Promoting an Integrated Knowledge Based Low-Carbon Development Policy Making in Asia

Rizaldi Boer

rizaldiboer@gmail.com; **+62811117660**

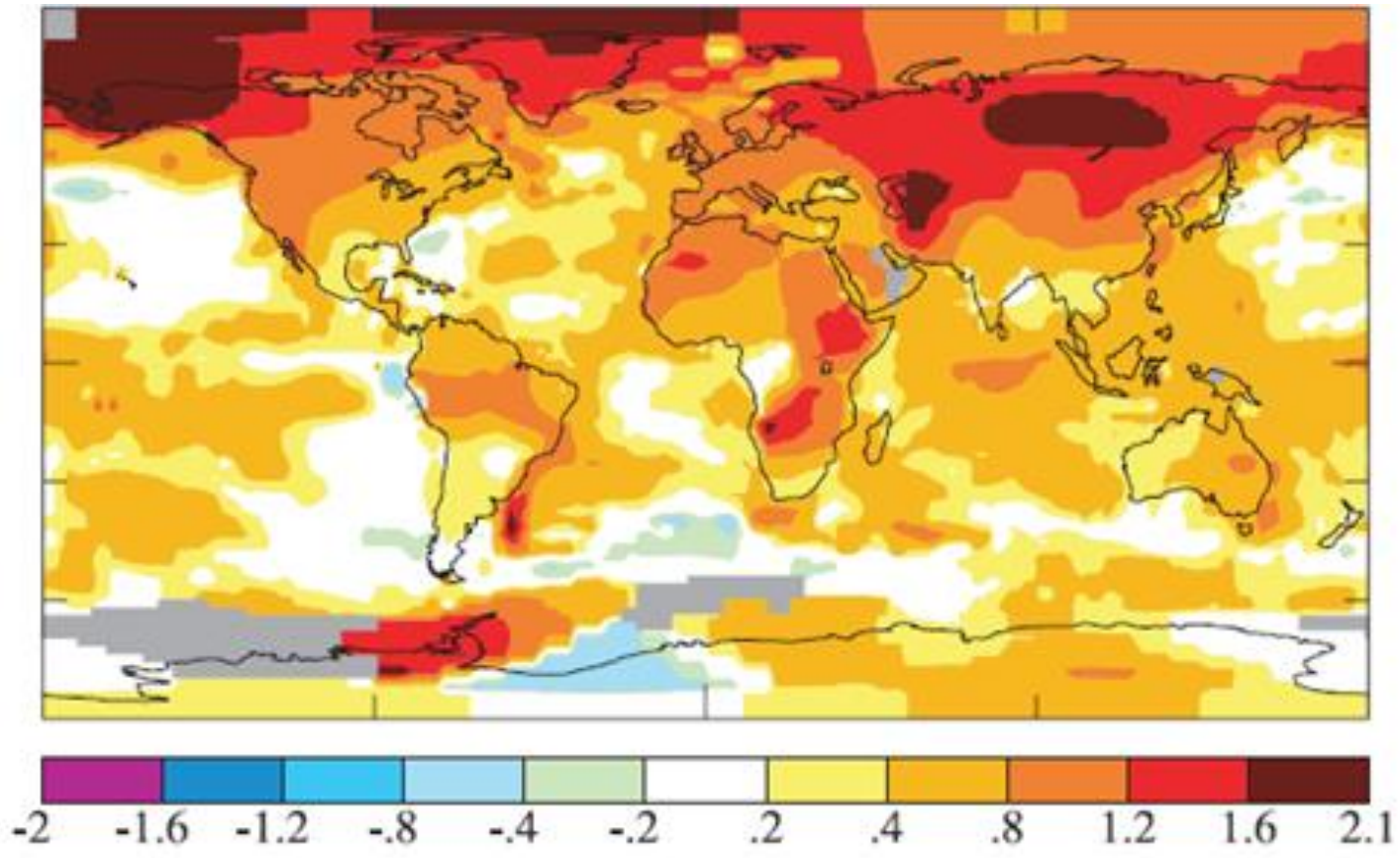
Seminar Nasional Jejaring Kerja Perubahan Iklim dan Kehutanan

Pusat Pengelolaan Risiko dan Peluang Iklim di Asia Tenggara dan Pasifik (CCROM-SEAP),

