


Measuring Progress towards Green Growth and Low Carbon Development in Asia

Keynote presentation at the 'Challenges to Low Carbon Asia Symposium' organised by the Ministry of the Environment of Japan (MOEJ) and the National Institute for Environmental Studies (NIES)
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ECOSYSTEM SCIENCES DIVISION/CLIMATE ADAPTATION FLAGSHIP
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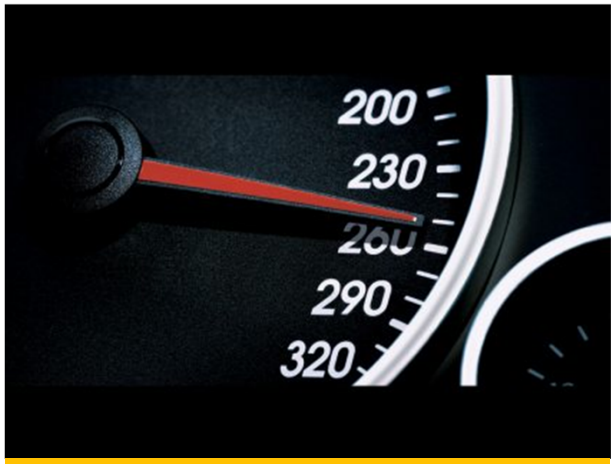
Main messages

- Sustainable resource use and low carbon development **will be instrumental for Asia** to ensure socio-economic development in a world in which resources are more constrained and the absorptive capacity of ecosystems is decreasing rapidly
- **Challenge for public policy** to achieve a transition to a Green Economy enabled by resource efficiency and systems innovation
- Change will not occur spontaneously but will require **well designed policies**
- Measuring progress more inclusively will provide an **evidence base** to the policy and business community **to steer a transition** to a resource efficient and green Asia
- The **change required is achievable** if we make the right decisions now.

What is the future going to be like?

Broadening the Compass for Decision Making

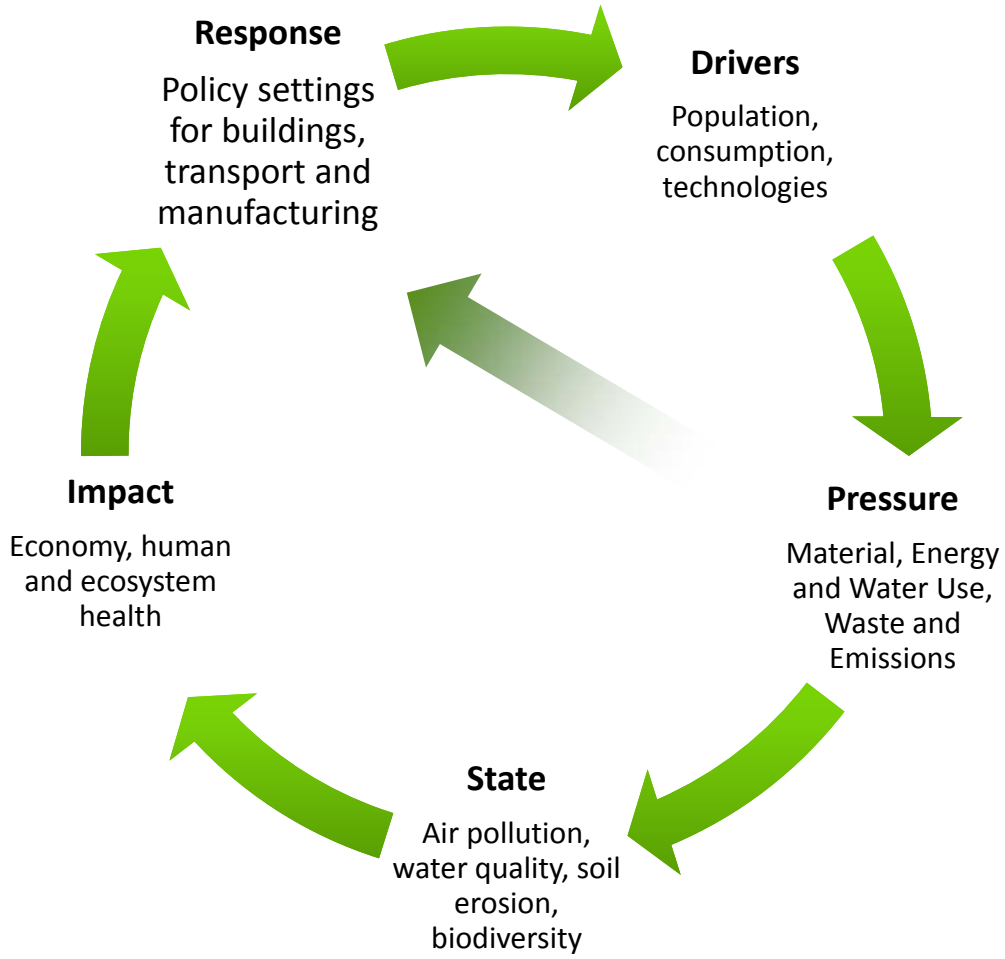


GDP
Employment rate
Inflation rate
Interest rate
Stock market

Stocks and flows of natural resources

- Materials and Waste
- Energy and Emissions
- Water and Land

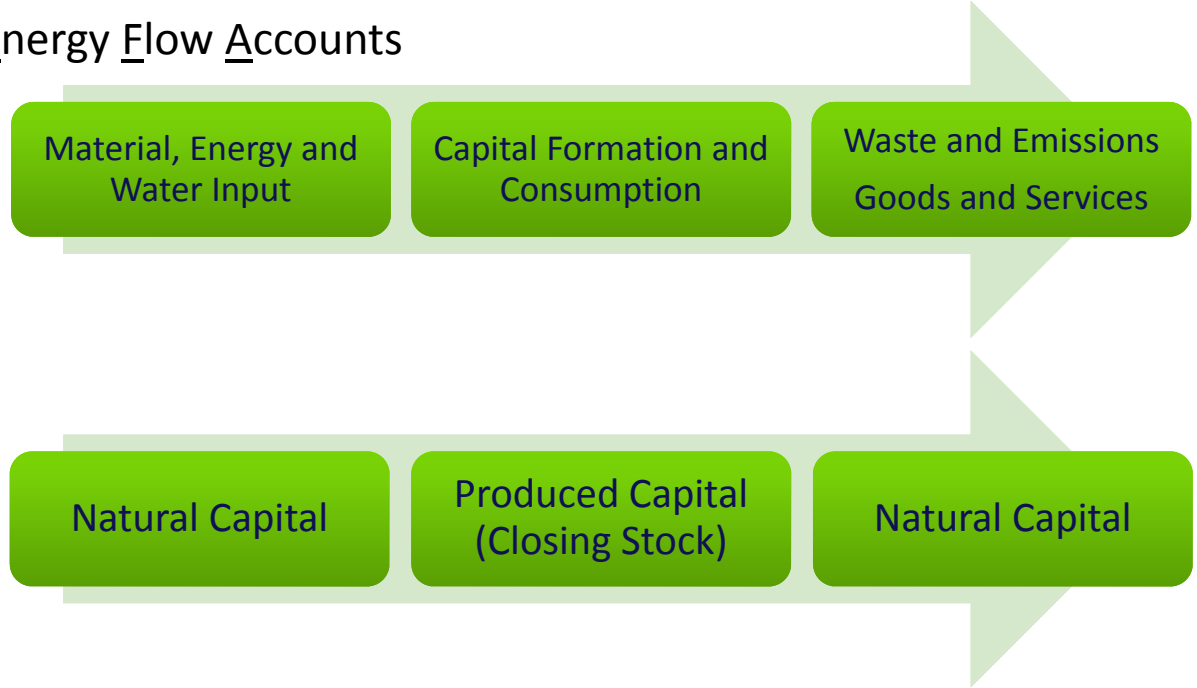
Drivers Pressure State Impact Response Framework



