FONDAZIONE ENI ENRICO MATTEI

# Transparency, Policy Surveillance and Levels of Effort

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Japan Pavilion - COP22
Marrakech, 15 November 2016

# 1. 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

# 2. Energy Policies

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

# 3. Scenarios

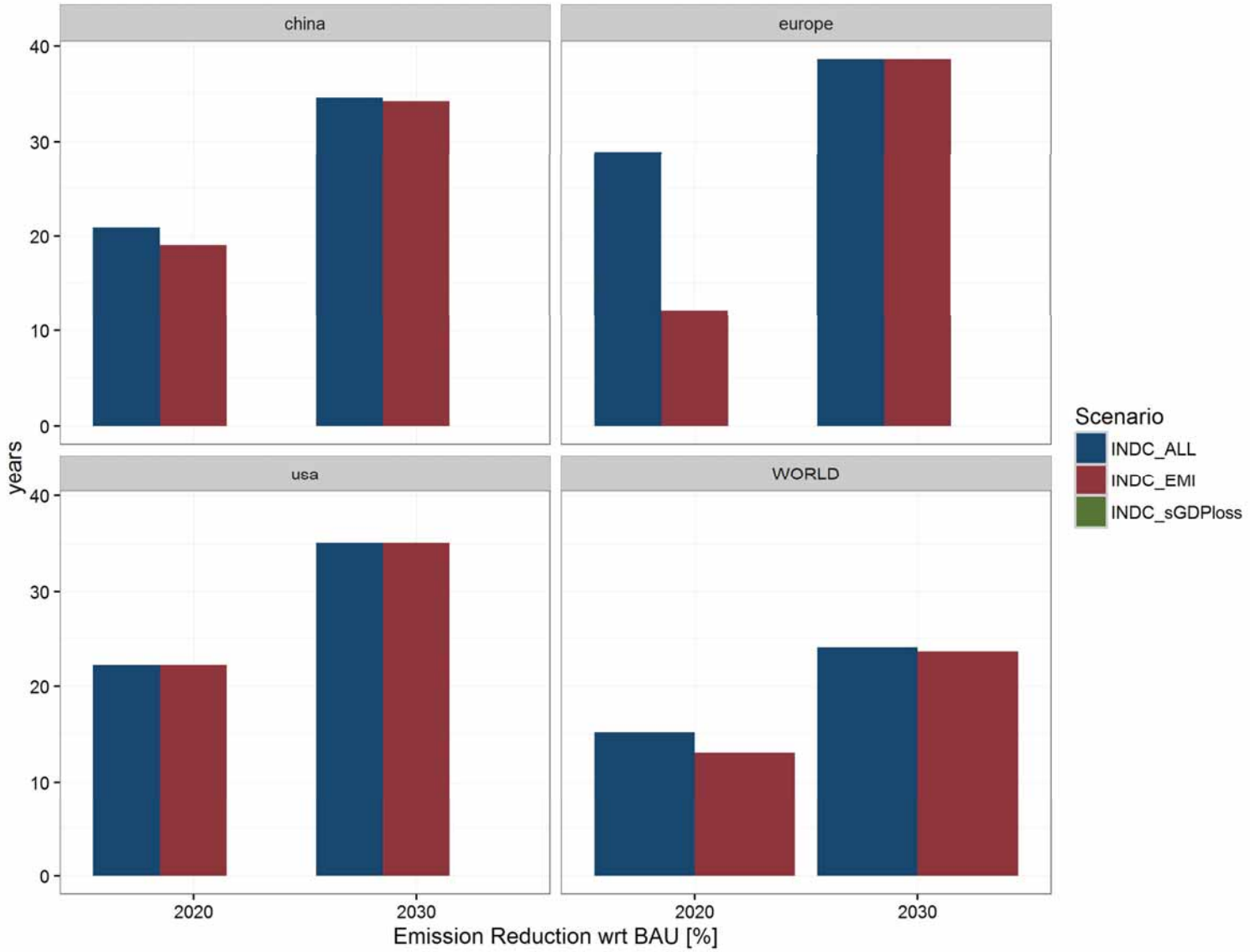
| Scenario name | Scenario description |
|---|---|
| **bau** | Business as usual |
| **INDC_EMI** | Implementation of the INDC emissions pledges |
| **INDC_ALL** | Implementation of the INDC emissions and energy pledges |
| **INDC_smac** | **Cost Efficient** |
| **INDC_sGDPloss** | Same **cost** (GDP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

# 2. GreenHouse Gases (GHG) emissions

## Can the NDCs be made more effective?

# 4.1.

# Emission Reduction vs BAU



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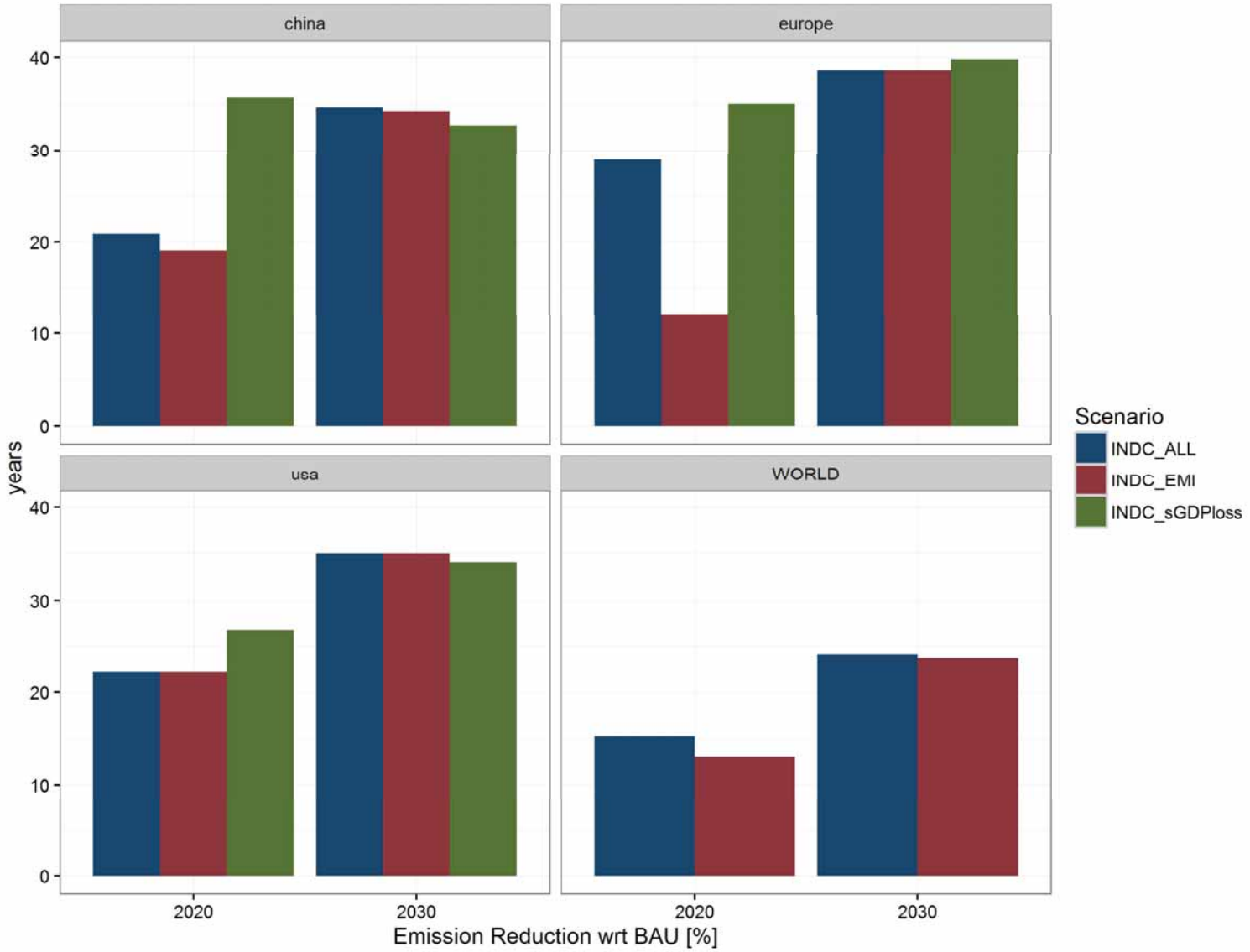
# 4.1. Emission Reduction vs BAU