Institut Pertanian Bogor

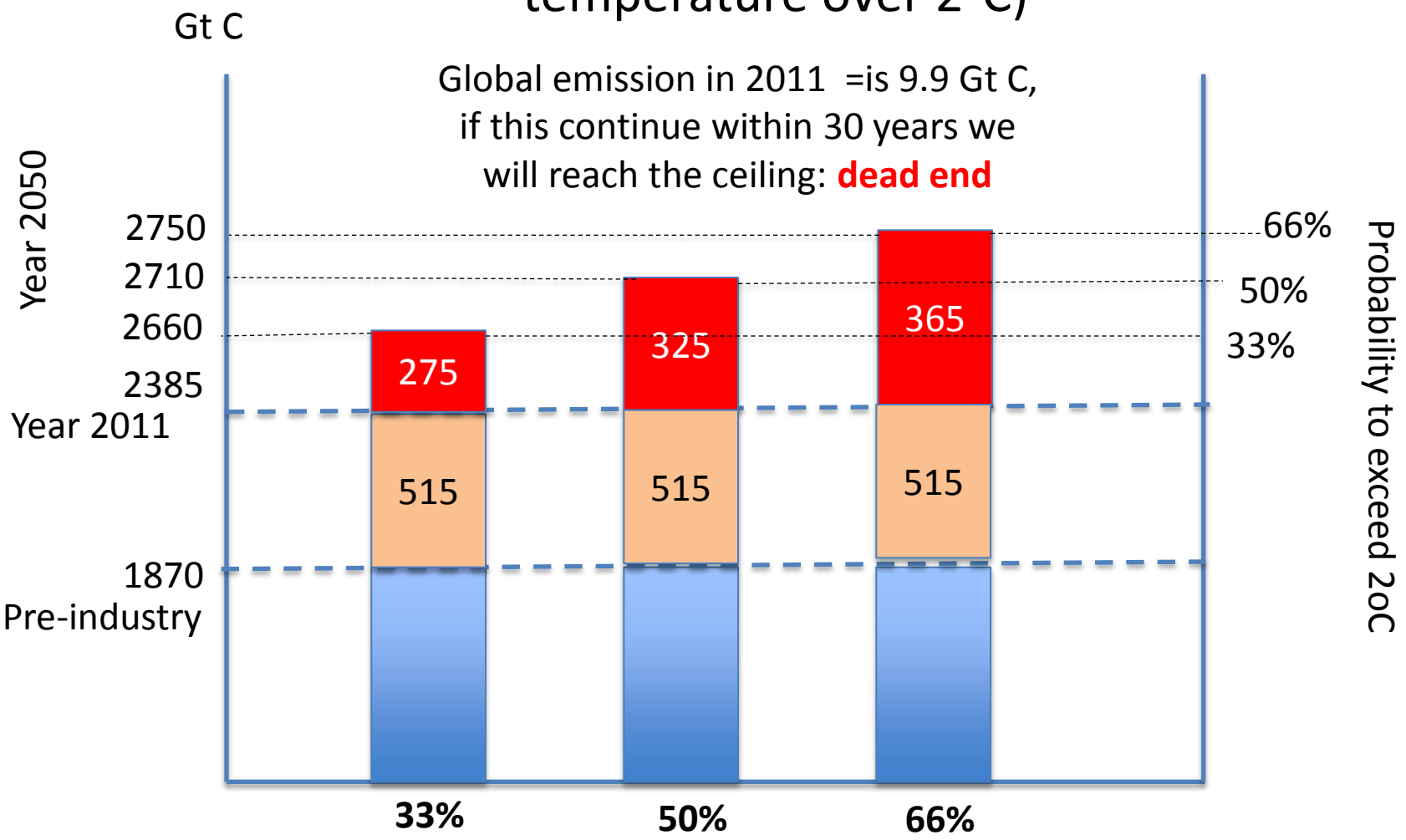
What Science tells us?

Global temperature continues to increase but not uniform



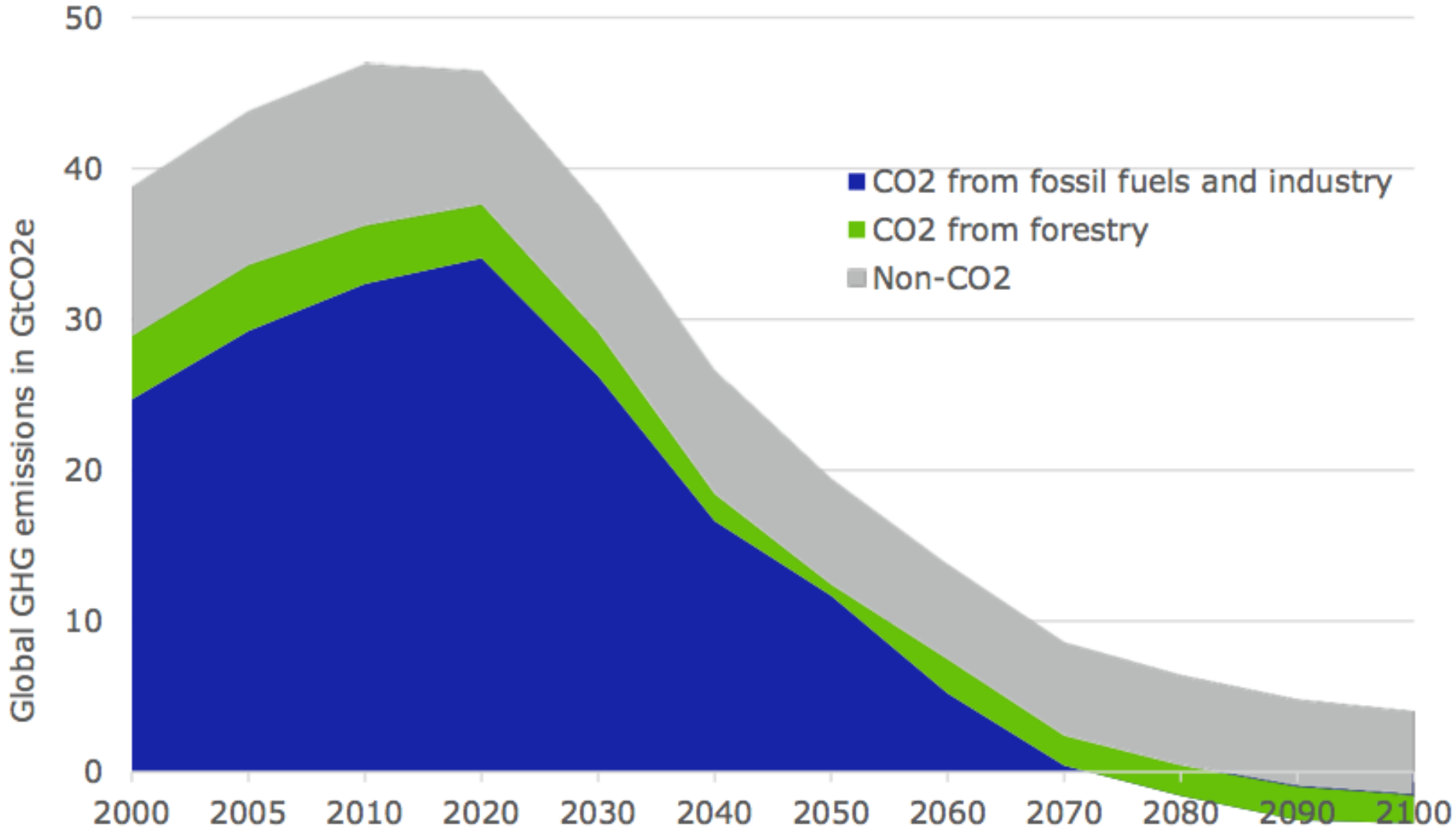
Global temperature anomaly of 2001-2005 relative to global mean temperature of 1951–1980 (Hansen *et al.*, 2006)

