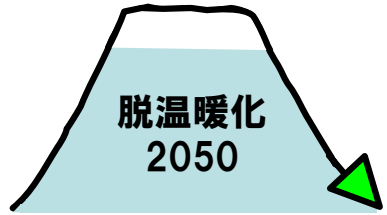
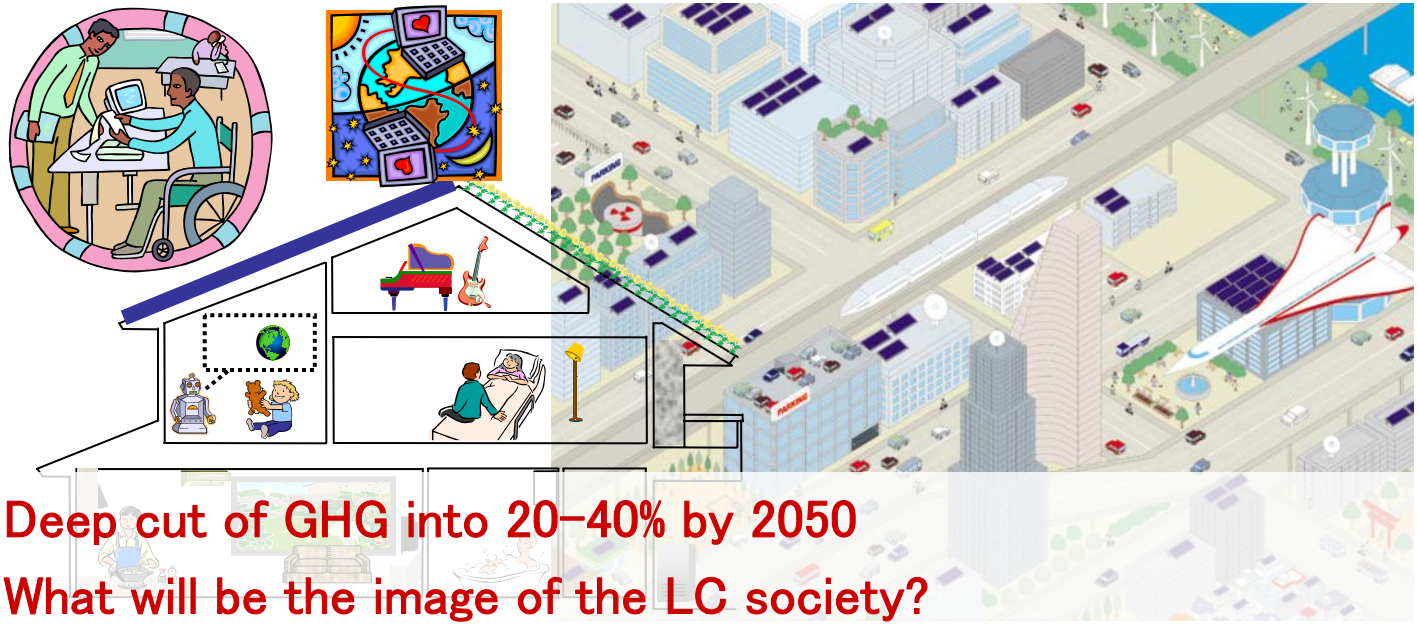
Low Carbon Japan: 2050

A reserach project (2004−2008)

S. Nishioka Project Leader



http://2050.nies.go.jp



Deep cut of GHG into 20-40% by 2050

What will be the image of the LC society?

How to attain the goal?

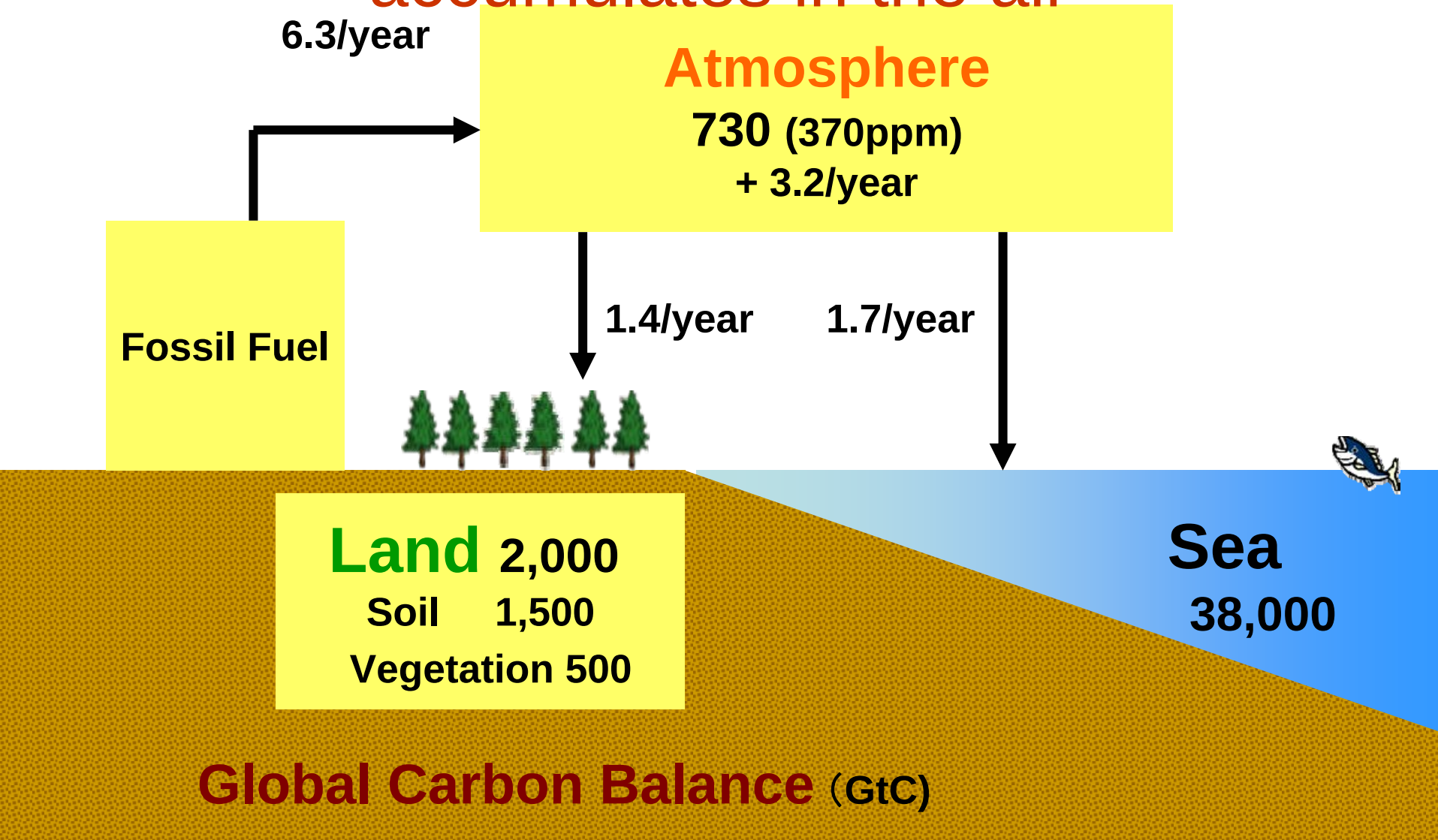
How to change energy demand /supply structure?

