



WORLD BANK GROUP

Diversification and climate policy action

Dilemmas of Carbon Intensive Countries in the Uncertain World

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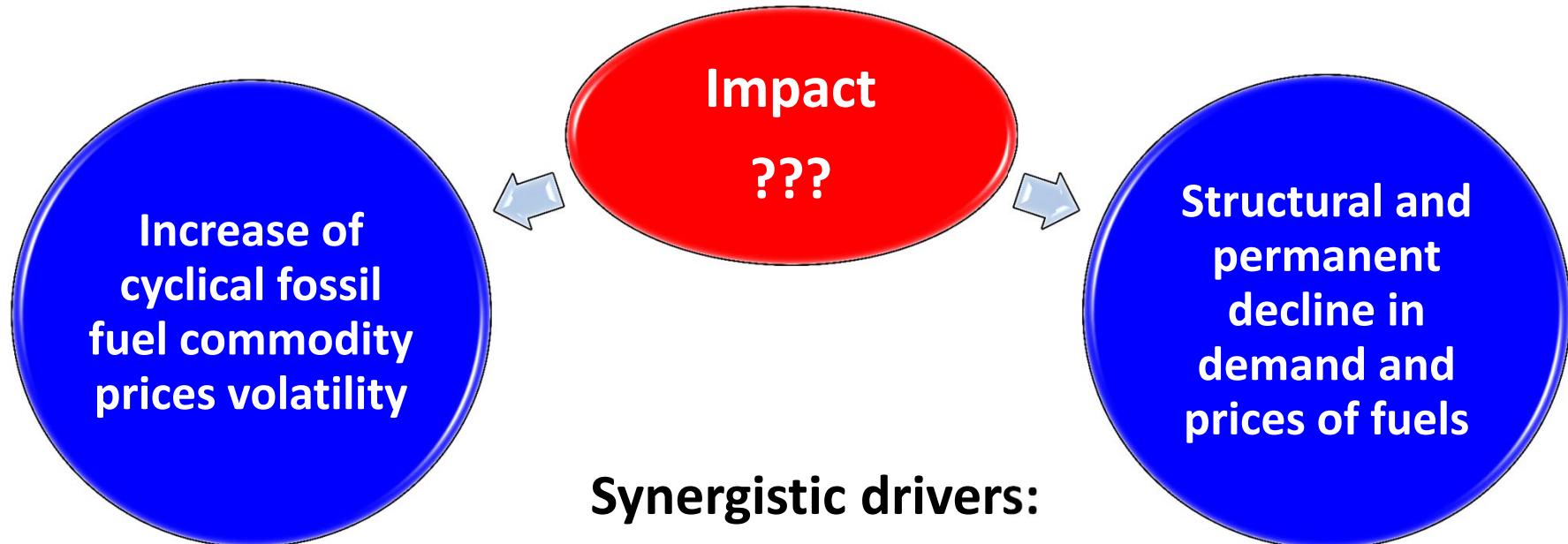
UNFCCC conference

“Economic diversification and transformation”

Doha, 2 October, 2016

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Transition Risk (Impact of Climate Response Measures)



Synergistic drivers:

- Climate and energy policies in energy importing countries
 - Disruptive clean technologies and business models
- Investments in infrastructure for clean energy and transport
 - Border adjustment measures
- Sudden shifts in consumers or investors' preferences

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Diversification and Climate Action in Carbon Dependent Nations: emerging WBG engagement

Helping countries dependent on carbon intensive wealth

- **Understand country vulnerability** to impacts affecting external demand for fossil fuels and the costs of using them domestically
- **Develop diversification strategies to increase national wealth and contribute to global climate mitigation action** by enhancing economic flexibility, adaptability and resilience through portfolio diversification of national assets
- **Develop tools to make informed decisions under uncertainty** about future impacts of climate response measures and other external shocks



Germany – diversified modern economy

Termitau, Kazakhstan. Region heavily dependent on carbon intensive industry

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Who is vulnerable?

