

Energy Supply Investments in Latin America under Climate Control Policy

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Research conducted in the CLIMACAP-LAMP project

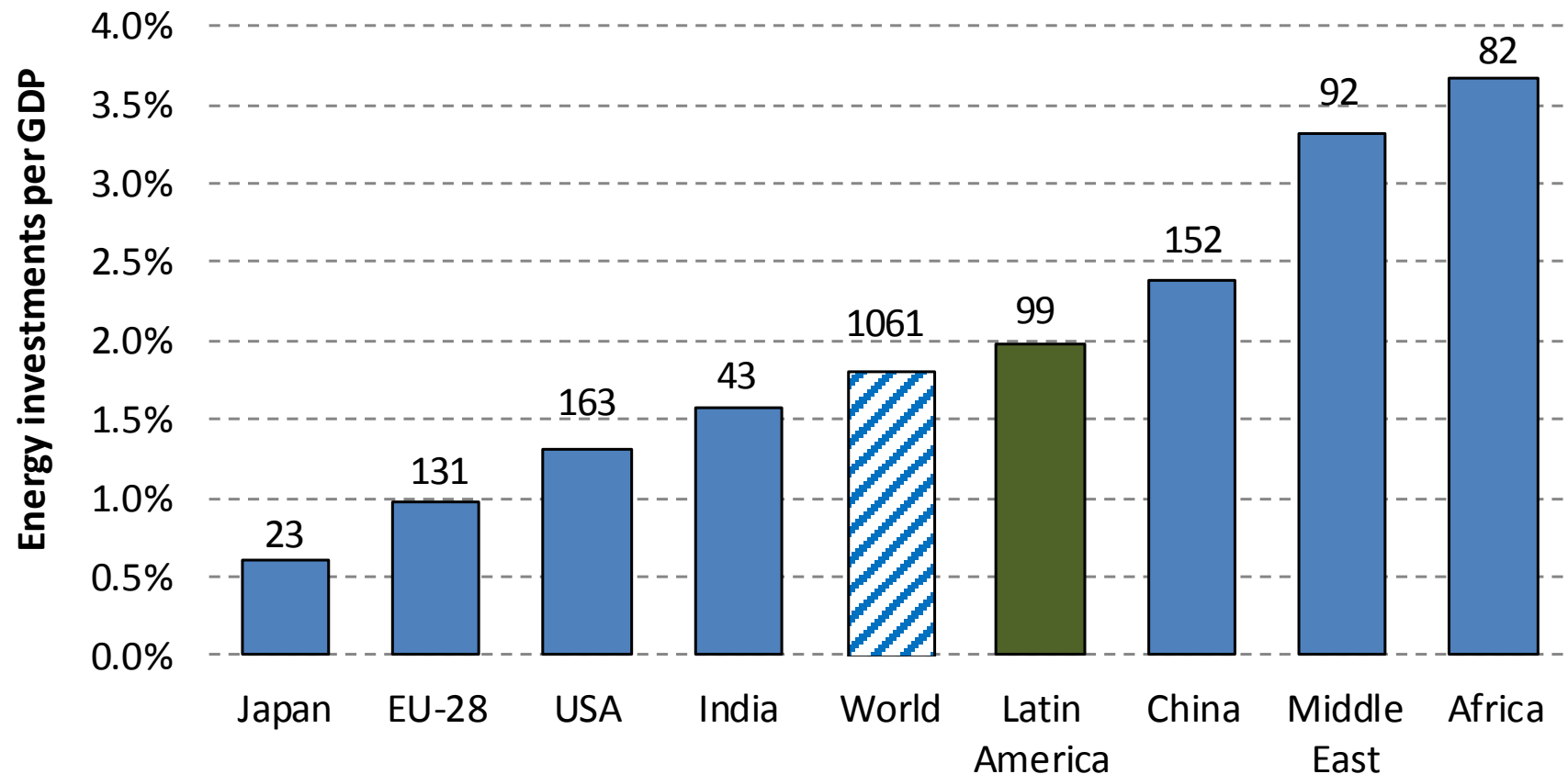


- www.climacap.org
- Latin America special issue in *Energy Economics*: “A Multi-Model Study of Energy Supply Investments in Latin America under Climate Control Policy”, co-authored by James Falzon, Bob van der Zwaan, Katherine Calvin, Amit Kanudia, Alban Kitous, Maryse Labriet

Key findings

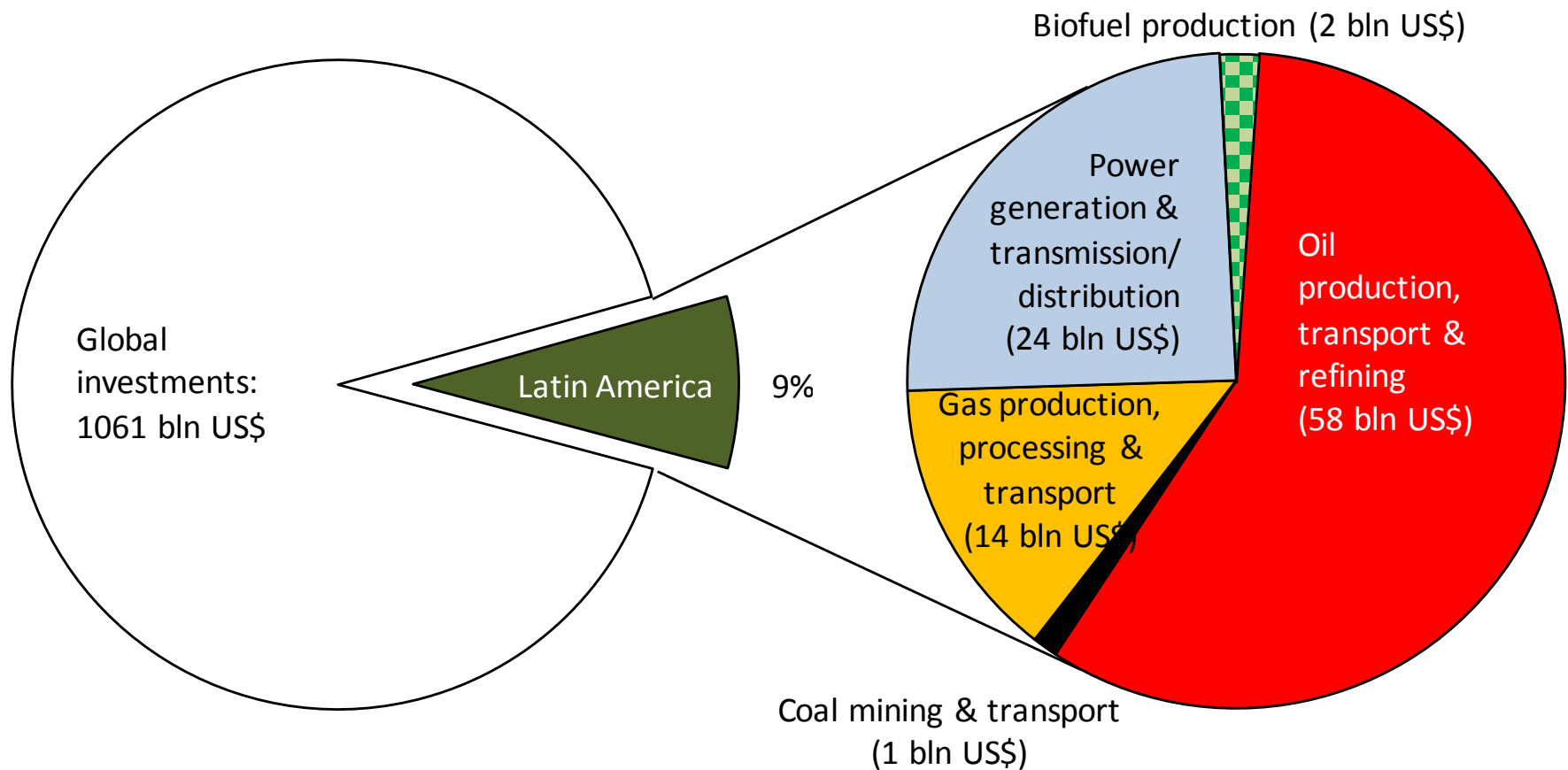
- Doubling of annual energy supply investments in the business-as-usual scenario between 2010 and 2050
- Under climate policy investments may even triple
- Climate policy promotes electricity sector investments, i.e. for renewable energy technologies and carbon dioxide capture & storage
- Compared to BAU development +21 billion US\$ per year of electricity supply investments by 2050 needed to reach 2C climate target
- Disinvestments in fossil fuel production due to climate policy