1st workshop on Japan – UK Joint Research Project Developing visions for a Low Carbon Society (LCS) through sustainable development on June 2006

50 Experts from 19 countries and 6 international organizations;
Asia: Japan, China, India, Thailand, Taiwan (China)
Africa: South Africa, Nigeria
Europe: UK, France, Germany, Denmark, Spain, Netherlands, Russia
Latin America: Brazil, Mexico, Chile
North America: US, Canada

A second workshop will be held in UK, 2007.

Only half of fossil fuel emission is absorbed by the land and sea; the rest accumulates in the air



Global Carbon Balance (GtC)

Risk management of carbon cycle

Whatever stabilization level is set, the principle must be

emission = sequestration

Q1: Will natural sequestration remain at 3.1Gt?

Fossil emission: CO_2 as C
Current **6.3** Gt/year
Future **20.0** Gt/year by 2100

In 6.3 emission

Q2: What is the dangerous level and rate of the change?

450-550ppm?

1000ppm
750ppm
550ppm
380ppm
280ppm

annual increase
3.2 Gt （1.5ppm）

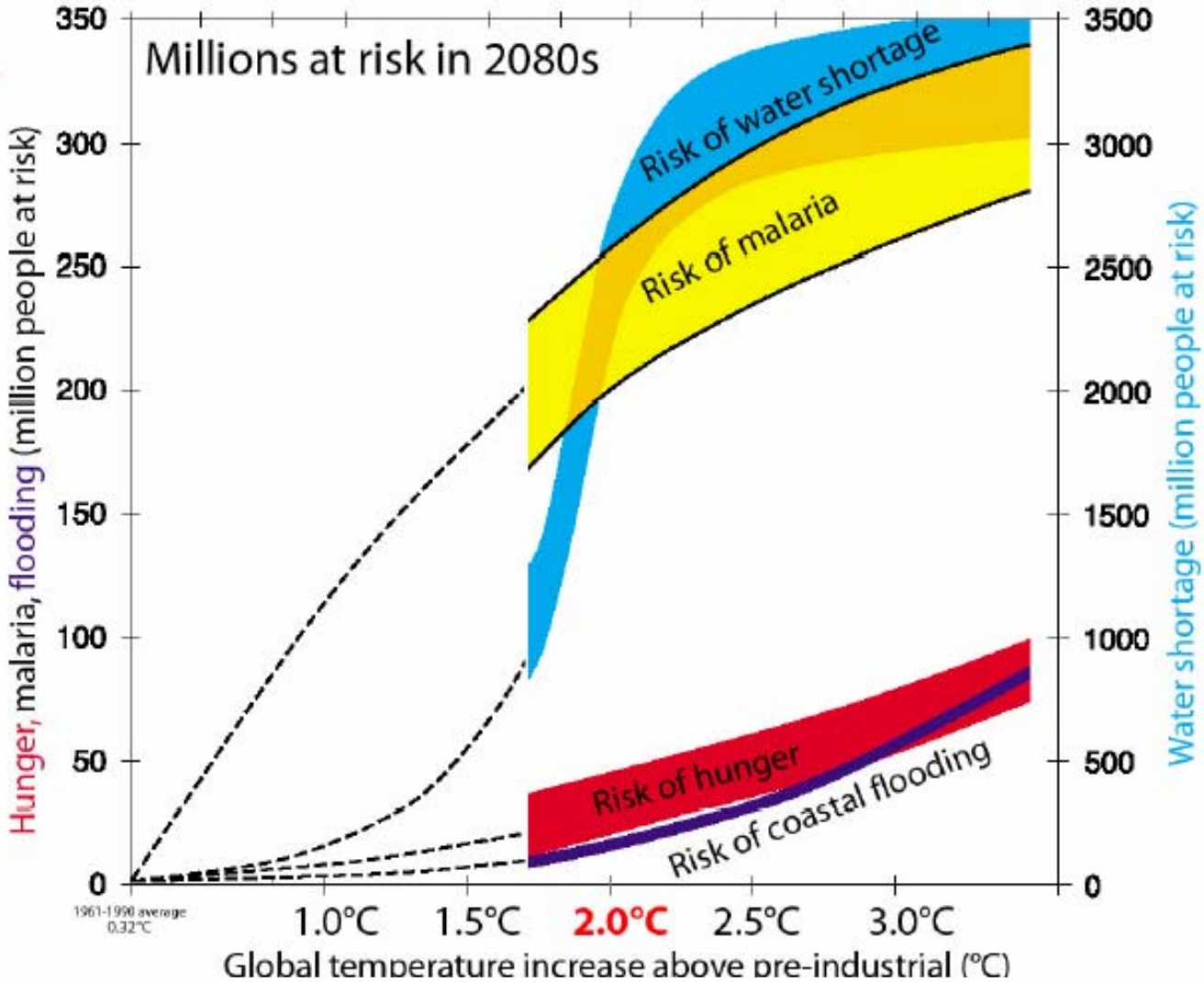
Accumulation in the air:
750 Gt

Out 3.1
absorption

Q3: How should we turn off the tap to prevent a dangerous level being reached?