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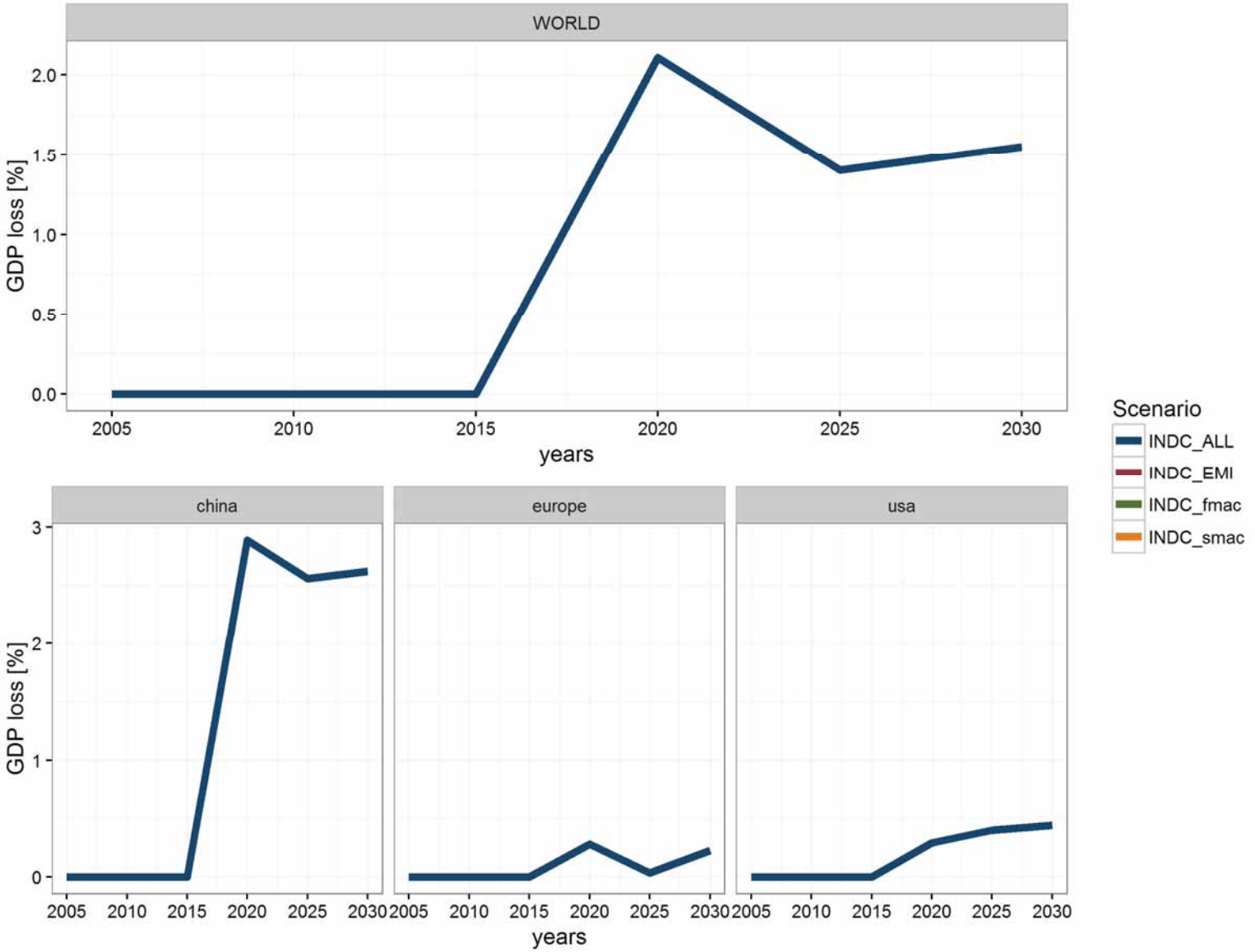
# 5. GDP Loss (% wrt BAU)

- **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)