Historic energy supply investments of selected world regions



Annual average energy supply investments (2000-2013) as share of average GDP(PPP) globally and for selected world regions , figures in the chart represent absolute investment values in billion US\$(2005) (IEA, 2014; World Bank, 2013)

75% of energy supply investments in oil and gas upstream sector



Average annual investments for energy supply technology in the period 2000-2013 (IEA, 2014)

Multi-model analysis with four Integrated Assessment Models

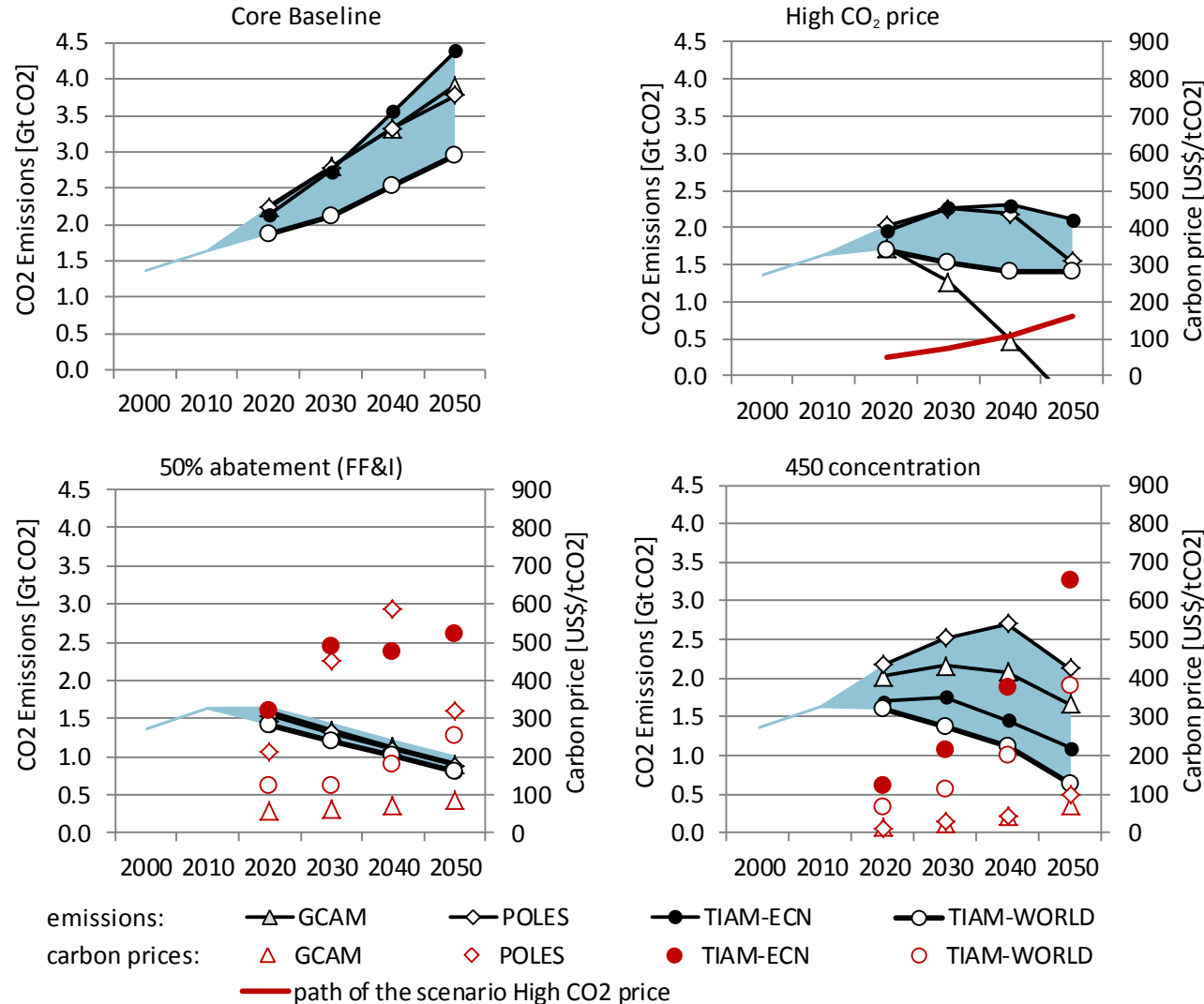


- **GCAM**: market equilibrium model where prices are adjusted until supplies and demands are equally; myopic perspective
- **POLES**: simulation model in which investments follow the development of energy technology deployment regardless of cost-efficiency paradigms
- **TIAM-World**: optimization model where investment decisions are the results of cost-optimality criteria
- **TIAM-ECN**: optimization model with a detailed representation of Latin America with investment decisions as the results of cost-minimization

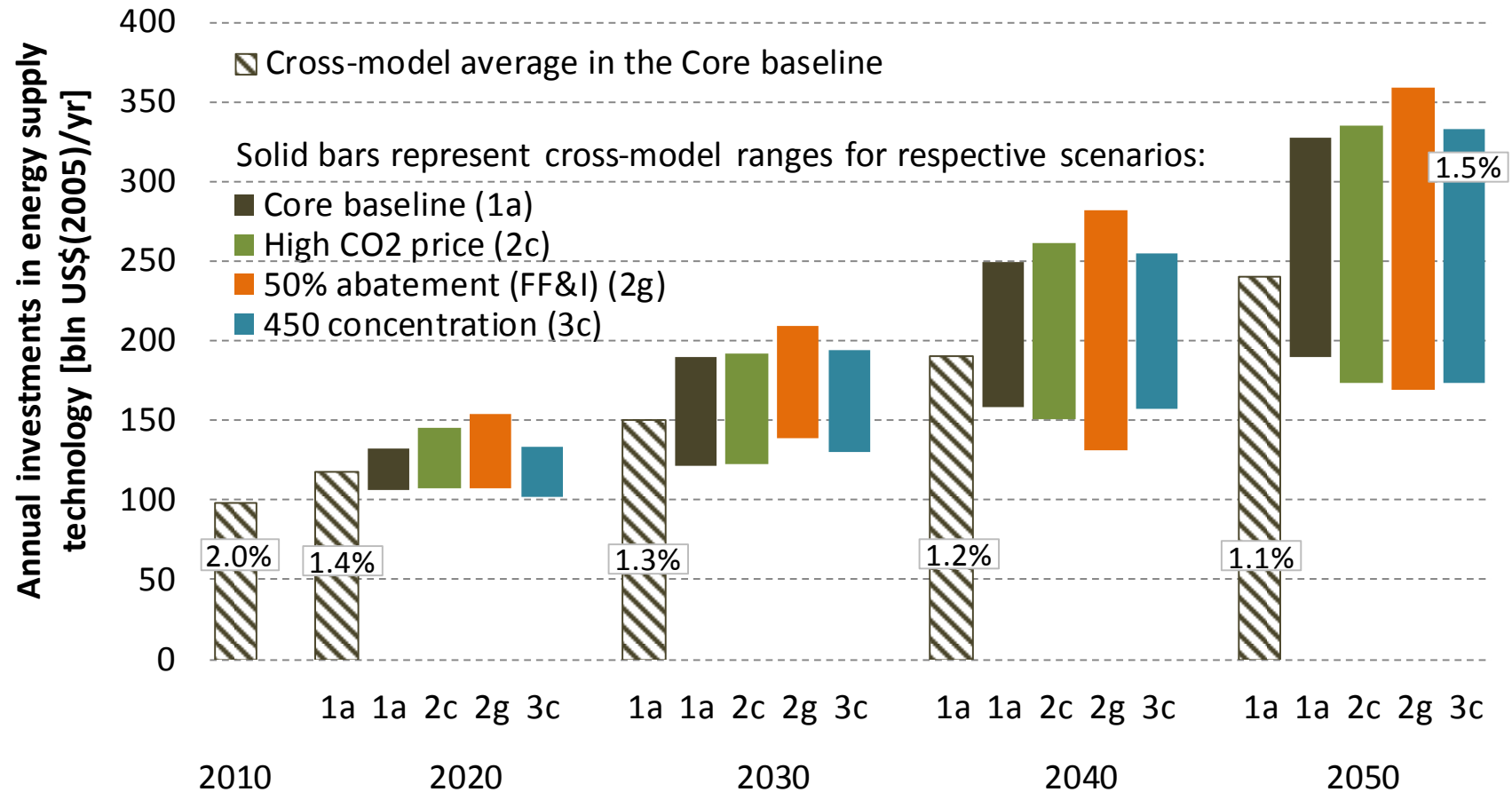
Three climate policy scenarios versus the Core Baseline

