

Climate actions and interactions with SDGs

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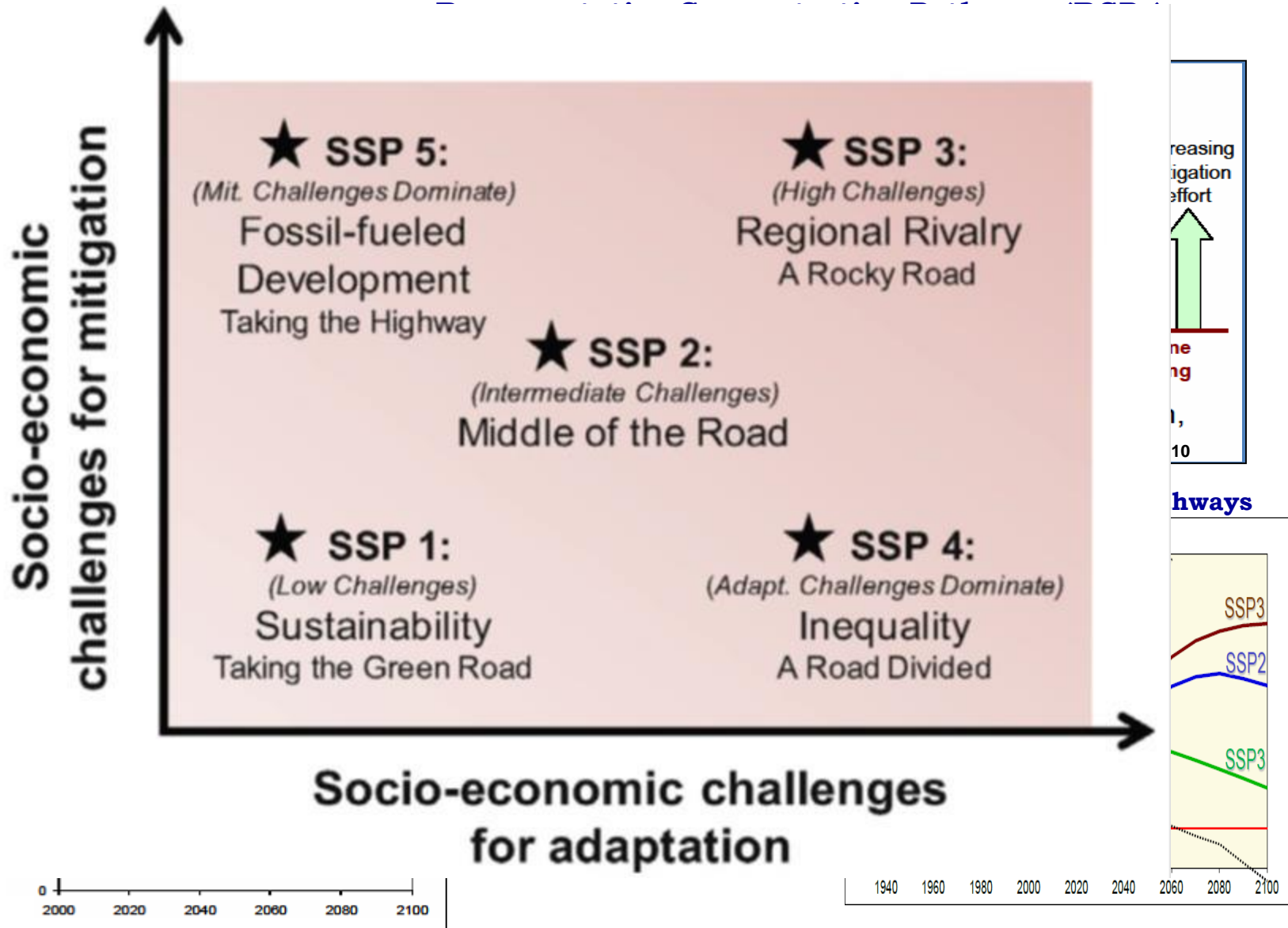
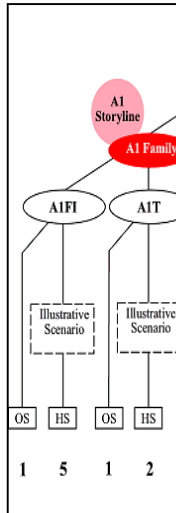
Low Carbon Asia Research Network (LoCARNet)
6th Annual Meeting 1-3 November 2017, Bangkok, Thailand