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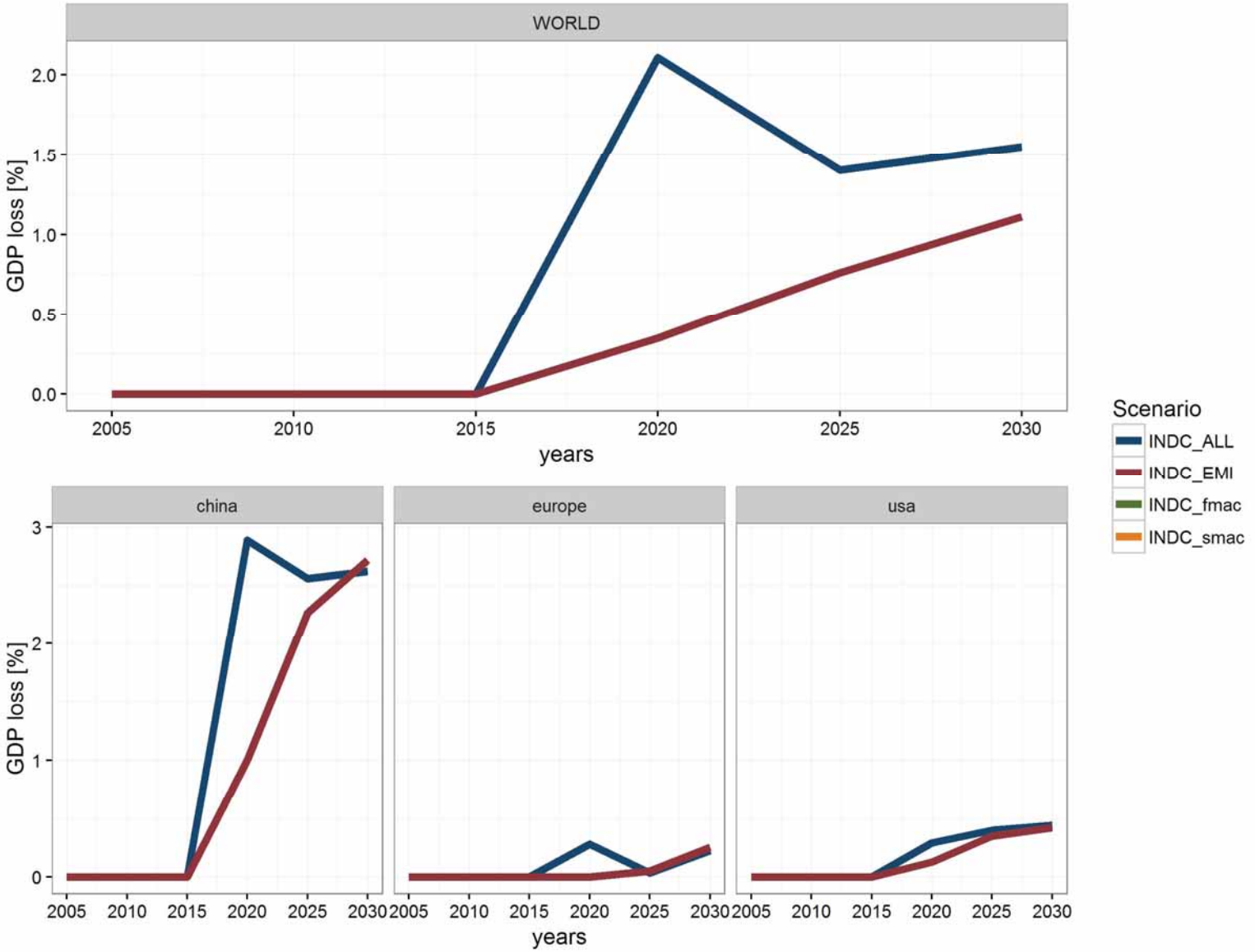
# 5.

# GDP Loss (% wrt BAU)



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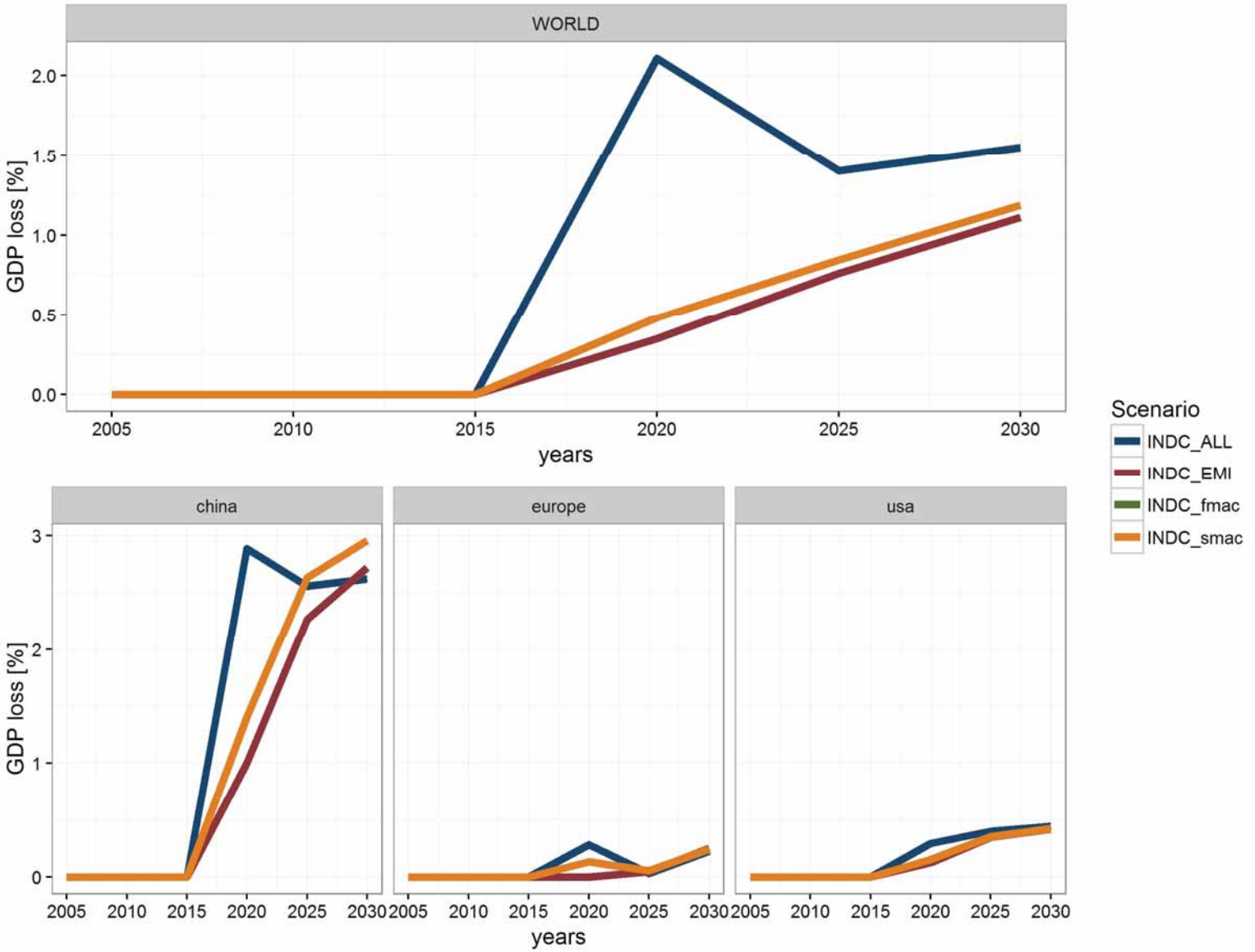
# 5.