Scenario name	Description
Core Baseline:	(1a) Business-as-usual scenario with climate and energy policies enacted prior to 2010.
High CO₂ price:	(2c) Scenario with a carbon tax of 50 \$/tCO ₂ e in 2020, which grows at a rate of 4%/yr.
50% abatement (FF&I):	(2g) Scenario with a emission reduction of CO ₂ from fossil fuel combustion and industry. This reduction increases linearly from 12.5% below 2010 level by 2020, to 50% below 2010 level by 2050.
450 concentration:	(3c) Scenario with globally cost-optimal allocation of emission certificates to reach a stabilization of the mean temperature increase at 2°C compared to pre-industrial level.

CO₂ emissions from fossil fuel combustion and industry



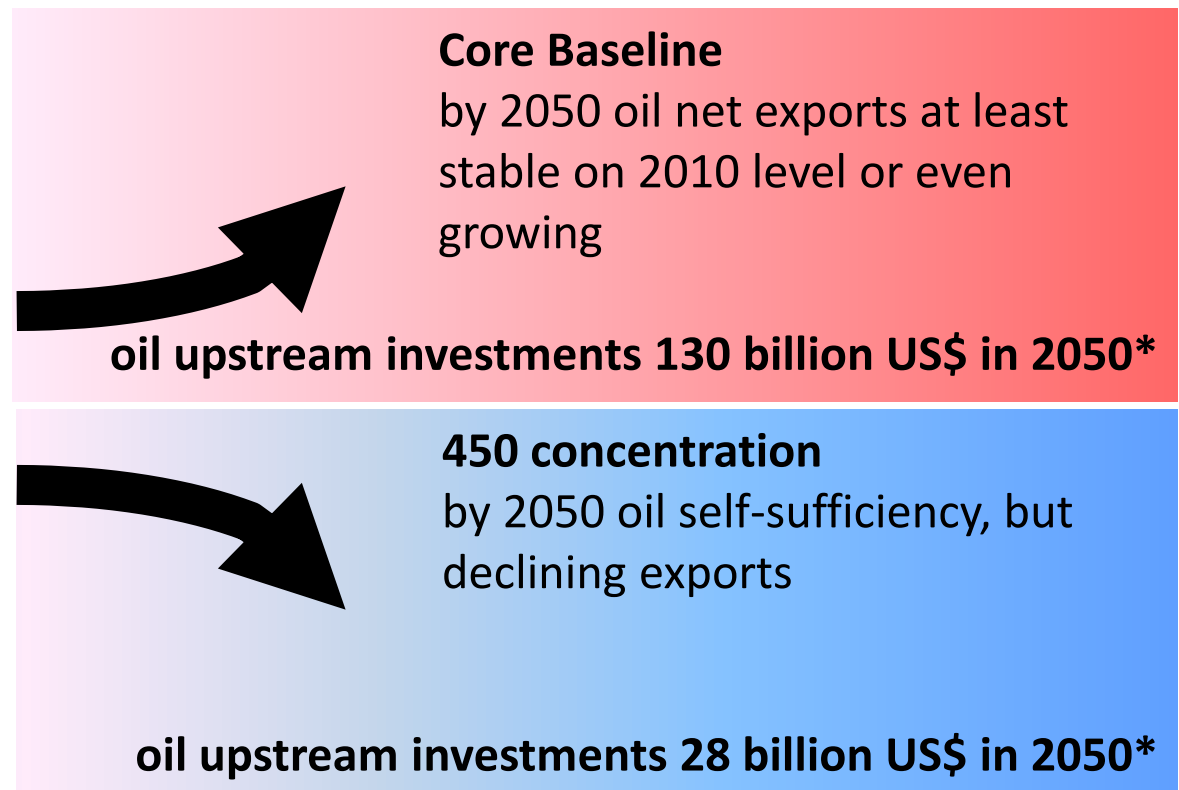
Energy supply investments at least double by 2050



Energy supply investments in Latin America based on results from POLES, TIAM-ECN and TIAM-WORLD in the Core baseline scenario (1a) and the three climate policy scenarios (2c, 2g, 3c). Percentages in boxes represent proportion of GDP

