



Transparency, Policy Surveillance and Levels of Effort

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Japan Pavilion - COP22
Marrakech, 15 November 2016

Context and Scope

- **Main Questions**

1. How National energy policies can contribute to:
 1. Technological improvement
 2. Air pollution
2. Can National energy strategies be made more efficient?
3. Are energy policies more or less effective than emission reduction policies?

- **Using Integrated Assessment Models (IAM)**

- WITCH model: 13 world regions with a detailed energy sector, contributor to the IPCC scenarios, FASSTR (mortalities from air pollution)
- Simulate unconditional Cancun and INDC pledges
 - Emission reduction pledges
 - Energy policy commitments

Energy Policies

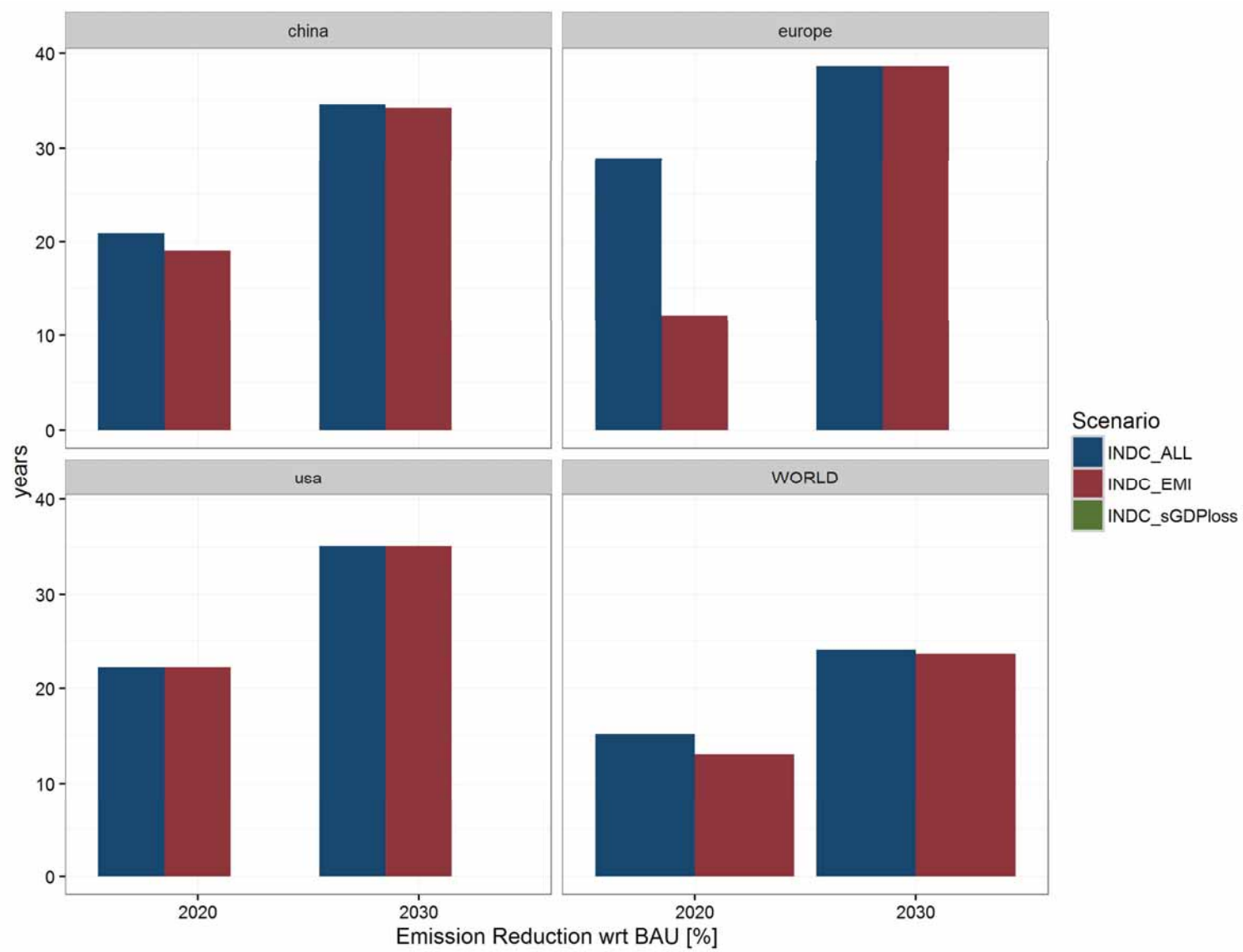
Capacity [GW]			Share
China	2015	Hydro: 270 Solar: 10 Wind :100	Gas in total primary energy 10% Non-fossil fuels in primary demand 15%
	2020	Nuclear: 55 Wind: 200 Solar:100	Non-fossil fuels in primary consumption 20%
Europe	2020		Renewables in power generation 10% Renewables in final demand 20%
	2030		Renewables in total primary energy 27%
USA	2020		Renewables in power generation 14%