Global Target (Allowable Cumulative total anthropogenic CO2 emission from 1870 (GtCO2) to avoid the increase of GHG temperature over 2^0C)



Based on IPCC (2013)

Illustrative scenarios of global GHG emission compatible with 2°C target (Höhne *et al.*, 2014)

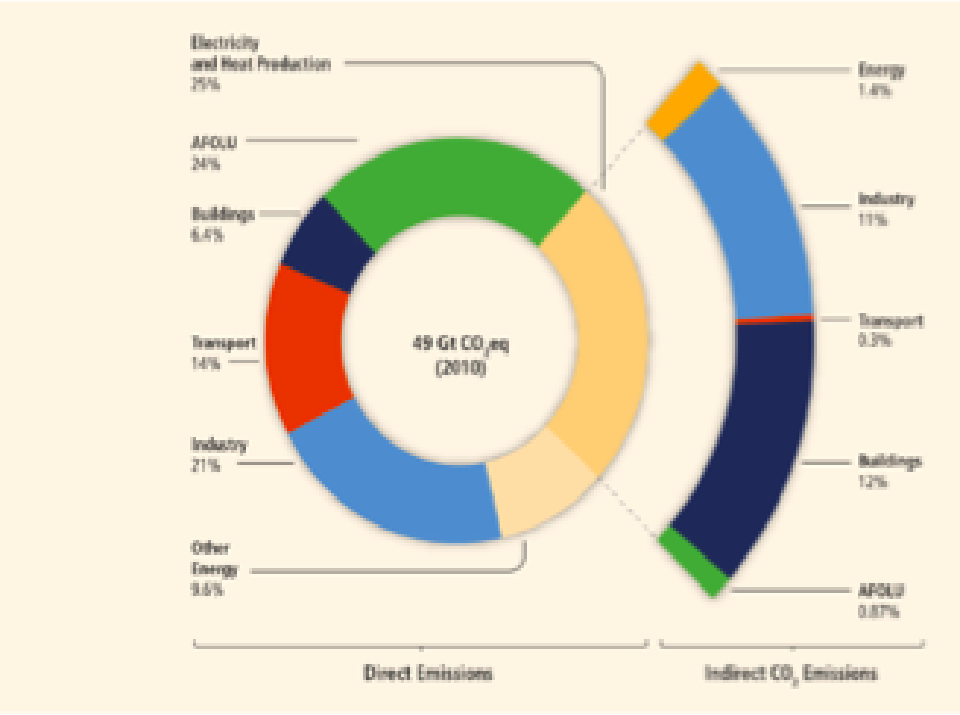


CO2 emissions from fossil fuels and industry are negative from 2070 onwards and are depicted to offset some of the CO2 from forestry and non-CO emissions (Marker scenario RCP 2.6 of the IPCC, from RCP scenario database