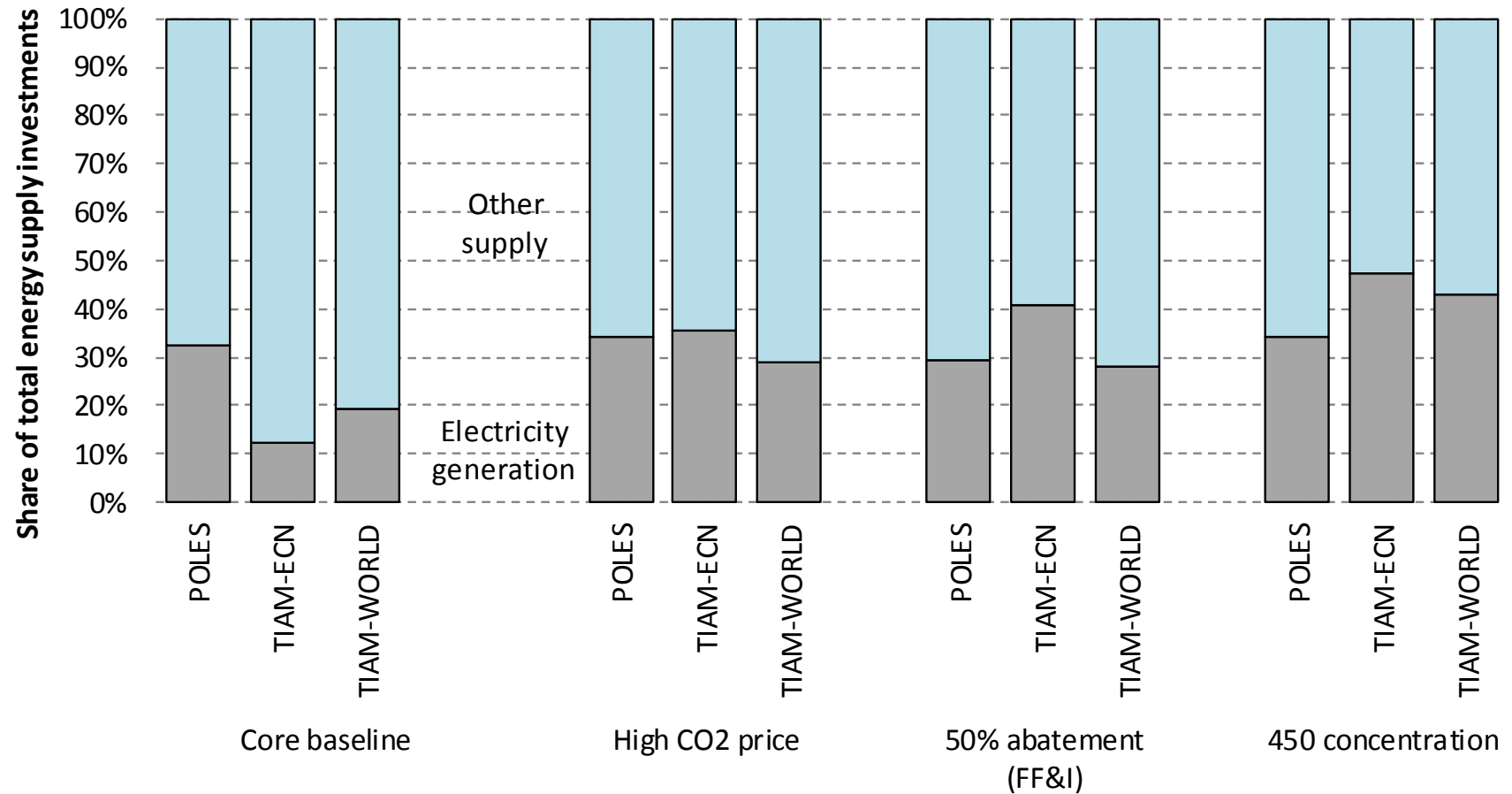
Disinvestment in fossil fuel production under climate policy

**Oil-upstream
investments:
58 billion US\$
average between
2000 and 2013**



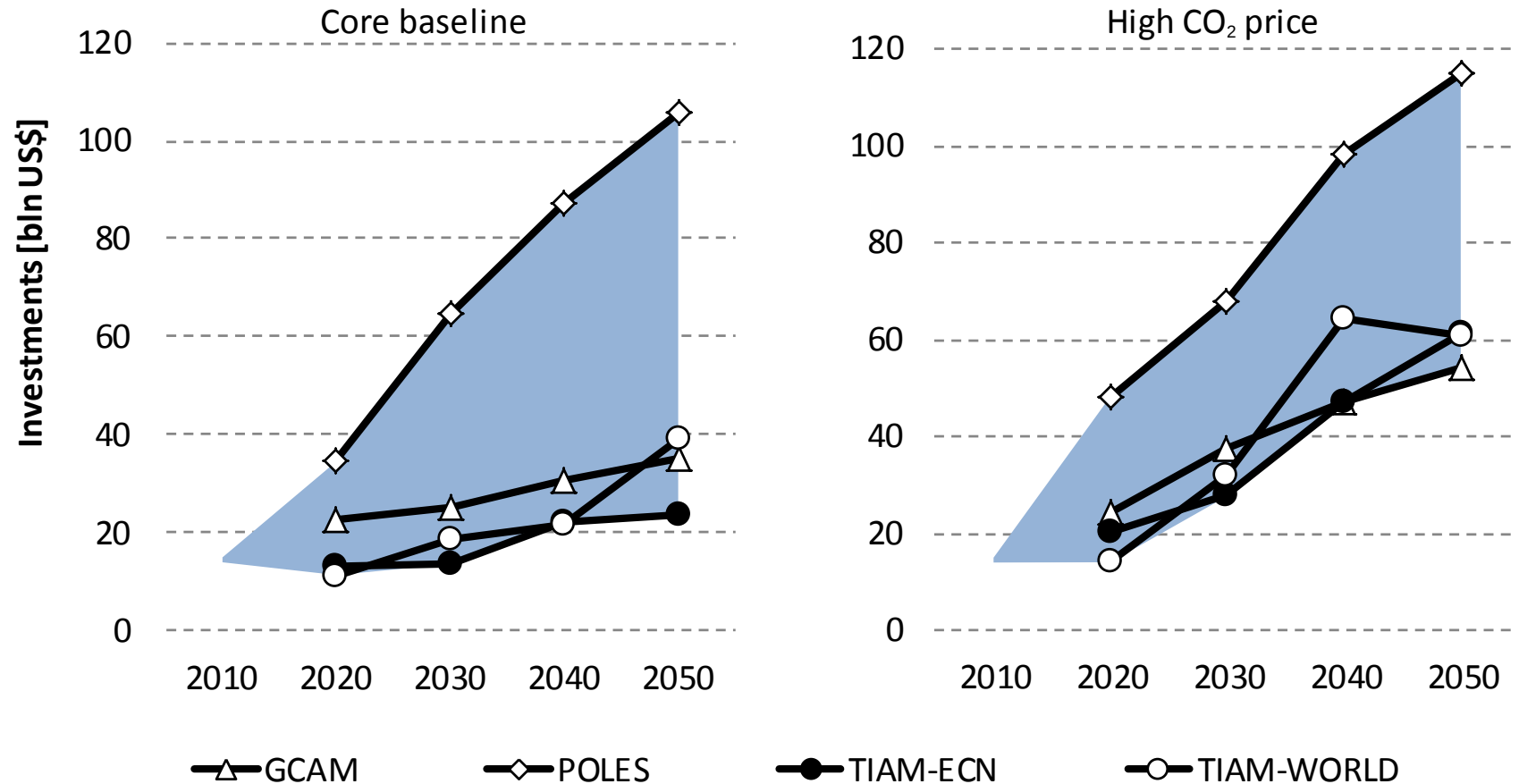
* refers to models results from TIAM-ECN