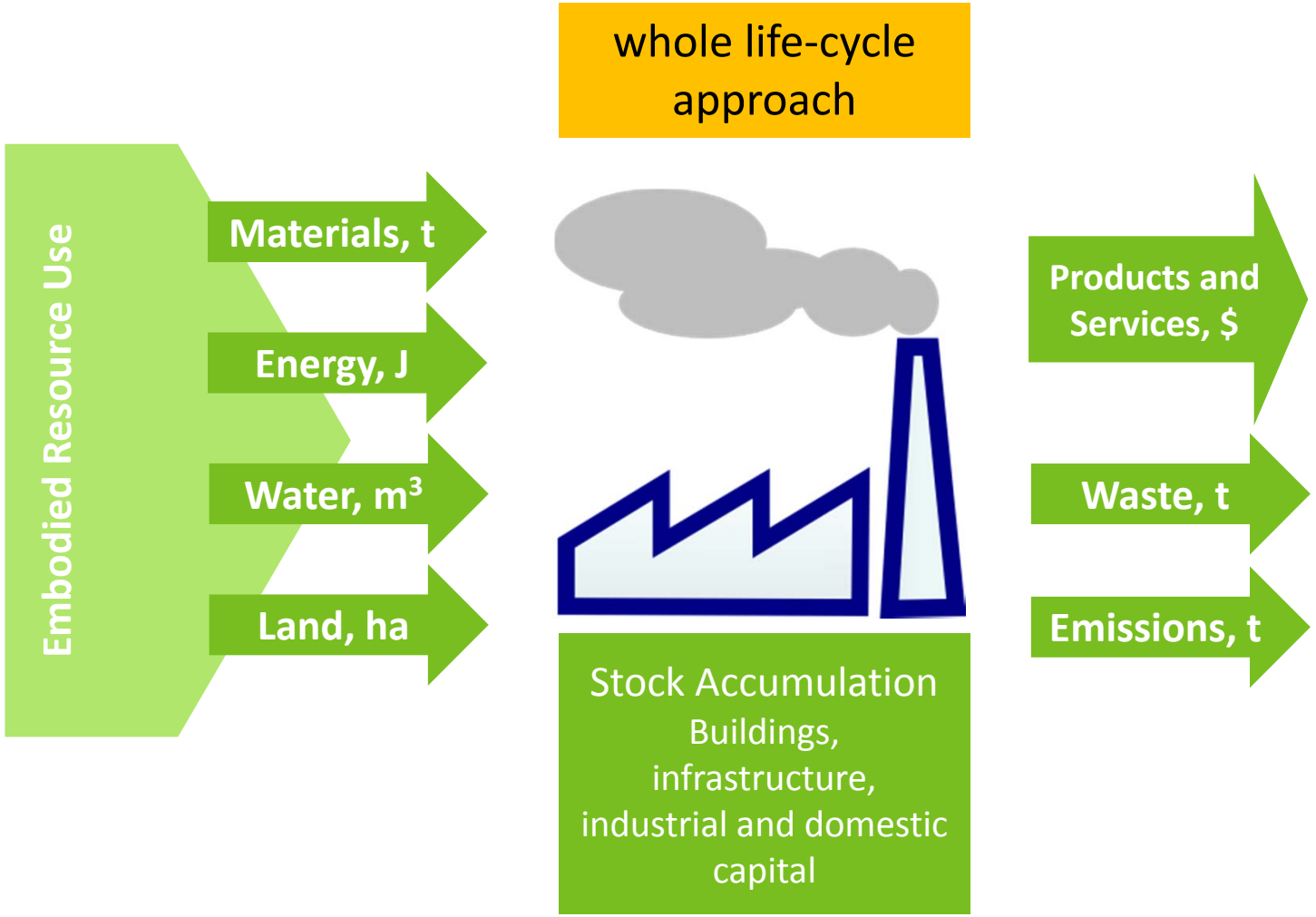
SEEA and MEFA

System of Environmental Economic Accounts

Material and Energy Flow Accounts



Natural Resources are Used and Waste and Emissions are Generated at all Steps in the Production – Consumption Process

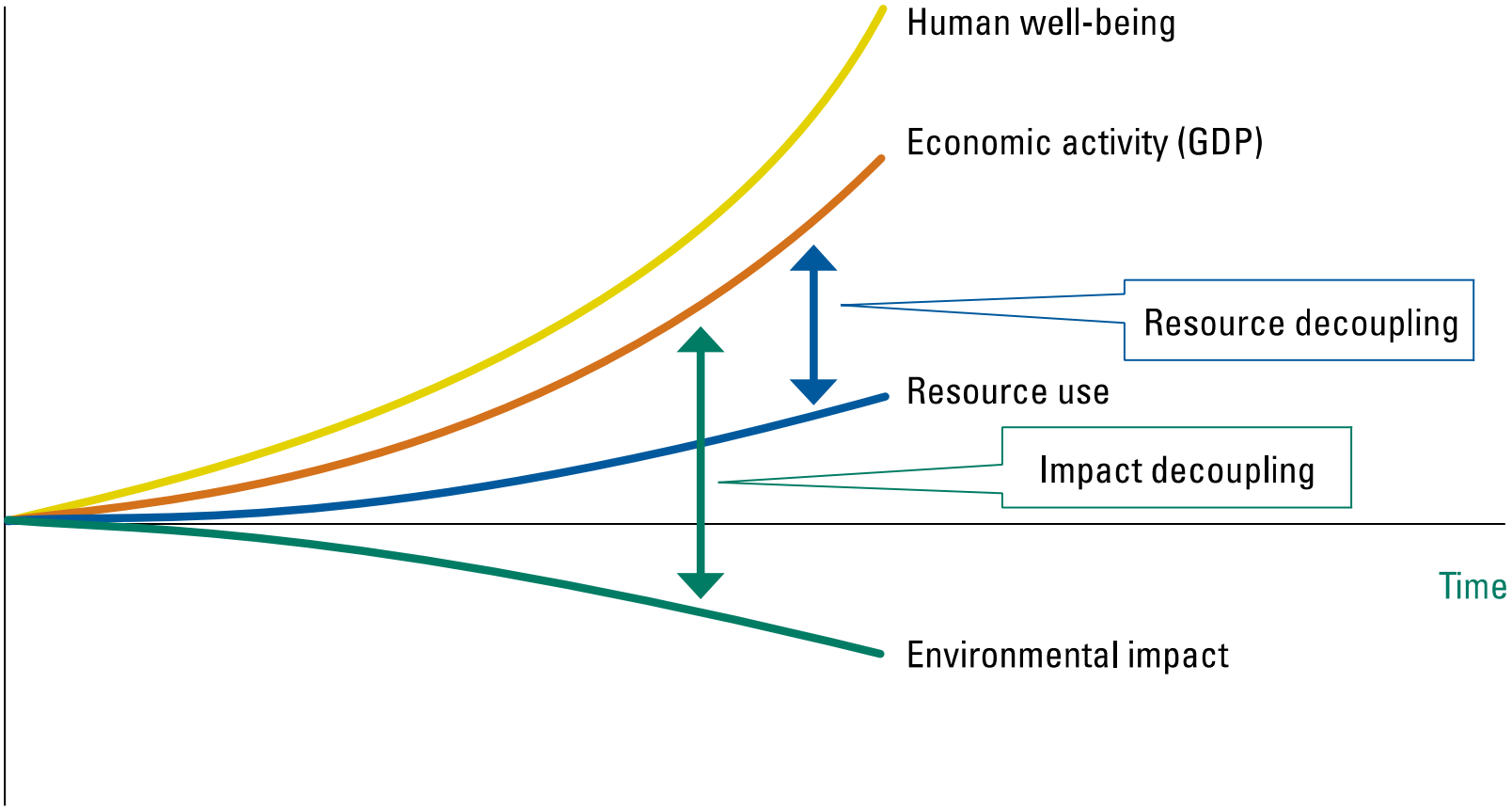


Environmental Impacts of Economic Activities

Problem	Mechanism	Pressures
Climate Change	CO_2, N_2O and CH_4	Energy consumption, land use, material flows
Acidification	SO_2, NH_4 and NO_x	Energy consumption, land use
Eutrophication	Bio-accessible phosphorus and nitrogen	Land use
Biodiversity loss	Intensive agriculture and forestry	Land use, material flows, global trade
Soil erosion	Agricultural and forestry practices	Land use
Water protection	Industrial effluents and municipal waste water	Land use, energy consumption
Waste problems	Manufacturing and households	Material flows
Depletion of natural resources	Non-renewable and renewable	Material flows, energy use and land use
Health risks	Toxic substances	Biological activity

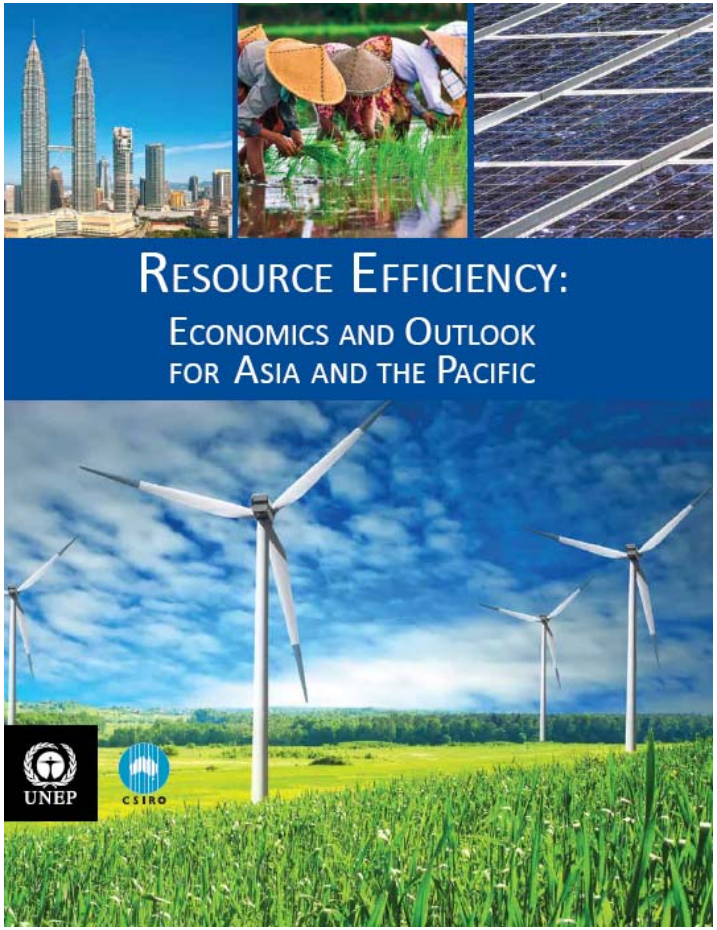
Decoupling and Dematerialization

Figure 1. Two aspects of 'decoupling'