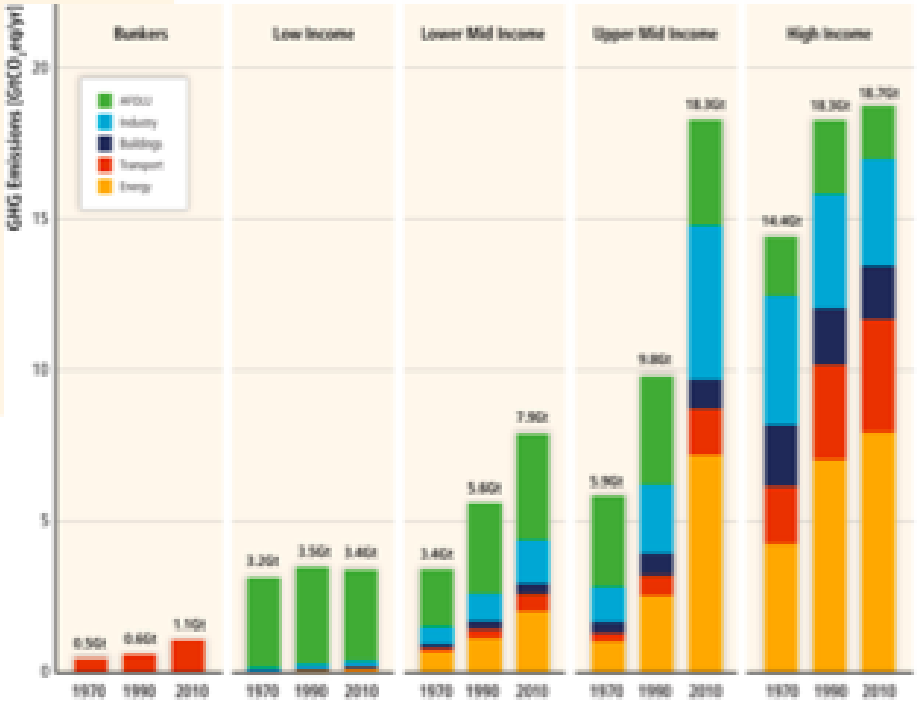
http://tntcat.iiasa.ac.at:8787/RcpDb/dsd?Action=htmlpage&page=download).

NEW FINDINGS of AR5:

AFOLU represents 20-24% of total emissions. Globally the largest emitting sector after energy…

