
Regional LCS

- Local LCS scenario methodology considering regional diversity -

Kei GOMI

Graduate School of Global Environmental Studies,
Kyoto University

AIM International Workshop Feb. 2009

NIES, Tsukuba, Japan





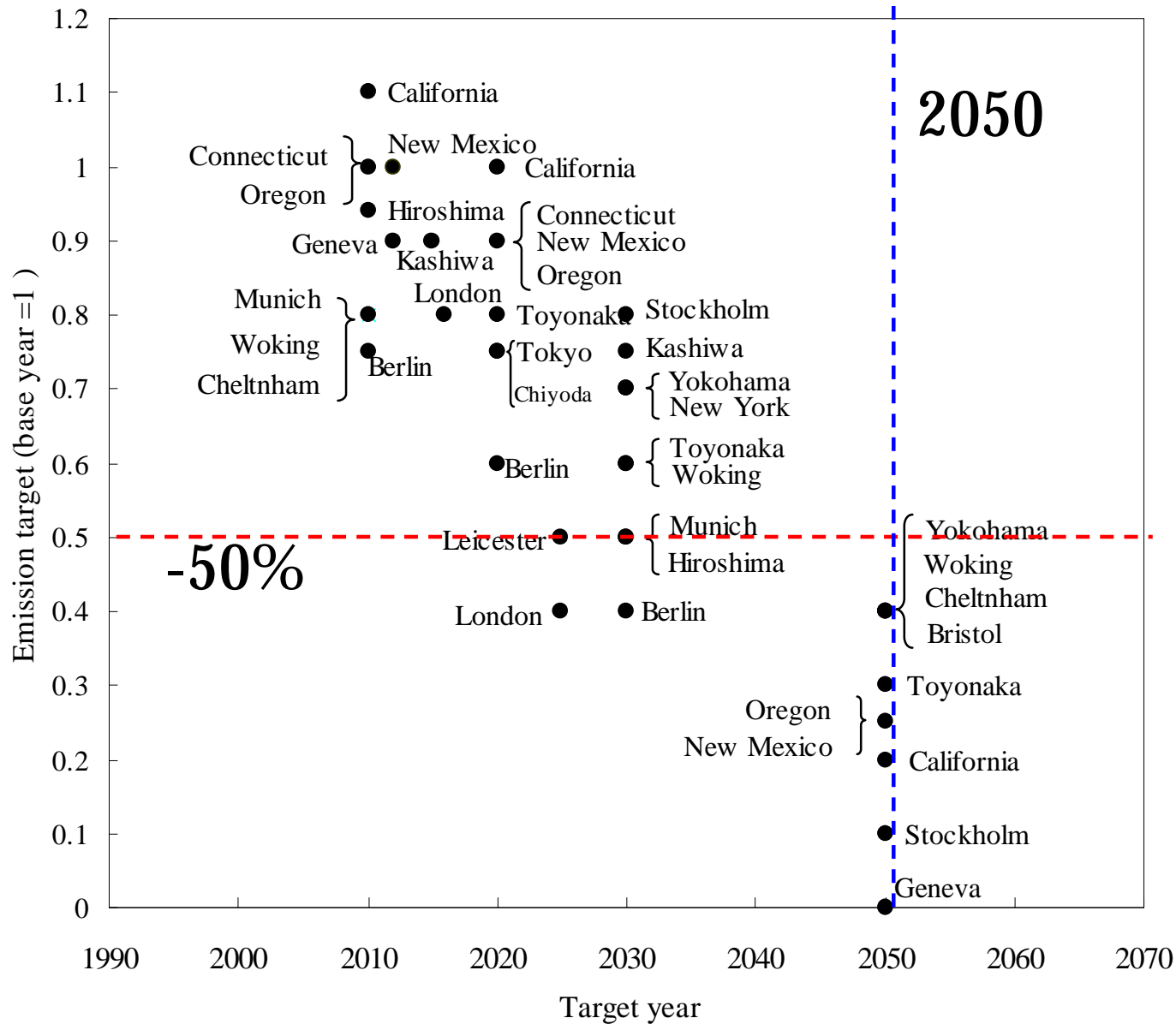
Agenda



- Background:
 - Needs for multi-level local LCS scenario
- Methodology and Model
- Application example: 8 areas in Shiga prefecture
 - Scenario setting
 - Results
- Conclusion – utilization in political process