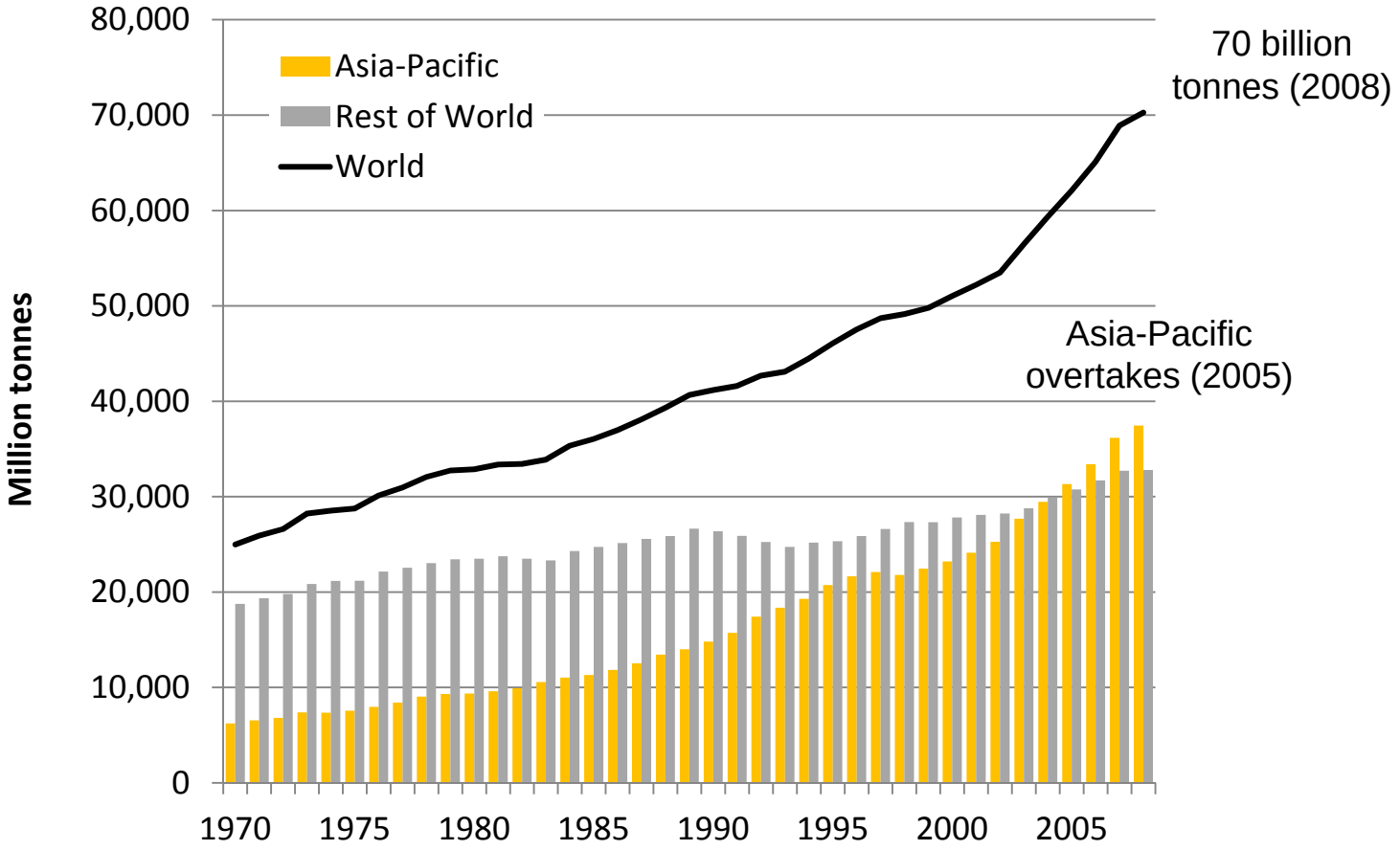
Source: UNEP 2011.

Economic growth and natural resource use in Asia



38 billion tonnes of natural resources use in 2008

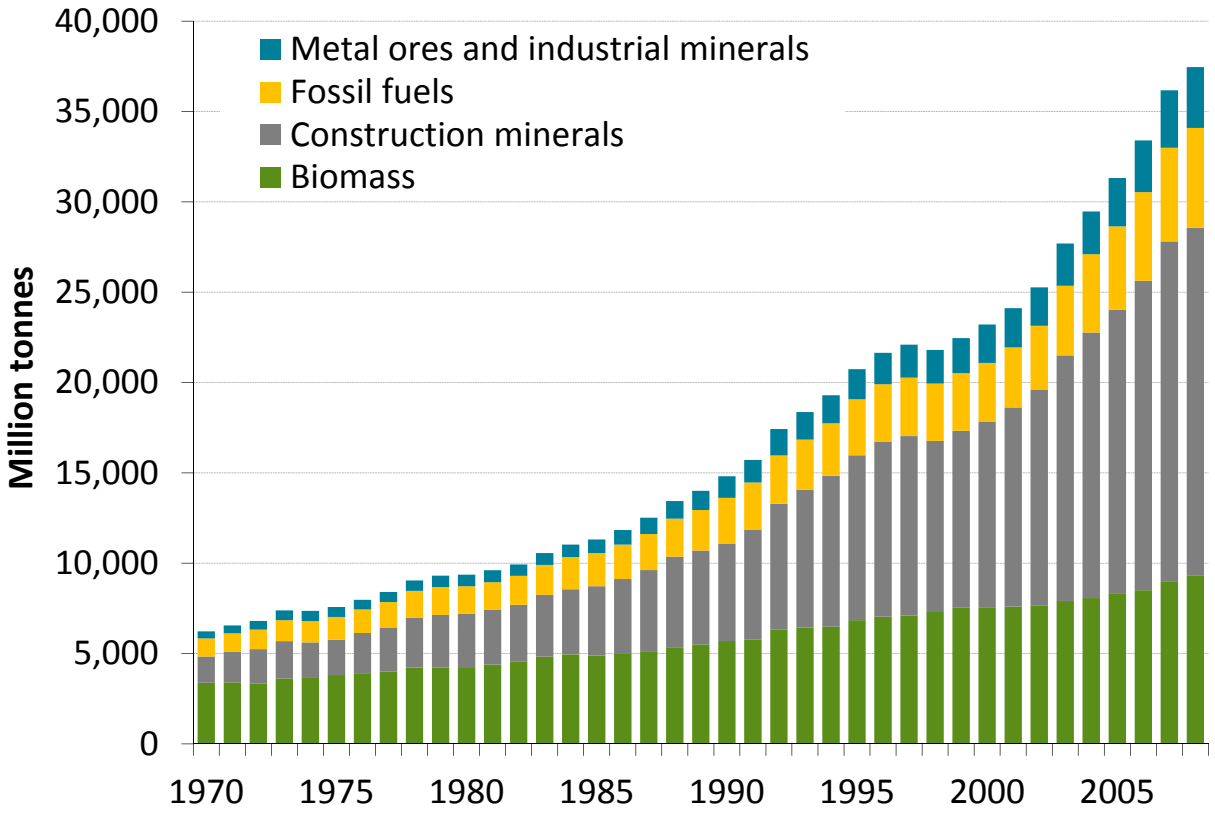
Domestic Material Consumption (DMC) → waste equivalent

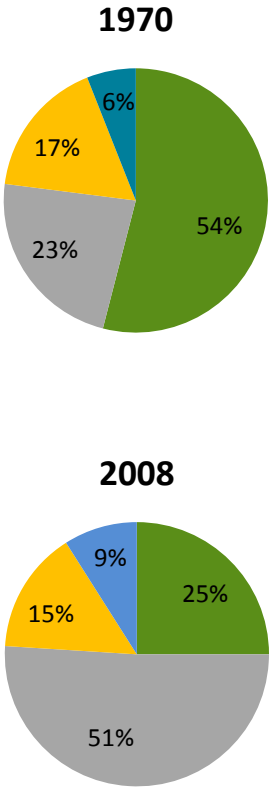


Source: UNEP 2011, West and Schandl 2013.

Transition to new materials

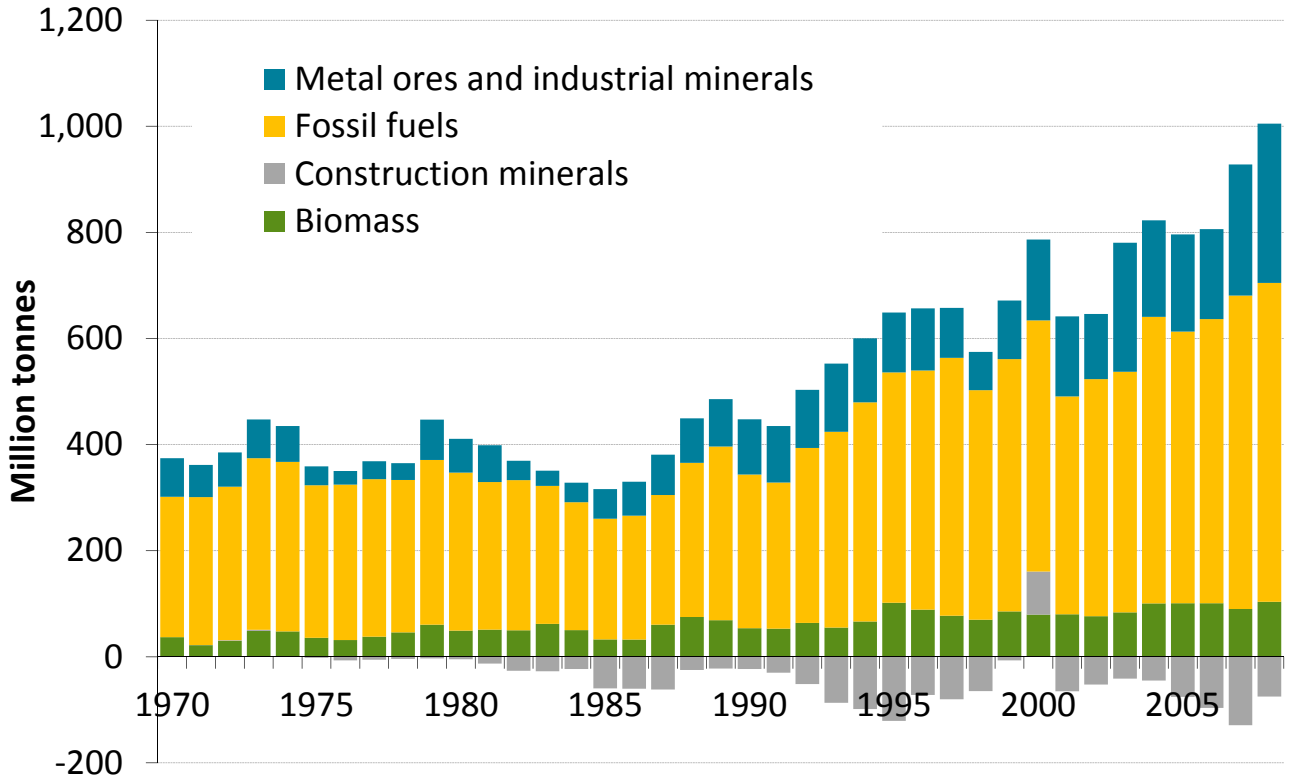
Increasing recycling and waste challenges