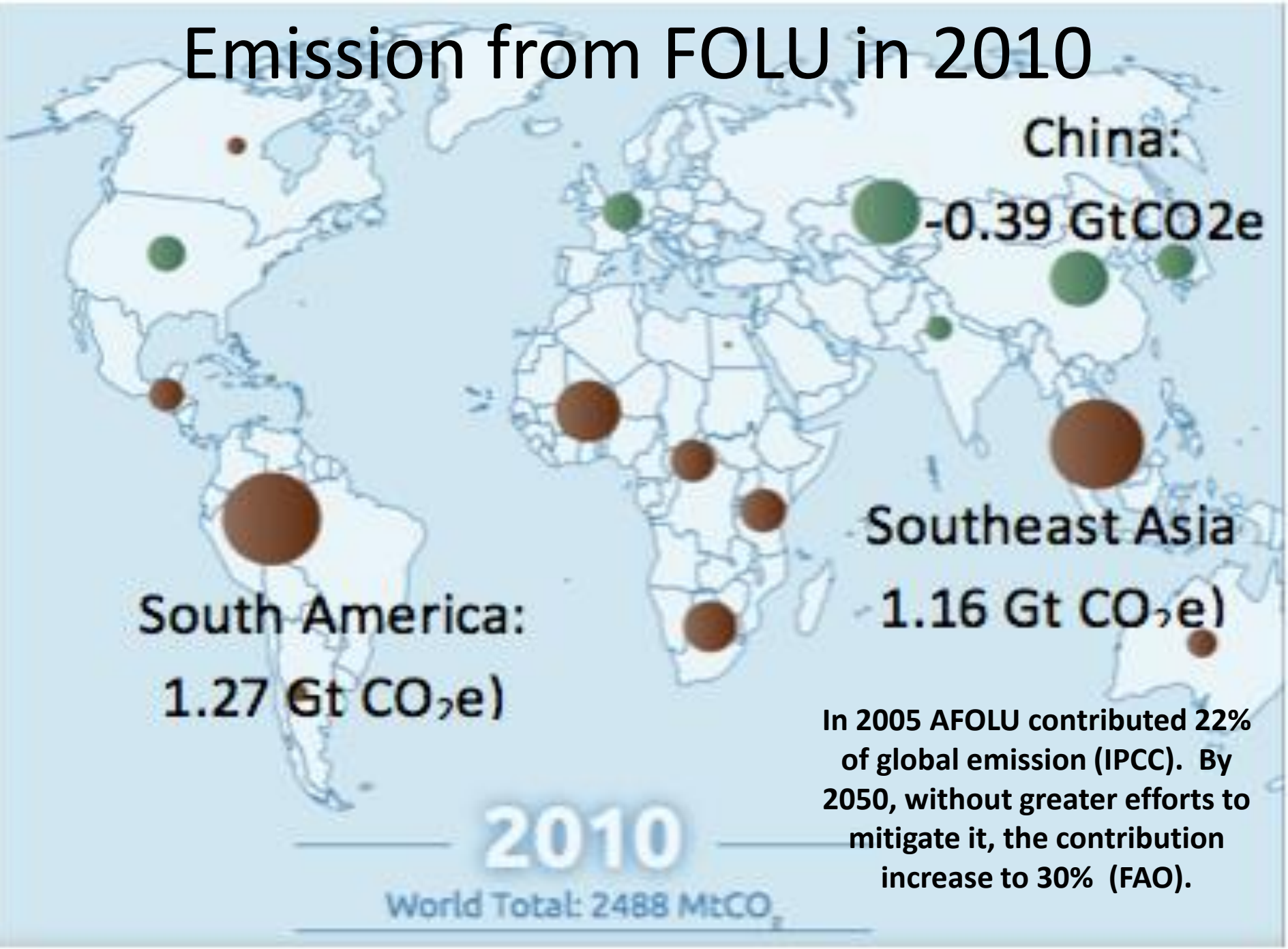


…and even more important in developing countries



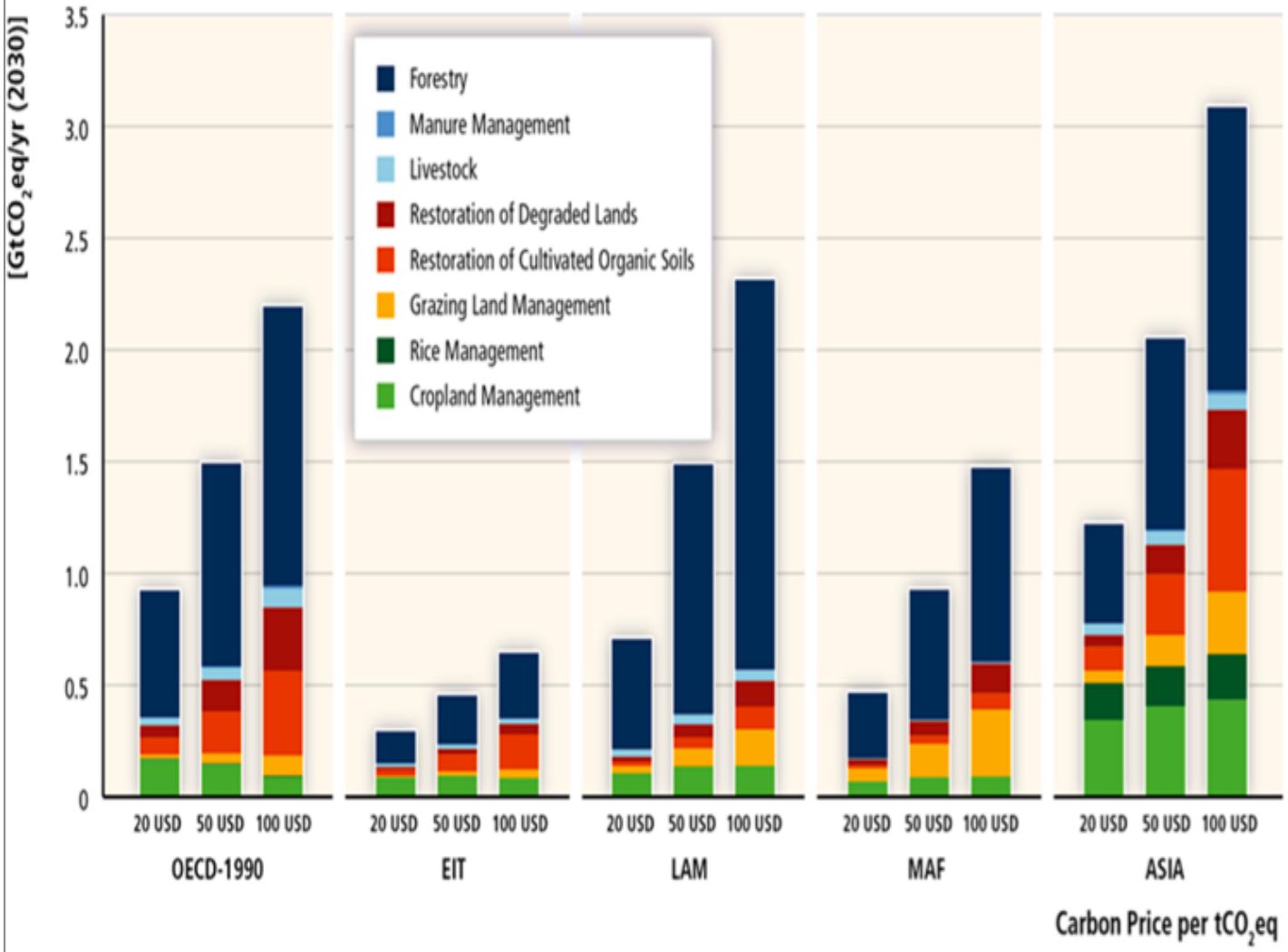
IPCC (2013)

Emission from FOLU in 2010



In 2005 AFOLU contributed 22% of global emission (IPCC). By 2050, without greater efforts to mitigate it, the contribution increase to 30% (FAO).

Economic mitigation potentials in the AFOLU sector by region by 2030 – Supply side.