Local LCS targets

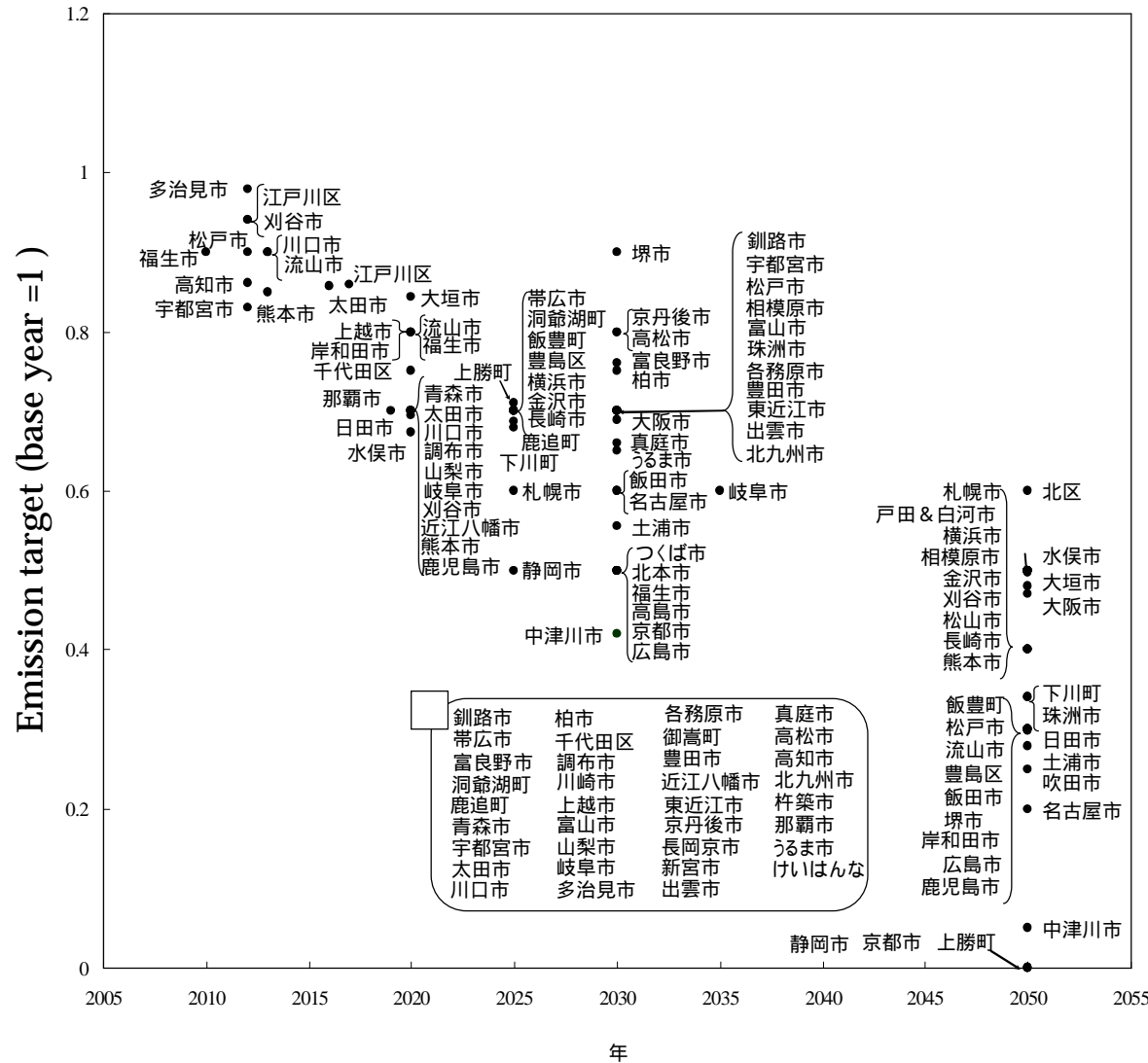


Target values are ratio to base year emission in each region.

Base years vary, though, 1990 is often used.



Environmental Model Cities



■ Japanese Prime minister's office called proposal of "Environmental Model City" to all municipalities.

(Feb., 2008)

■ 82 municipalities responded and proposed their targets and plans.

■ 13 were certified; Yokohama, Kitakyushu, Obihiro, Toyama, Simokawa, Minamata.

(July, 2008)

Kyoto, Sakai, Iida, Toyota, Yusuhara, Miyakojima, Chiyoda. (Jan. 2009)

Source: Kantei HP: www.kantei.go.jp

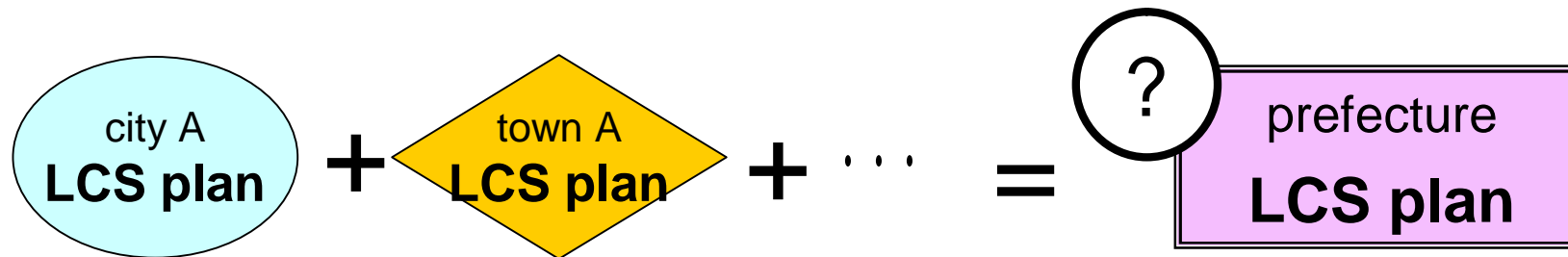
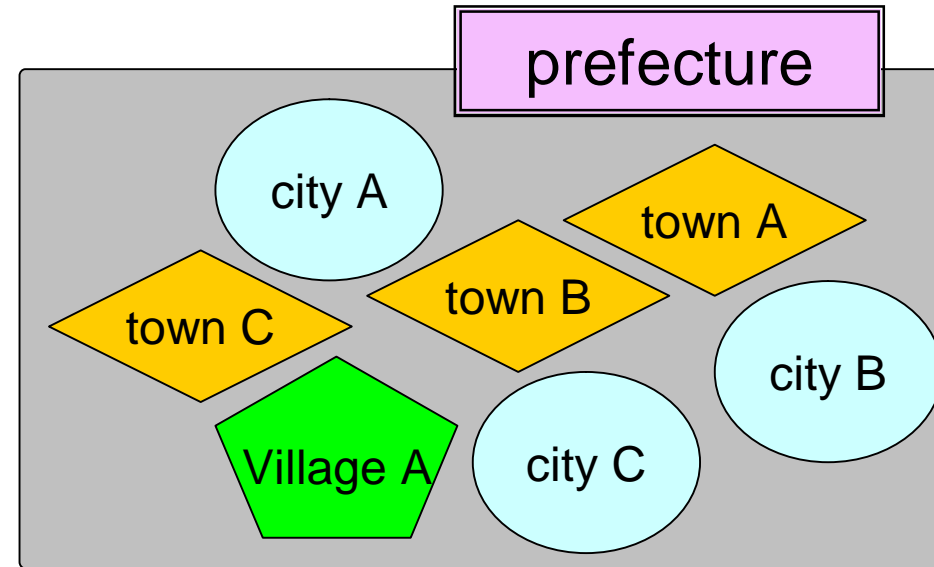
Special thanks to Mr. Yuki Ochi @Kyoto University