Scenarios

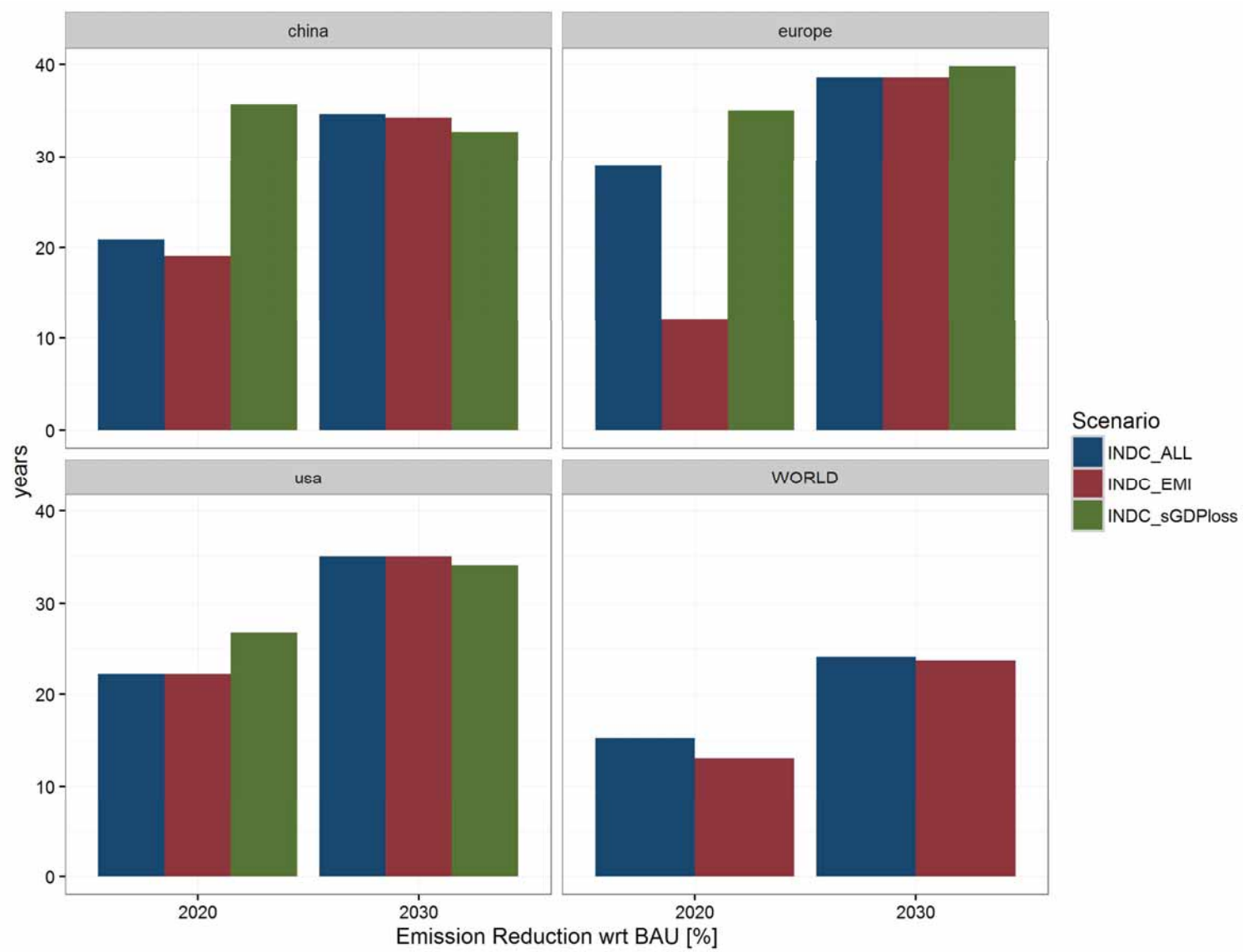
Scenario name	Scenario description
bau	Business as usual
INDC_EMI	Implementation of the INDC emissions pledges
INDC_ALL	Implementation of the INDC emissions and energy pledges
INDC_smac	Cost Efficient
INDC_sGDPIloss	Same cost (GDP loss) as INDC ALL but equalizes the mac for all sources within a country

Can the NDCs be made more effective?

Emission Reduction vs BAU



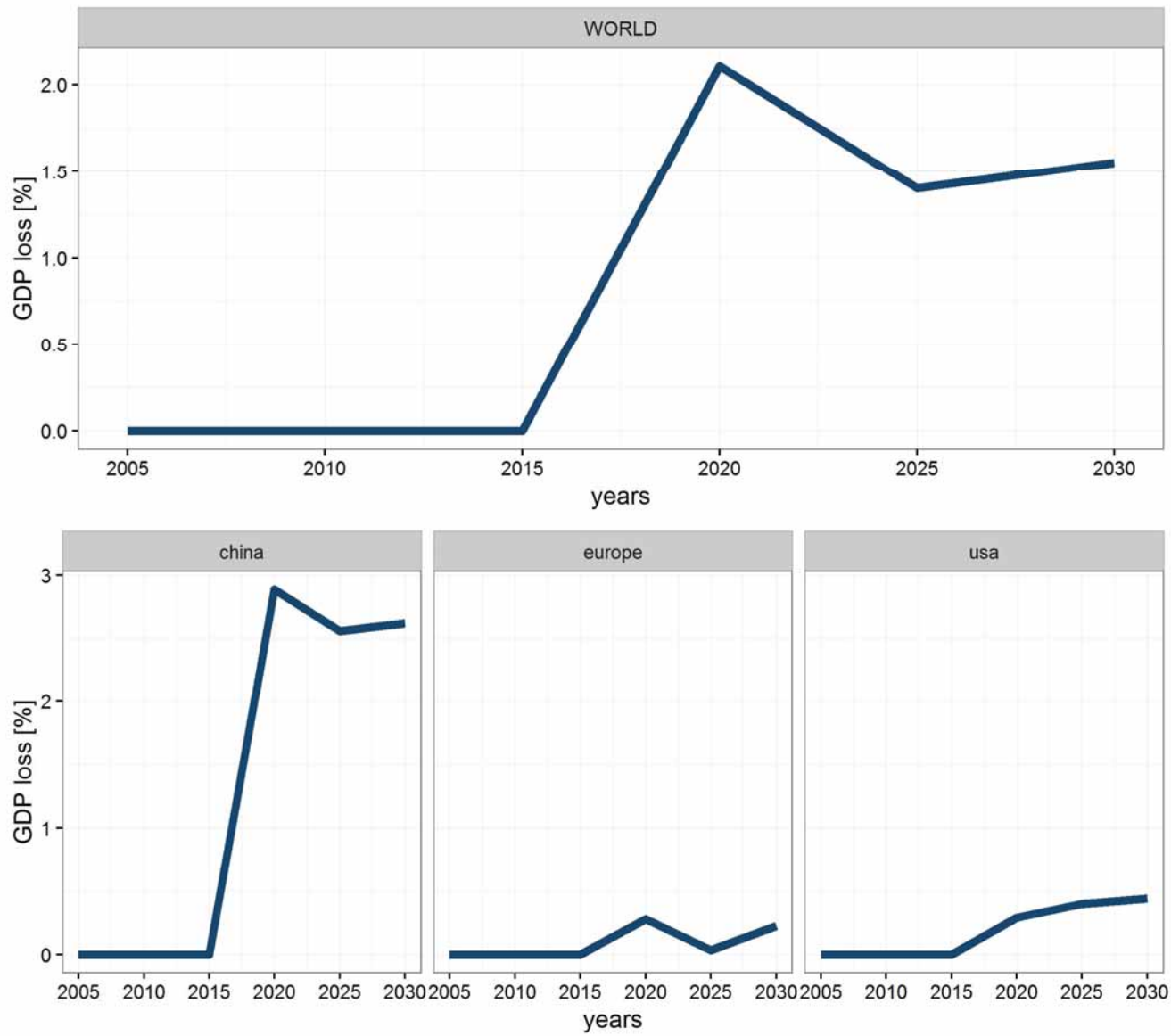
Emission Reduction vs BAU



- **GDP Loss with respect to the BAU measures the total cost of a policy, it includes the effect of trade of resources between regions, investment costs and taxes**