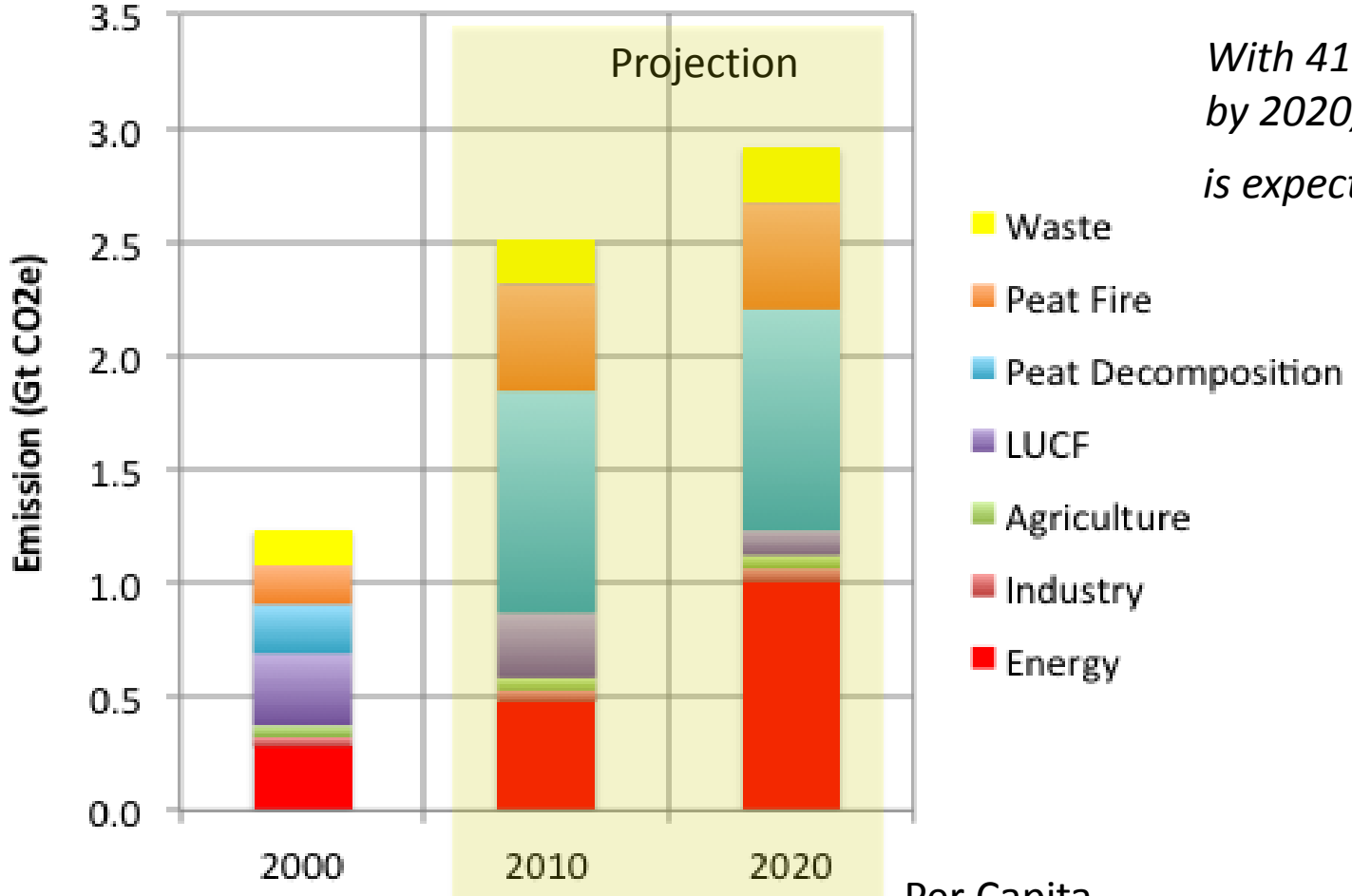
Three price scenarios;

- ✓ 20 USD/tCO_2e
- ✓ 50 USD/tCO_2e
- ✓ 100 USD/tCO_2e

IPCC (2013)

Supply side: economic mitigation 7.18 - 10.6 $GtCO_2e$/yr at carbon prices up to 100 USD/tCO_2e. About a third can be achieved at <20 USD/tCO_2e

Projection of Indonesian Emission under the BAU up to 2020 (*based on SNC; MoE 2010*)



	2000	2010	2020
AFOLU	3.55	7.61	6.14
Non-AFOLU	2.26	3.09	5.01
Total	5.81	10.70	11.15