Structure of local authorities



- Multi-level structure
- Possibility of conflict between LCS scenarios of smaller and wider
- Some of the measures need to be addressed targeting several cities and towns.
- (e.g. Railway planning)



Assumptions of population, economic growth, industrial structure, etc.
Baseline GHG emission
GHG targets
Diffusion of countermeasures



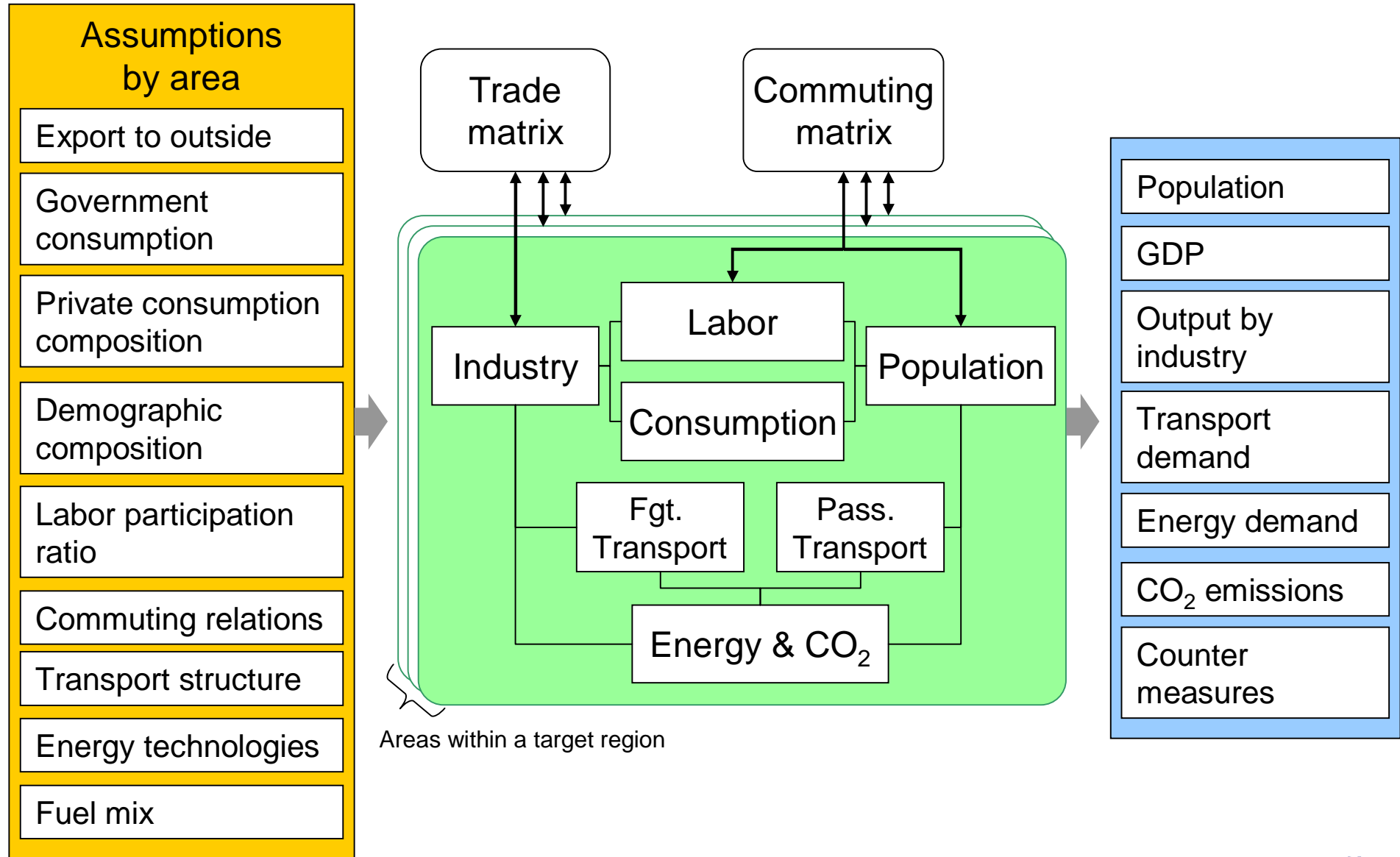
Modelling policy



- Multi regional
 - Trade of goods and services
 - Commuting relationship
- Basic structure: the same with ExSS (extended snapshot tool)
→Static (snapshot)
- Without optimization (identify counter measures through manual iteration process)
- Population and GDP are endogenous. Export drives whole regional economy.
- Formulate as a system of simultaneous equations (using GAMS and solver CONOPT)



Multi-regional ExSS





Application to Shiga Pref.

