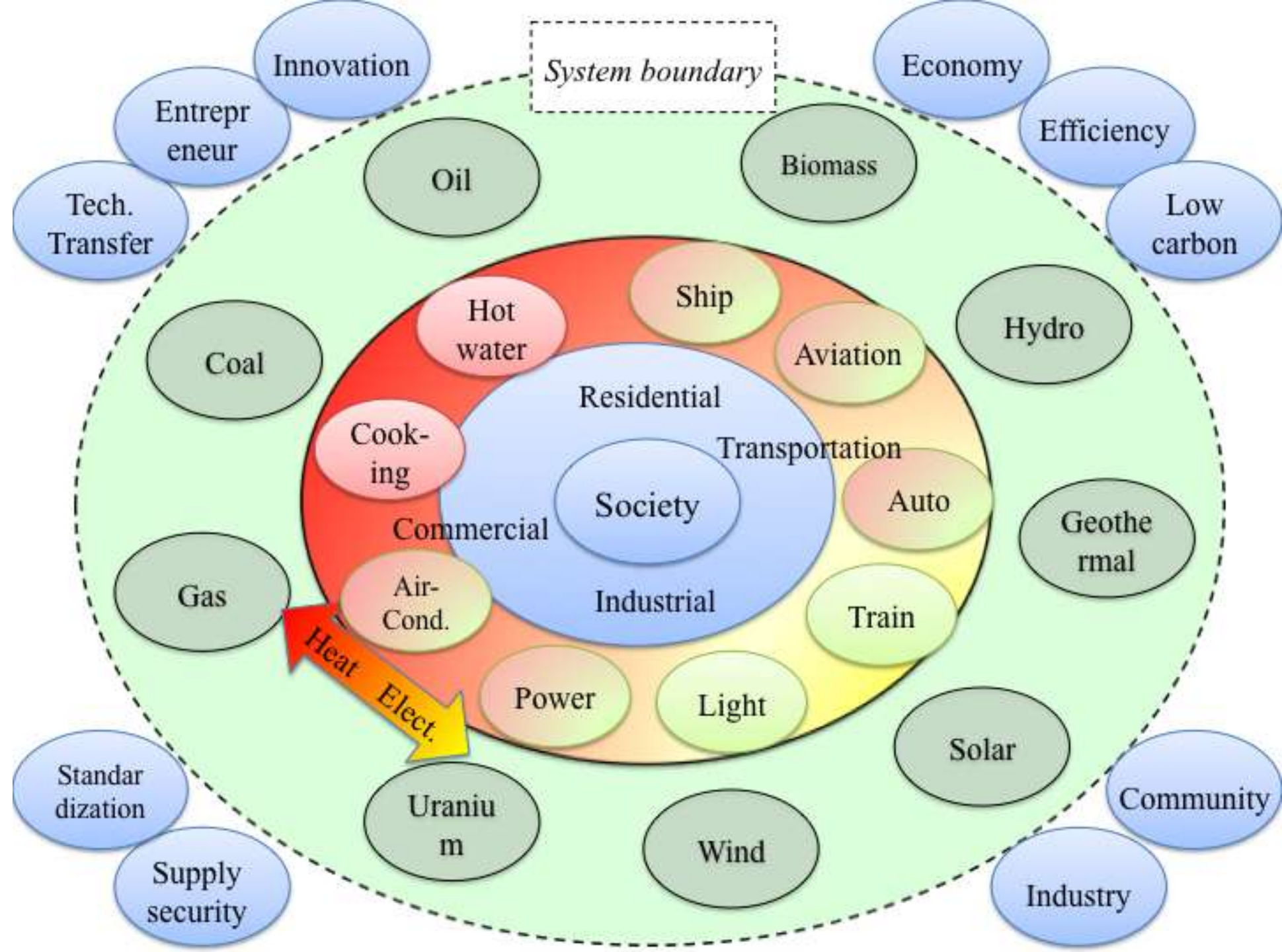
The 49<sup>th</sup> JAIF Annual Conference