SDGs and Climate Change: multiple interfaces



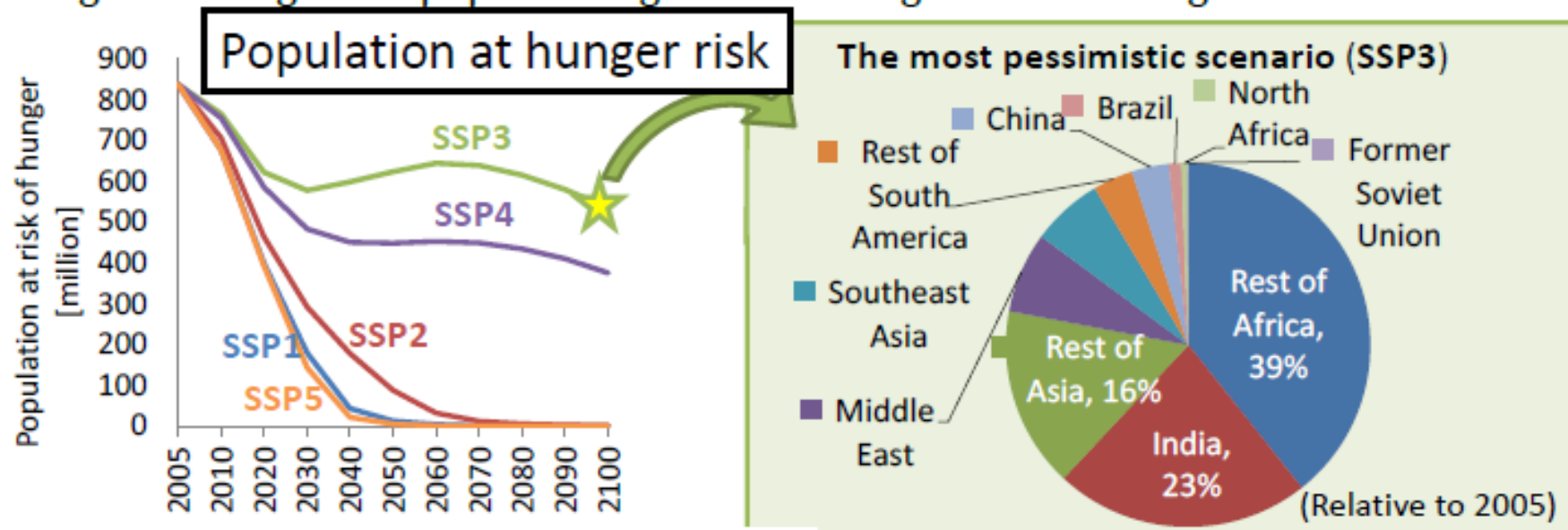
Numerous Global Scenarios Architectures

SRES

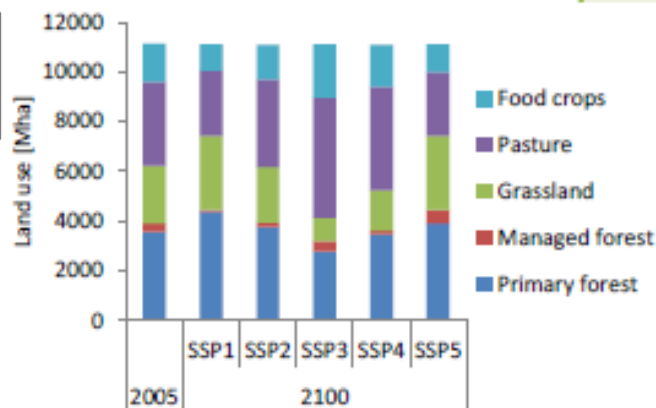


Risk of hunger in the 21st century

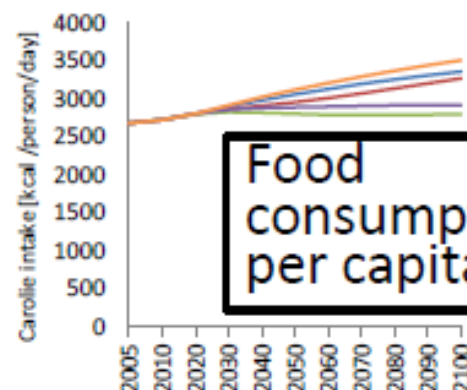
- 21st-century risk of hunger strongly differs among different socioeconomic conditions
- Regional distribution depends greatly on population growth, equality in food distribution and increase in food consumption
- Regions with greater population growth face higher risk of hunger.



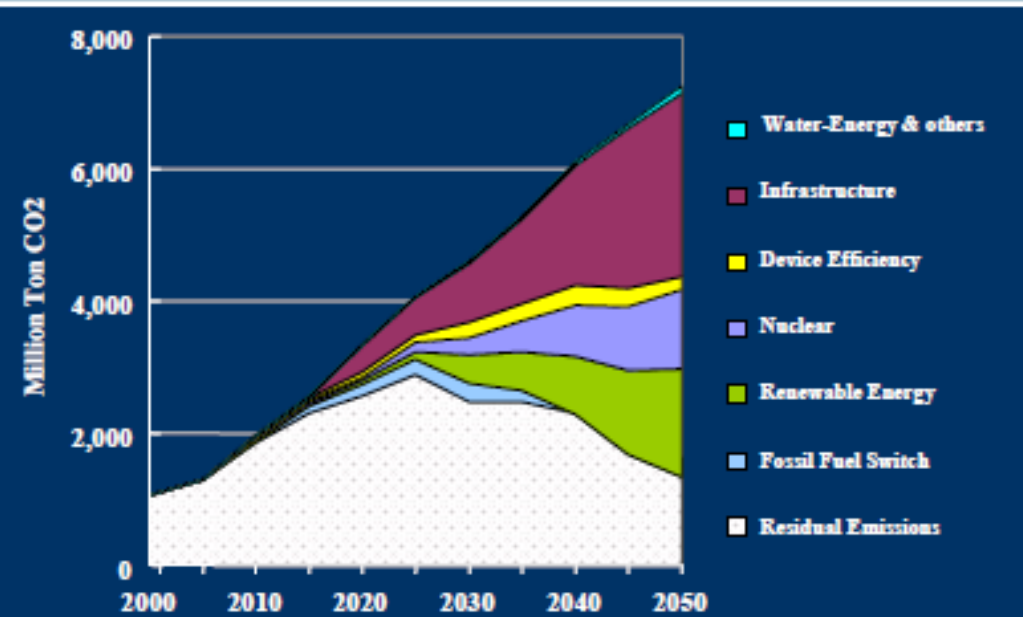
Land use change



Hasegawa et al.,
2015



2°C Stabilization: Mitigation Alternatives



Conventional Approach: transition with conventional path and carbon price

- High Carbon Price
- Climate Focused Technology Push
- Top-down/Supply-side actions