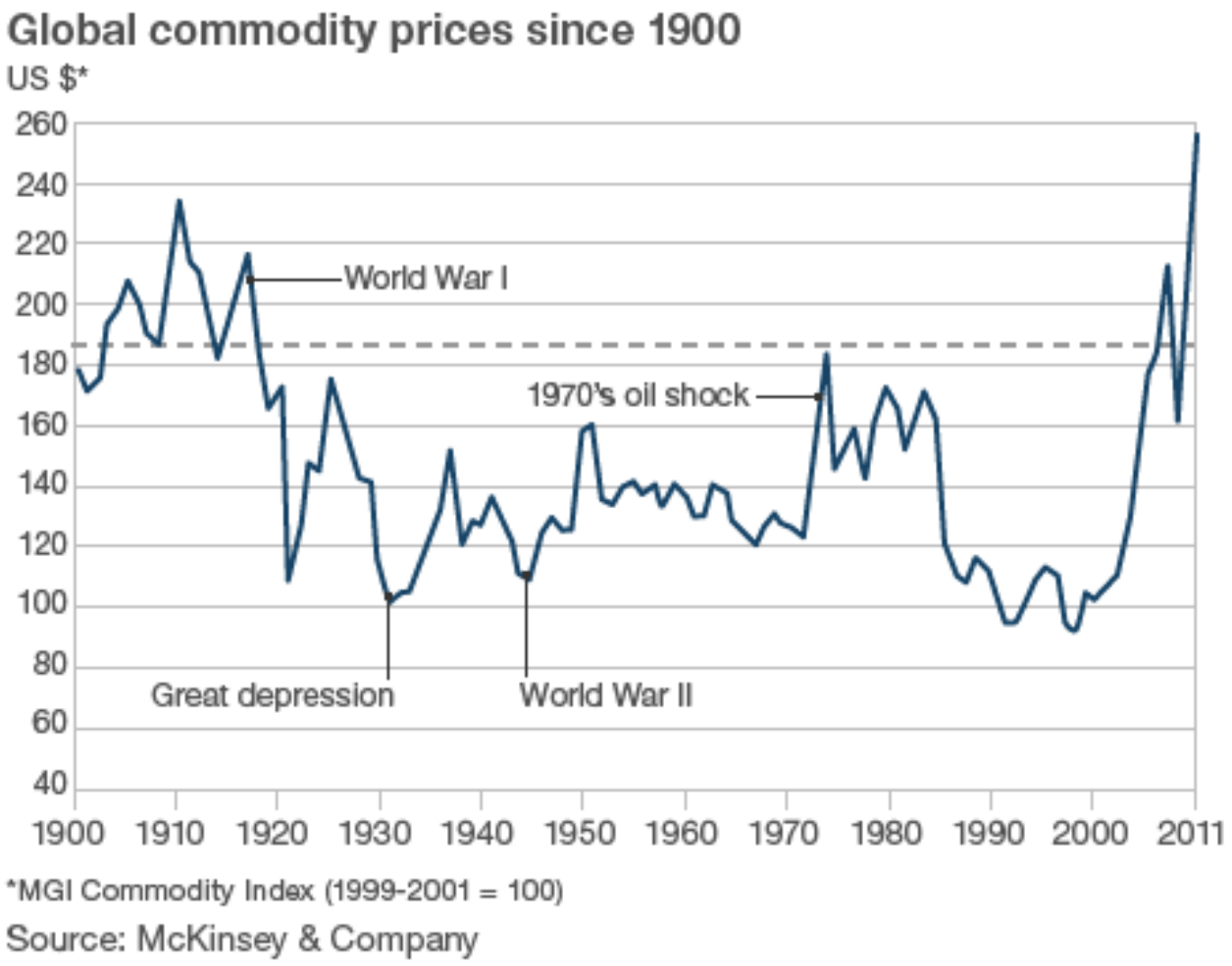
Source: UNEP 2011, West and Schandl 2013.

Growing trade dependency



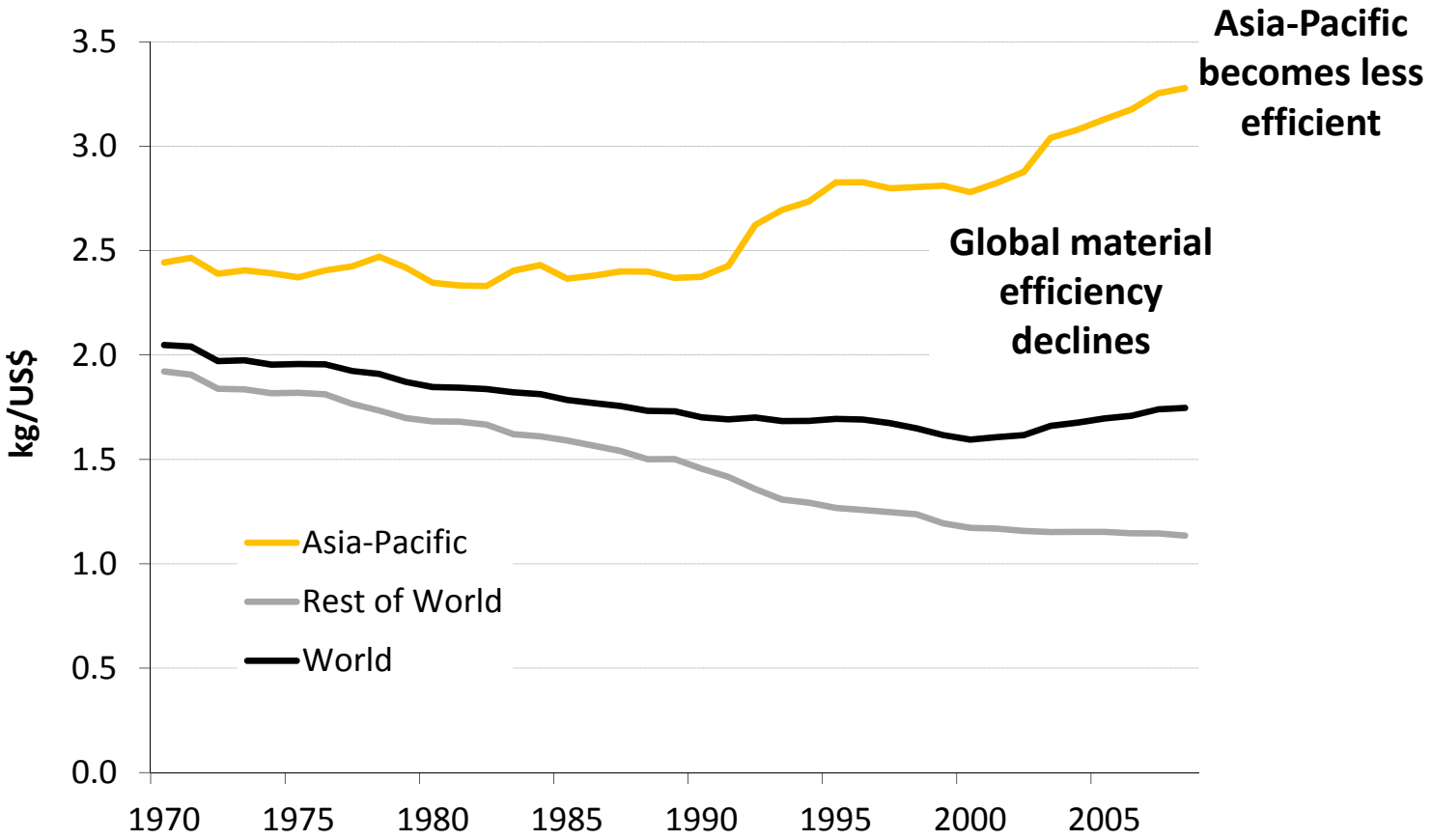
Source: UNEP 2011, West and Schandl 2013.