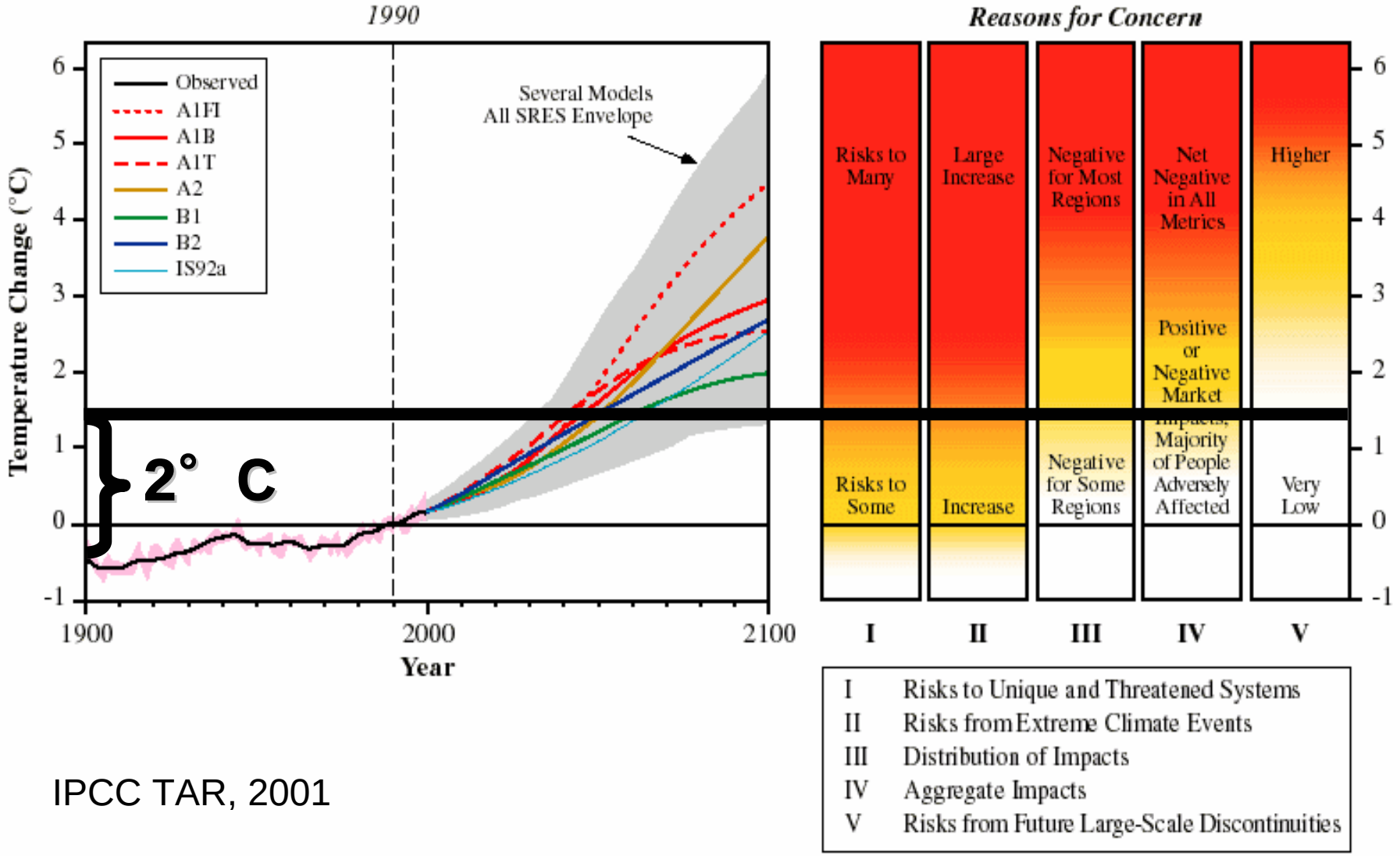
Q4: Can we avoid dangerous change in time?
If not, what adaptation strategy?

Millions at Risk (Parry et al., 2001)



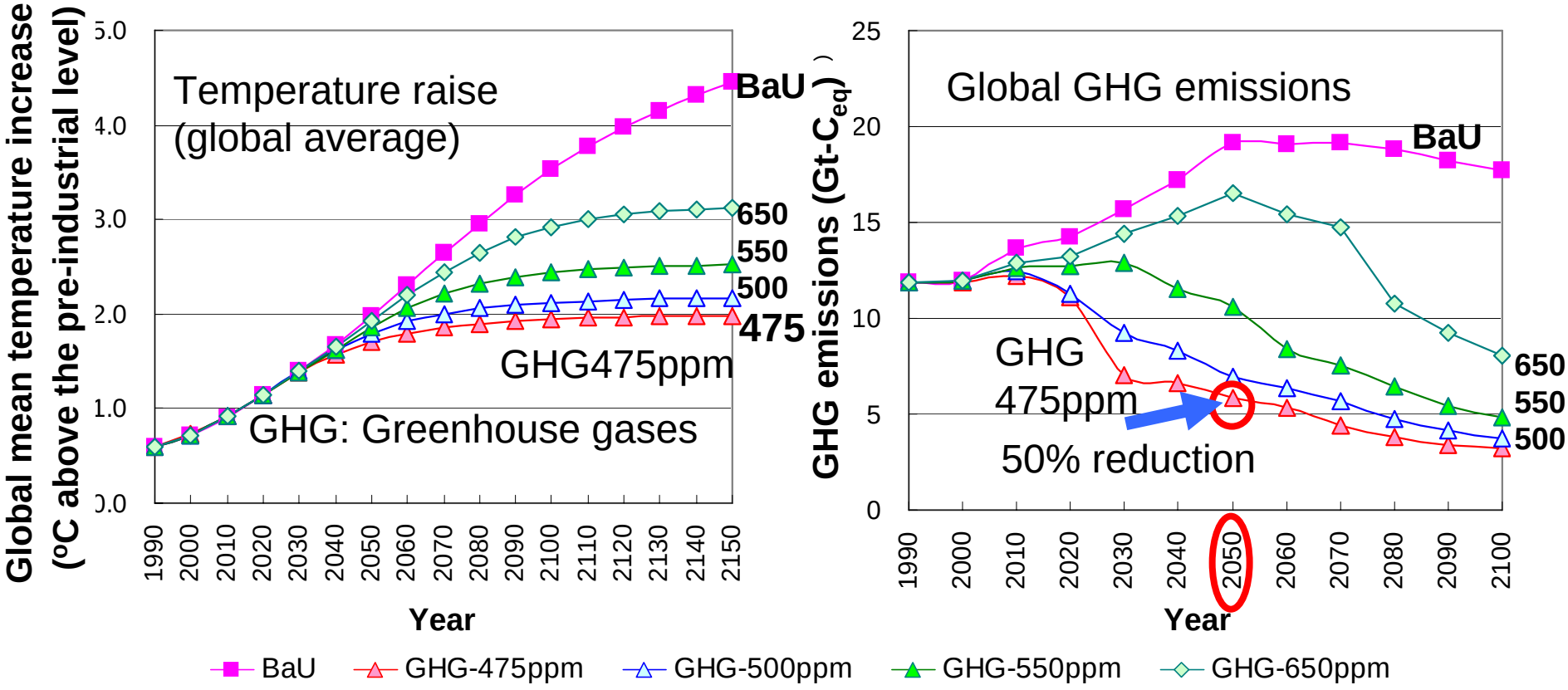
Parry and his team examined how global warming will affect a global population already facing water shortage, malaria, hunger and coastal flooding. The graph indicates a sudden increase in at risk population at around 1.5-2.0° C.