Technology Co-operation Areas

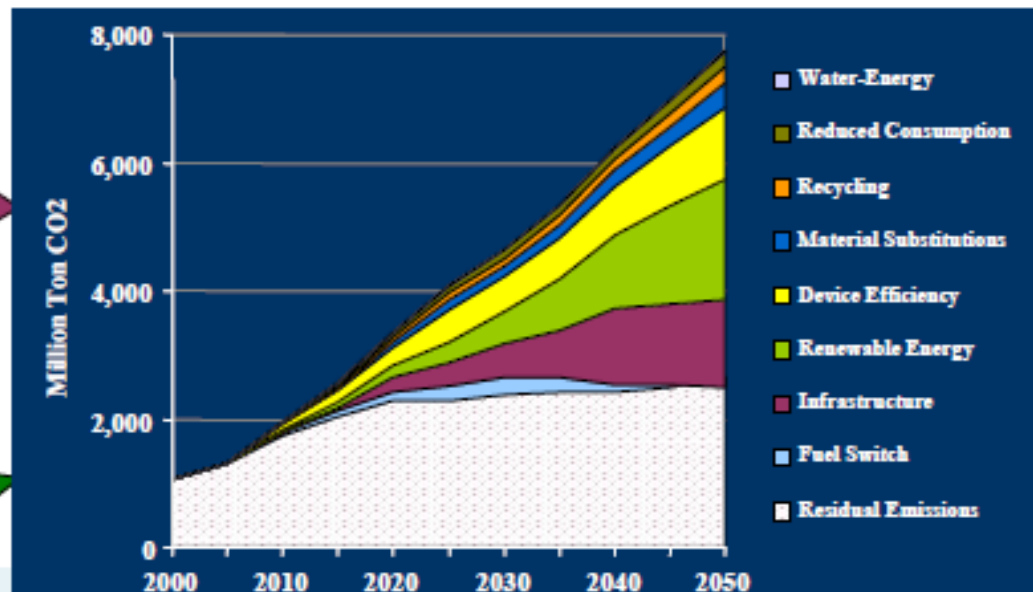
- Energy Efficiency
- Wind/Solar/Biomass/Small Hydro
- Nuclear/Low Carbon Infrastructure

Sustainability Approach: aligning climate and sustainable development actions

- Low Carbon Price
- Bottom-up/Demand-side actions
- Behavioural change
- Diverse Technology portfolio

Technology Co-operation Areas

- Transport Infrastructure Technologies
- 3R, Material Substitutes, Renewable Energy
- Process Technologies
- Urban Planning, Behavioral Changes

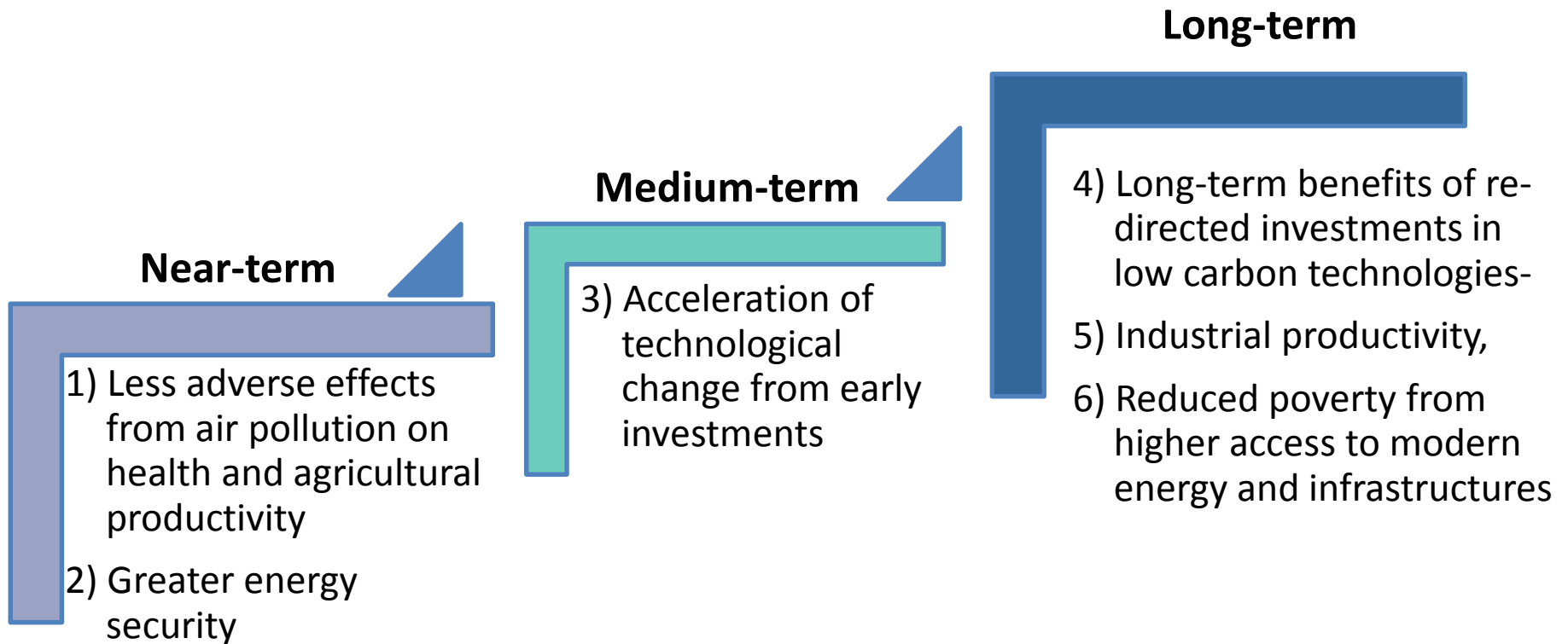


Social Value of Mitigation Action

Mitigation actions entail direct costs, co-benefits, and adverse side effects (IPCC, 2014b) - Potential co-benefits include:

- The **immediate benefits of avoided GHG emissions**:
 - Less adverse effects from local air pollution on health & agriculture productivity (Clarke et al. 2014)
 - Greater energy security and lower vulnerability of trade balance to oil price volatility
- An **acceleration of technological change** when early investments in low-carbon technologies deliver learning-by-doing effects with positive spillovers on technological change in the form of a “Schumpeterian” innovation wave (Stern 2015b; Bramoullé and Olson 2005).
- The **short-term knock-on effects and long-term development benefits** of a well-conducted low-carbon transition:
 - Redirecting savings toward productive investments
 - Strengthening industrial fabric through investing in low-carbon technologies and local resources
 - Reduced poverty through higher growth, higher employment, and better access to modern energy, transport, and housing infrastructures (Arezki et al. 2016).