April 13, 2016

Tohoku University, School of Engineering

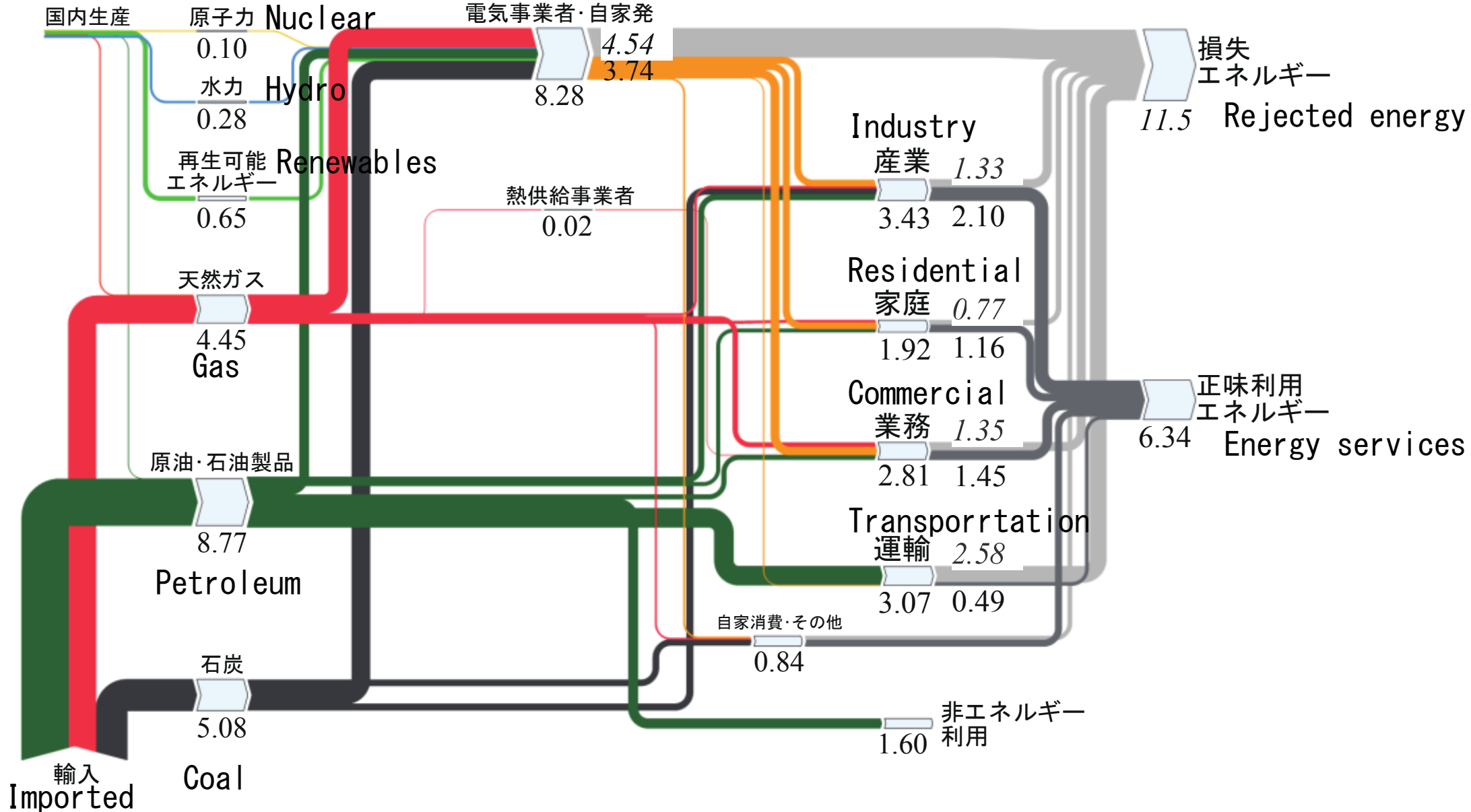
Toshihiko Nakata

1. Life and energy
2. Current energy supply & demand
3. Size of cities
4. Glocal energy system

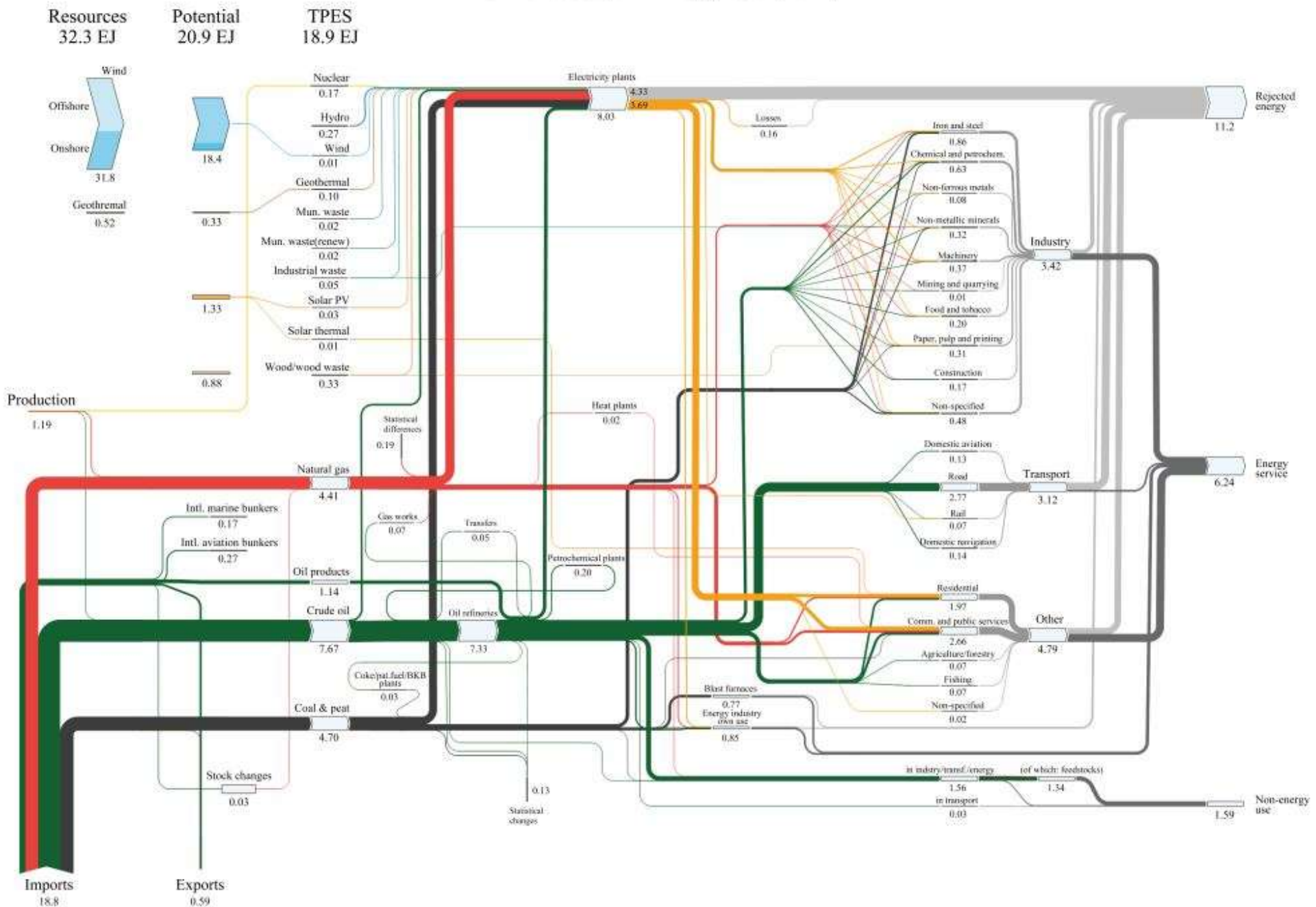


TEPS  
総供給量 : 19.0 EJ