A changing economic context



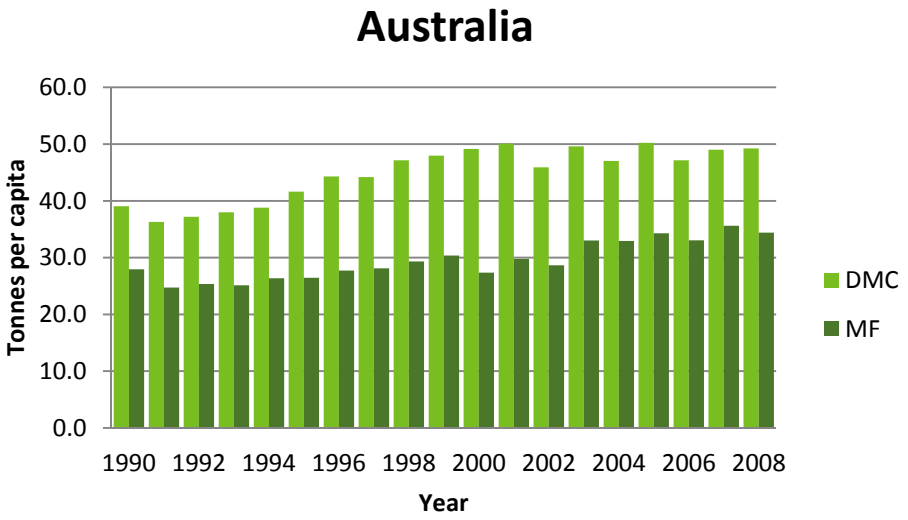
Source: McKinsey and Company 2011.

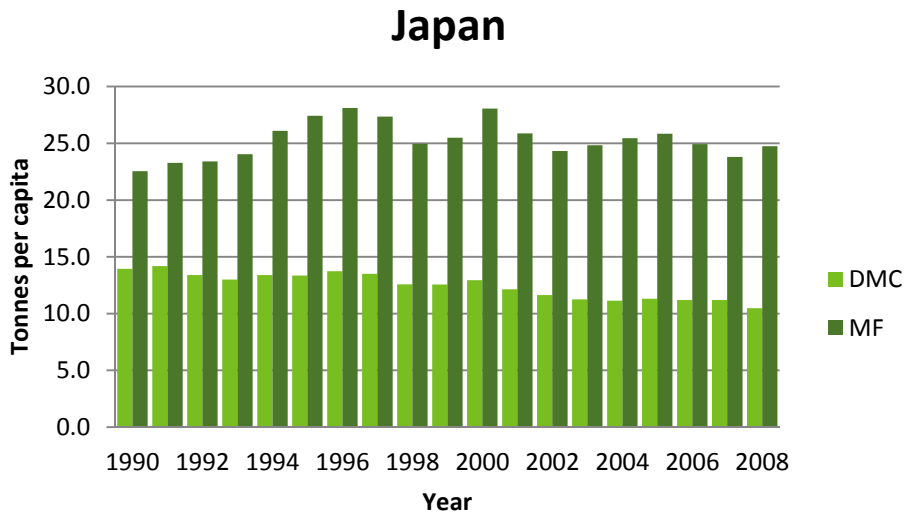
Reducing material efficiency

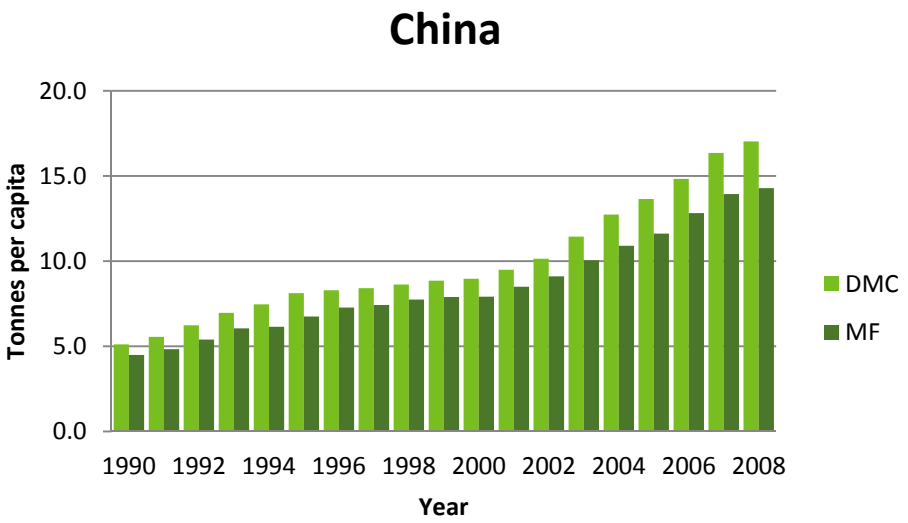


Source: UNEP 2011, West and Schandl 2013.

Differences between DMC and Material Footprint







Landing point
25-30 tonnes per capita

2050
9 billion people
270 billion tonnes of natural resource use
4 times of today

Source: Wiedmann et al. 2013

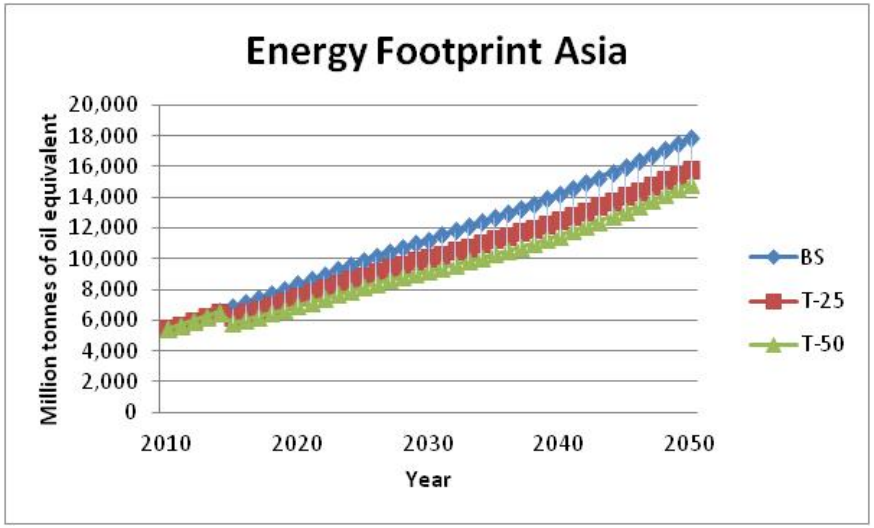
Challenges and opportunities

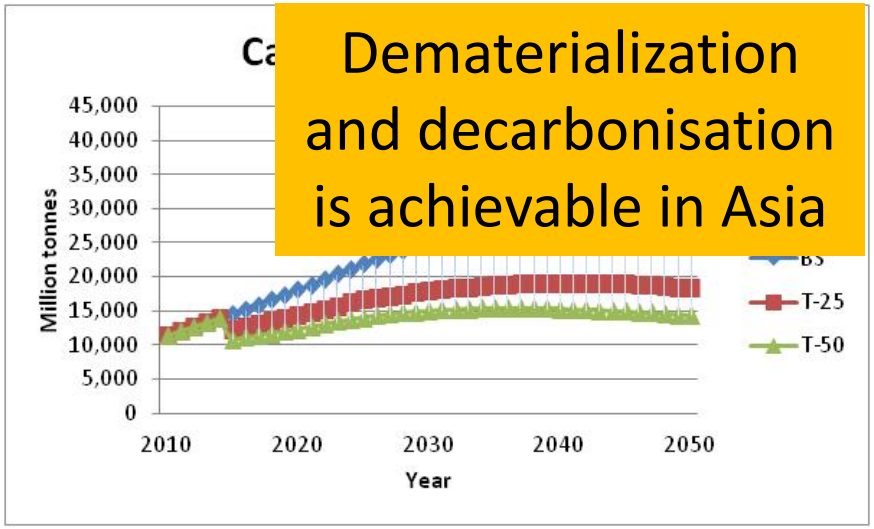
- 3 billion additional middle class consumers by 2030
- 80% rise in steel and cement demand by 2030
- Price rises in food, energy, materials and water
- Cost of extraction of oil and metals doubling
- Recycling potential for many metals underutilised
- Converging pressure points of supply security and climate change
- Large investment in resource systems needed to satisfy demand
- Housing, transport, energy and food may deliver 75% of savings
- $2.9 trillion of savings in 2030 through capturing the resource efficiency potential (3.7 trillion if carbon is priced at 30$ a tonne)

Economics and Outlook: Scenarios for growth, employment and resource use in Asia

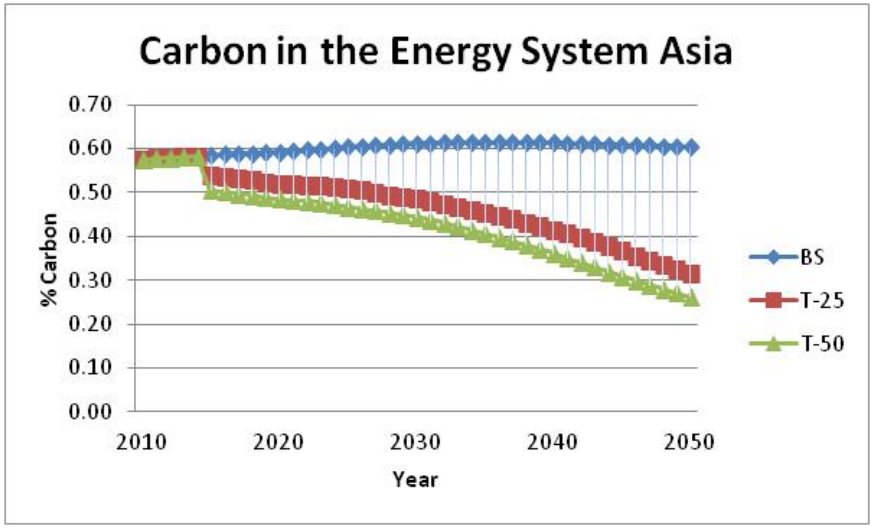
Three main scenarios	Scenario settings	Three models (coupled)
Base Case	No carbon price No investment in resource efficiency above business as usual	Technology based physical stocks and flows model (MEFISTO) *CSIRO Ecosystem Sciences*
Step Change in resource efficiency	25$ global carbon price Investment in resource efficiency to achieve technical potential in major sectors	Integrated Global Economy – Climate Model (GIAM) *CSIRO Climate and Atmospheric sciences*
Step Change in resource efficiency plus change in consumer behaviour	30$ carbon price Investment in resource efficiency and sustainable consumption Systems Innovation	Global, multi-regional input-output model (EORA) *University of Sydney*