Co-benefits of Climate Mitigation Actions



Energy Transitions: Share of renewables, India

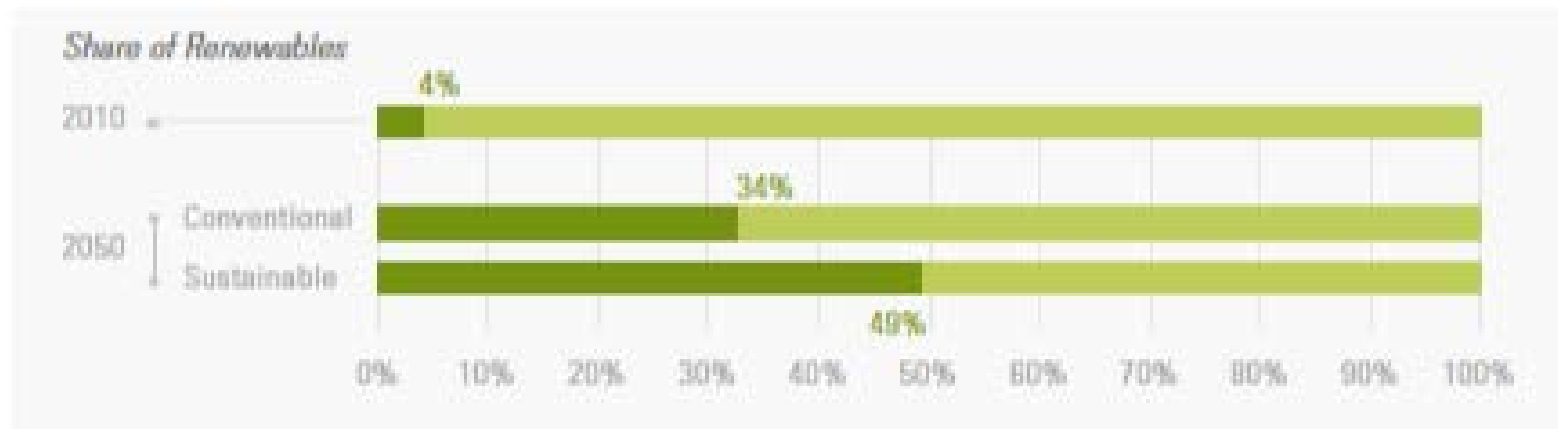


Table 4.1: CO₂ Intensity of Electricity Generation (grams CO₂/KWH)

	2010	2020	2030	2040	2050
Conventional	771	641	319	121	66
Sustainable	771	558	254	102	56

Example: Synergies and Trade-offs



- Climate change will alter ecosystems affecting food security
- Competing uses: Energy crops vs food crops
- Trade-offs: BECCS?
- Synergies with SDGs (food security, ecosystem services)
- Challenges: Demand side measures (changing diets)

Urbanization pathways and transitions



Synergies across mitigation-adaptation-SDG

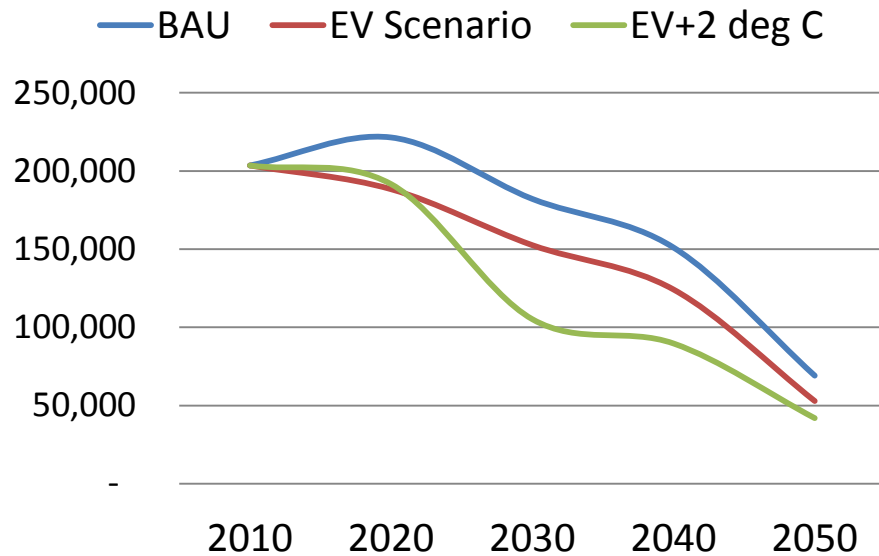
Cities as sites of risk; centers of innovations; incubators of climate action

Technical and socio-economic transitions

Changing dynamics across the fabric – urban--- peri-urban---rurban----rural--- -regional....

Challenges: Governance, equity, replication

Technological transformations: Air quality co-benefits of Electric vehicles



PM2.5 Emissions



Ecosystems and biodiversity



Global mitigation (sinks)

Regional and local adaptation (watersheds, regional climate)

Vulnerability to climate threats

Systemic effects (species extinction, etc.)