Per Capita Emission (ton CO2

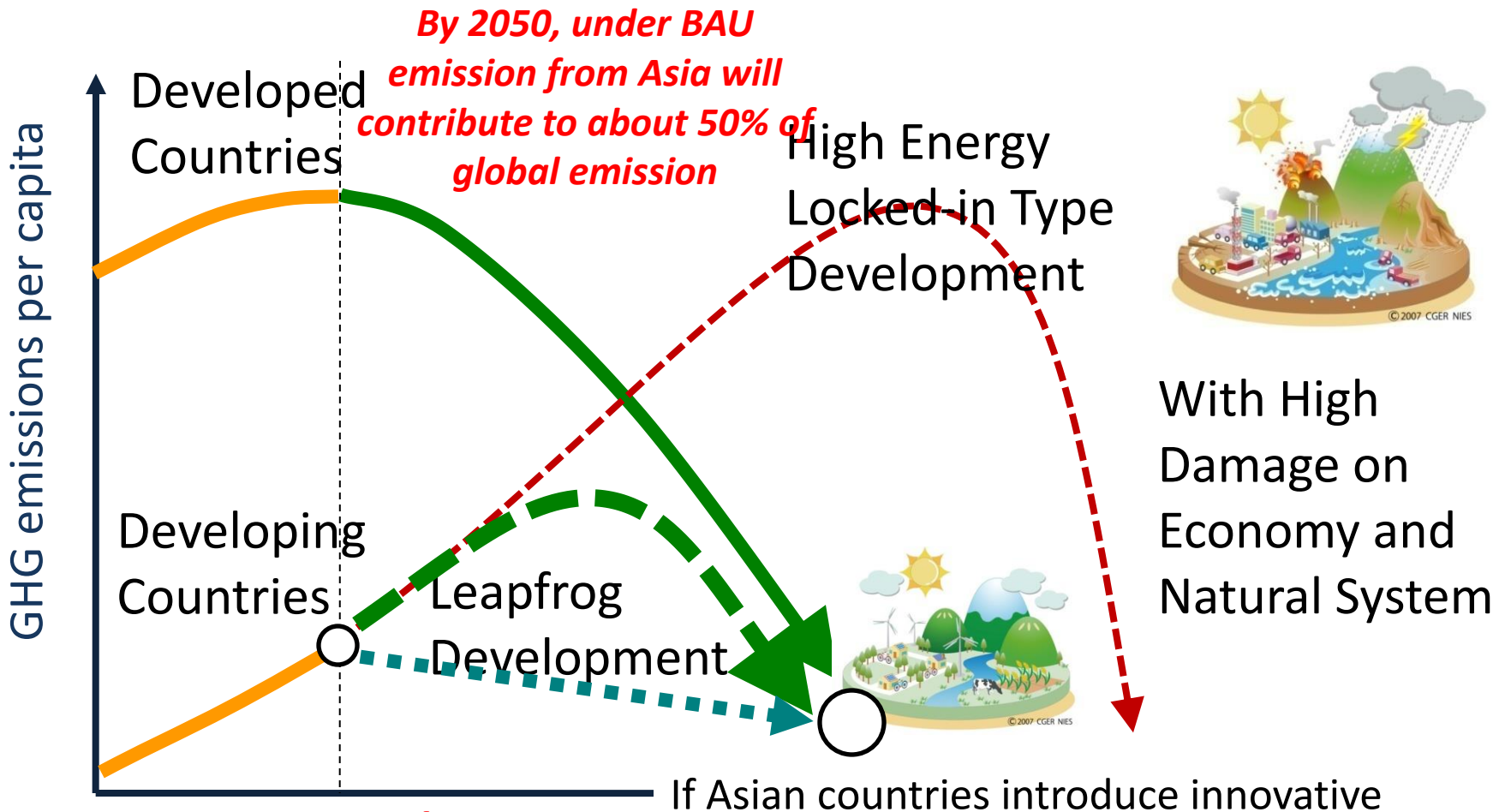
With 41% ERT (26%+15%) of by 2020, per capita emission is expected to be $6.6\ tCO_2$

To meet the global target, we expect to reduce our per capita emission by 2050 to

1.27 tCO2

The need to decarbonized our development deeply

Are we able to move down to LCD?



http://2050.nies.go.jp/index.html

If Asian countries introduce innovative technologies and "leapfrog" in their development, they will be able to move down the pathway to low-carbon development (science based policy is important)

Deep Decarbonization of Development: Energy & Industry (Siagian et al., 2014)

- By 2050, emission per capita can reach 1.27 ton CO2/cap/year: through a combination of measures:
  - Energy use efficiency,
  - Fuel switching to gas,
  - Deployment of renewable, nuclear, and CCS and
  - Structural change of the economy especially in the industrial sector (share of service sector to GDP growth should be increased more than industry sector)

Deep Decarbonization of Development: Energy & Industry (Siagian et al., 2014)

- **Possible Pathways to Deep Decarbonized Development**
  - High efficiency Coal (Combustion efficiency >50%) and and CCS about 3,300 Mton (eq. to 286 Mton/yr; stored in the abandoned and depleted oil and gas reservoirs), and natural gas (no more oil for power plant)
  - Massive use of biofuels for transport, industry, and power generation (85 Mton/yr)
  - RE: 30 GW HEP (potential 75 GW), Geothermal 25 GW (Potential 29 GW), Biomass energy 15 GW, PV 90 GW

Deep Decarbonization of Development: Energy & Industry (Siagian et al., 2014)

- **If only half of the CCS and Biofuel scenario is possible:**
  - HEP need to be increased to 61 GW, but potential location HEP mostly in Eastern part of Indonesia while the demand center in Western Part of Indonesia
  - Biomass energy (Biomass Combustion) increased to 20 GW.
  - Solar power is constraint by grid reliability (intermittent renewable, maximum only 25% of total grid).
  - Land availability and competition with other sectors also inhibit the production of biofuel (above scenario will require 18 Mha)

Deep Decarbonization of Development: AFOLU (Boer et al., 2014)

- By 2030, AFOLU can potentially become net-sink by 2030 at a rate of about -0.29tCO_2e/cap and by 2050 about -1.08 tCO2/cap without changing government target to meet rice self sufficiency and palm oil and wood production.