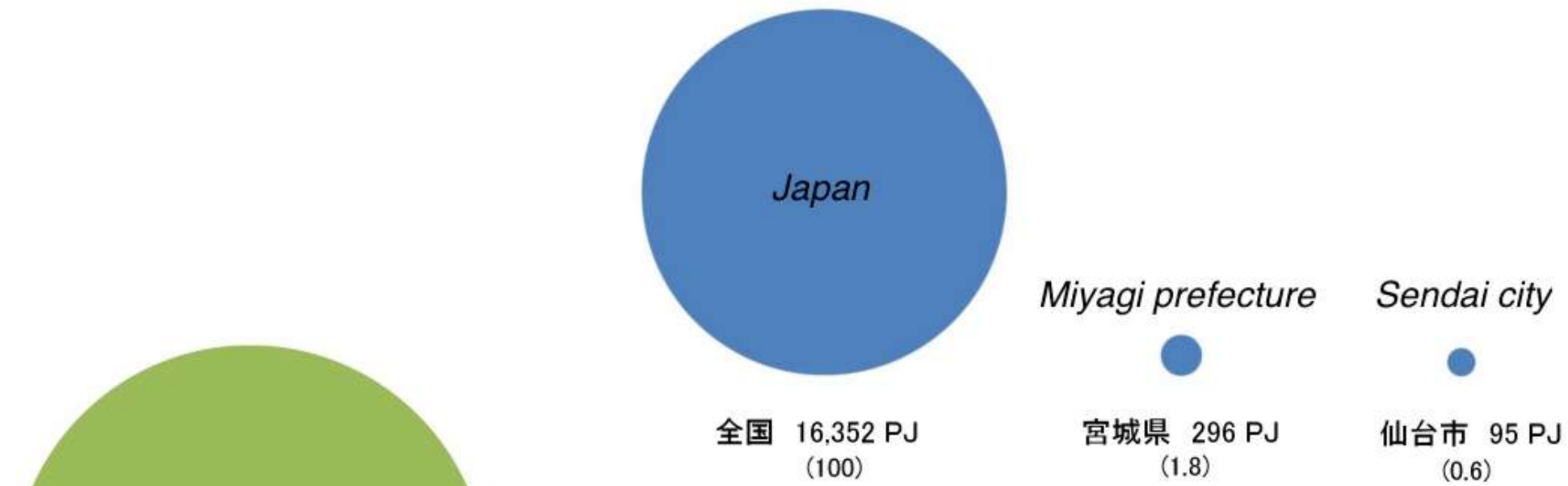
### Electricity generation



# Estimated Japan Energy Use (2012)





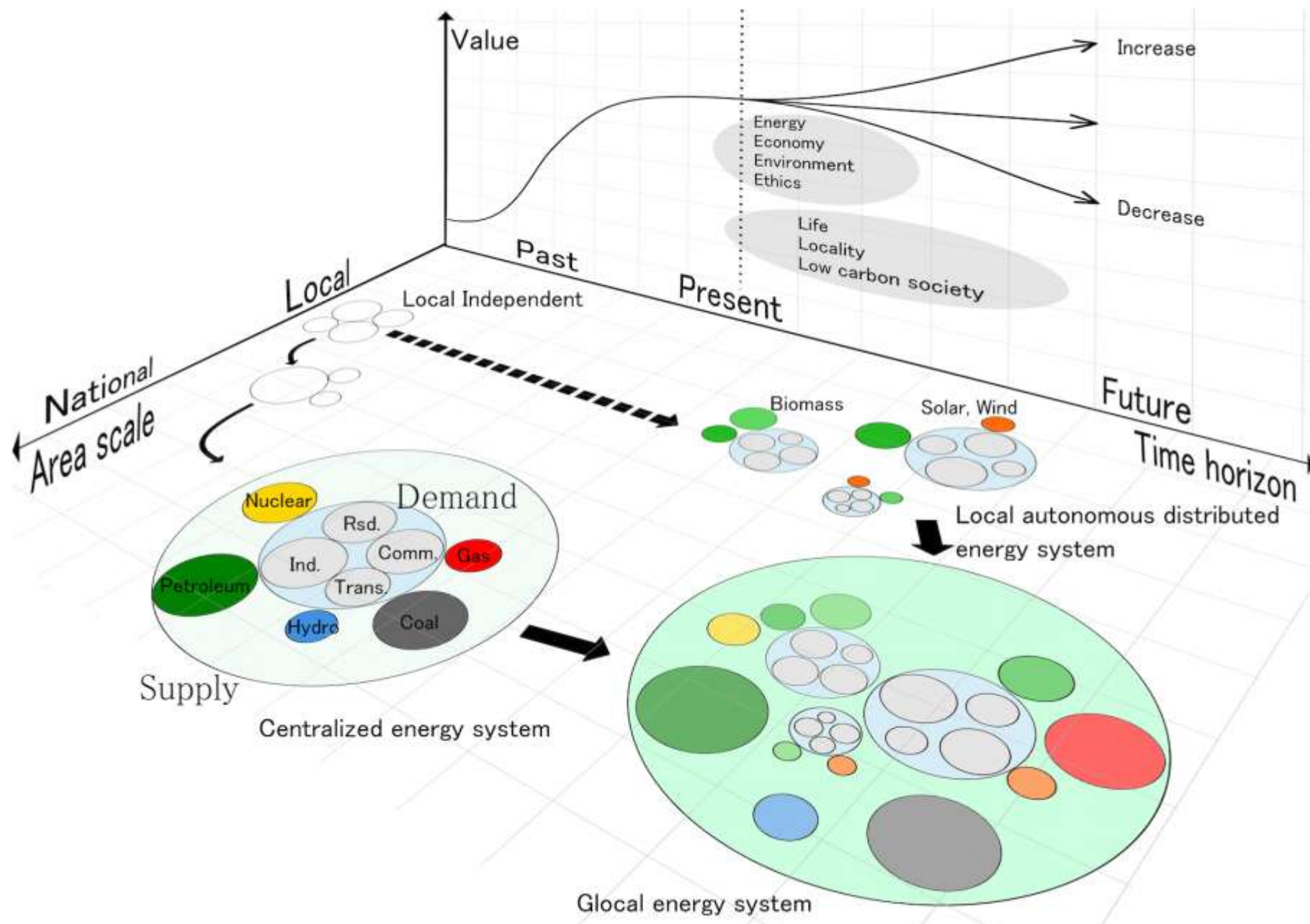


最終エネルギー消費量 (2005年)  
*Final energy consumption*

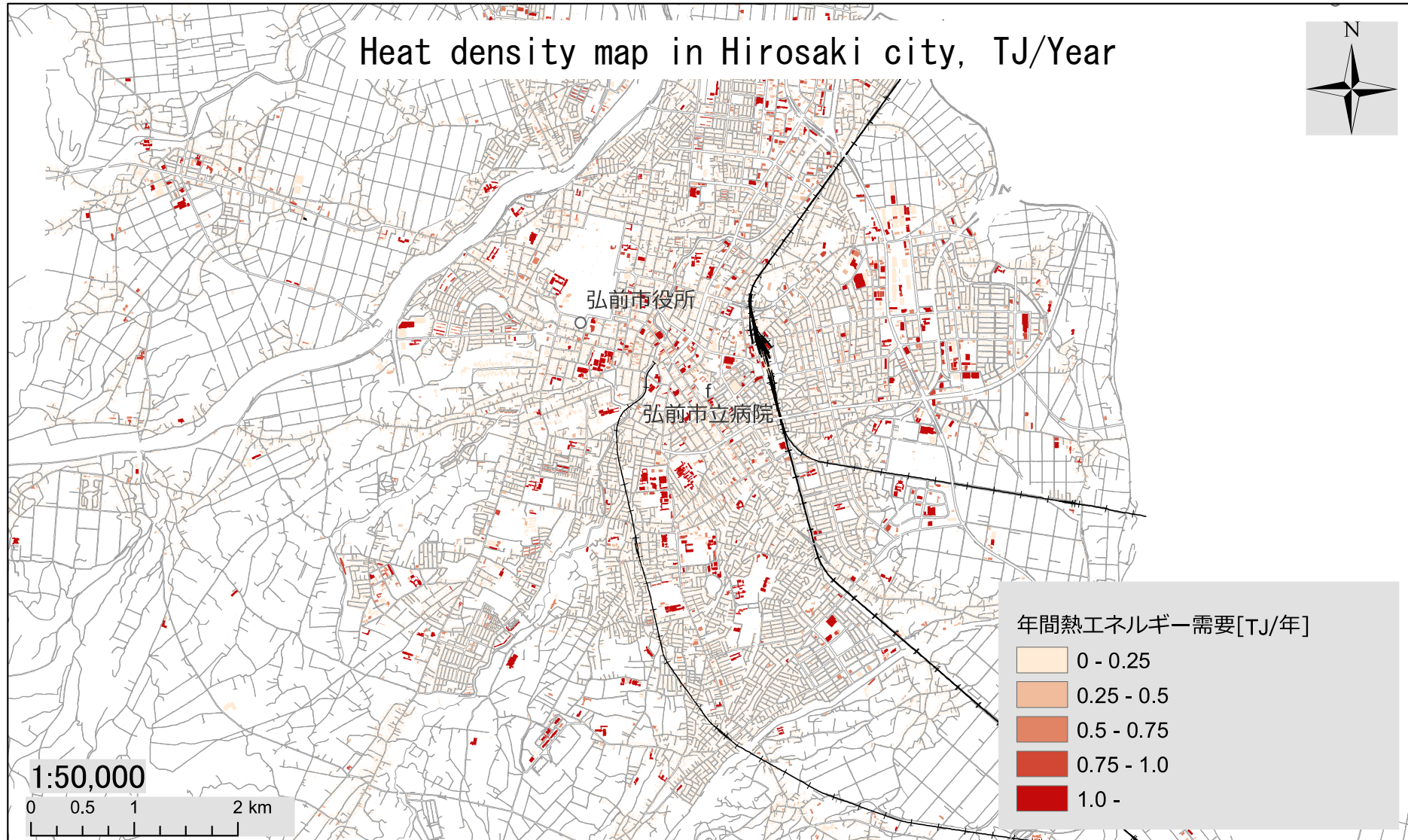


CO<sub>2</sub>排出量 (2005年)  
*CO<sub>2</sub> emission*

仙台市環境基本計画 2011-2020「社の都環境プラン」より作成  
 ※エネルギー消費量は二酸化炭素排出量から換算した値



# 弘前市の年間熱エネルギー需要分布図 2012



参考文献: esriジャパン(株) ArcGIS Datacollection 詳細地図 2012  
(財)建築環境・省エネルギー機構 住宅事業建築主の判断基準 2009  
(財)日本エネルギー経済研究所 民生部門エネルギー消費実態調査 2003

単位: TJ =  $10^{12}$  J

May. 14 2014 Onda@Nakata lab.



# Why nuke is shunned and environmental issues are preferred ?

Issues	Environment		Nuclear power	
		Pollution	Climate change	Fukushima Daiichi
Region	Local	Global	Local	Global
Damages	Air, Water, Soil	Global warming	Radiation	
Impacts	Life	Life, Global economy	Life	Global economy
Faults	Mining indus.	Society	Utilities	
Victim	Residents	Society	Residents	
Values from solutions	Local environment	Sustainable development	Local environment	Electricity Sustainability
Time	1870-	1990-	2011-	1960-