# GDP Loss (% wrt BAU)



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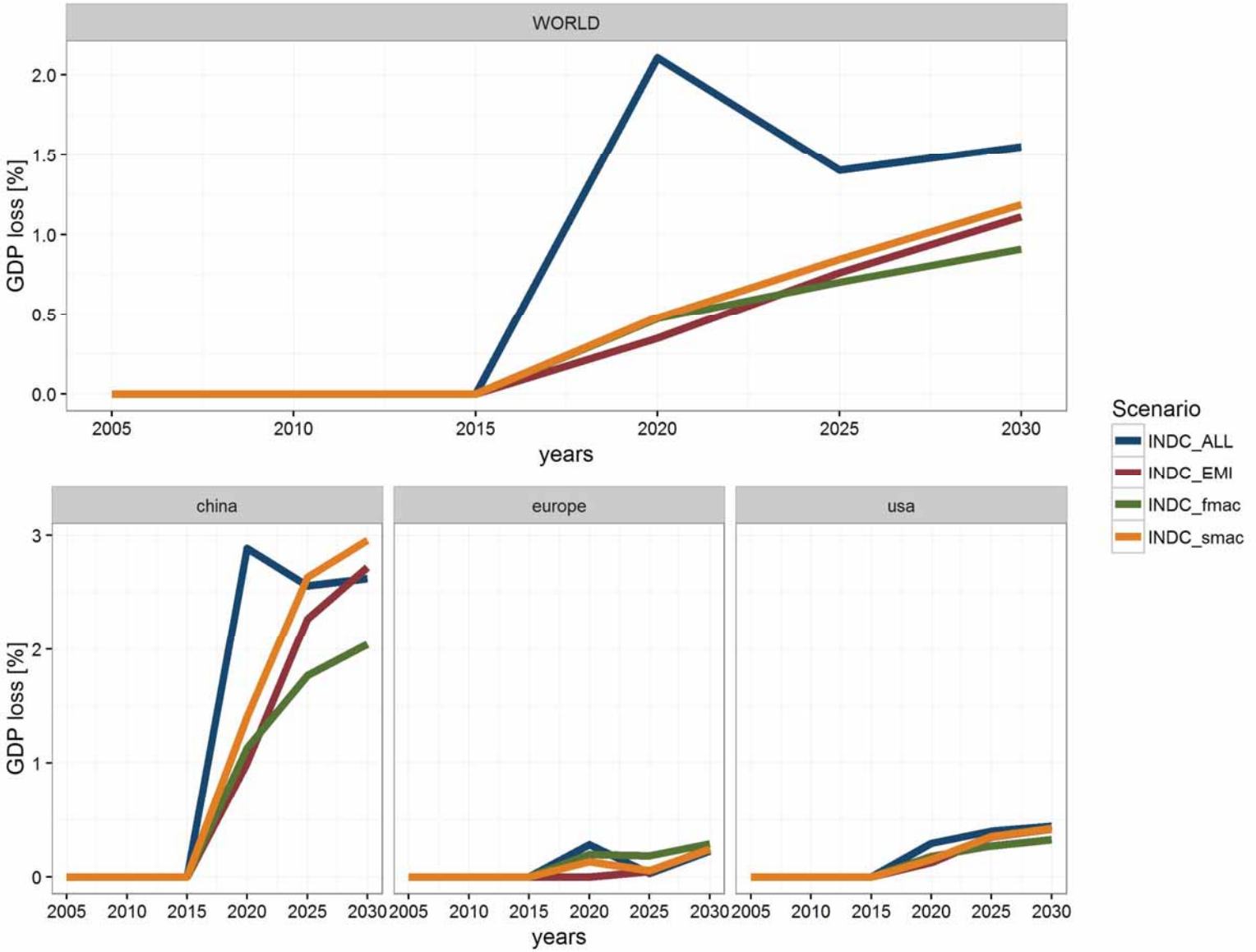
# 5.

# GDP Loss (% wrt BAU)



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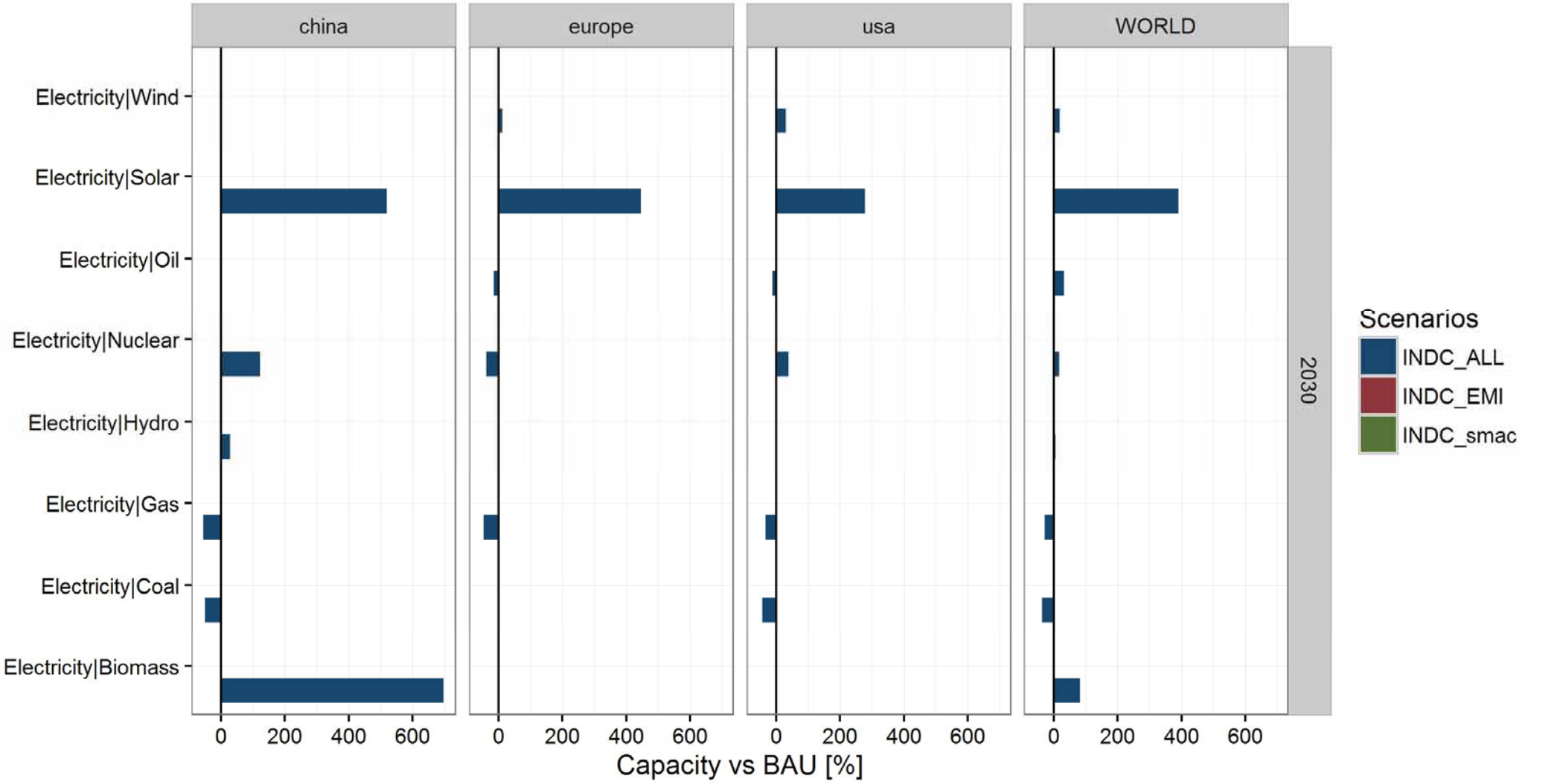
# 6. Installed capacity