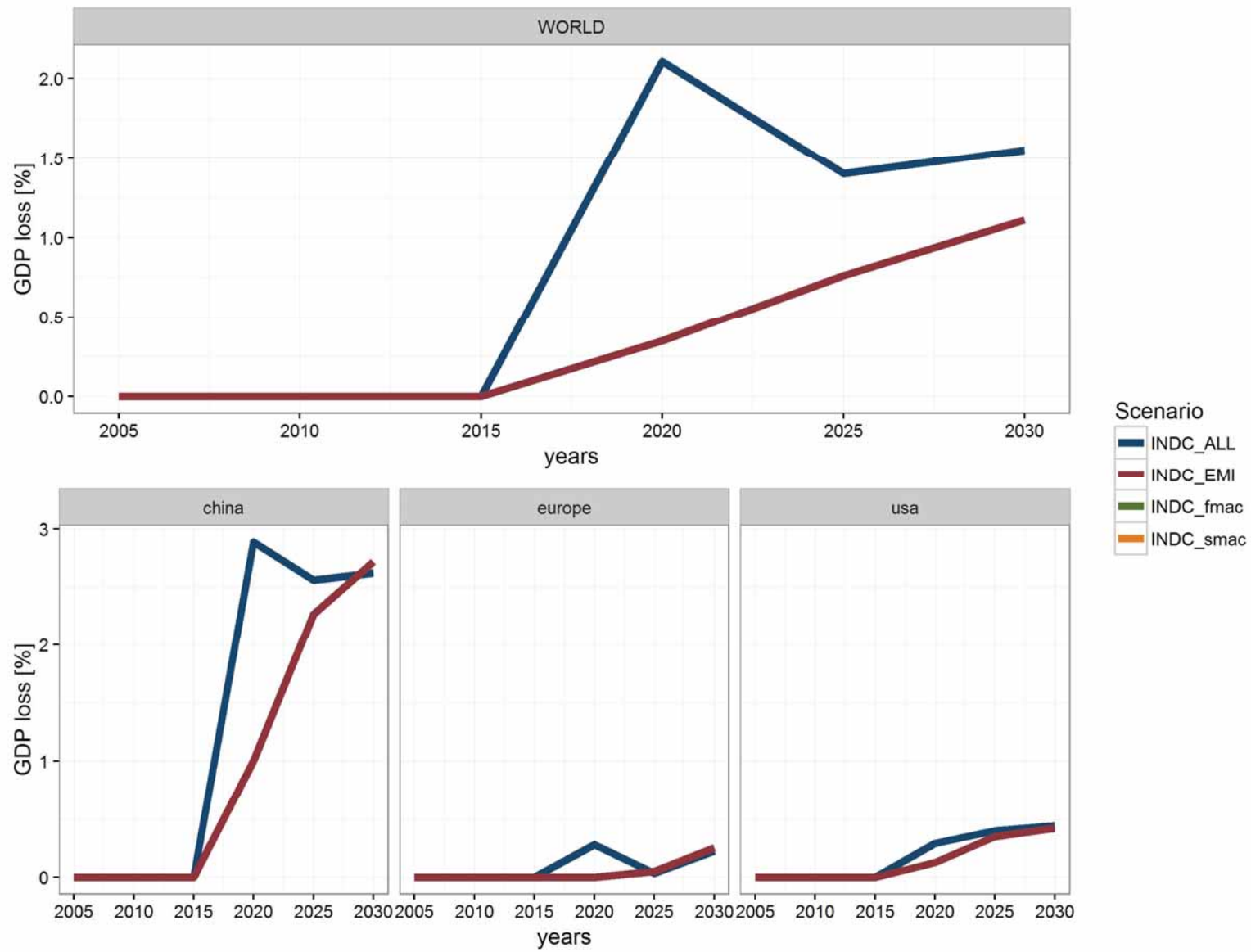
Can the NDCs be less costly?