Climate policy shifts investments towards the power sector

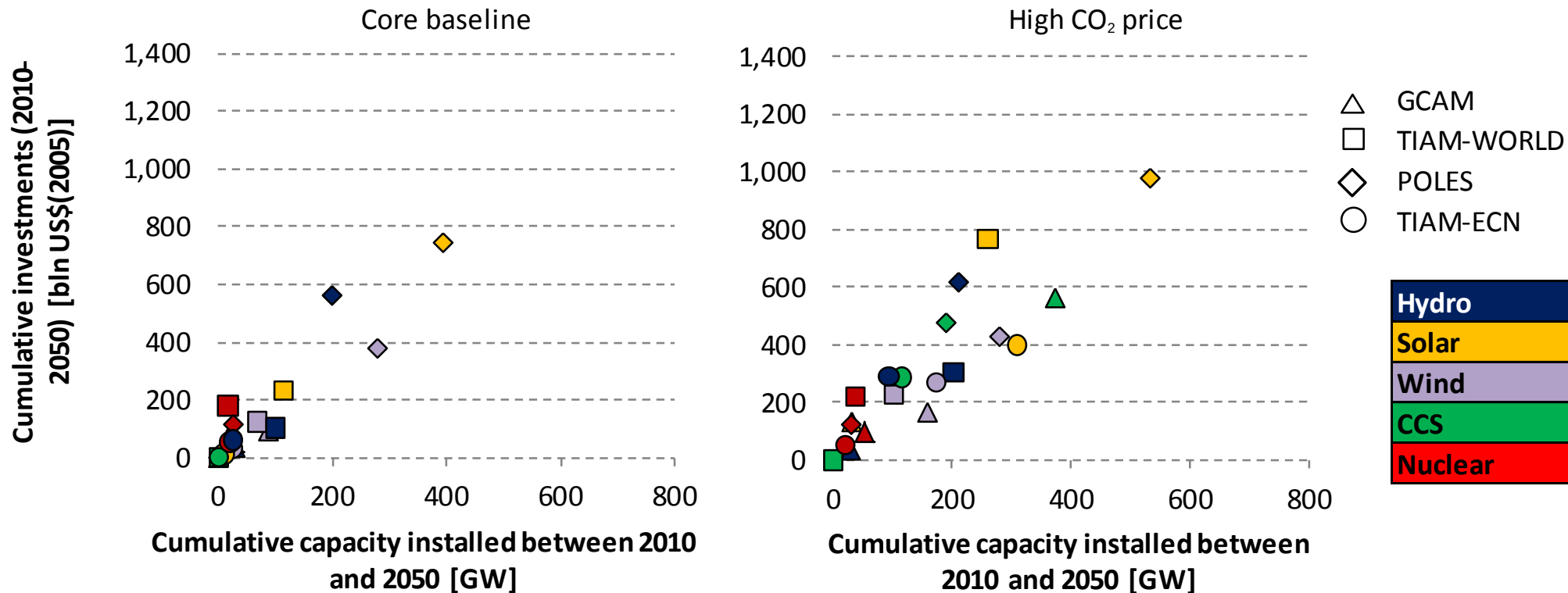


Breakdown of energy investments in Latin America in 2050 in the Core baseline scenario (1a) and the three climate policy scenarios (2c, 2g, 3c)

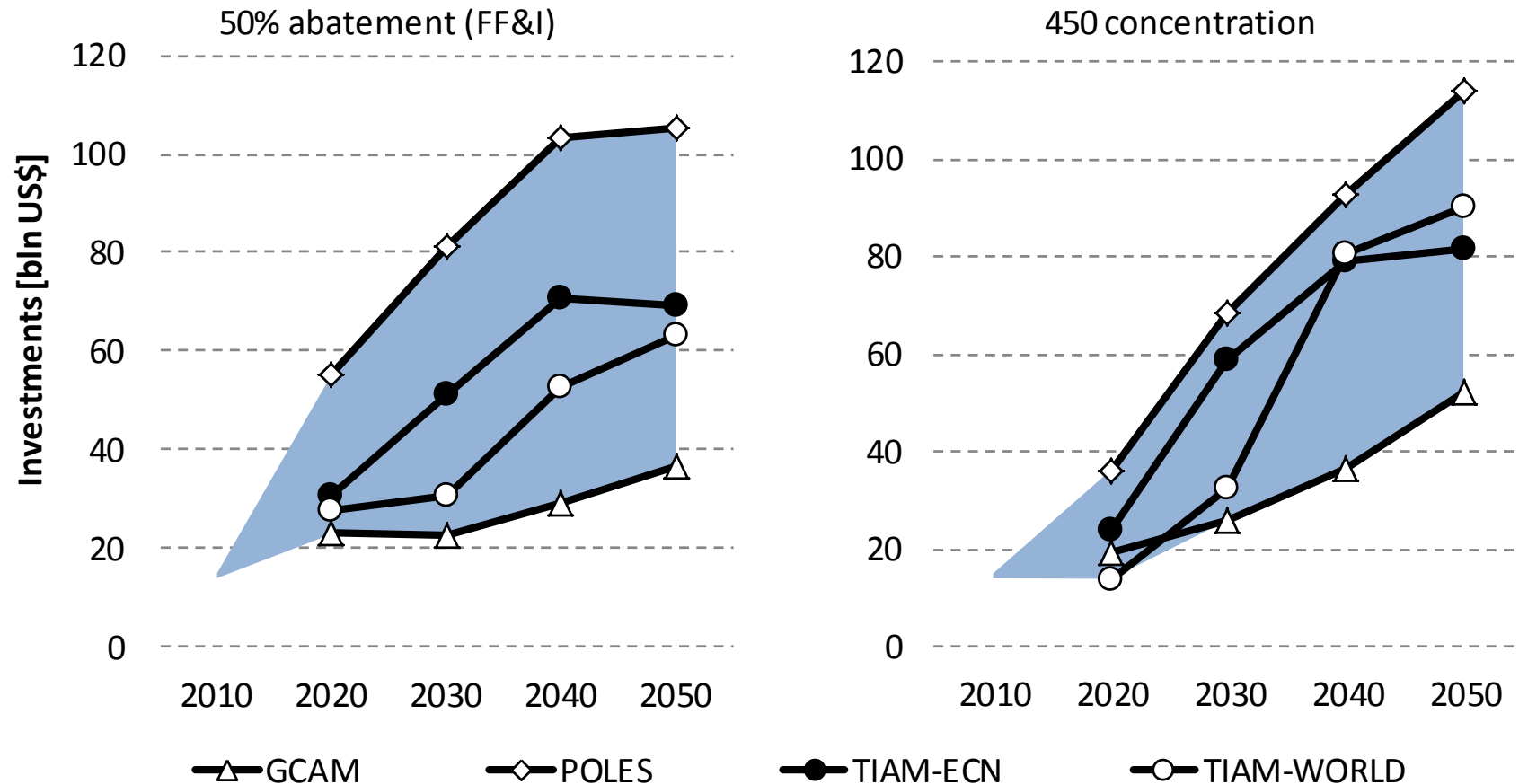
Electricity sector investments in the baseline and the carbon tax scenario