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

**Do national policies benefit technological innovation?**

# 7. Installed Capacity



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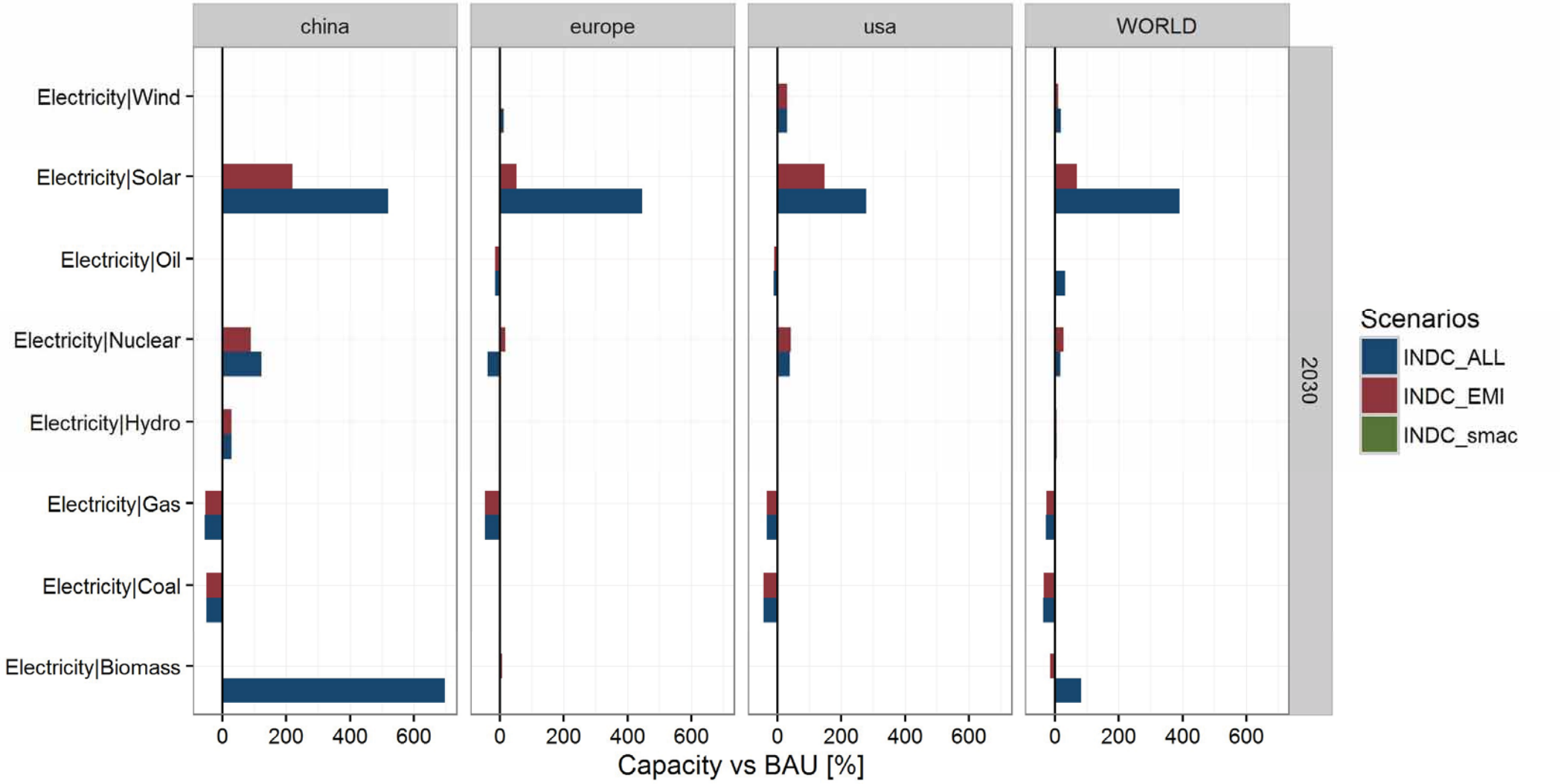
# 7. Installed Capacity