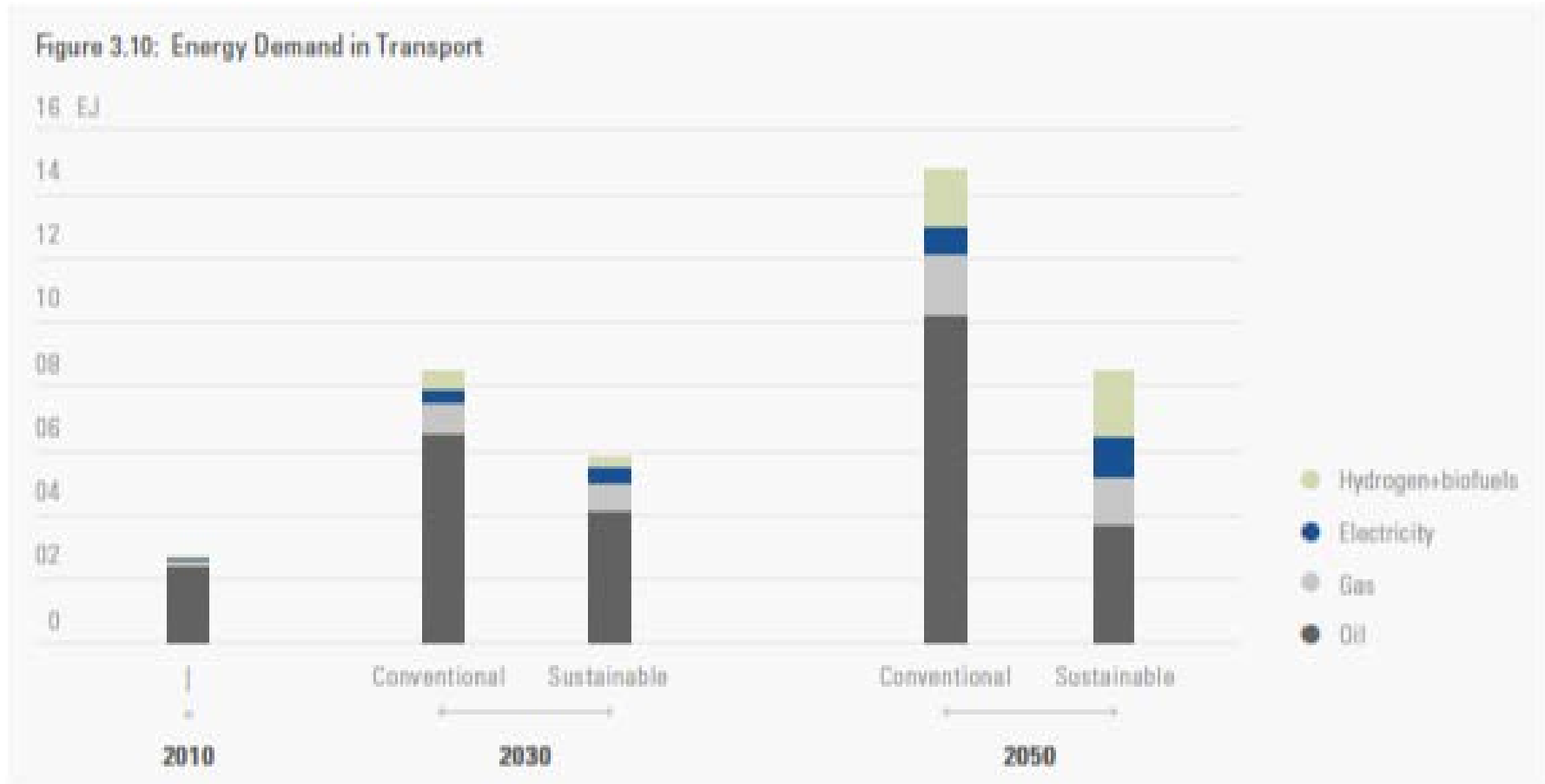
Trade-offs (bioenergy/food security)

Ecosystems based approaches to synergize climate change and sustainable development



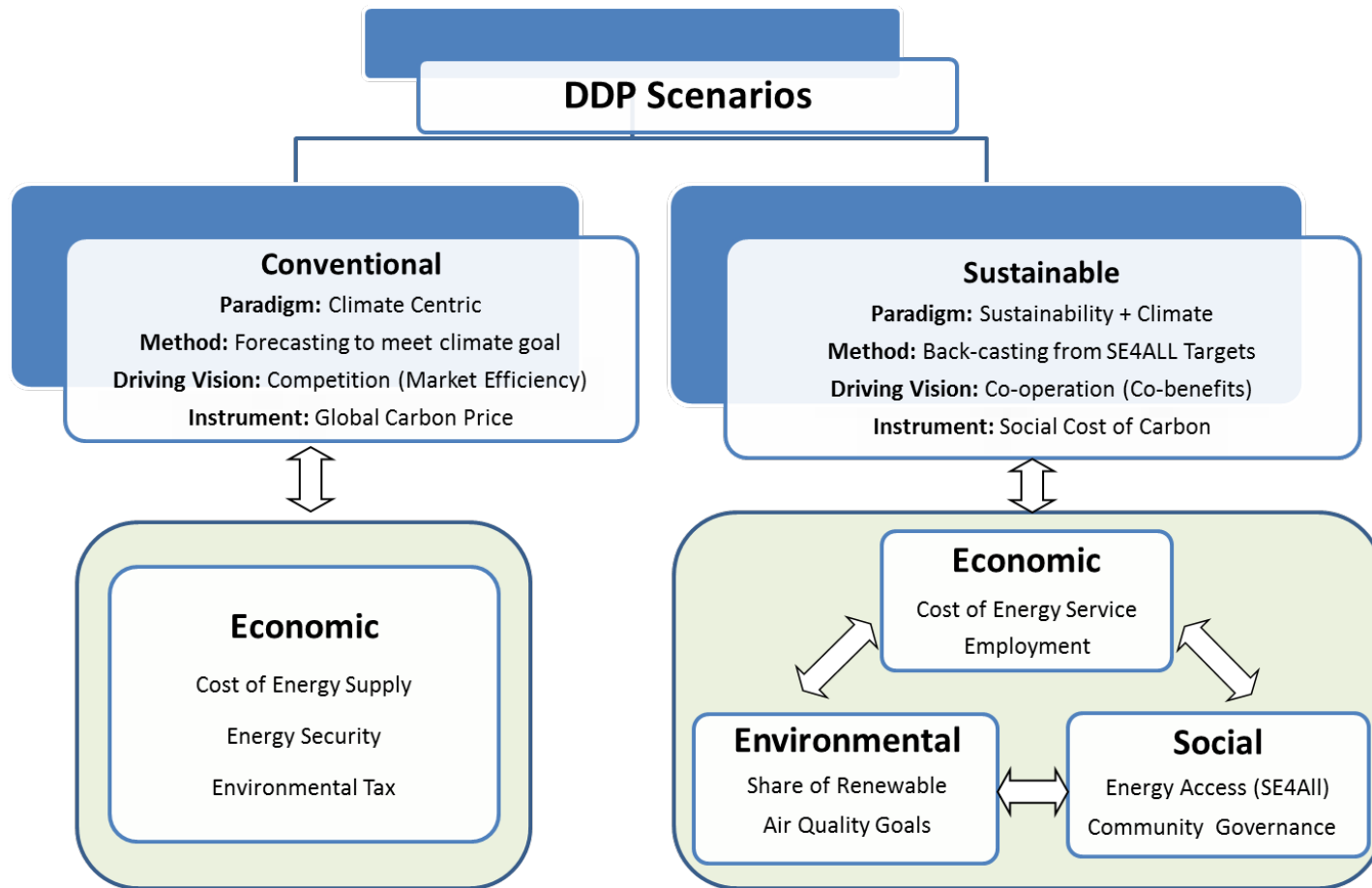
Sustainable Deep Decarbonization: Example - India