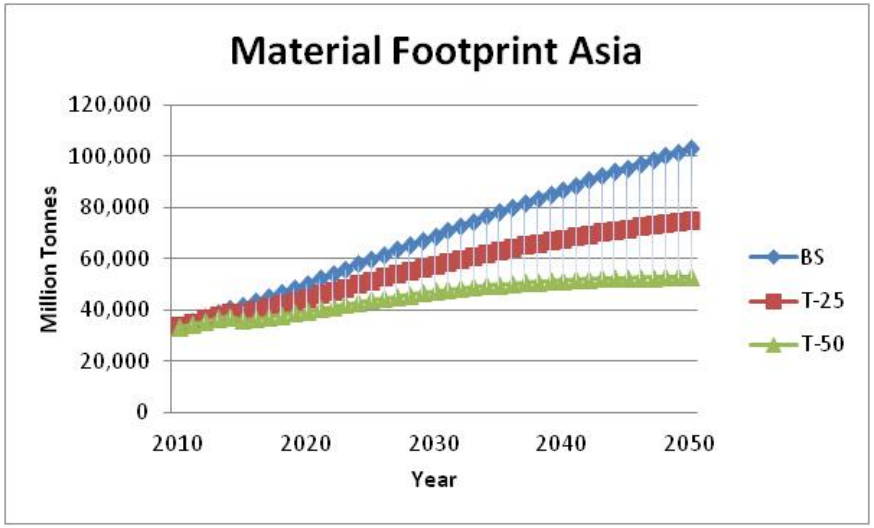
Decoupling in Asia





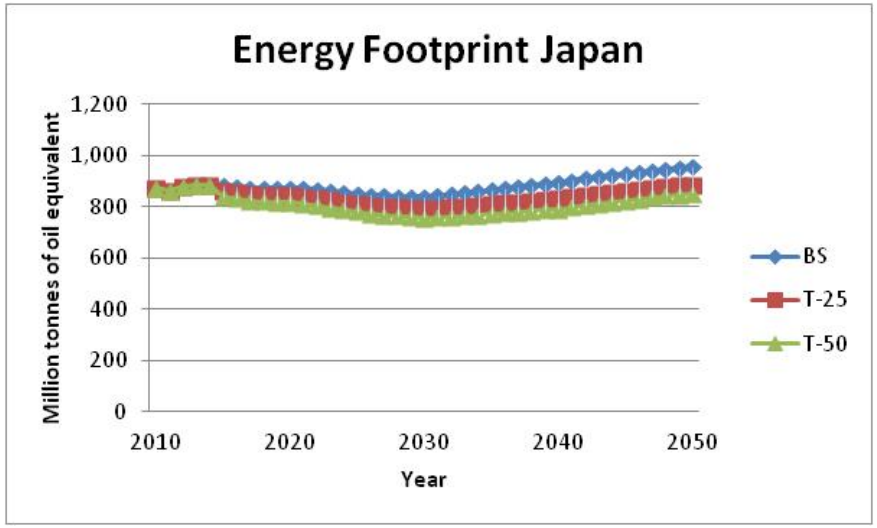
Dematerialization and decarbonisation is achievable in Asia

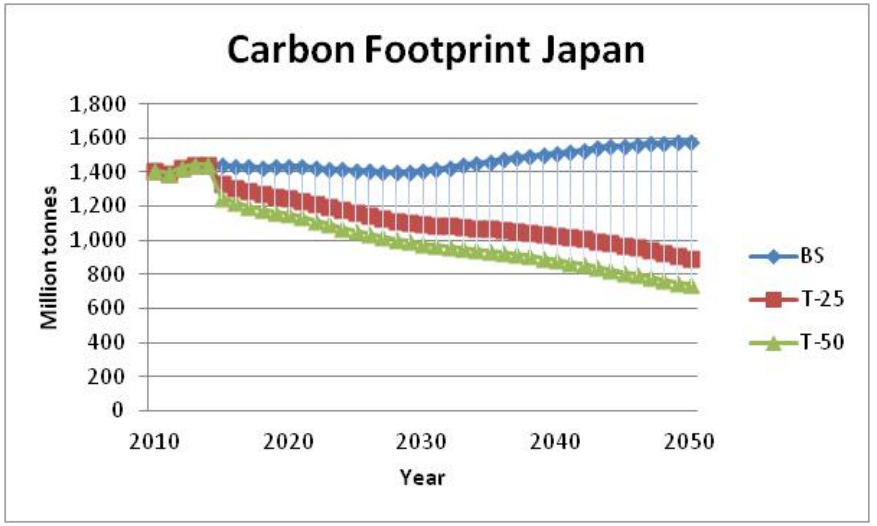


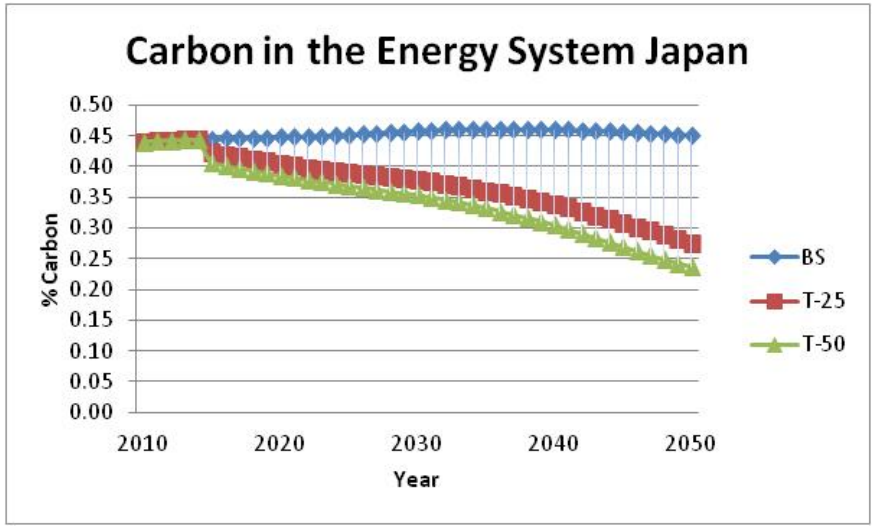


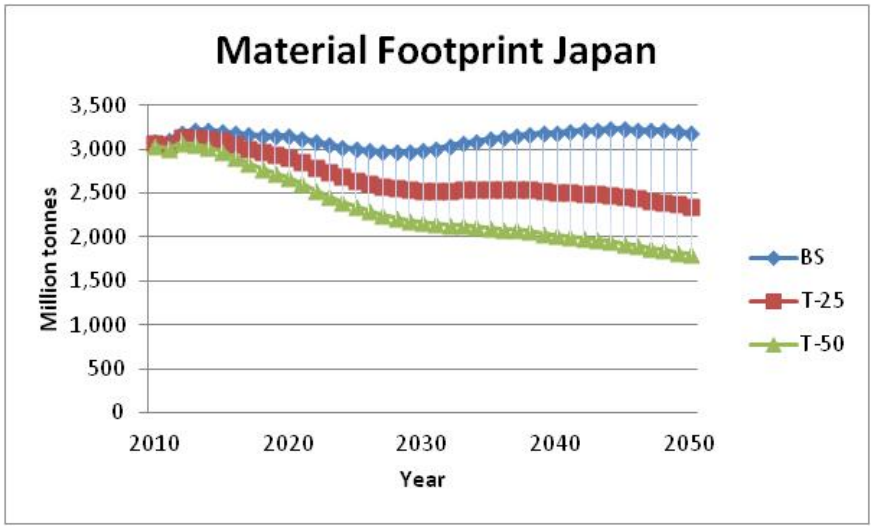
Source: CSIRO Integrated Economy – Environment Model and Sydney University EORA model 2013