Indicators of vulnerability to low-carbon transition impact

Vulnerability

Exposure

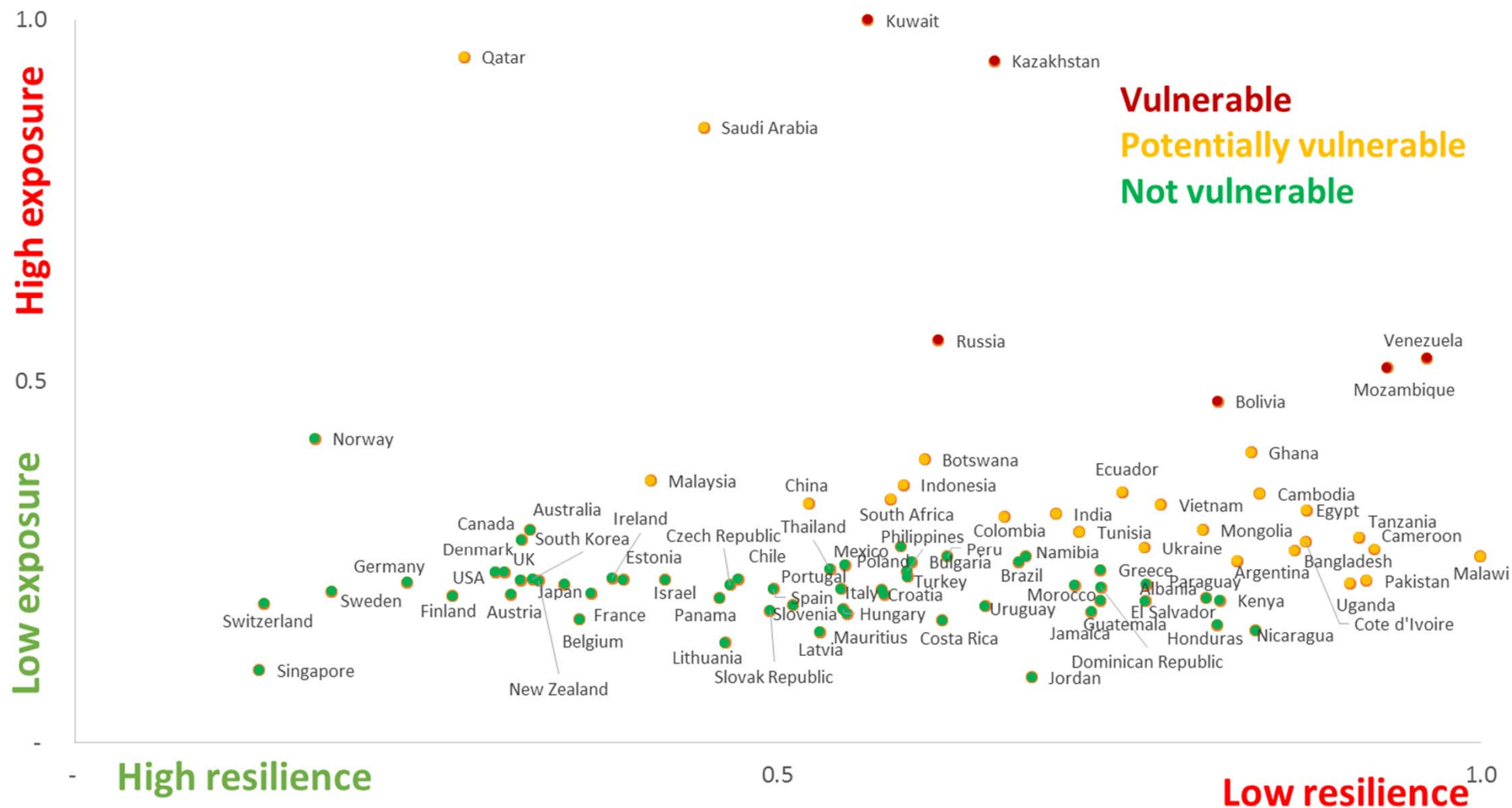
1. Export revenue from fossil fuels as a share of GDP
2. Expected rents from known fossil fuel reserves as a share of GDP
3. Carbon intensity of manufacturing exports
4. Committed emissions in the power sector divided by current power production

Resilience/flexibility

1. Gross domestic product per capita
2. Economic complexity
3. Macroeconomic stability
4. Financial market development and efficiency
5. Quality of infrastructure
6. Human capital
7. Institutional quality and good governance
8. Ability to absorb technology
9. Ease of doing business

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Vulnerability to low-carbon transition impact



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**Coping strategies
to reduce vulnerability if/when impact comes**

Carbon clubs in simulated strategic climate games

Players: 3 “carbon clubs”; 5 country groups each

Climate policy leaders

EU15 + Norway

EU13

US

China

High Income FF Importers

Climate policy followers

Australia, Canada

India

Middle income net importers - high users

Middle income net importers, clean infra

Low income without FF reserves

Carbon Dependent Countries

OPEC GCC

OPEC other

Russia

Middle Income coal exporters

Low income with large FF reserves

- Players divided by their pattern of carbon dependency, income level, market power and observed/expected behavior
- Outcomes of strategic games simulated with global dynamic recursive WBG CGE model ENVISAGE

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How to diversify (use resource rents)?