Transport Energy demand, India



Source: DDPP, India (2015)

Alternative Development Paradigms: India



Indian Scenarios: Macro Drivers

	2010	Conventional 2030	Sustainable 2030	Conventional 2050	Sustainable 2050
Population (million)	1206	1476	1434	1620	1509
Households (million)	247	365	356	502	473
Urbanization (%)	30	39	43	50	55
GDP (Billion \$)	1397	6489	6002	25664	23007
GDP per capita (US \$)	1158	4397	4186	15842	15247

Source: Shukla *et al.*, 2015

Sectors and Strategies

Habitats

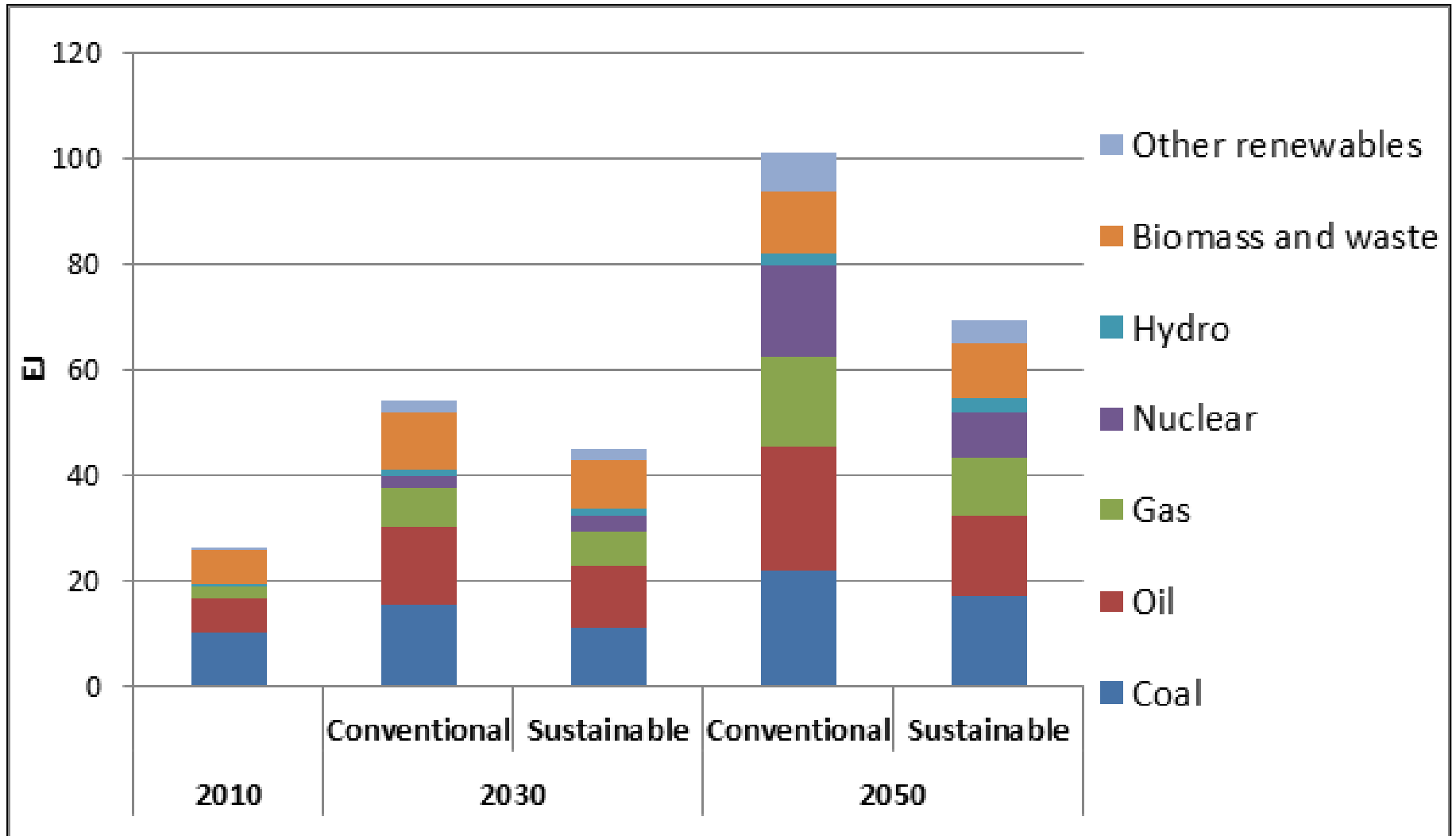
Sectors	Strategy
Housing	Affordable housing + Building Codes, Materials
Lighting	CFL /LEDs
Cooking	Access to clean fuels
Cooling /Heating	Labelling, Building Codes
Waste	National Mission on Waste
Transport	Avoid, Shift, Improve, Switch, Share