5. GDP Loss (% wrt BAU)

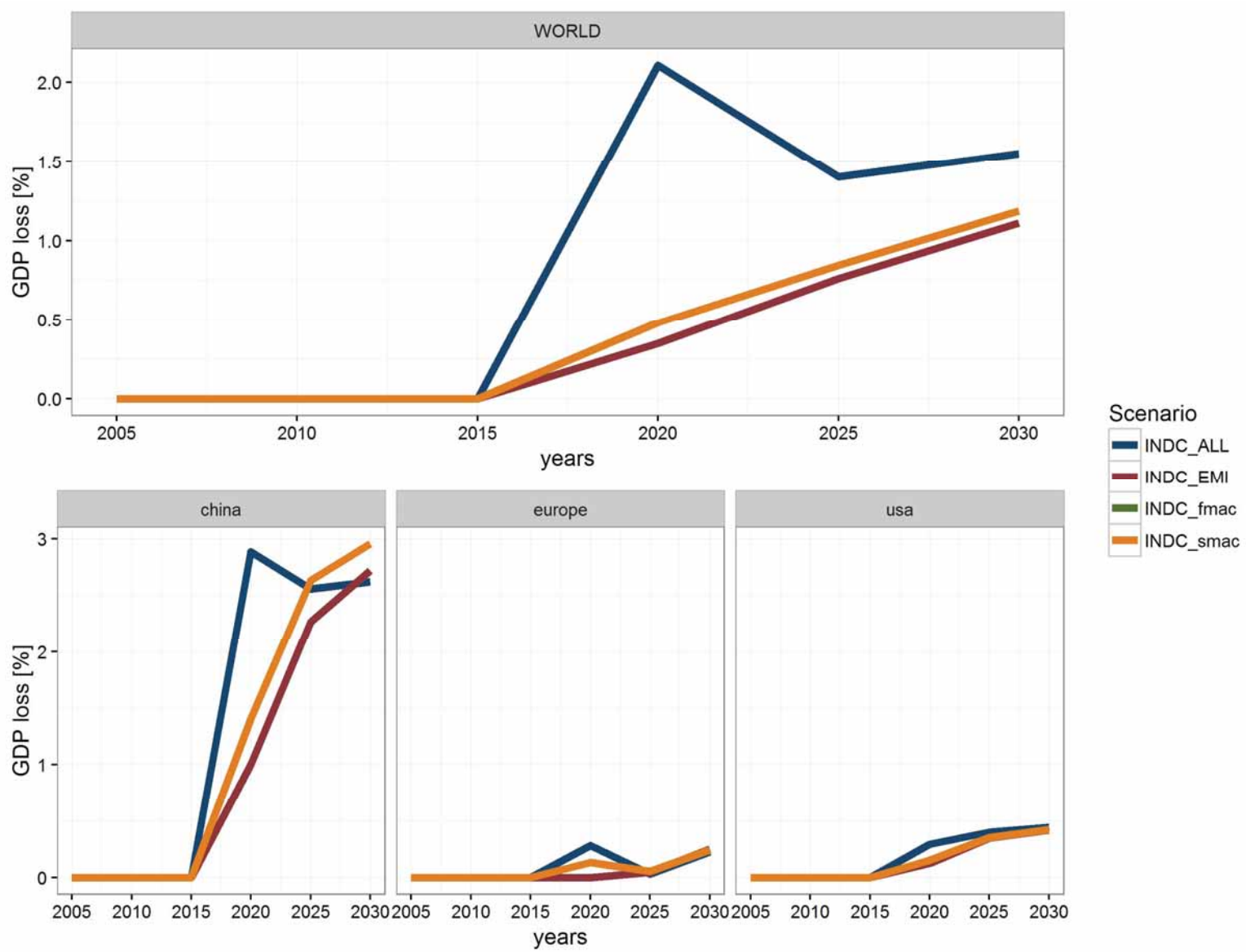


- Scenario
- INDC_ALL
 - INDC_EMI
 - INDC_fmac
 - INDC_smac

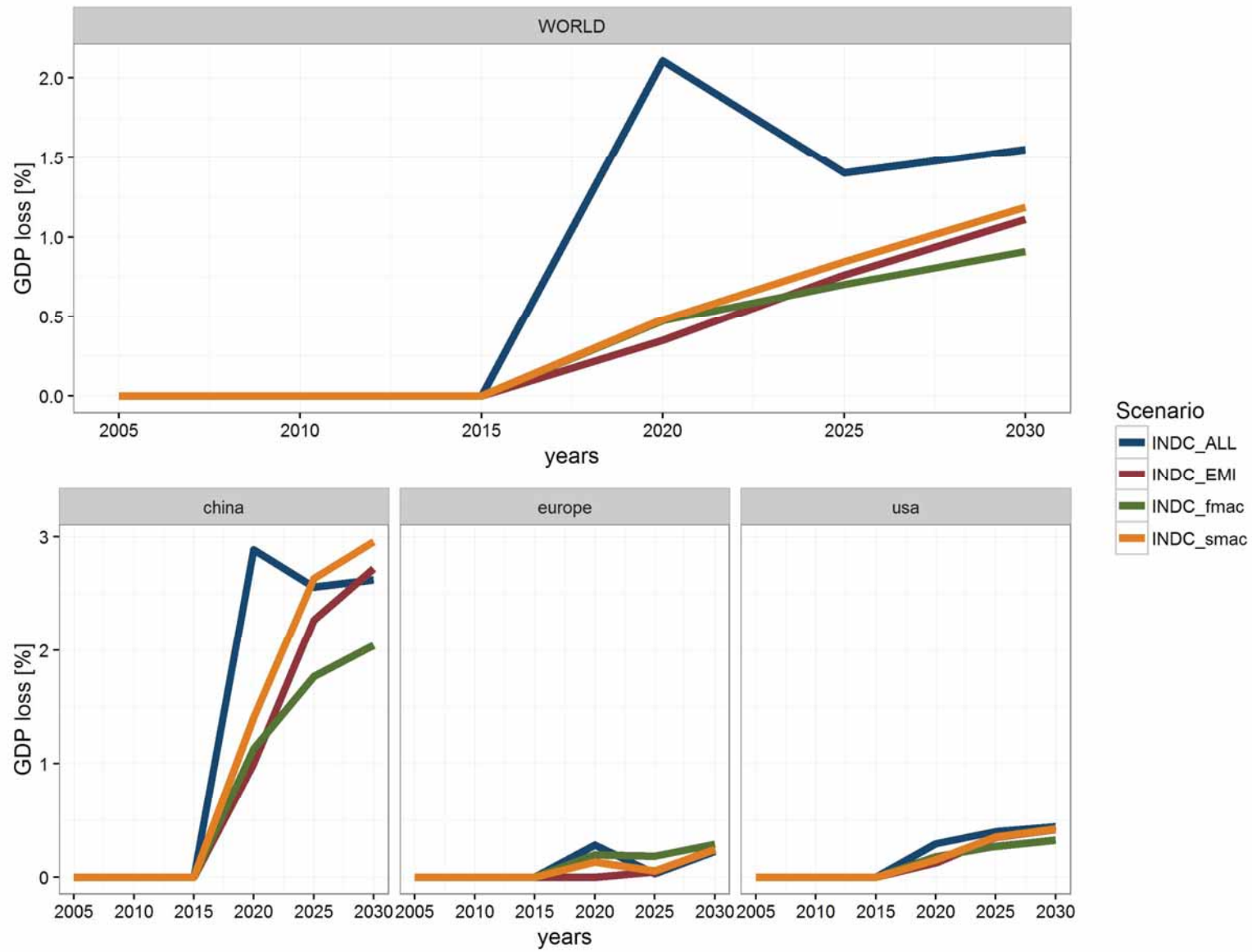
5. GDP Loss (% wrt BAU)



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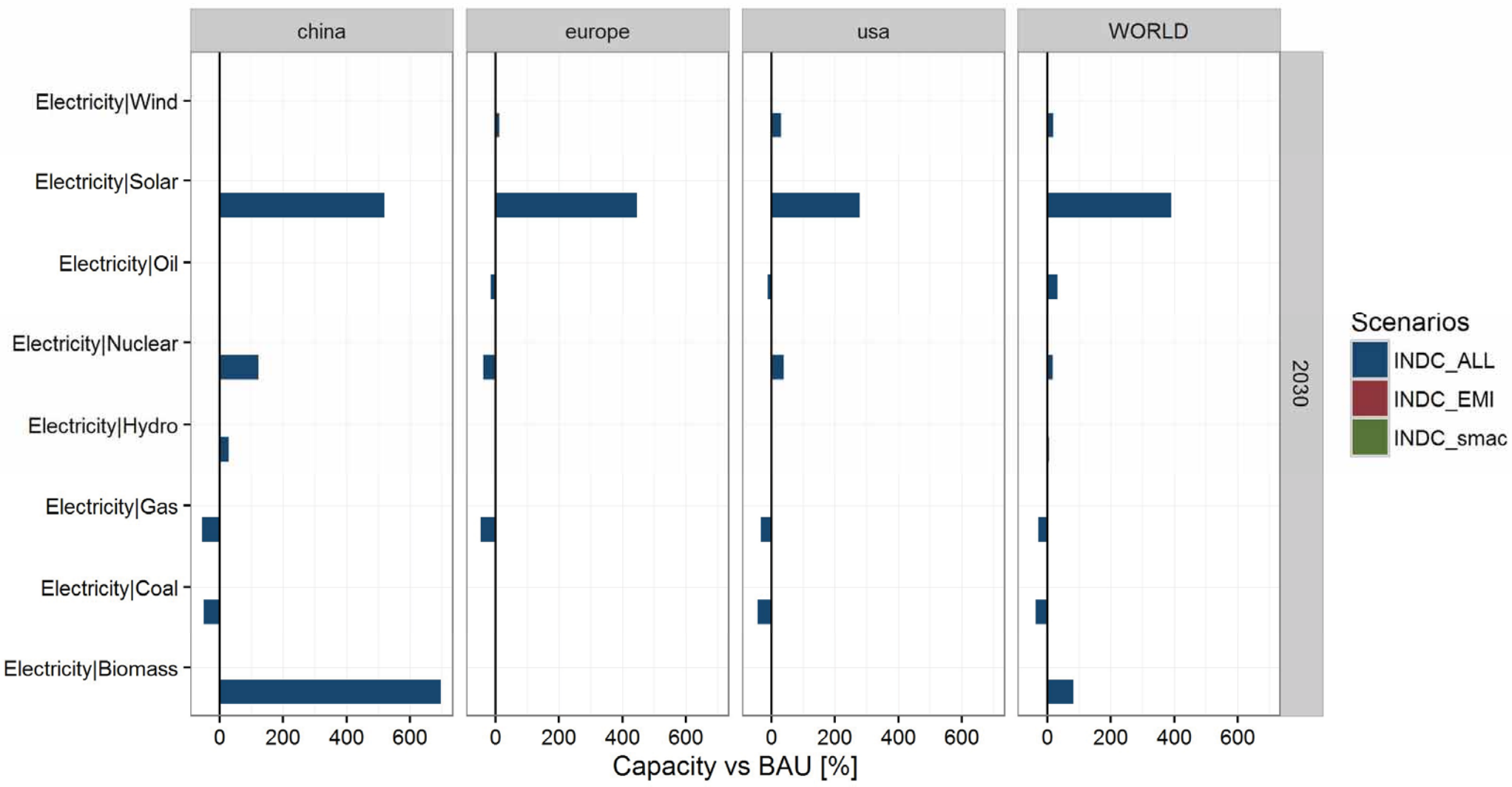
5. GDP Loss (% wrt BAU)