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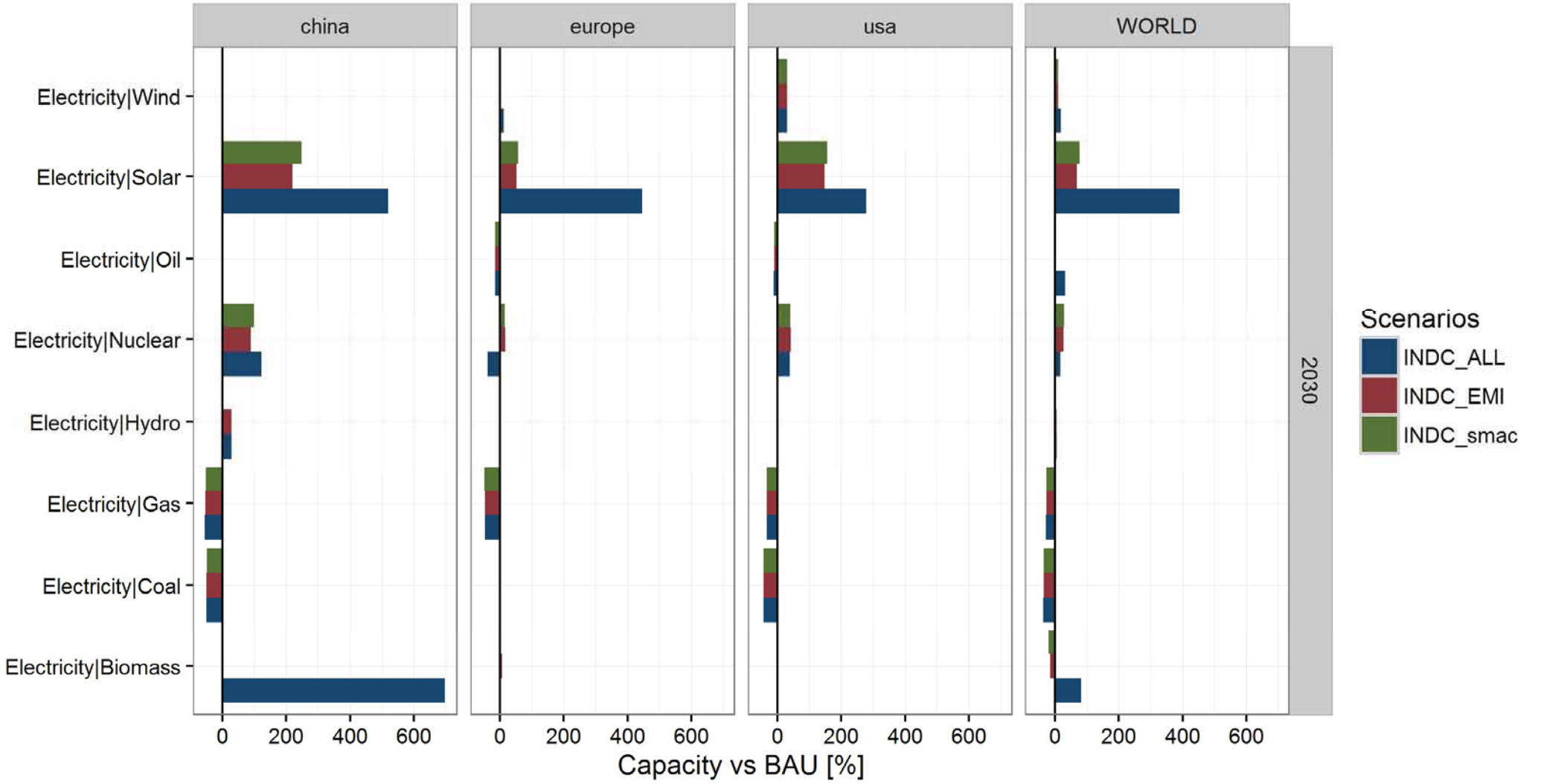




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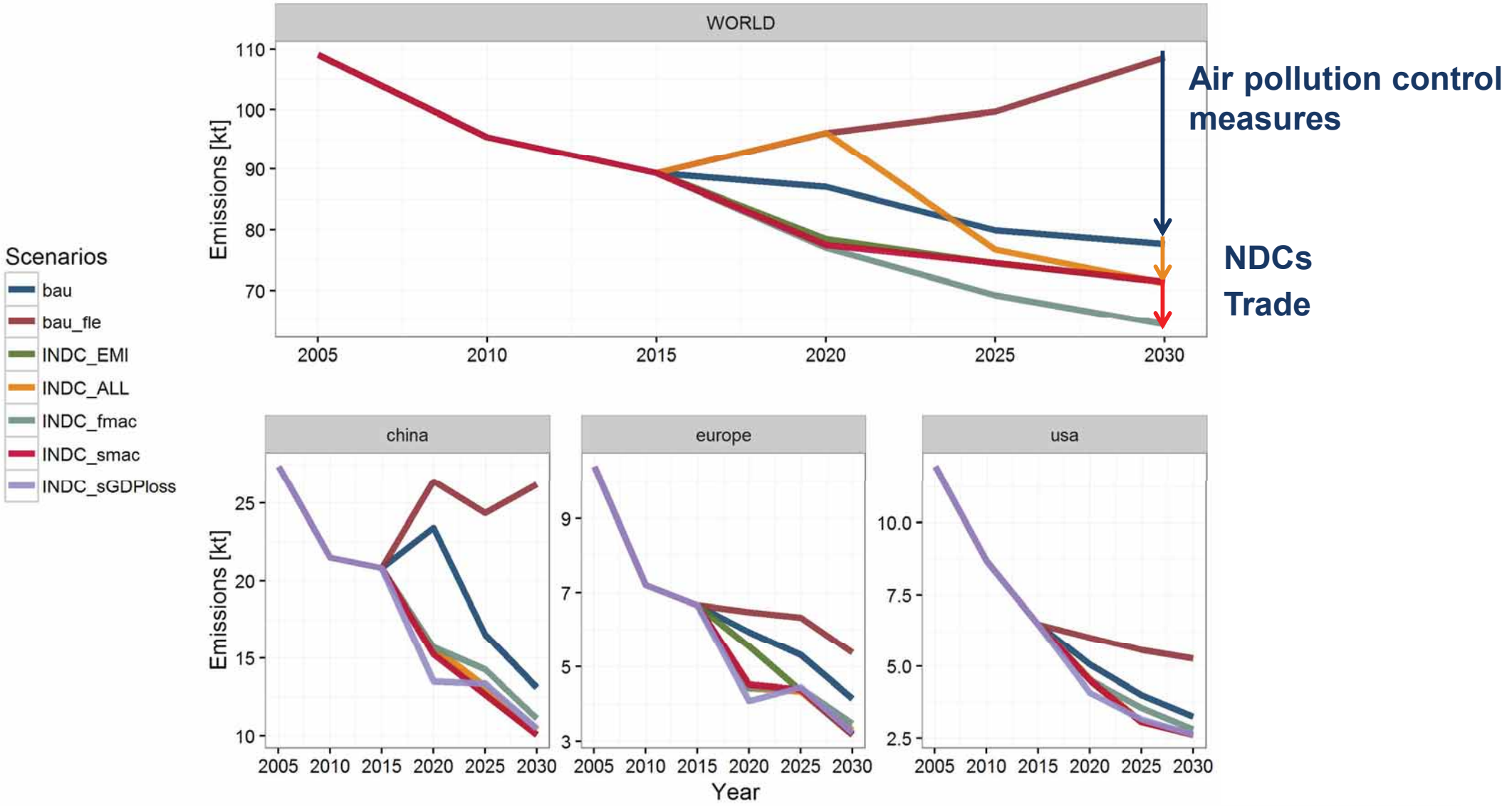
# 7. Air Pollution