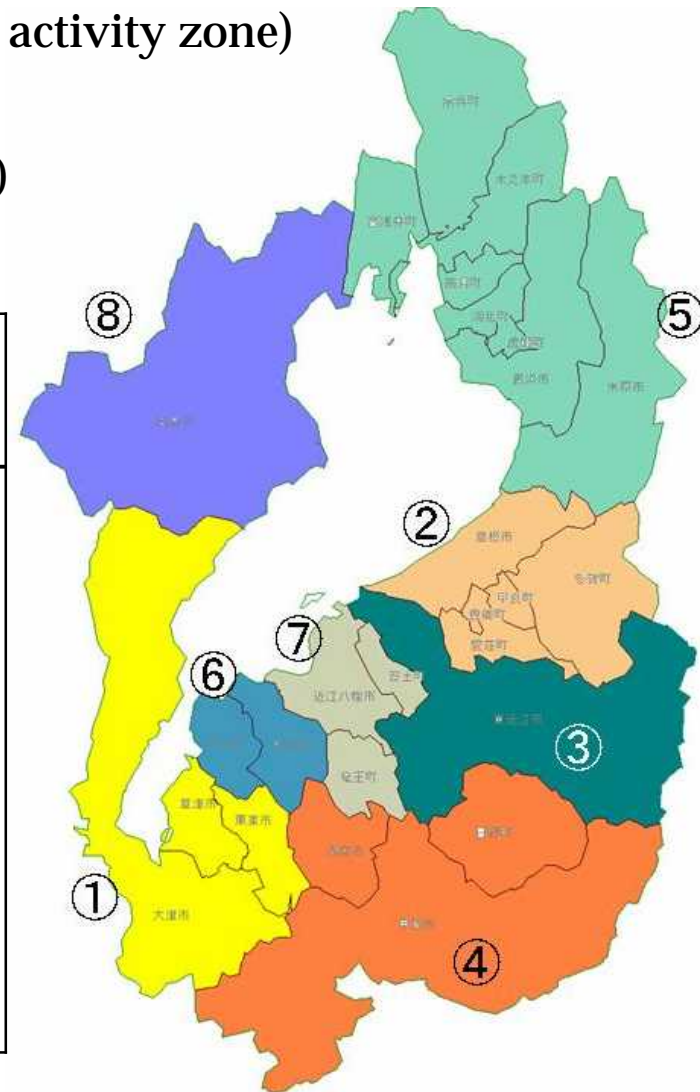


Divided Shiga prefecture to 8 areas (RAZ: regional activity zone) mainly by commuting relationship.

Cf. Urban Employment Area (Kanemoto et al. ****)

Profile of RAZs in the year 2000

	RAZ	Pop.	GDP (bill. Yen)	Industrial Structure	CO ₂ emission (ktC)
1	Otsu	479843	1982	0.3:49:50	954
2	Hikone	150527	709	1:64:34	359
3	Higashi-omi	114323	617	1:71:27	347
4	Koga	169202	905	1:72:28	595
5	Nagahama	165101	782	1:67:32	365
6	Moriyama	113807	599	1:67:32	284
7	Omi-hachiman	94015	398	2:61:37	179
8	Takashima	55435	253	2:64:35	99
	Total	1342253	6245	1:62:37	3182