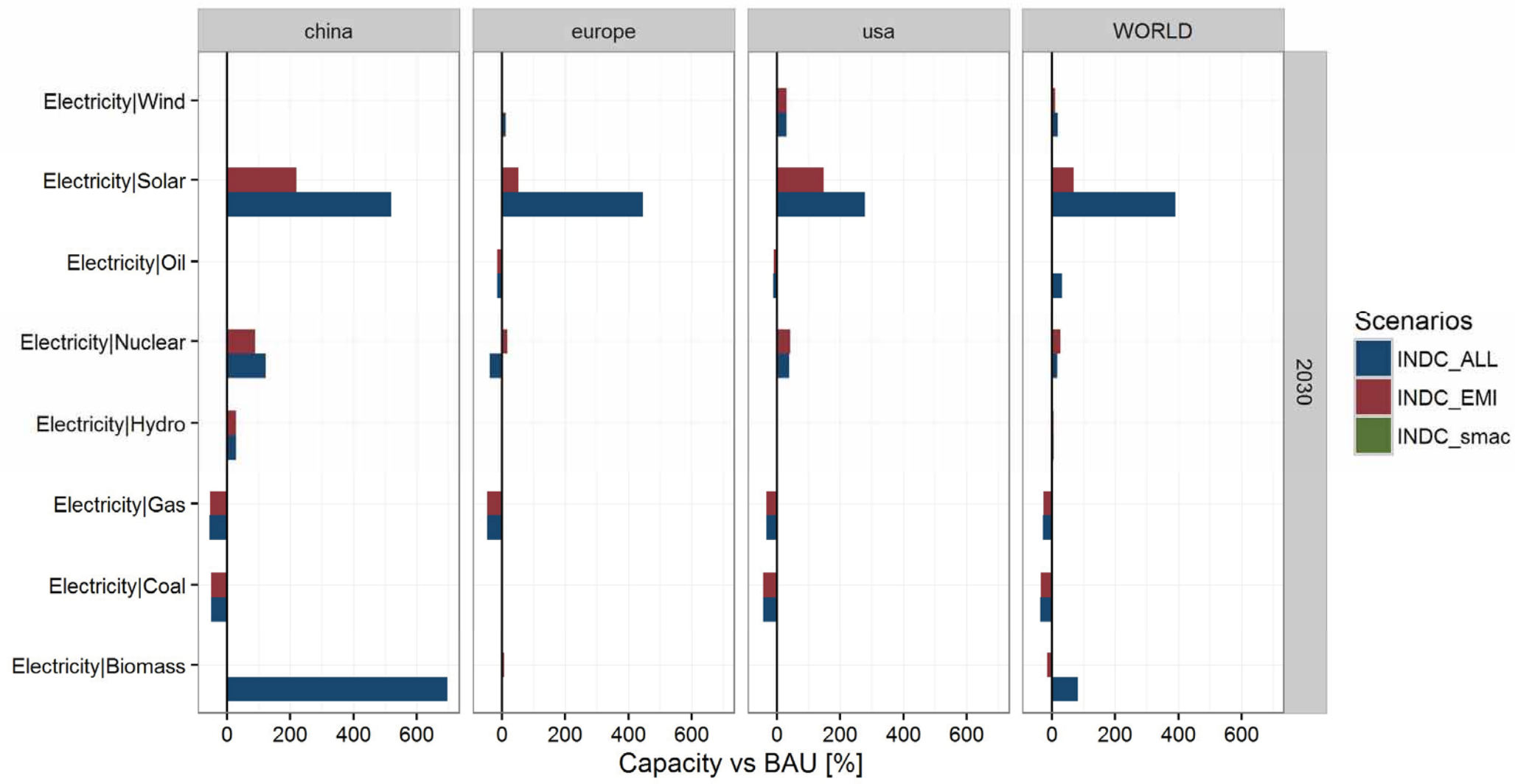
- **Installed capacity is a measure of the investments on the energy system**

Do national policies benefit technological innovation?