To avoid serious CC impacts, it is likely to be necessary of temperature raise stabilization below 2 degree compared with pre-industrialized level



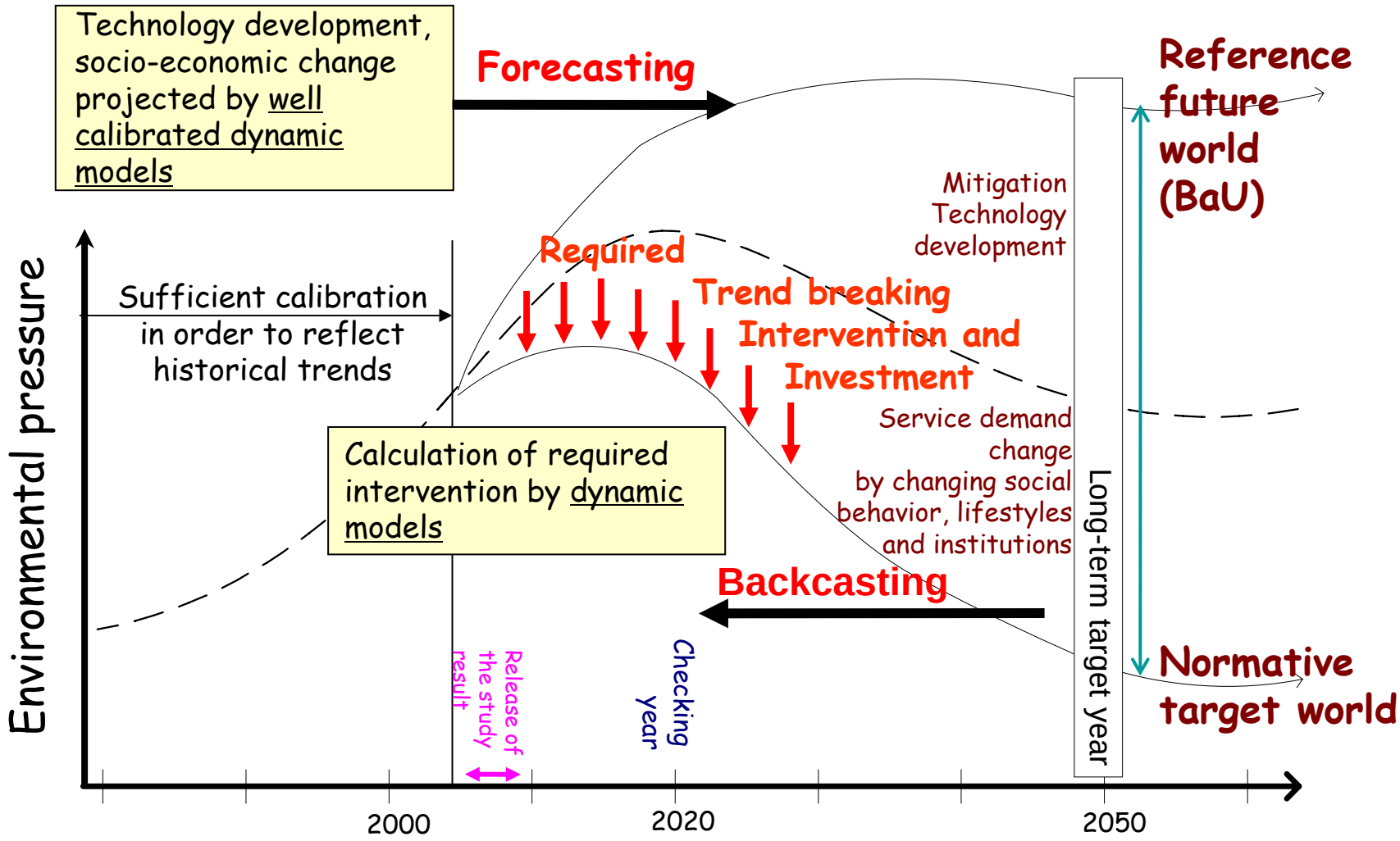
IPCC TAR, 2001

Key message 1:
"Low-carbon societies are necessary to avoid dangerous climate change."

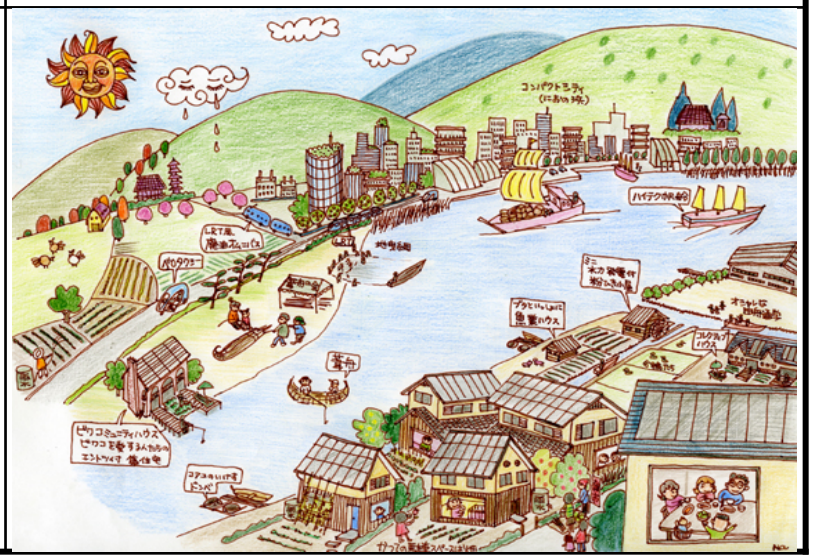


Relationship between human-induced GHG emissions, atmospheric GHG concentration, and increase in global mean temperature. (Calculated by AIM/Impact[policy] Model)