Industry

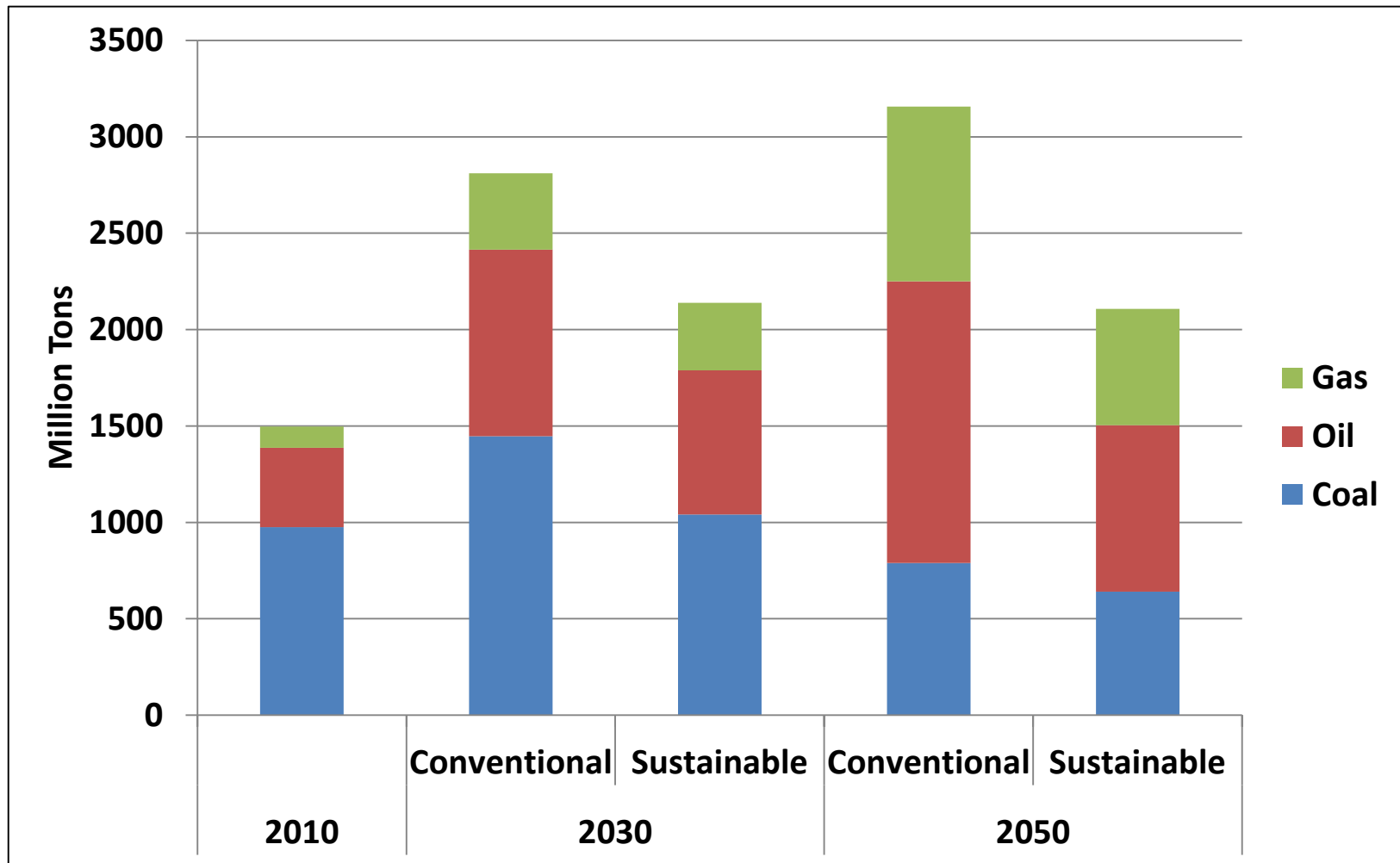
Sectors	Strategy
Steel	Plant Benchmarking, PAT, Market Reforms, Recycle
Cement	Plant Benchmarking, PAT, Market Reforms, Materials (FlyAsh)
Aluminium	Plant Benchmarking, PAT, Market Reforms, Recycle
...	
Electricity: Supply, T&D and Demand	

Sectors	Strategy
Renewable	National Mission on Solar, Wind; Feed-in-Tariff
Coal	Clean Coal Technologies,
T&D	Coal by Wire
Consumption	Targeted Subsidies