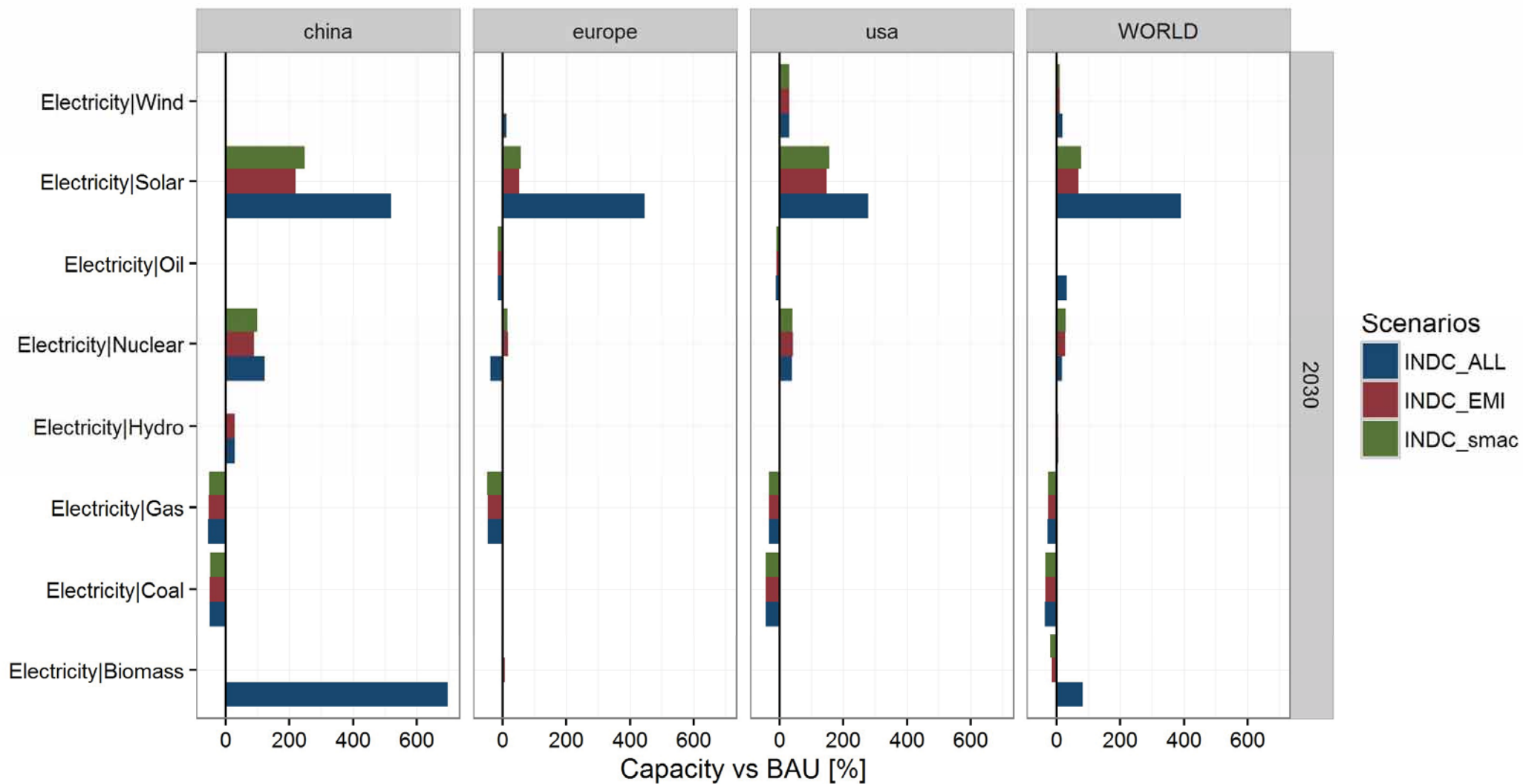
Installed Capacity



Installed Capacity



7. Installed Capacity

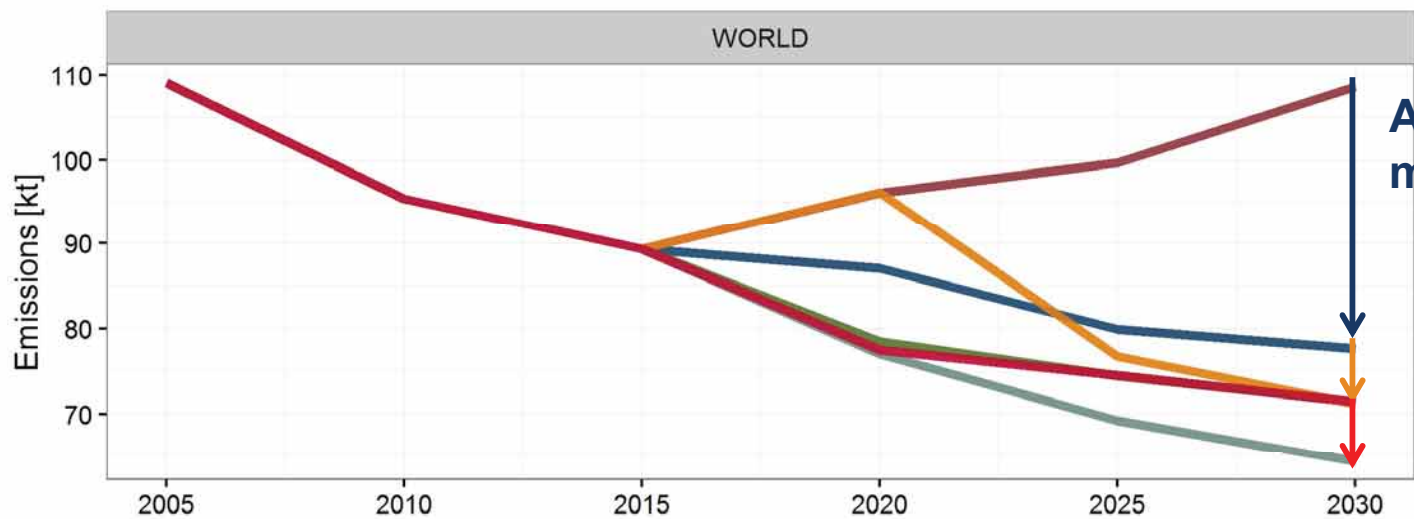


Do national policies generate air pollution co-benefits?

Air pollution Emissions (SO₂)