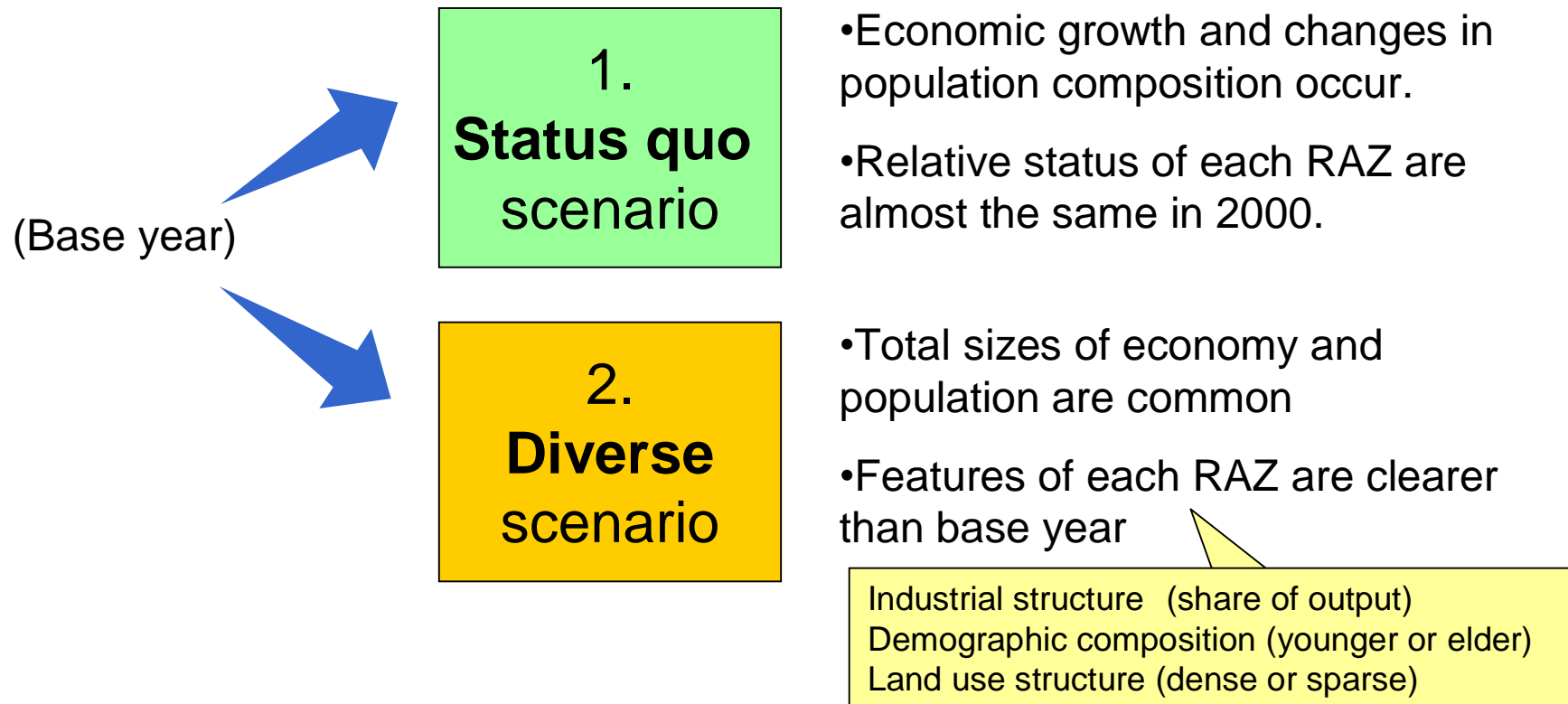




Scenarios



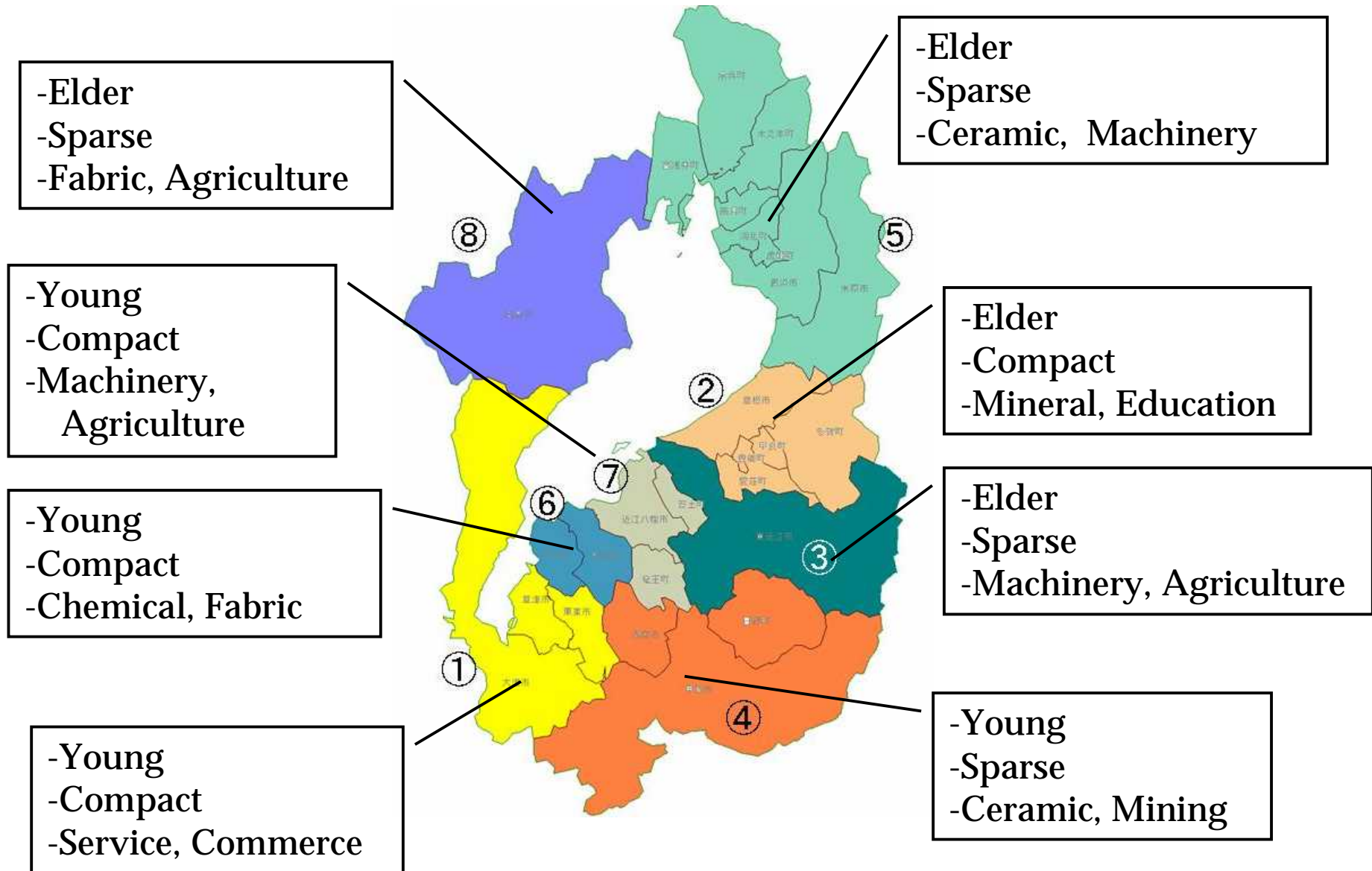
■ Two socio-economic scenarios



- Identify counter measures to achieve the target of whole prefecture for each scenario. (50% reduction compared to 1990, CO₂ emissions from fossil fuel use)