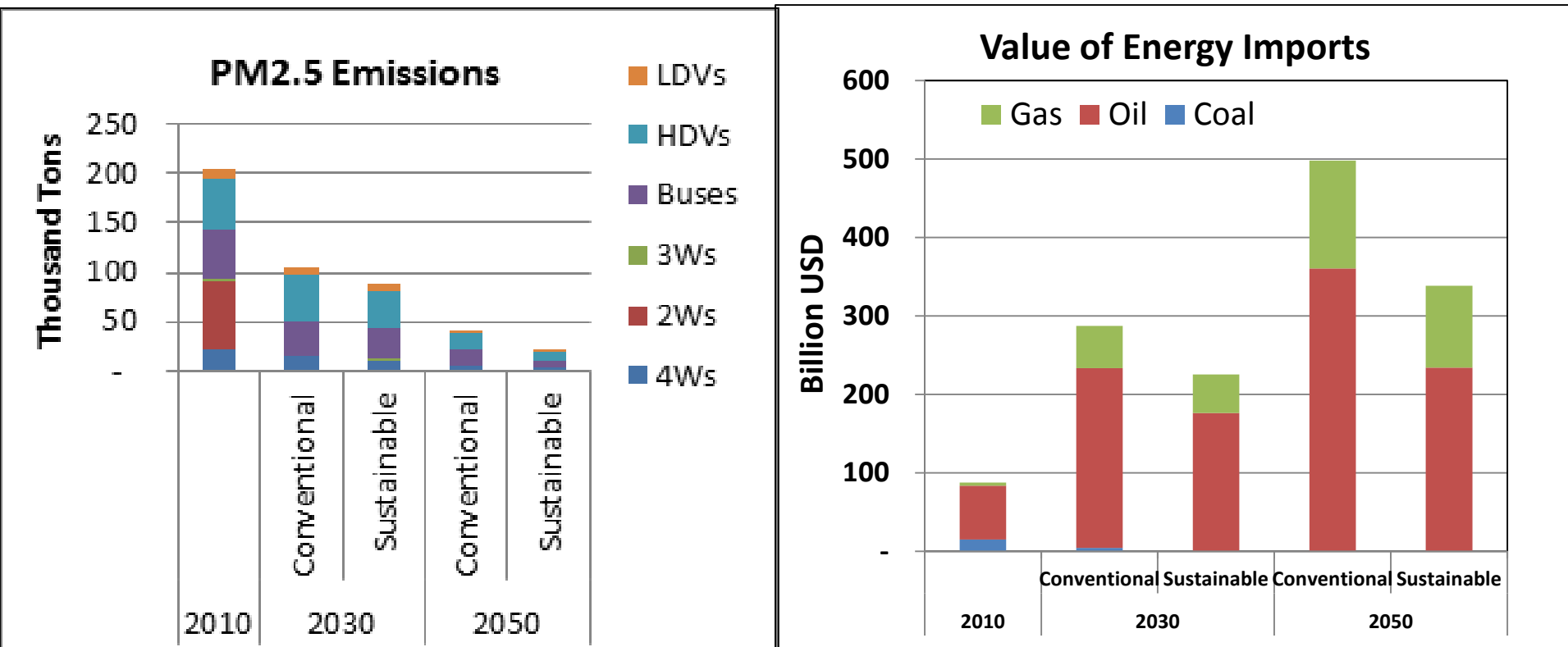
Primary Energy



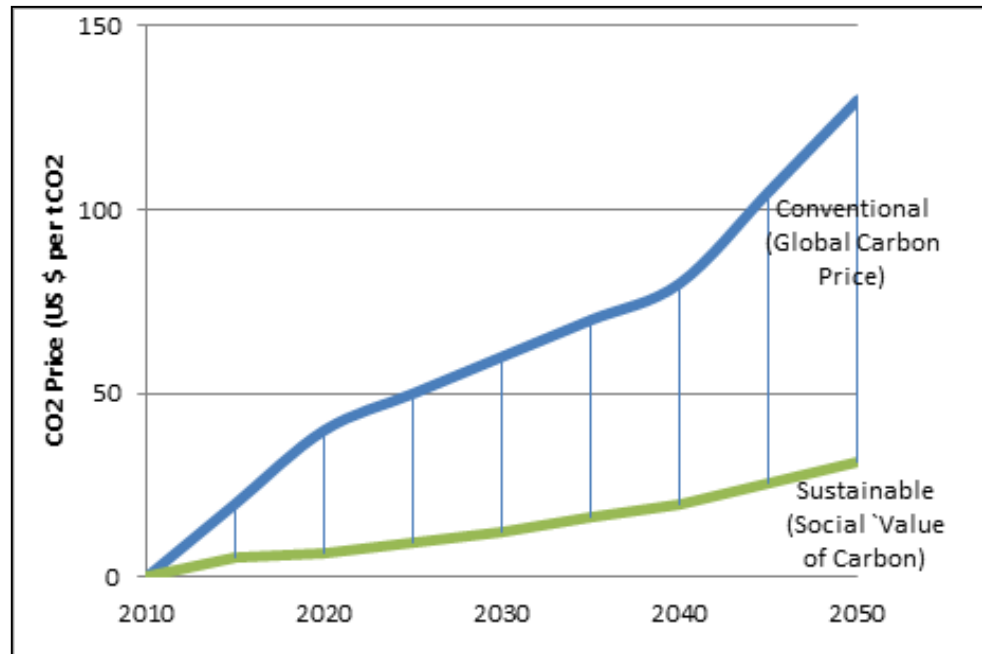
CO₂ Emissions



Co-Benefits: Air Pollution & Energy Security



Co-benefits: Social Value of Carbon



Revenues from carbon saved in Sustainable Scenario

	2020	2030	2040	2050
CO ₂ saved (Million tCO ₂)	370.6	671.8	918.9	1049.4
Revenue from CO ₂ saved (Bn US \$ 2010)	16.6	45.1	82.3	152.9
Revenue as % of GDP	0.6%	0.8%	0.8%	0.7%

Climate change and SDGs: Way forward

- Strong global and national underpinnings - Paris Agreement, UNSDGs, Nationally Determined Contributions
- Opportunities across scales
- Transformations across sectors, technologies, social, behavioural and governance
- Optimize interlinkages (Renewables, Energy Efficiency) to maximize co-benefits;
- Role of scientific community – Research on policy interactions
- Policy community- Long-term balancing act with short term goals
- Financing sustainable resilient low carbon development – 2 deg C to 1.5 deg C
- Rapid economic growth and huge population – Asia has a significant role !!
- Opportunity for Asian countries to reap multiple CC+SD dividends by addressing governance challenges, cross-learning, regional cooperation and innovative financing mechanisms

Thank you