Decoupling in Japan



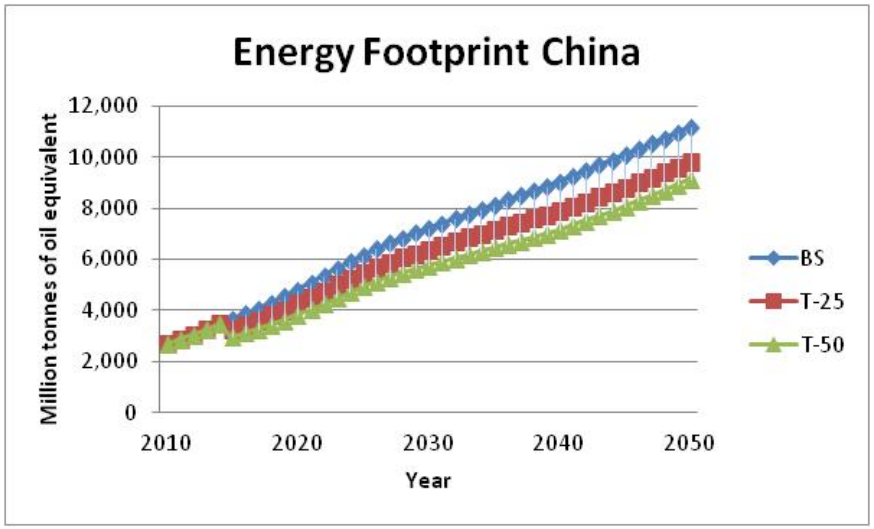


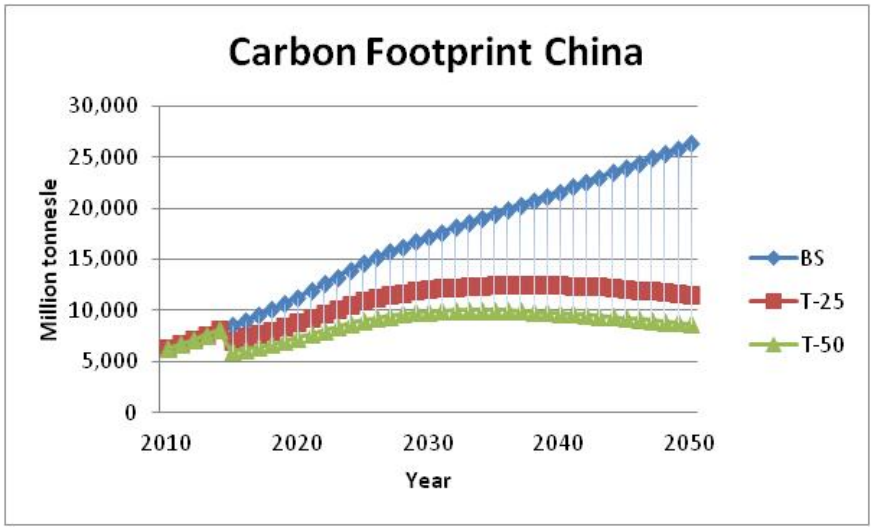


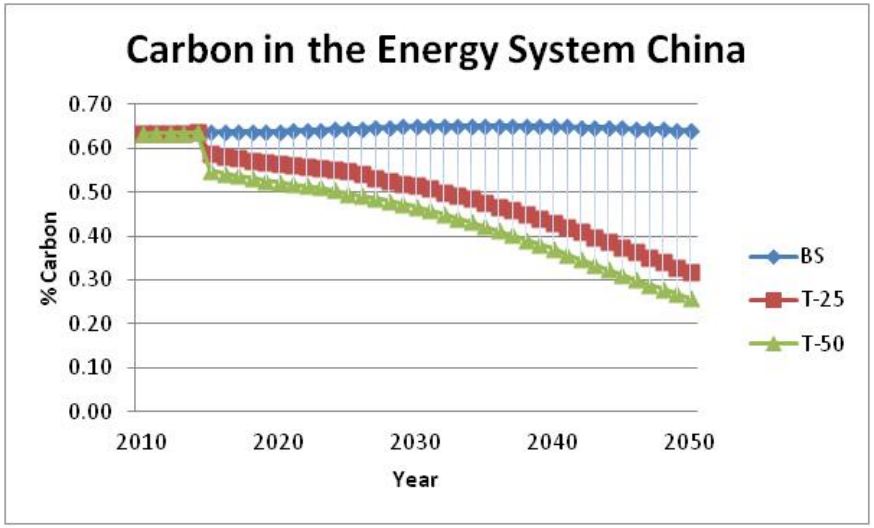


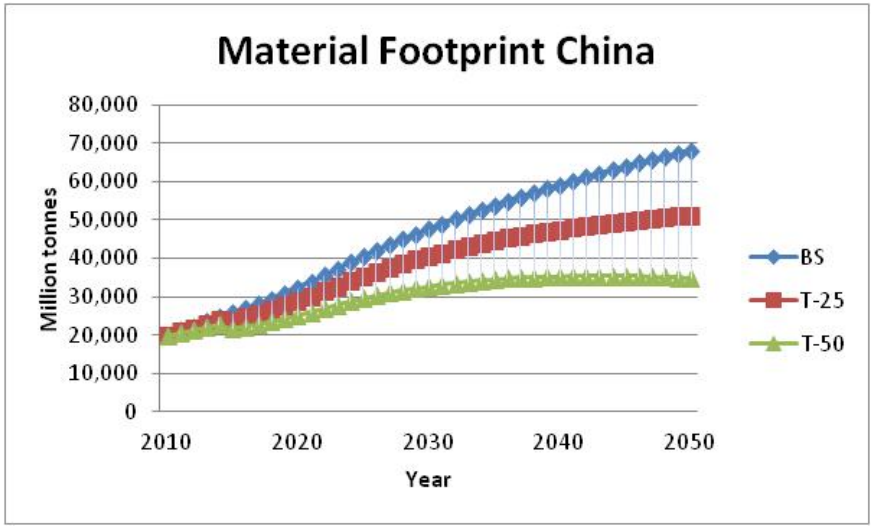
Source: CSIRO Integrated Economy – Environment Model and Sydney University EORA model 2013

Decoupling in China









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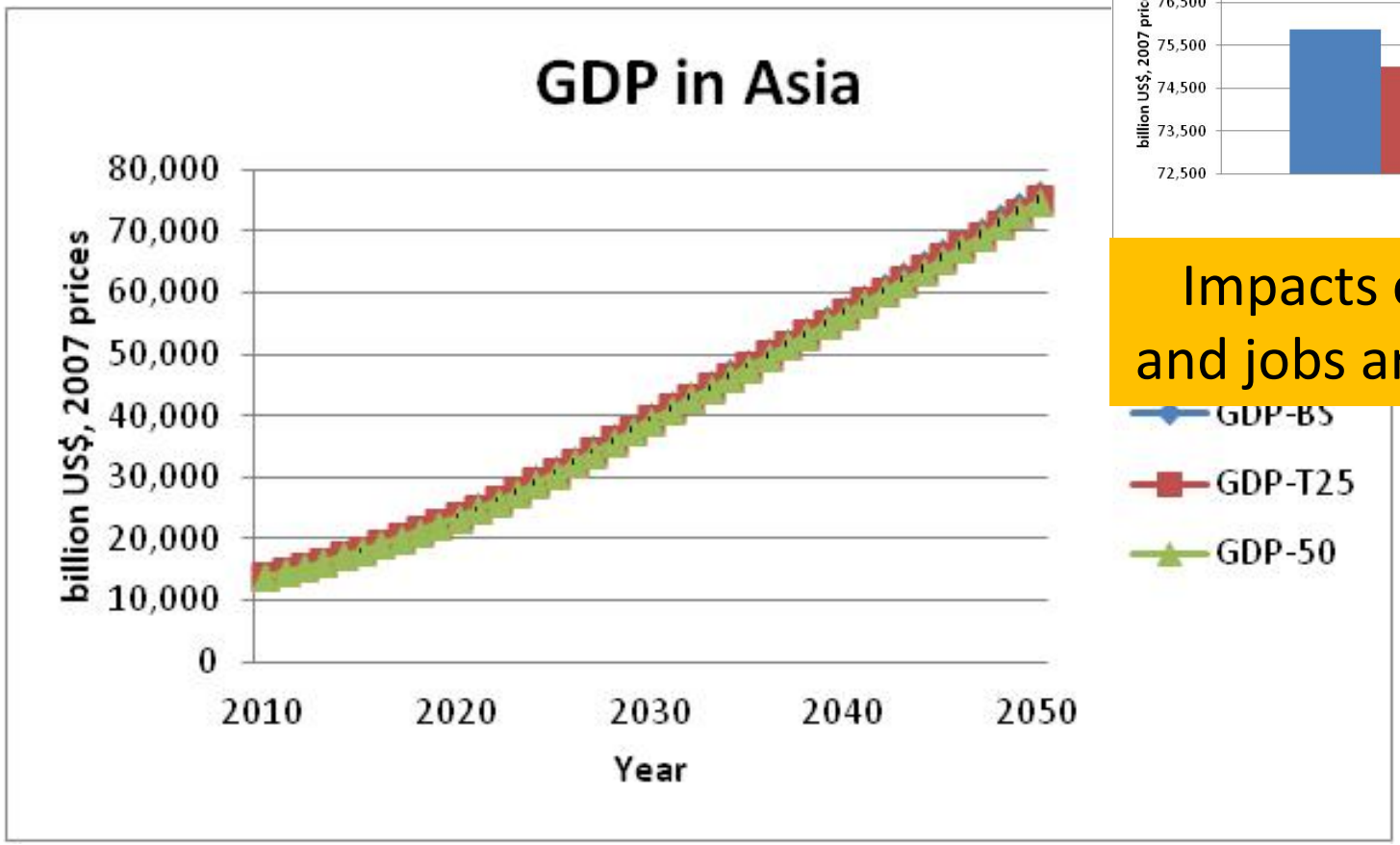
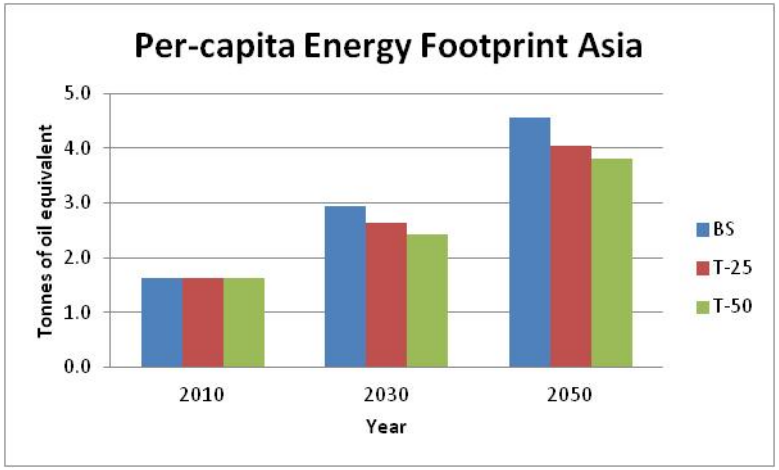
GDP in Asia