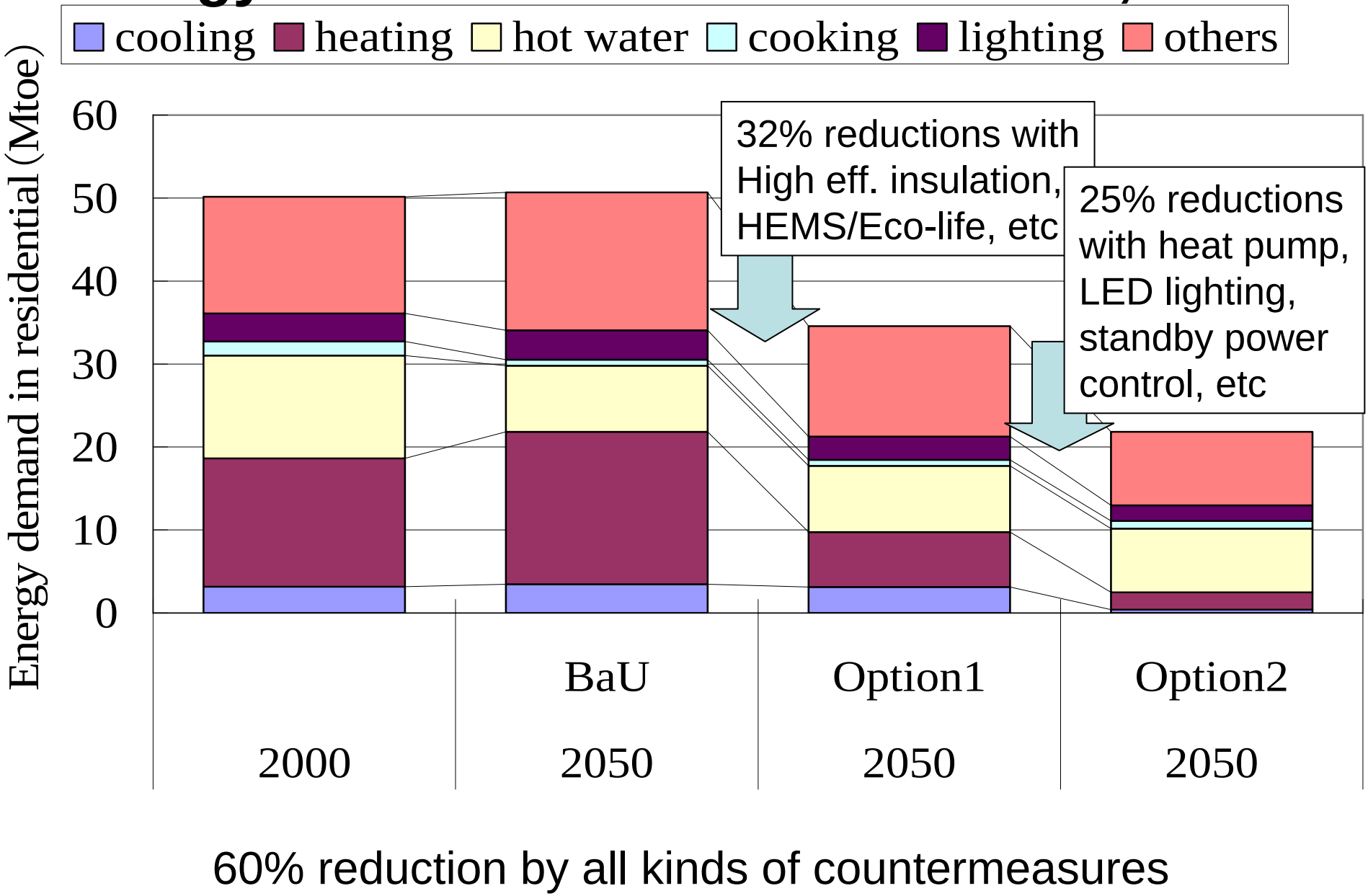
Forecasting from now and Backcasting from future prescribed/normative world



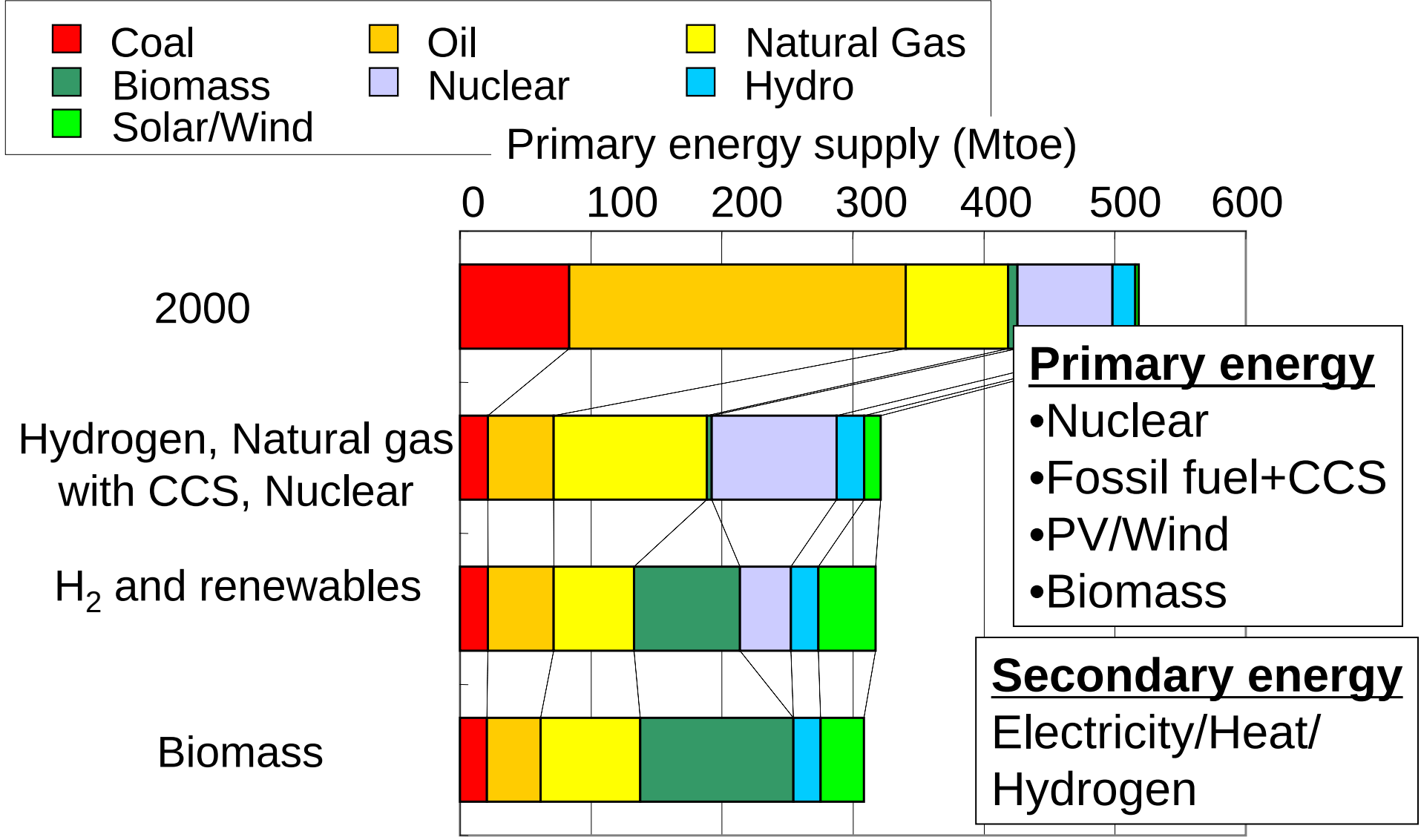
As for LCS visions, we prepared two different but likely future societies

Scenario A	Scenario B
Bustling, Technology-driven	Slow, Natural-oriented
Urban concentrated/ Individualistic	Decentralized, Community-oriented, Self-sufficient
Centralized production /recycle	Produce locally, consume locally,
Convenient and Beneficial	Social and Cultural Values
	