Investments in low-carbon technology: 50 – 70%

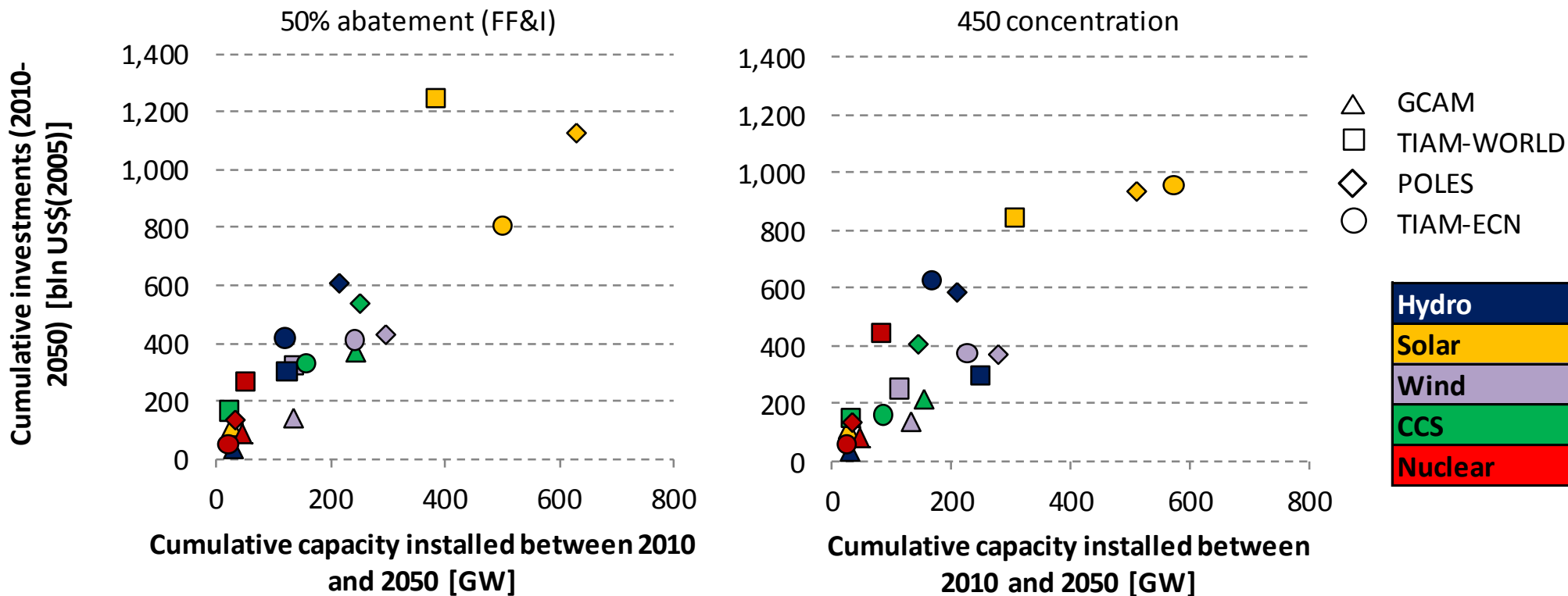


Electricity sector investments under stringent climate policy



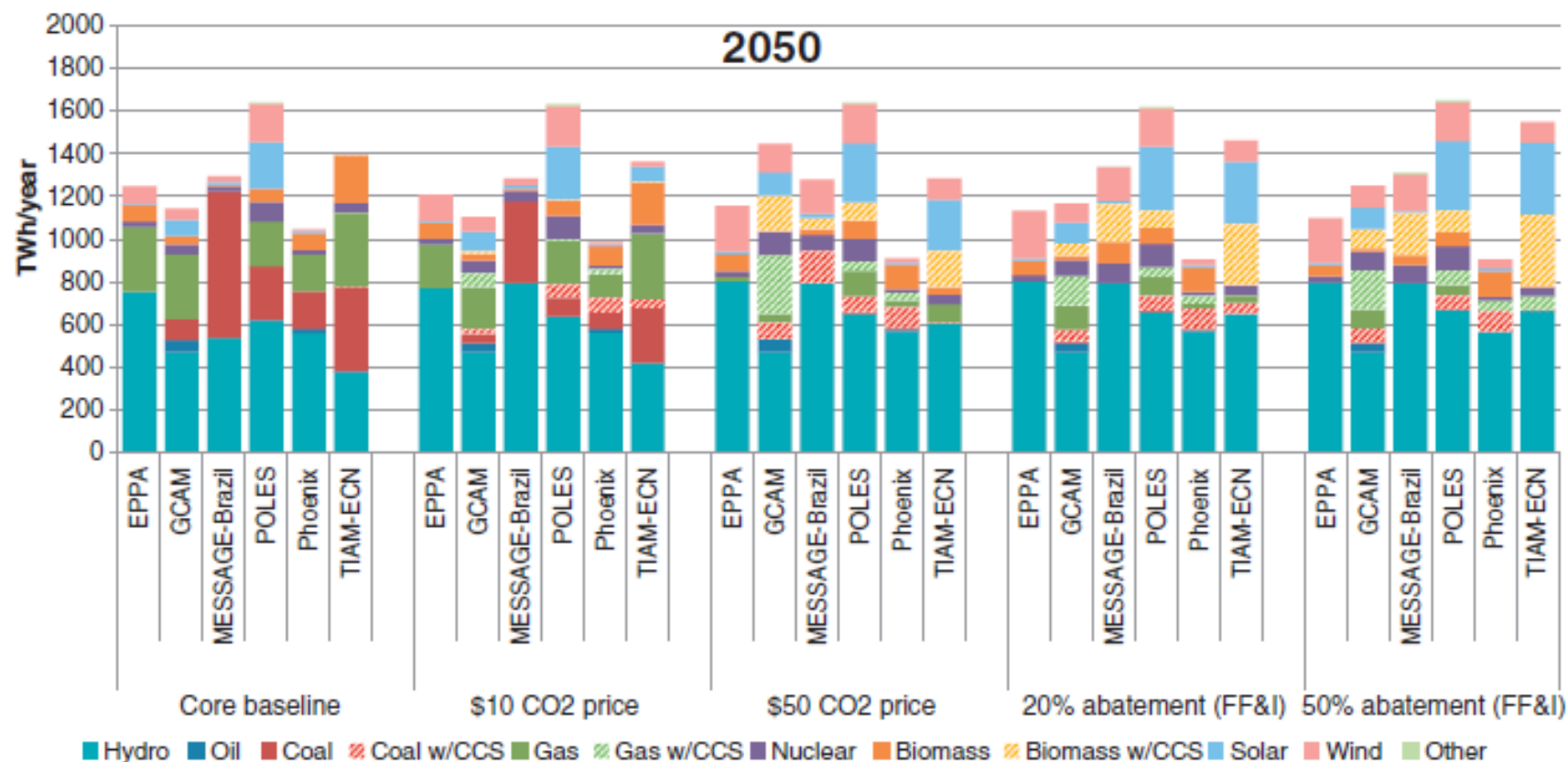
On average **+21 bln US\$/yr** comp. to the baseline to reach 450 ppm concentration
→ compare to 100 bln US\$₂₀₂₀ globally targeted under the Copenhagen accord.

Investments in low-carbon technology: 80 – 90%



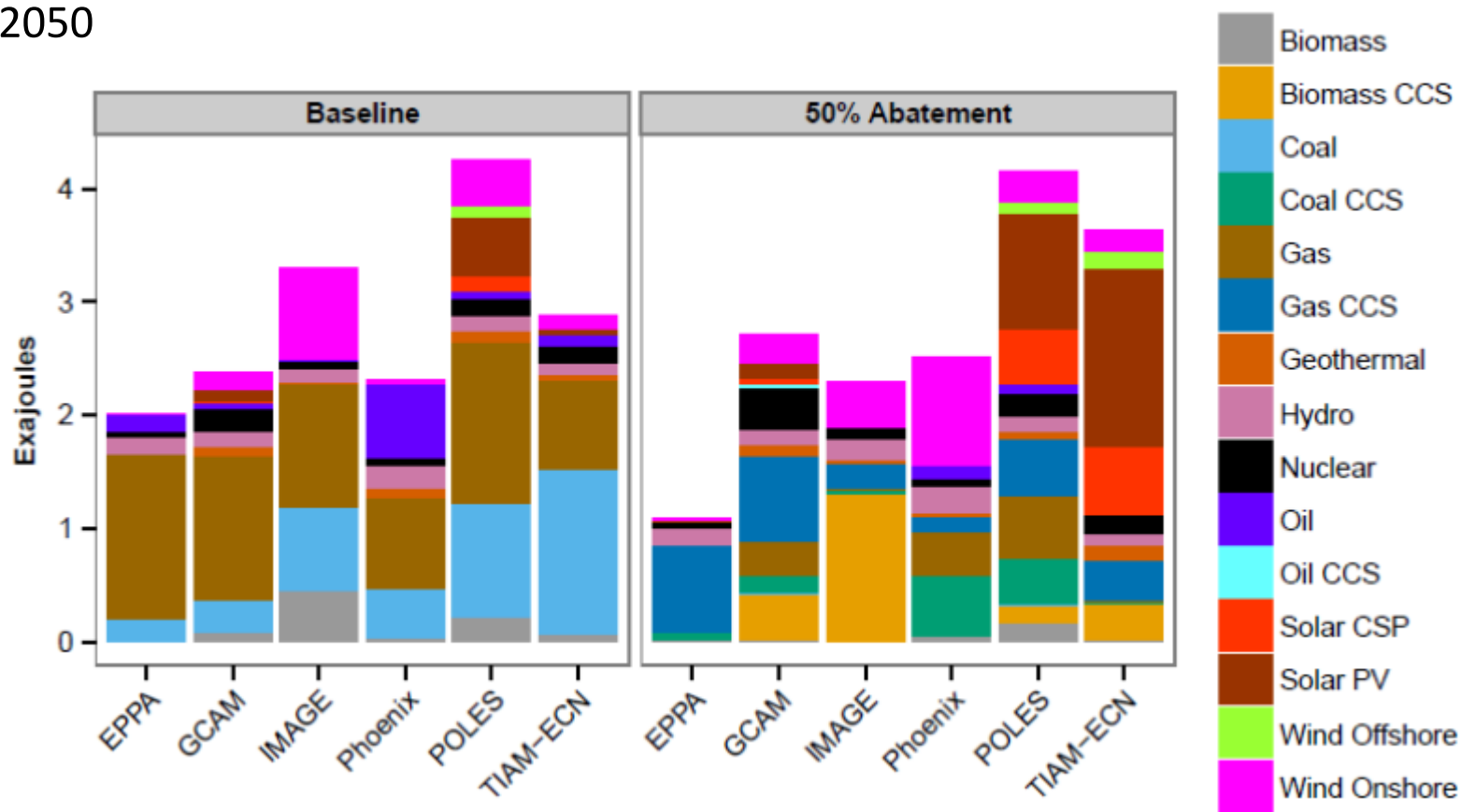
Investment volume in solar > 1000 bln US\$, and in wind & CCS < 500 bln US\$