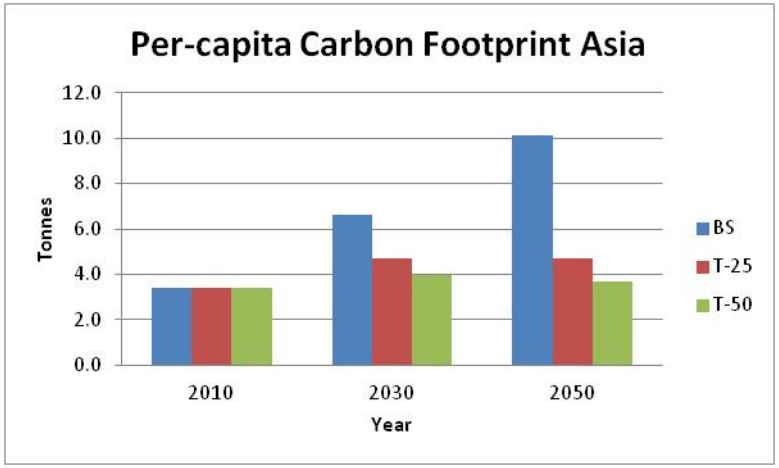


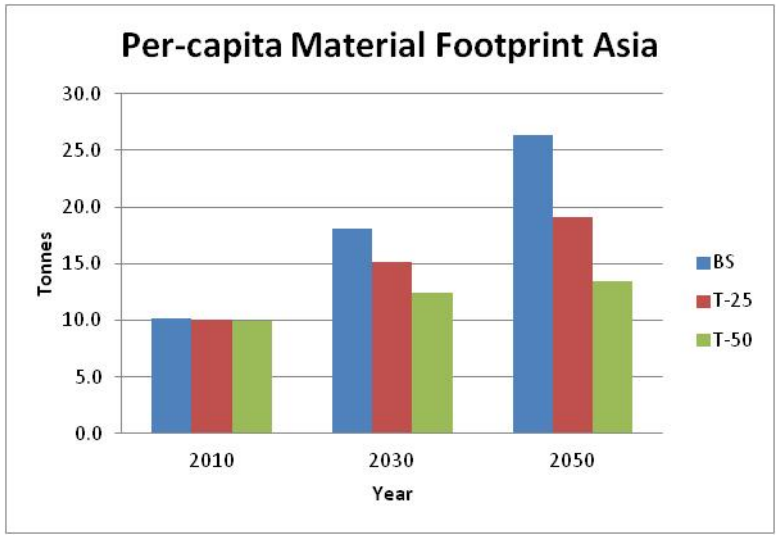
Impacts on growth and jobs are negligible

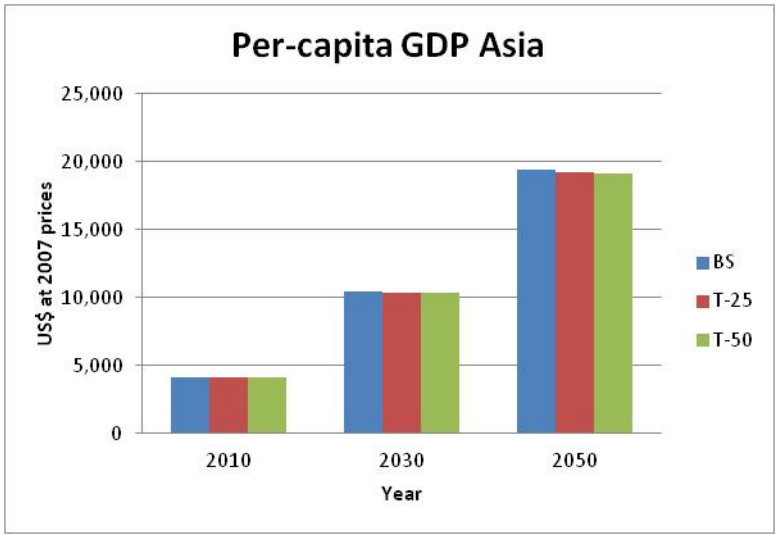
Source: CSIRO Integrated Economy – Environment Model and Sydney University EORA model 2013

Per-capita resource use and economic growth in Asia



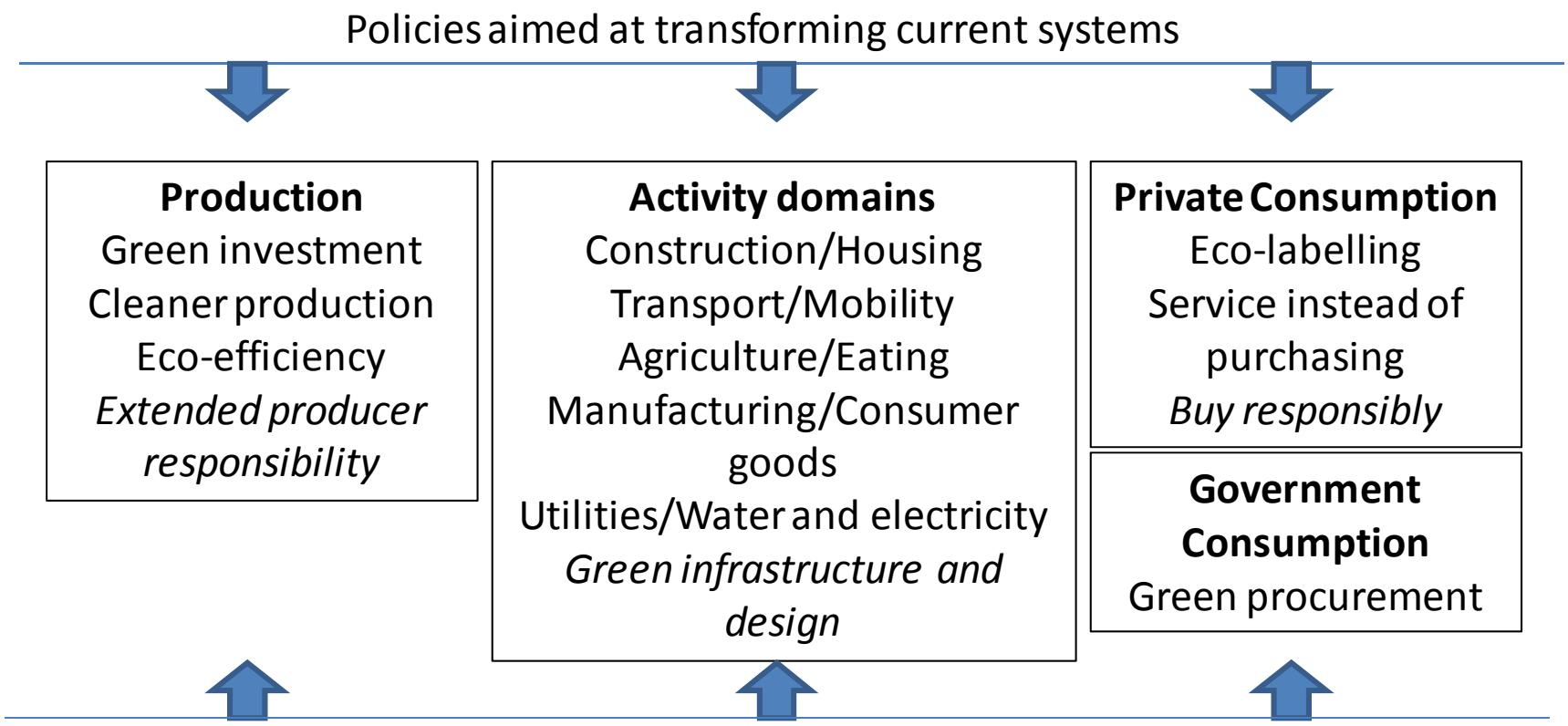






Source: CSIRO Integrated Economy – Environment Model and Sydney University EORA model 2013

Incremental and transformative policies



Transformative policies

- Green budget and tax reform – revenue neutrality
- Pricing and capping the use of natural resources and carbon emissions at source
- Paying productivity gains in increased recreation time and not just by rising incomes – to reduce rebound effect
- Replacing subsides on resources
- Investing in product service systems, eco industrial parks and eco-cities, resource recycling and cascading

Institutions ‘naturally’ respond to sustainability issues when the causes and consequences are understood, when there is something that can be done and when there is a social commitment to do something.

Technologies are not the bottleneck – social choices are

- Economics to cover scale, allocation and distribution of natural resources
- Monetary and physical accounting
- Based on the notion of socio-economic metabolism

- Social science to understand the social nature of production and consumption
- Agency of social actors is constrained and enabled by natural and social conditions that have to be addressed in both material and symbolic terms

Thank you

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