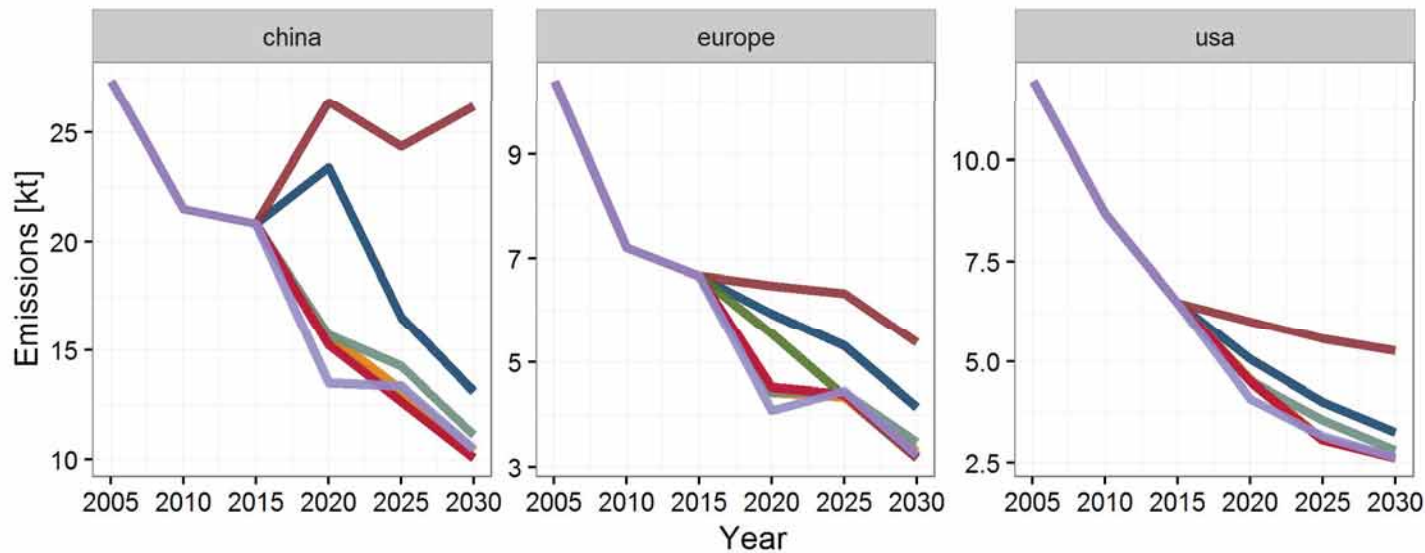
Scenarios

- bau
- bau_file
- INDC_EMI
- INDC_ALL
- INDC_fmacc
- INDC_smac
- INDC_sGDPIloss

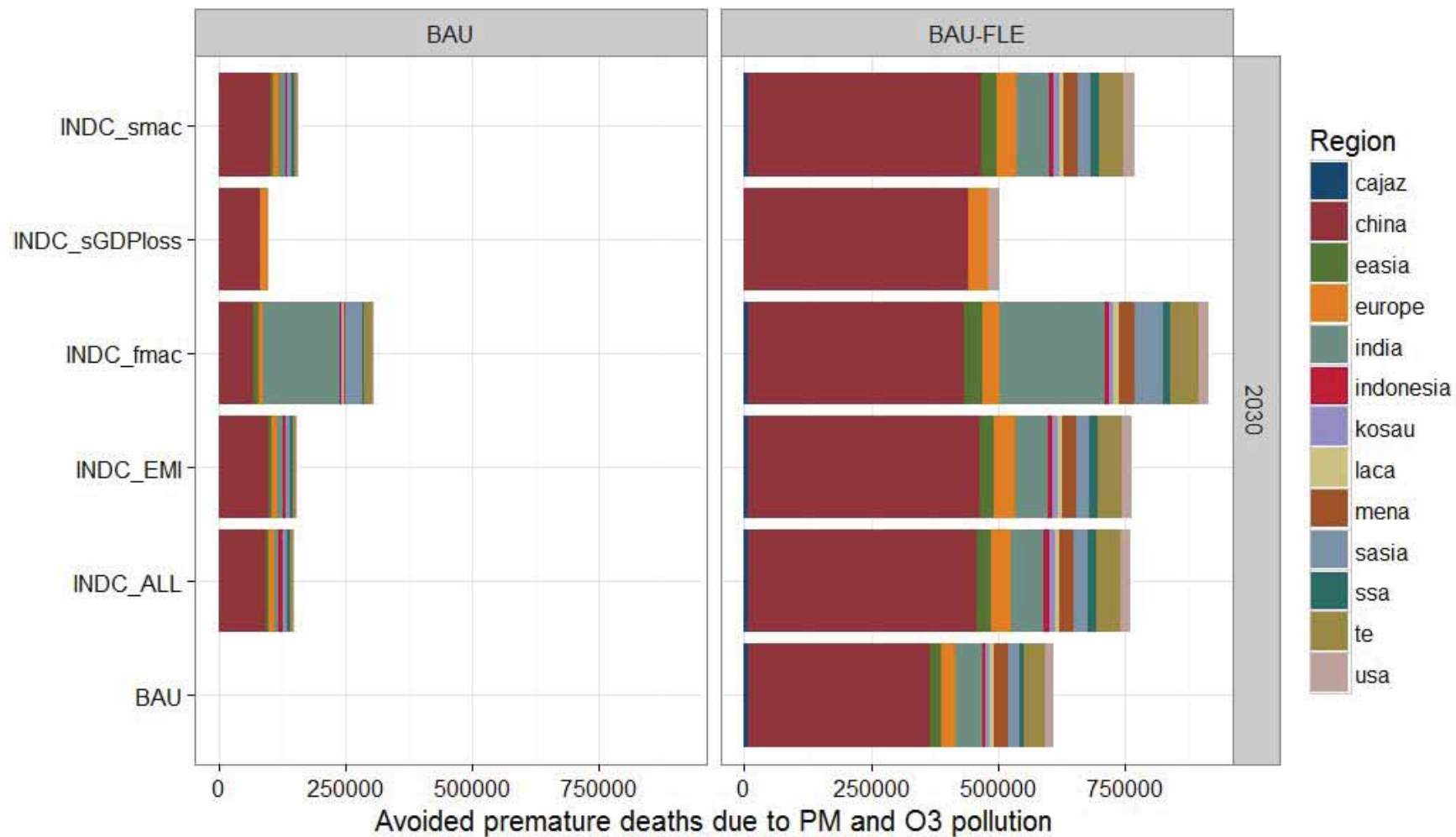


Air pollution control measures

**NDCs
Trade**

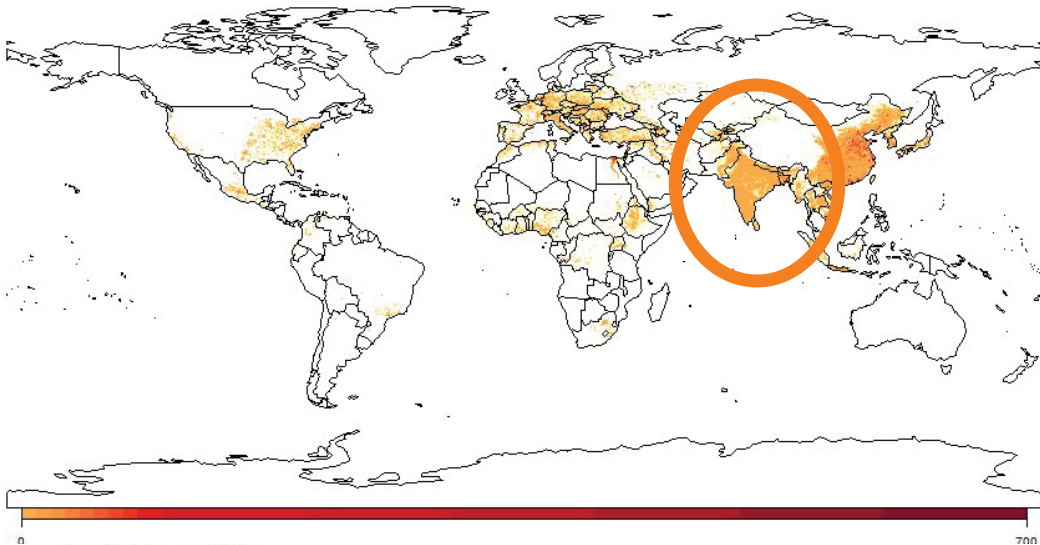


Mortality due to Air Pollution



Mortality due to Air Pollution in 2030 (avoided deaths)