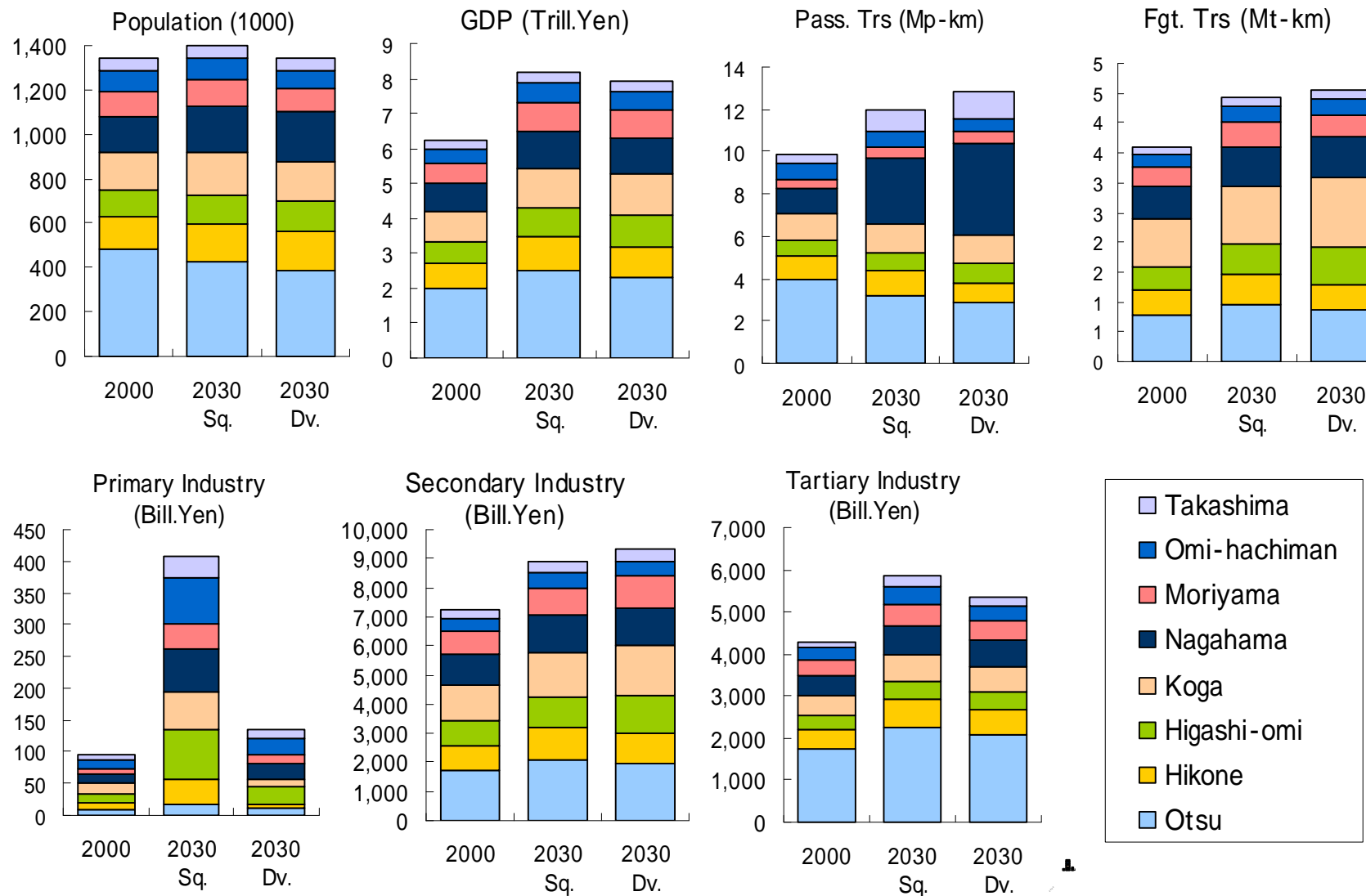


RAZs and Scenarios



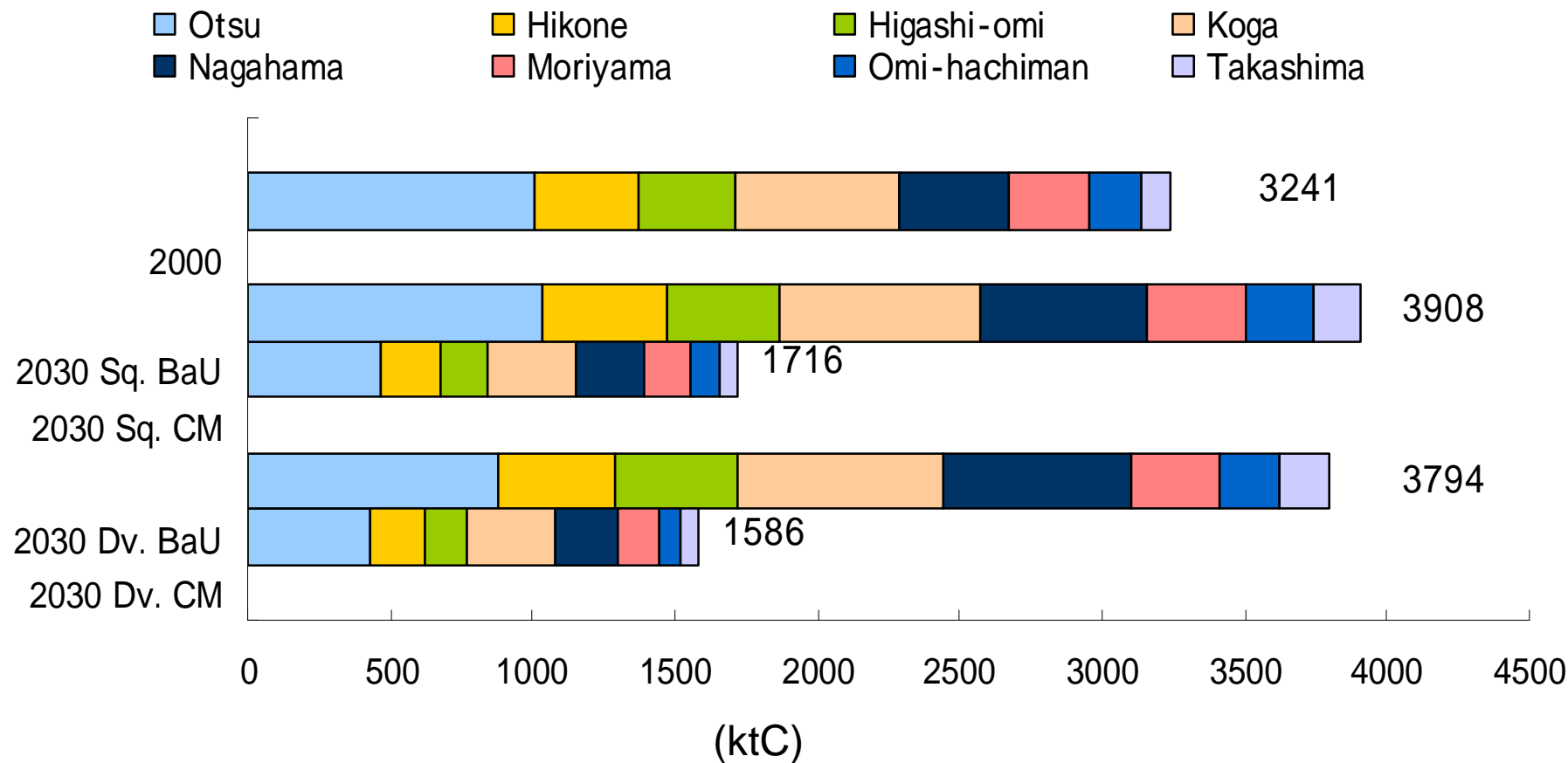


Results (1) Socio-economic



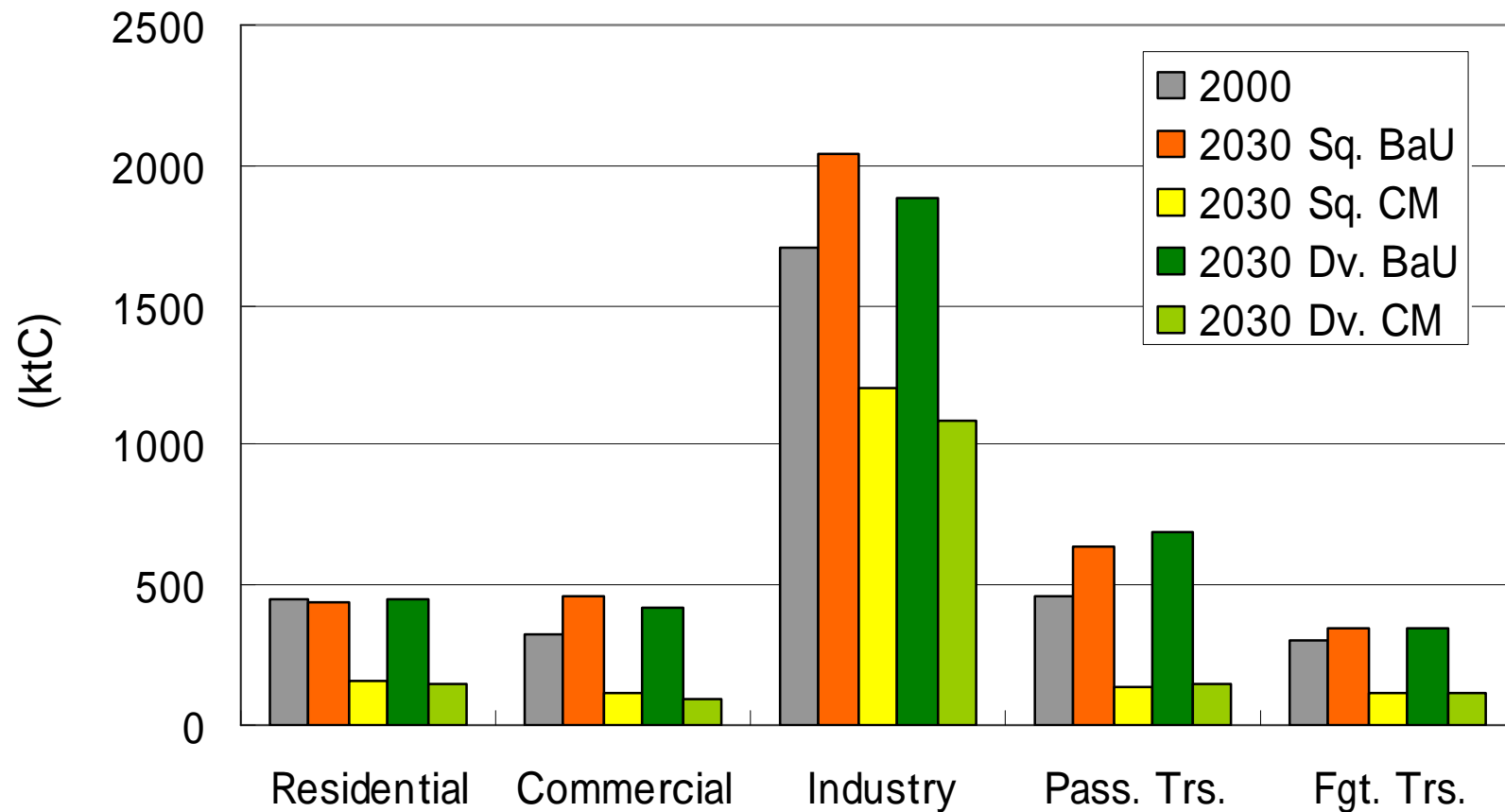


Results (2) GHG emissions by RAZ





Results (3) GHG emissions by sector