## Do national policies generate air pollution co-benefits?

# 8. Air pollution Emissions (SO2)



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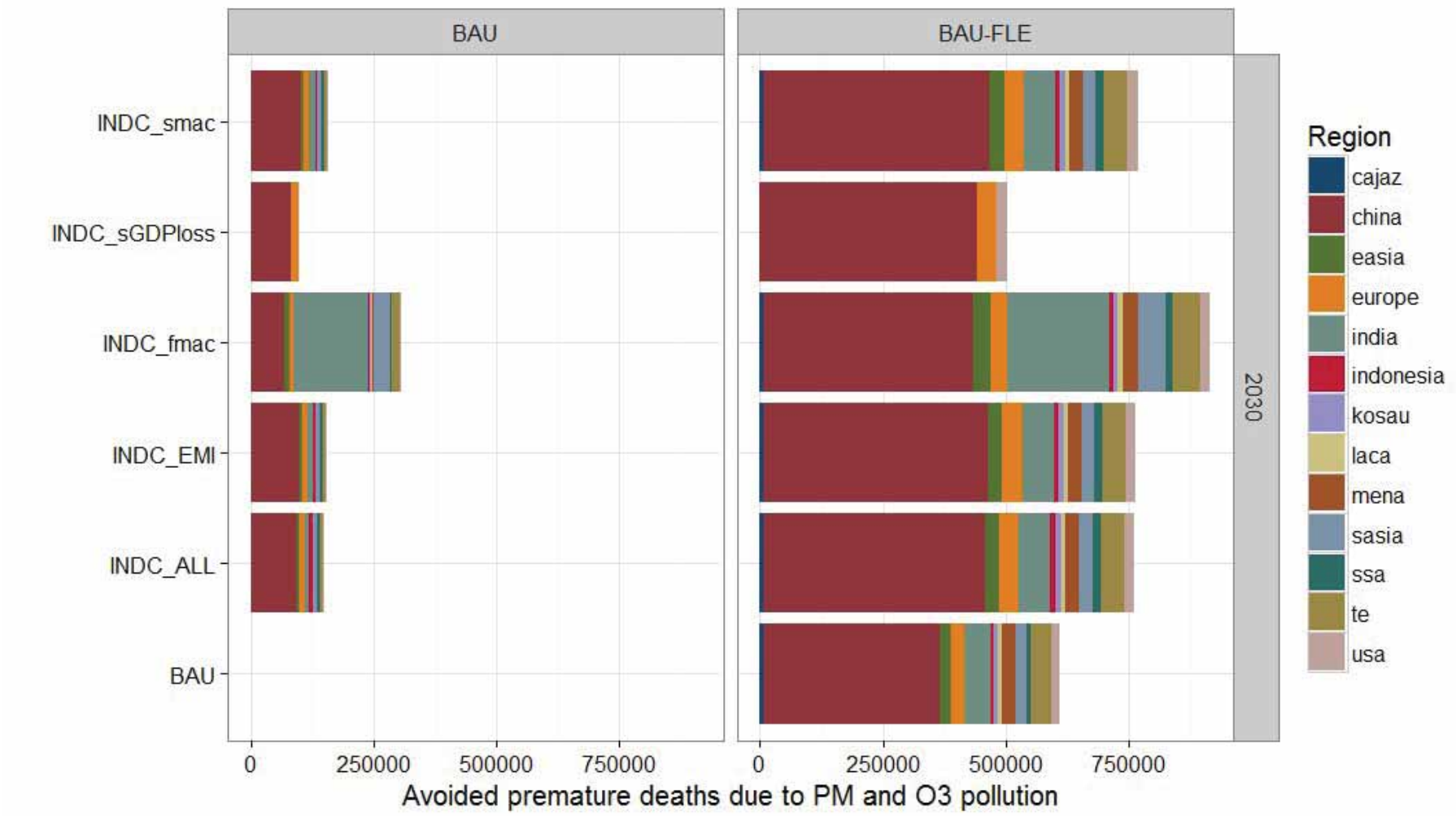
# 8. Mortality due to Air Pollution



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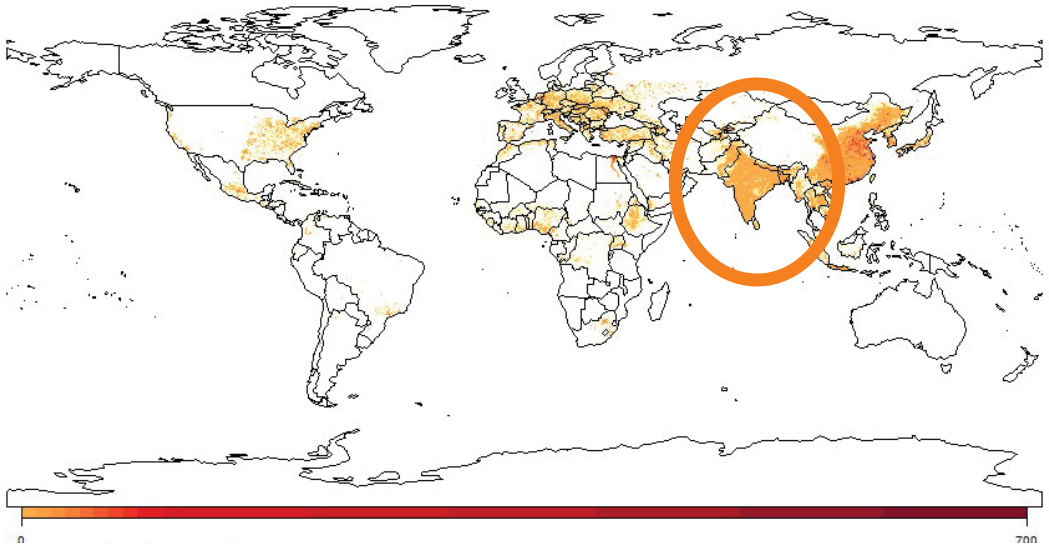
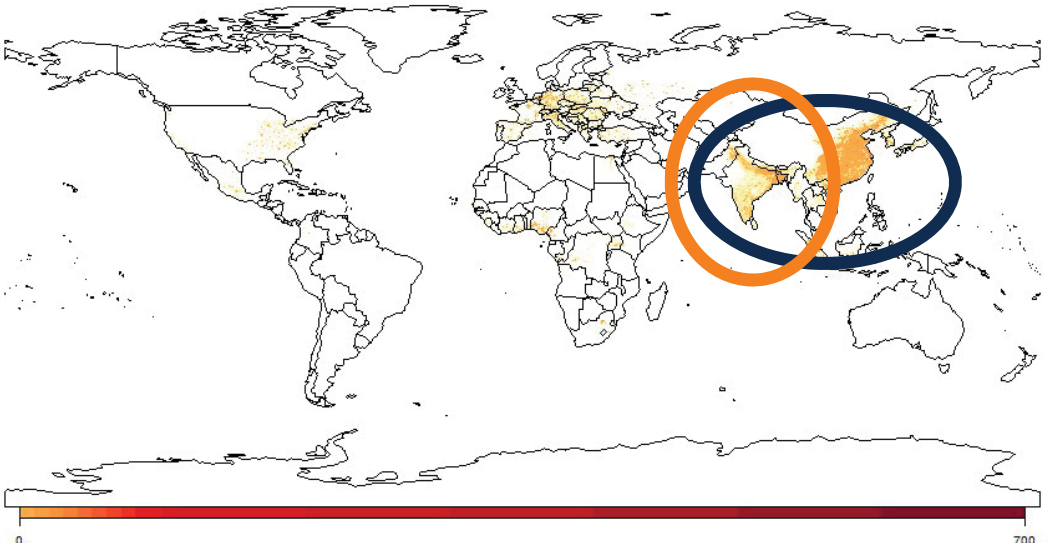
# 8. Mortality due to Air Pollution in 2030 (avoided deaths)