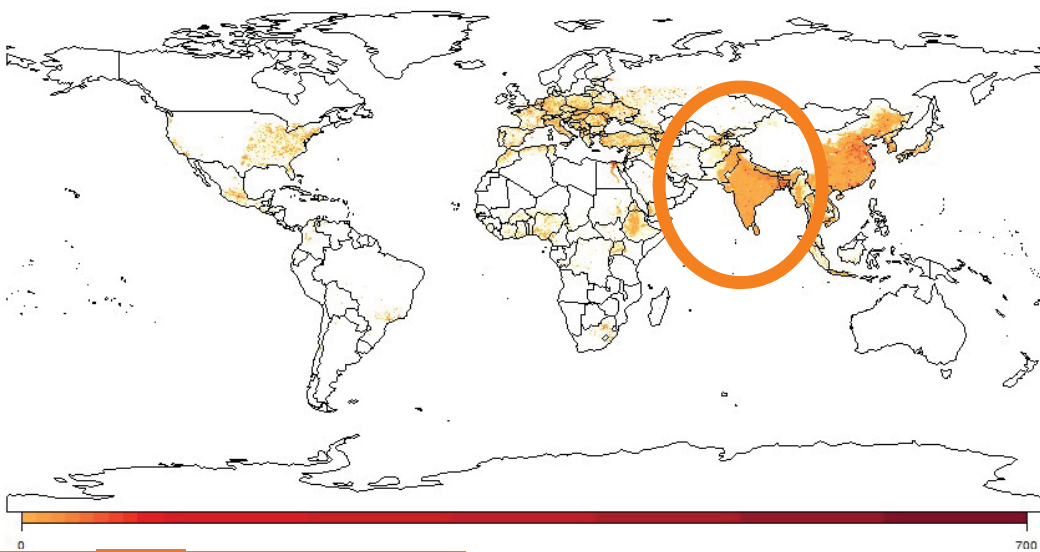
NDC vs BAU-FLE



NDC vs BAU



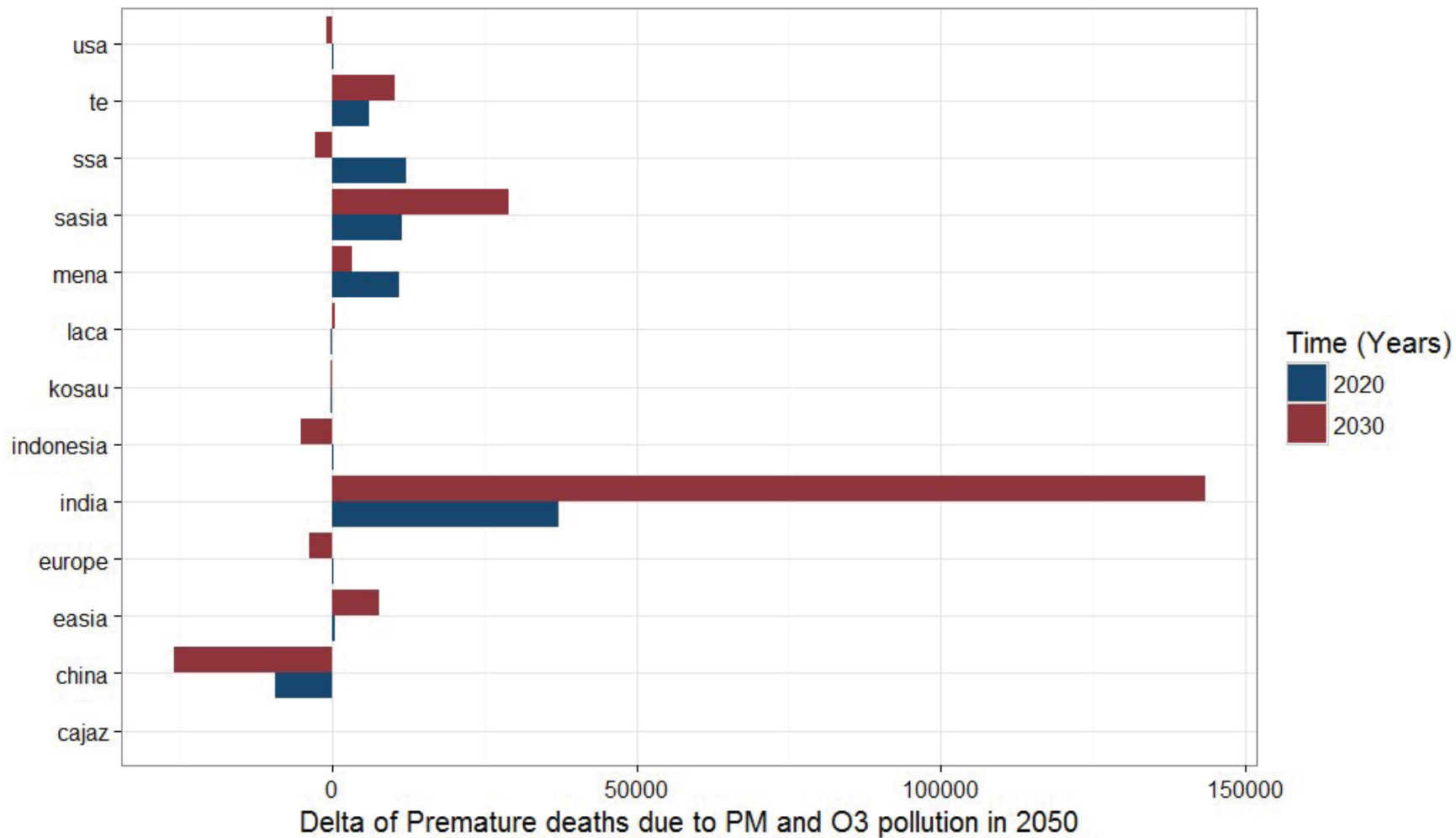
Trade vs BAU-FLE



Trade vs BAU



Mortality due to Air Pollution – Effects of Global trade



Conclusions

Can the NDCs be more effective?

- The combination of both emission reductions and energy policies brings emissions down than considering only emission reduction pledges
- For some countries, with the same GDP loss of NDC national commitments is possible to achieve higher reductions both of GHG and air pollutants and avoid more premature deaths, especially in 2020

Do national policies benefit technological innovation?

- Higher deployment of renewables and less development of nuclear (in EU)

How can NDCs generate more air pollution co-benefits?

- A global GHG emission could avoid a considerable number of premature deaths
- The most efficient scenario in terms of climate targets is also more efficient than the NDC policies



Thank you for your attention!
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