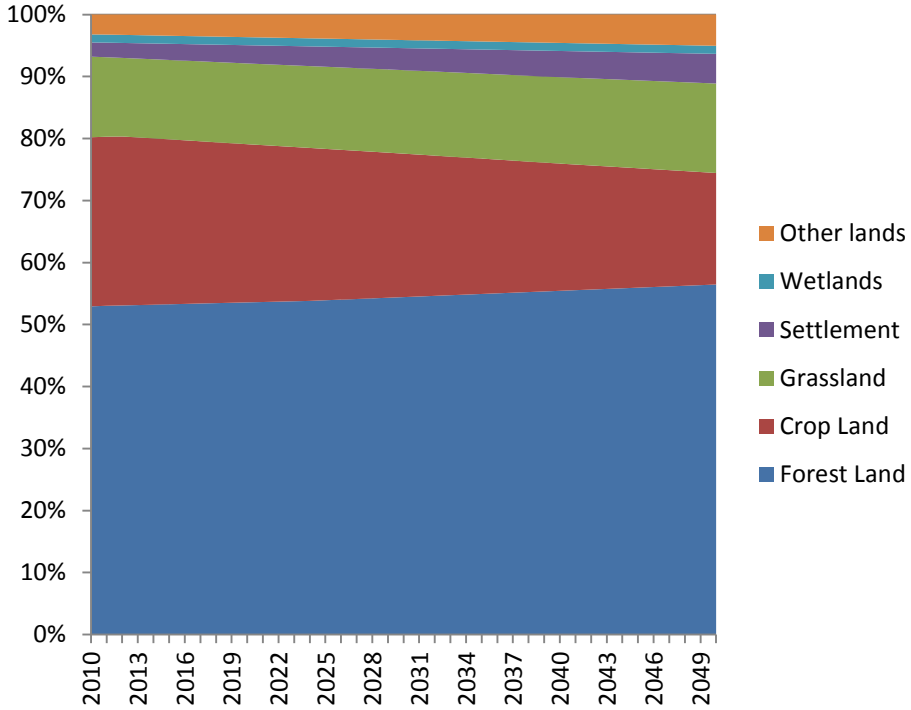
Deep Decarbonization of Development: AFOLU (Boer et al., 2014)

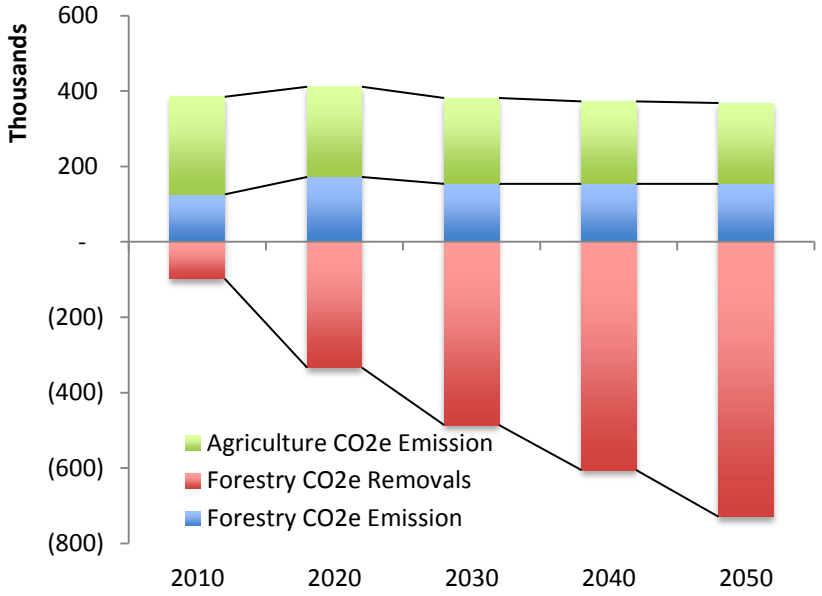
- The mitigation measures are by
  - Reducing dependency on natural forests in meeting wood demands through the increasing use of low-carbon stock lands or degraded lands for the development of timber plantation
  - Enhancing carbon sequestration by increasing forest regeneration and land rehabilitation
  - Reducing forest conversion in meeting land demand for agriculture by increasing the productivity of the existing agricultural land and planting intensity as well as optimizing the cultivation of unproductive lands
  - Restricting use of peat land for agricultural development and the implementation of low-emission technologies in peat land and crop cultivation

Deep Decarbonization of Development: AFOLU (Boer et al., 2014)

	Commodity	Unit	2010	2020	2030	2040	2050
Population		Million	234	262	280	299	307
GDP per cap		USD	1,098	1,676	2,809	4,711	7,473
Consumption	**Rice**	kg/cap/yr	138	131	124	117	111
	palmoil	kg/cap/yr	4	5	5	5	5
Demand	**Rice**	000 ton	32,236	34,407	34,723	35,011	34,153
	palmoil	000 ton	1,004	1,181	1,327	1,489	1,607
CI	**Rice Java**	/yr	1.60	2.0	2.2	2.2	2.2
	Rice Outside Java	/yr	1.20	1.3	1.5	1.6	1.7
	palmoil	/yr	0.71	0.71	0.71	0.71	0.71
Yield	**Rice Jawa**	ton/ha	5.6	5.6	5.6	5.6	5.6
	Rice Outside Java	ton/ha	4.3	4.3	4.3	4.3	4.3
	palmoil	ton / ha	23.17	30.57	40.33	53.21	70.20
Production	**Rice**	000 ton / yr	35,478.07	40,907.31	46,412.47	51,587.55	57,304.59
	palmoil	000 ton / yr	132,996	192,556	225,000	225,000	225,000

Deep Decarbonization of Development: AFOLU (Boer et al., 2014)





Deep Decarbonization of Development

- In Indonesia, forest and land use will play important role to achieve meet the global target, however as Energy, this sector also faces big challenges to realize the such emission level (land tenurial issues, land productivity, low farming practices, water availability, high opportunity cost – mining resources etc)
- Local governments need tools to assist them in evaluating alternative land uses (balanced between economic growth, emission, food security and energy security, low carbon spatial plan)

Science-Policy Network