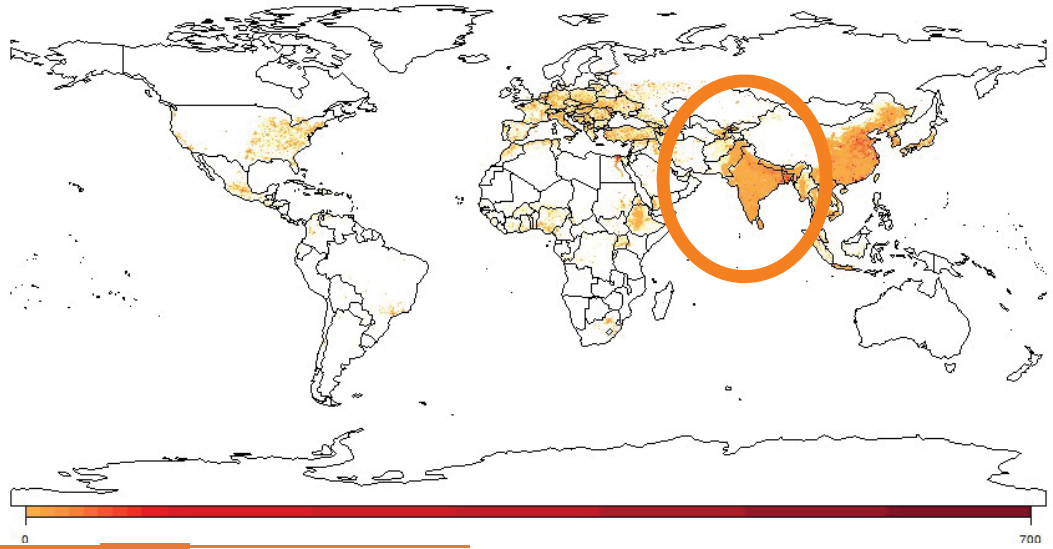
## NDC vs BAU-FLE




## NDC vs BAU

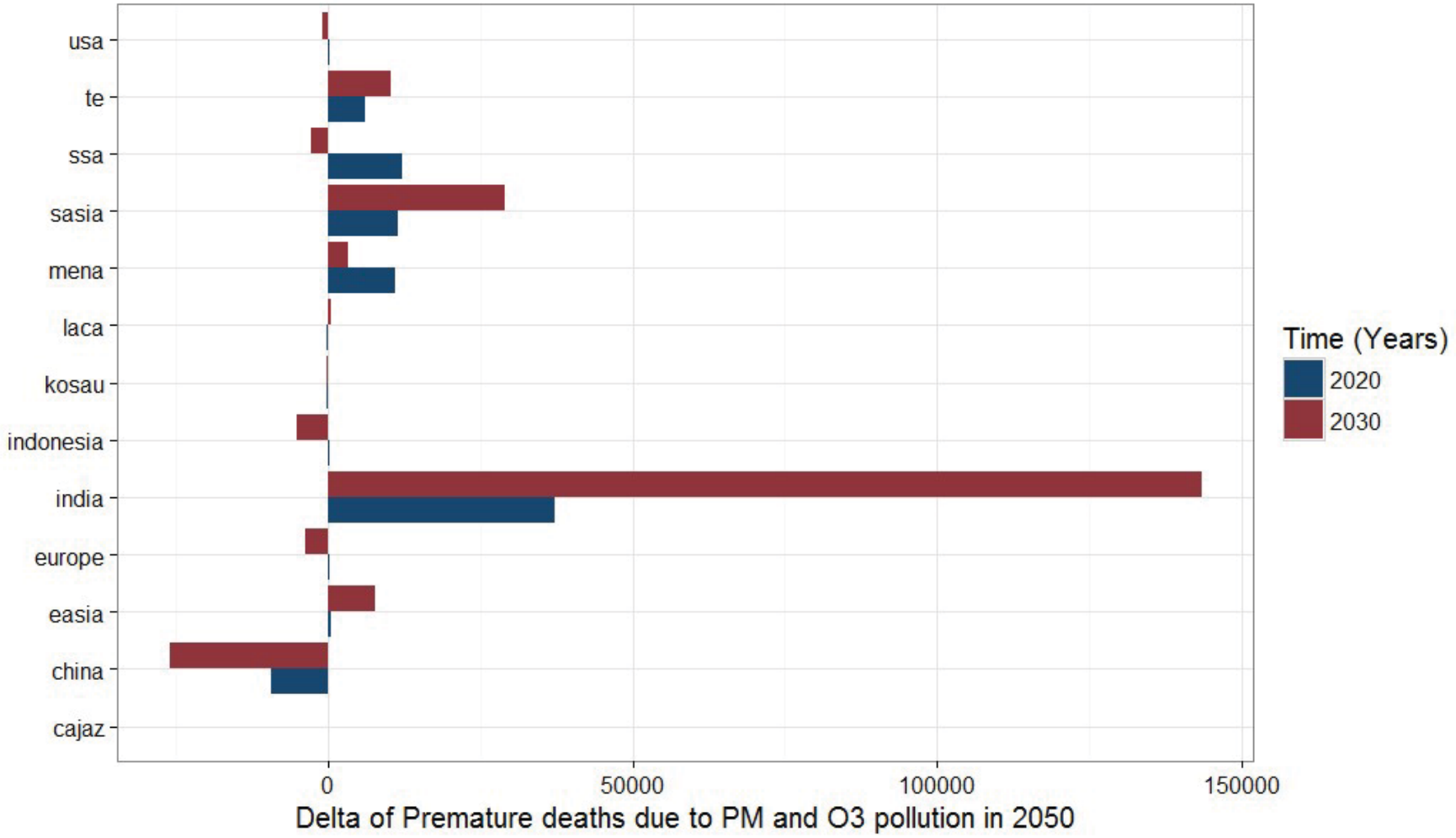



## Trade vs BAU-FLE




## Trade vs BAU

# 8. Mortality due to Air Pollution – Effects of Global trade



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9.

# Conclusions

## Can the NDCs be more effettive?

- 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 teams of climate targets is also more efficient than the NDC policies

# Thank you for your attention!

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