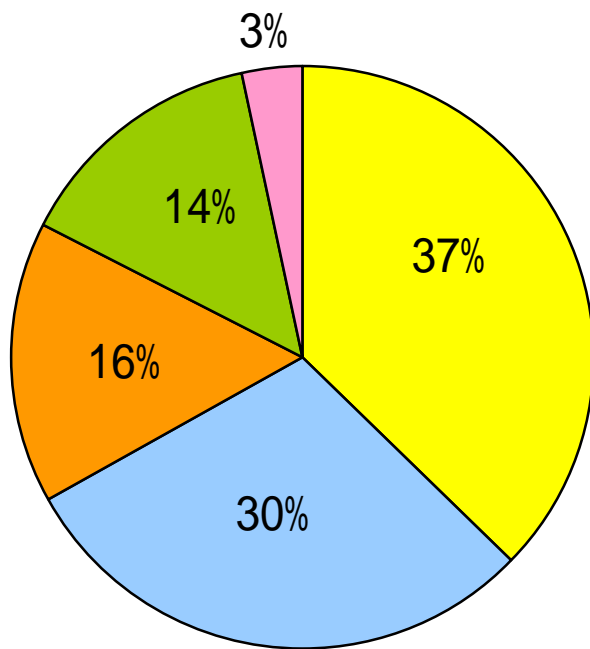




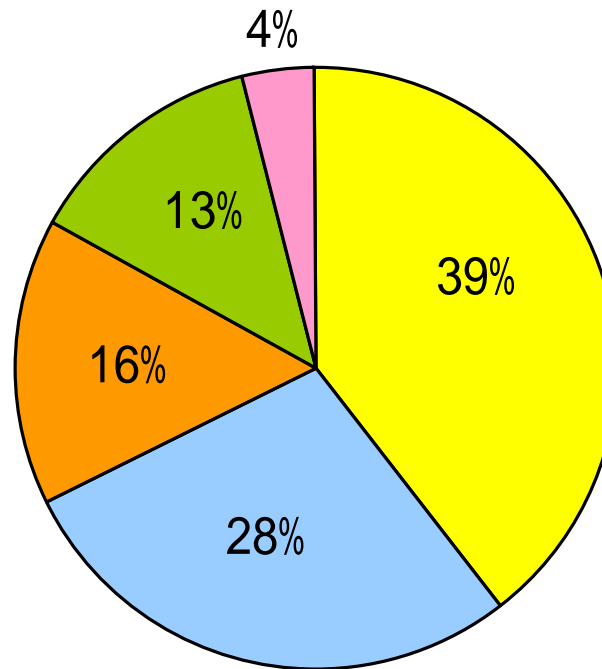
Results (4) Contribution of measures



2030 Sq.



2030 Dv.



- Energy efficiency improvement
- Fuel shift (demand side)
- Fuel shift (supply side)
- Energy saving behavior
- Transport structure



Concluding remarks



- To be connected with actual policy process in Shiga prefecture,
 - Developing a data set by local authority
 - Using the tool in meetings and workshop to make LCS scenarios in EACH region
 - Conduct a meeting inviting BOTH prefectural and city&town representatives