Energy demand in residential sector, 2050



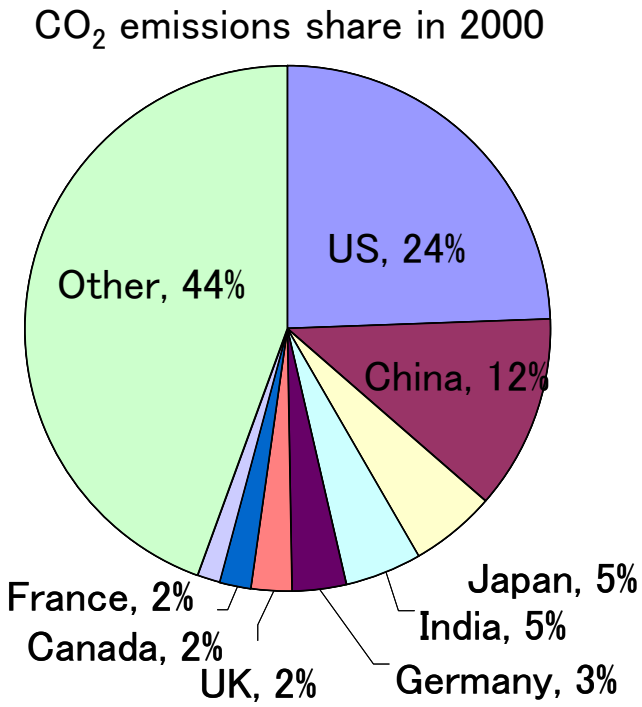
60% reduction by all kinds of countermeasures

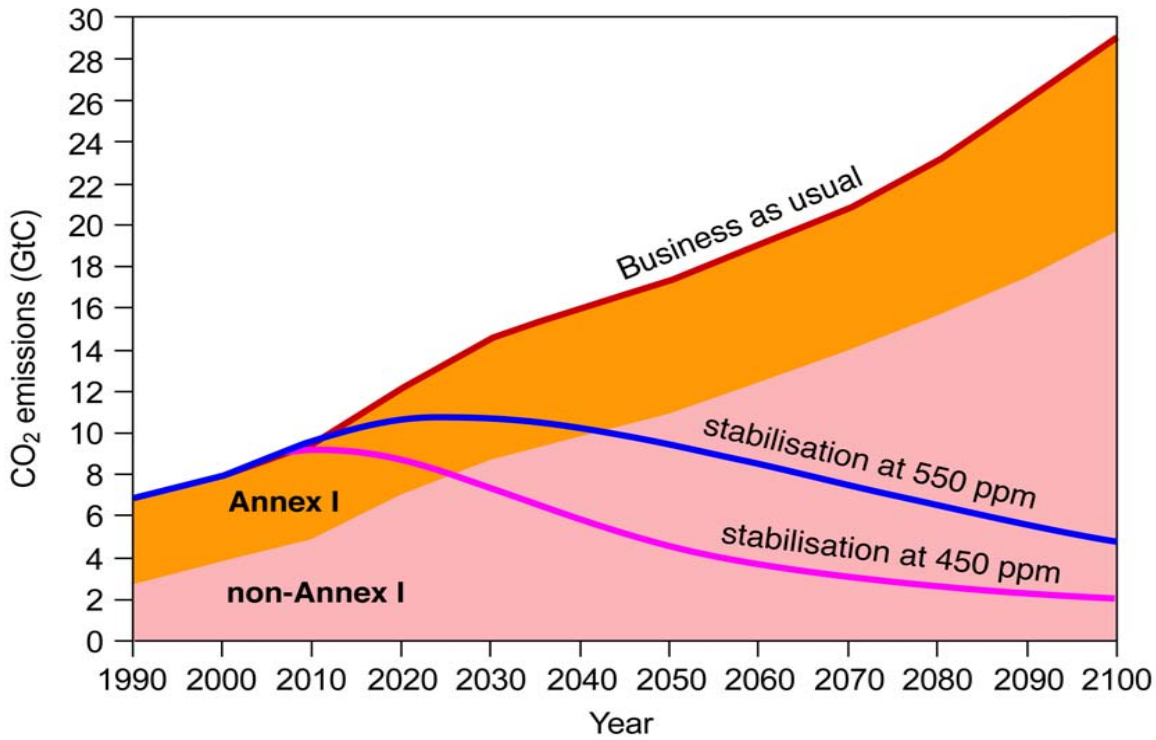


Both supply side and demand side countermeasures are required to achieve 70% CO_2 reduction by 2050

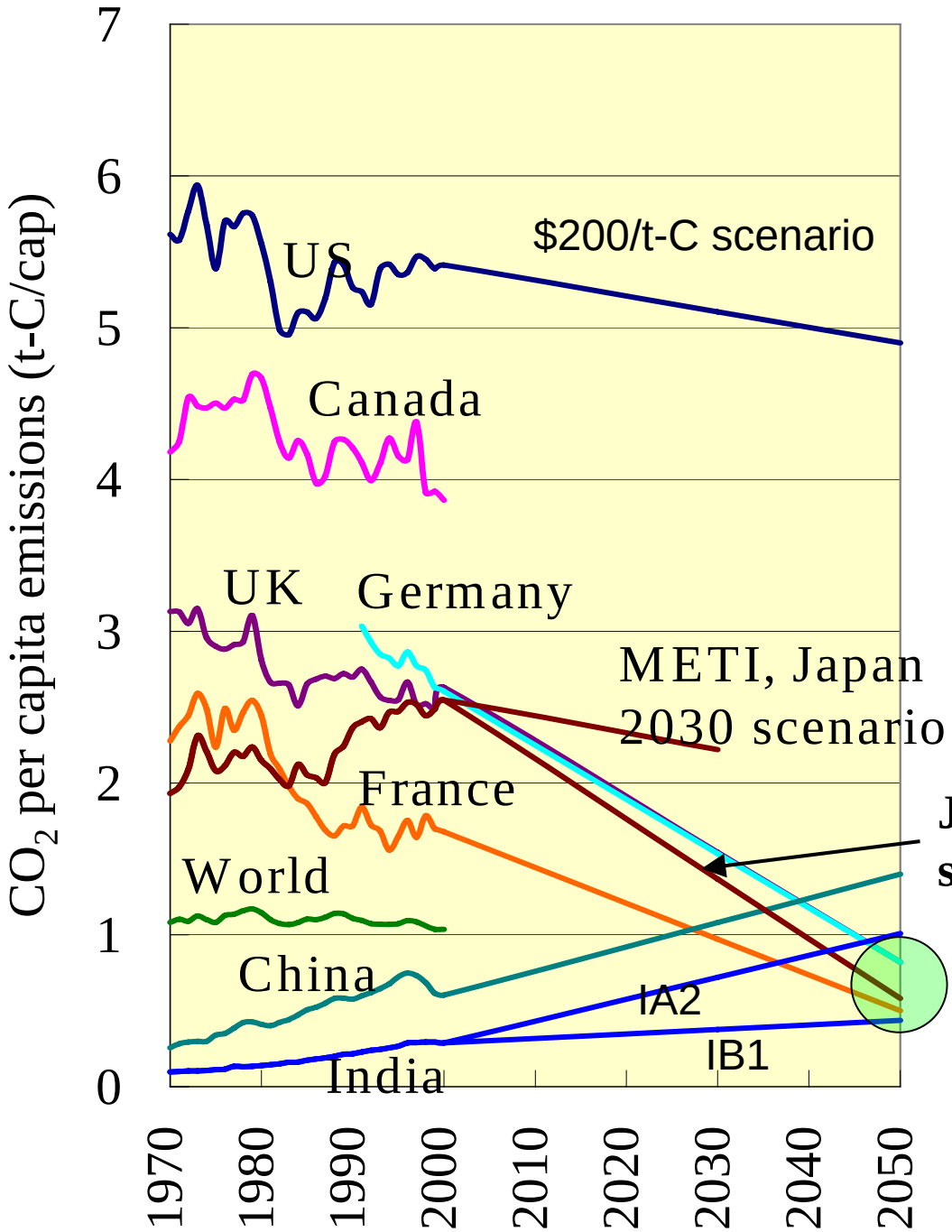
Key message 2:

"A portfolio of options and international cooperation are necessary to realize global LCS."





Current per capita CO_2 emissions and Target



US: delay for tech development, global warming business

EU: Initiatives toward LCS
Japan: Need long-term vision

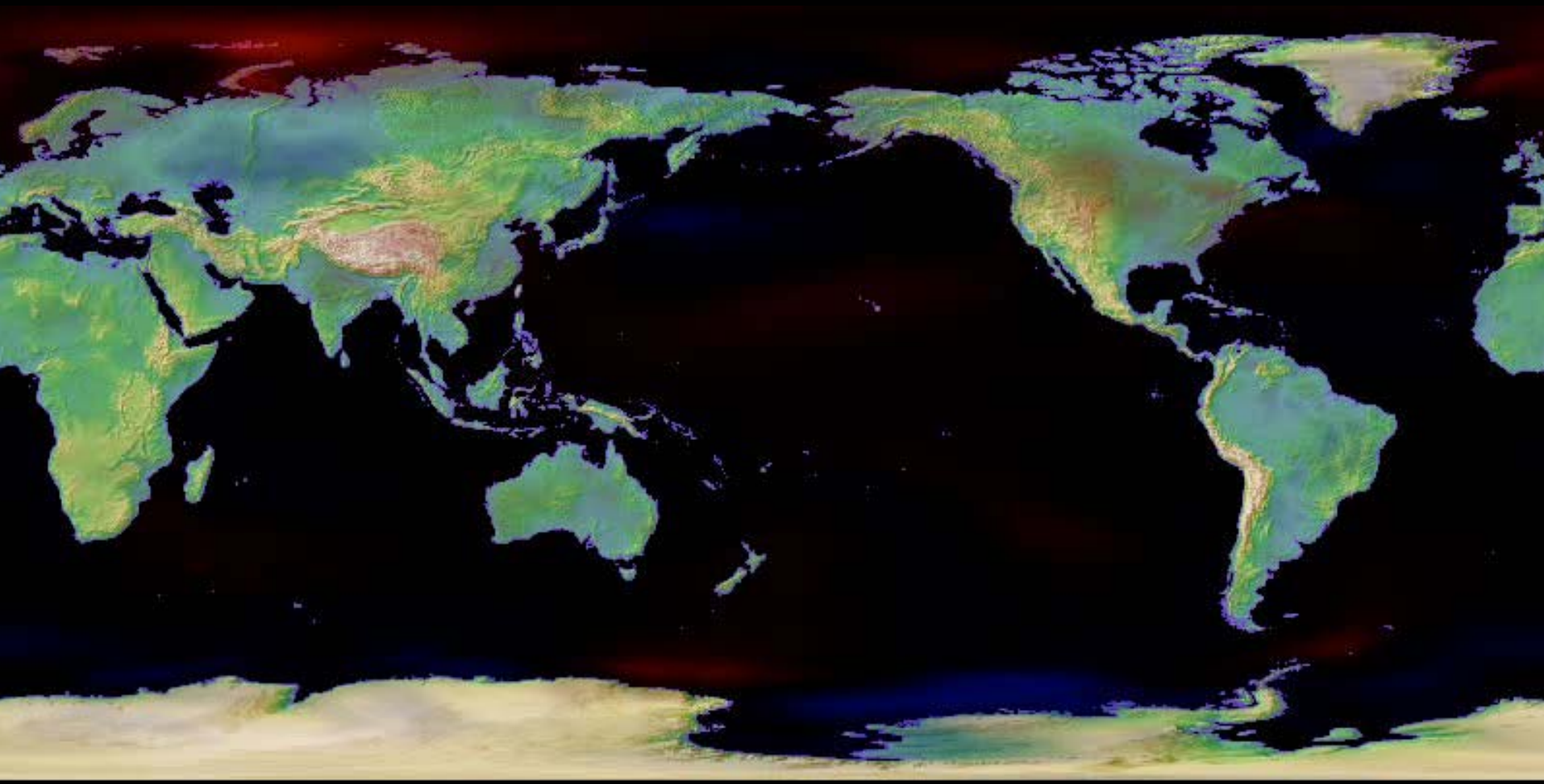
Developing countries: earlier guidance toward LCS is key