Electricity generation in Brazil

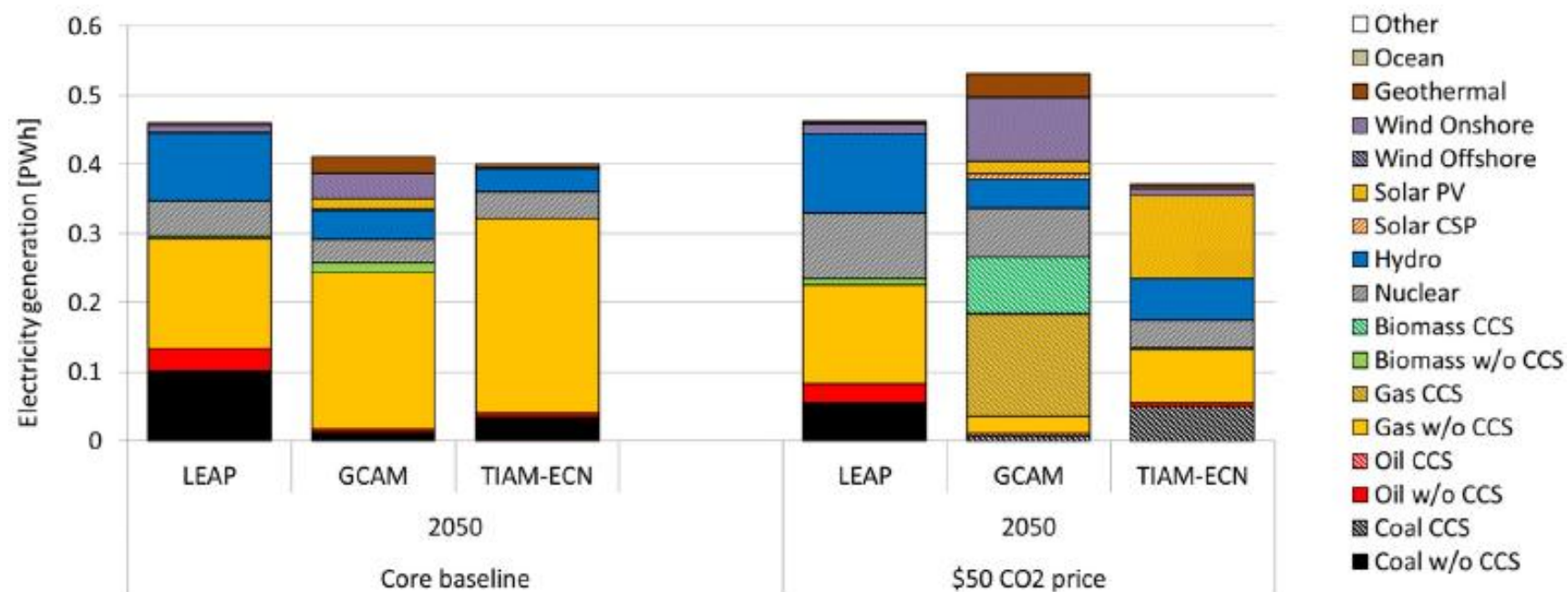


Electricity generation in Mexico

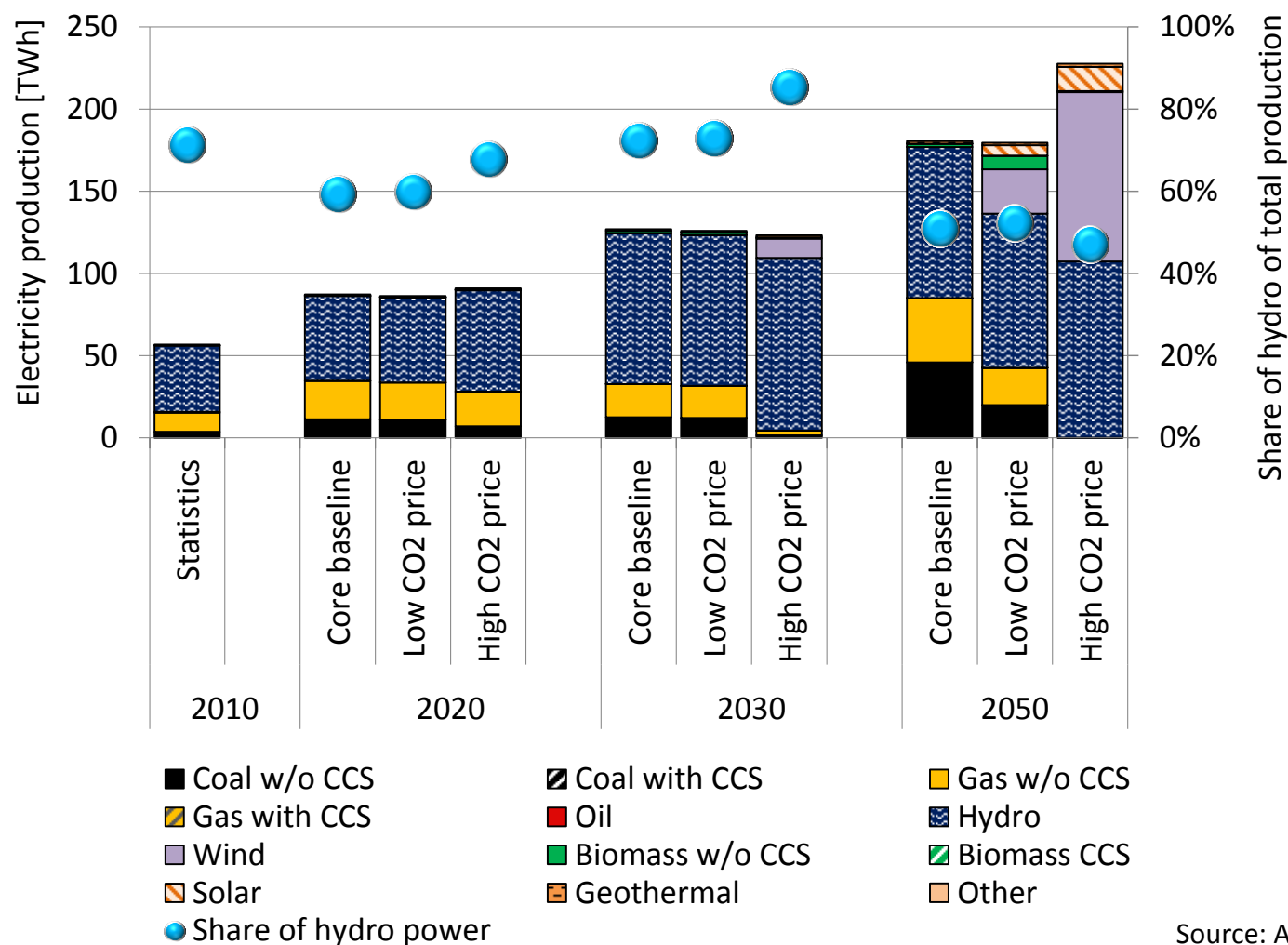
2050



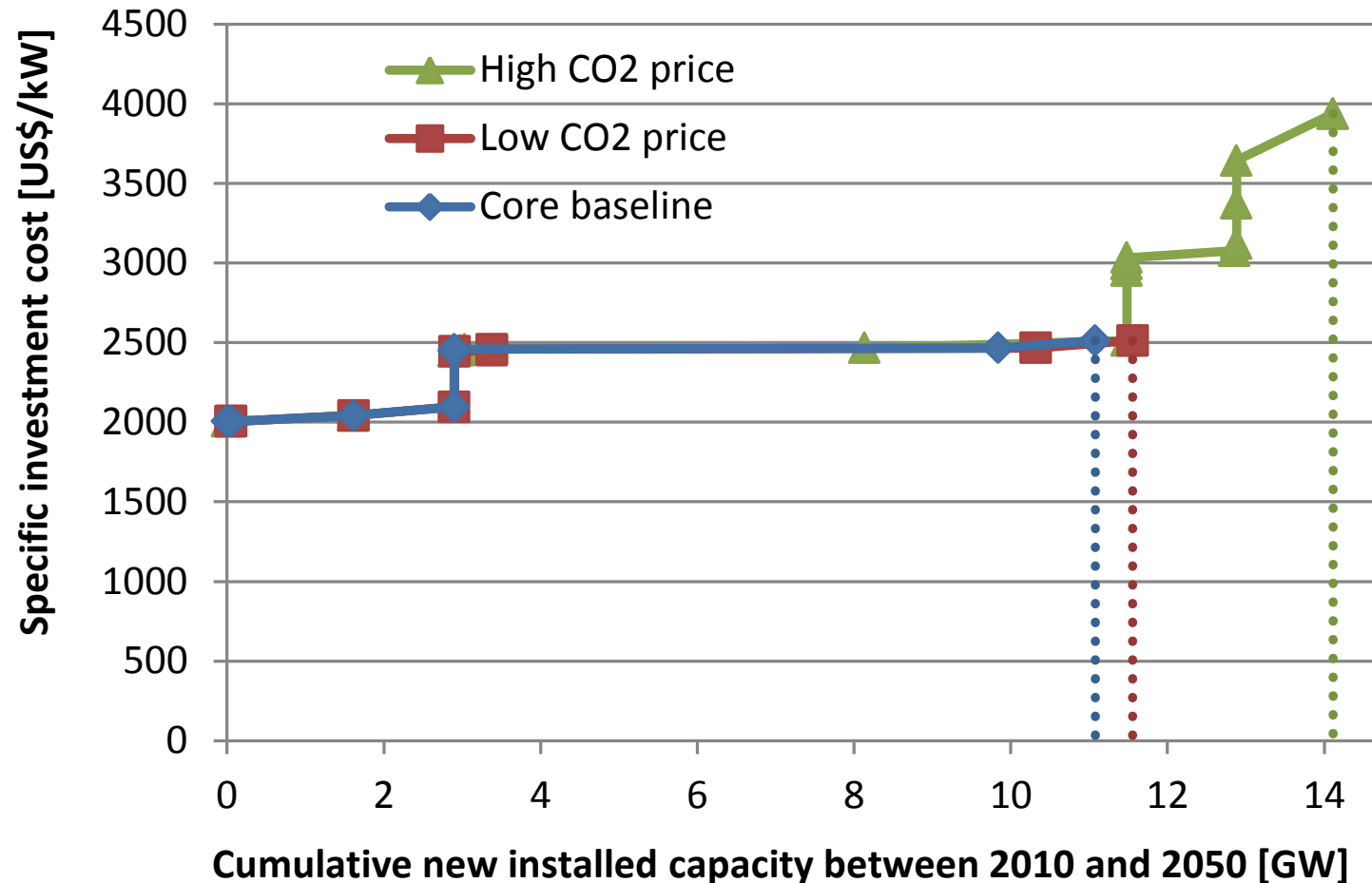
Electricity generation in Argentina



Electricity generation in Colombia



Good investment opportunities for hydro power in Colombia



Findings and recommendations

- Doubling of annual energy supply investments in the business-as-usual scenario between 2010 and 2050
- Under climate policy investments may even triple with promotion of electricity sector investments, i.e. for renewable energy technologies and carbon dioxide capture & storage and reduced investments in fossil fuel production