Traditional economic diversification of exports and products in energy/carbon intensive industries

- downstream processing of oil and gas,
- petrochemicals,
- fertilizers,
- iron and steel or aluminium plants
- Airlines
- etc.
- Relies on traditional comparative advantage
- May be successful in hedging the risk of cyclical volatilities
- Challenge of picking the winners, managing vested interests and attract private investments

Broad diversification of a wide range of national assets

- Physical capital,
- Natural capital (land use, water, forests, biodiversity)
- Intangible assets,
 - Education (human capital)
 - High quality economic and social institutions,
 - Innovation, R&D, knowledge
- Increases economic productivity, flexibility, resilience and ability to turn external shocks into opportunities
- More open to private sector and entrepreneurship. Limit rent-seeking by vested interests
- Facilitates structural transformations to discover new comparative advantages.
- May be needed to cope with new transformational challenges and the deep uncertainties related to a low-carbon transition.

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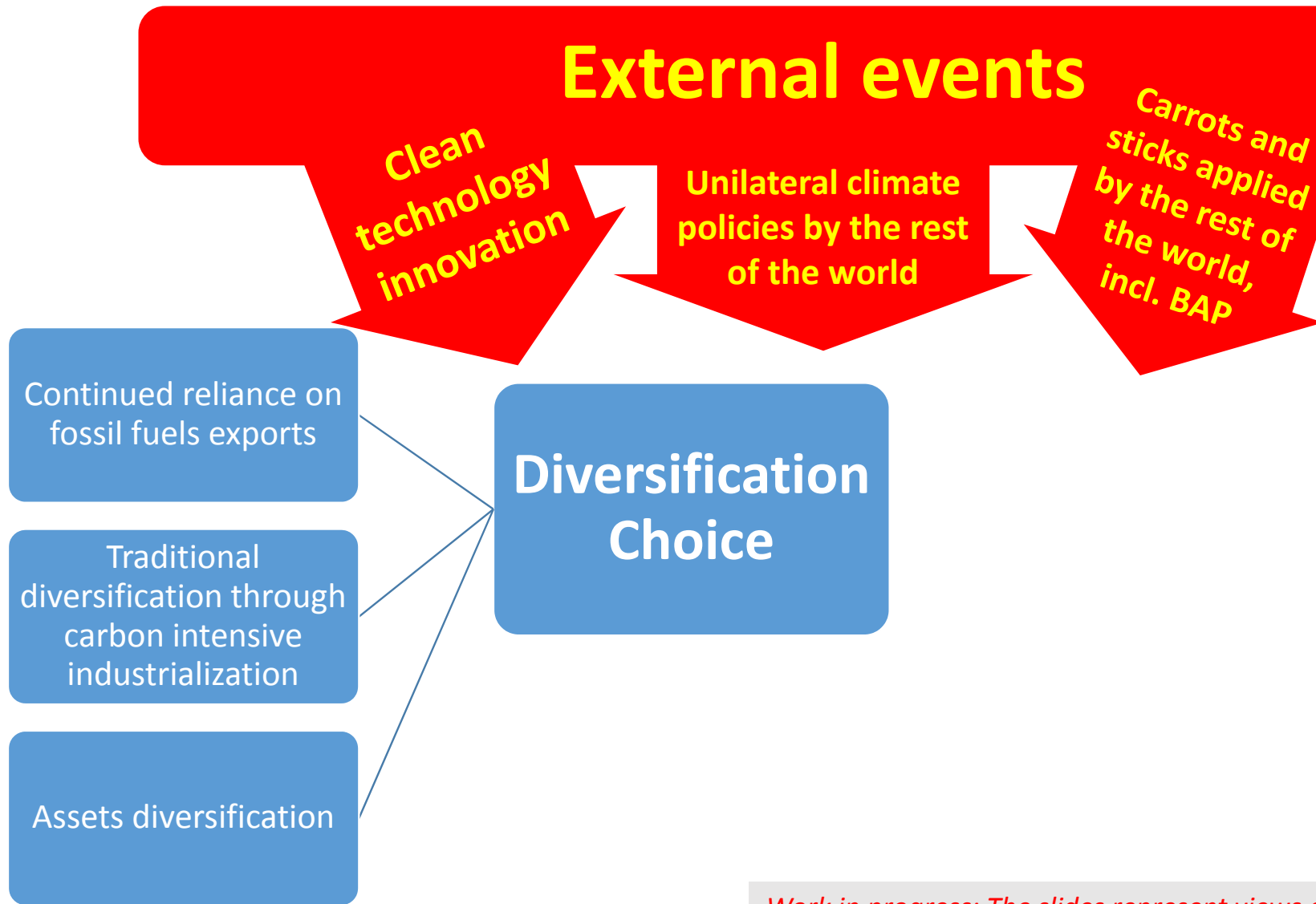
External events and choices for carbon dependent countries