Target for Low Carbon Society

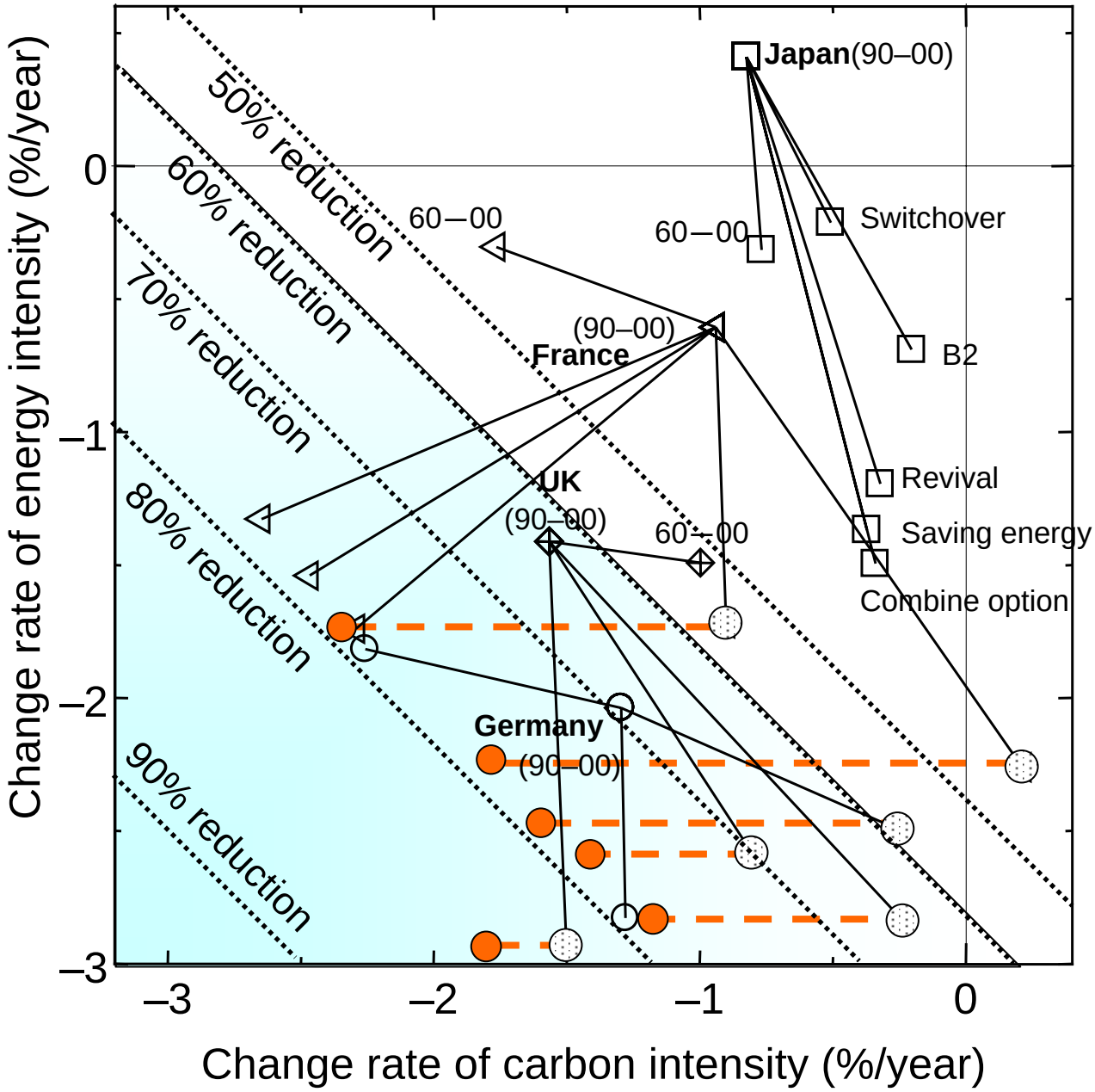
Shuzo Nishioka, Junichi Fujino;
NIES COP11 and COP/MOP1 side event
Global Challenges Toward
Low-Carbon Economy (LCE), Dec.3, 2005

CCSR/NIES/FRCGC, Japan

Surface Air Temperature Change (1990=0 °C)



Change rates of energy/carbon intensity



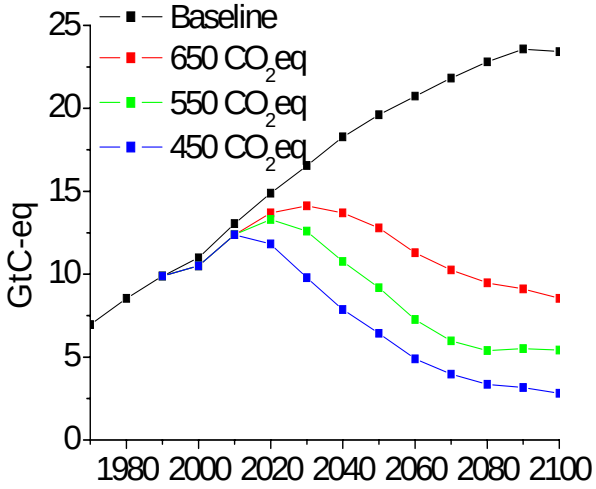
With carbon capture and storage

Many scenarios aiming to 70-80% reduction in 2050 use the method of carbon capture and storage, although there are some scenarios that realize 80% reduction without carbon capture and storage.

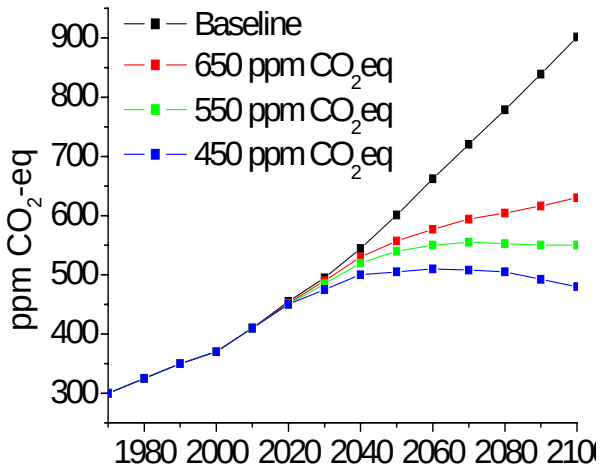
(Source: Kawase et al. 2005)

Emission pathways that lead to stabilisation

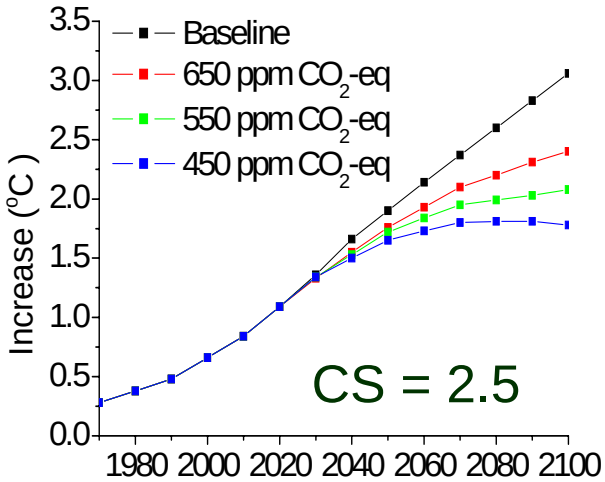
Emissions



Concentration



Temperature



- **Criteria:**
  - **Annual reduction smooth : preferably constant over time (and always < 3%).**
  - **Smooth transition in rate of reduction**
  - **If possible, avoid rapid early reduction**
  - **Stay below conc. level target (650,550) or allow minimum overshoot (450)**

Cumulative reduction

- 650 GtC (30%)
- 850 GtC (45%)
- 1200 GtC (60%)

Den Elzen, Meinshausen and Van Vuuren.Multigas stabilisation pathways.