- Compared to baseline on average +21 billion US\$ per year of electricity supply investments by 2050 to reach 2C climate target
- Maintain and increase ambition for fund-raising, i.e. clean carbon fund
- Capital markets need to be prepared for investments needs in emerging economies

Thank you!

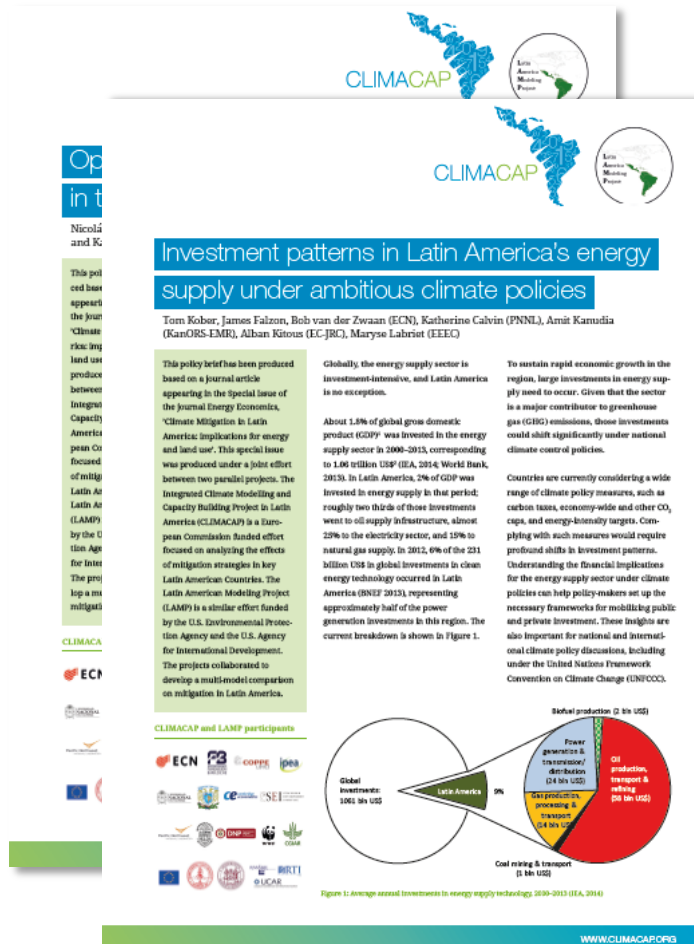
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Special issue in *Energy Economics*, and
Policy briefs to be published soon!

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Disclaimer

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