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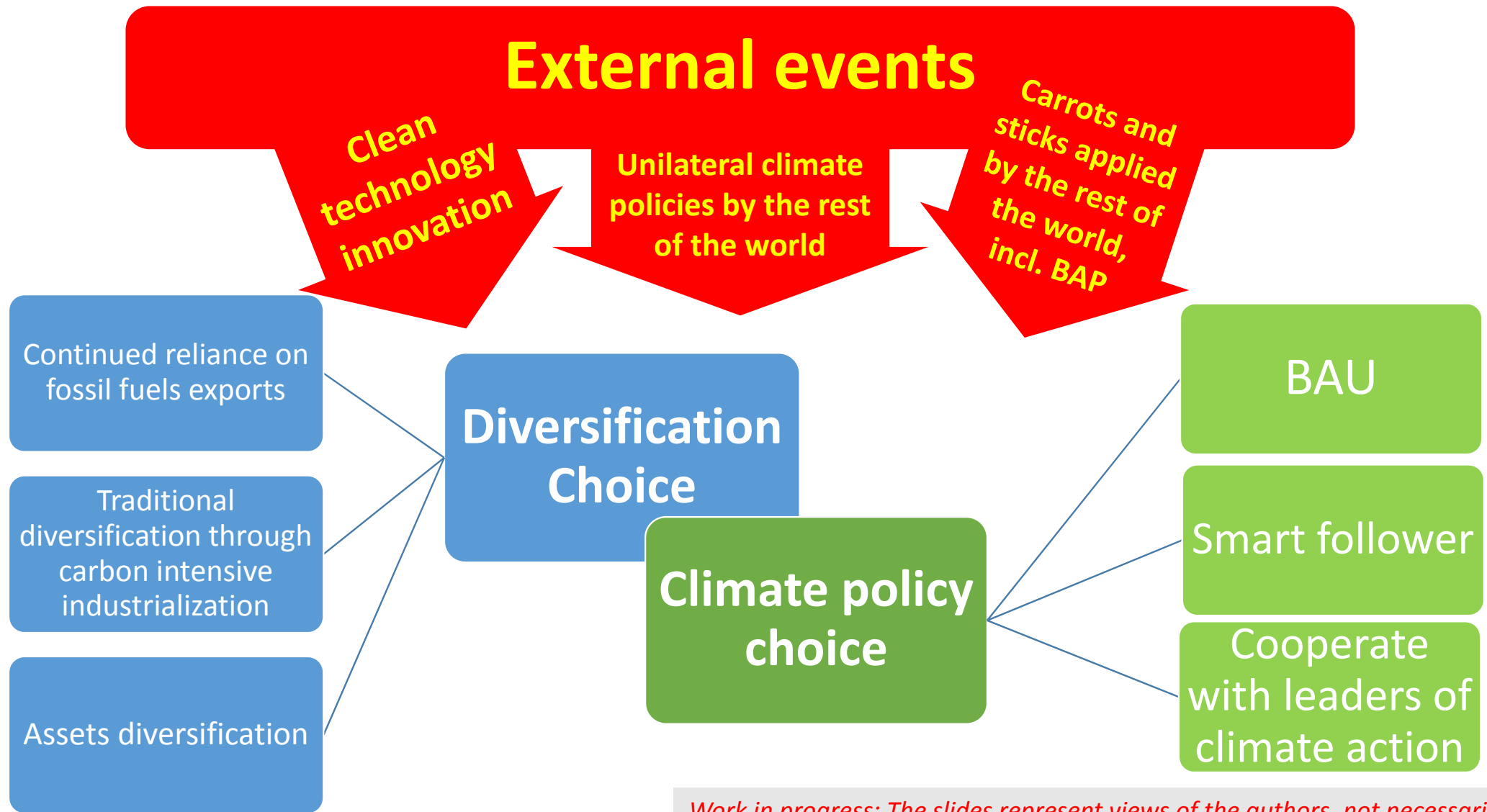
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External events and choices for carbon dependent countries



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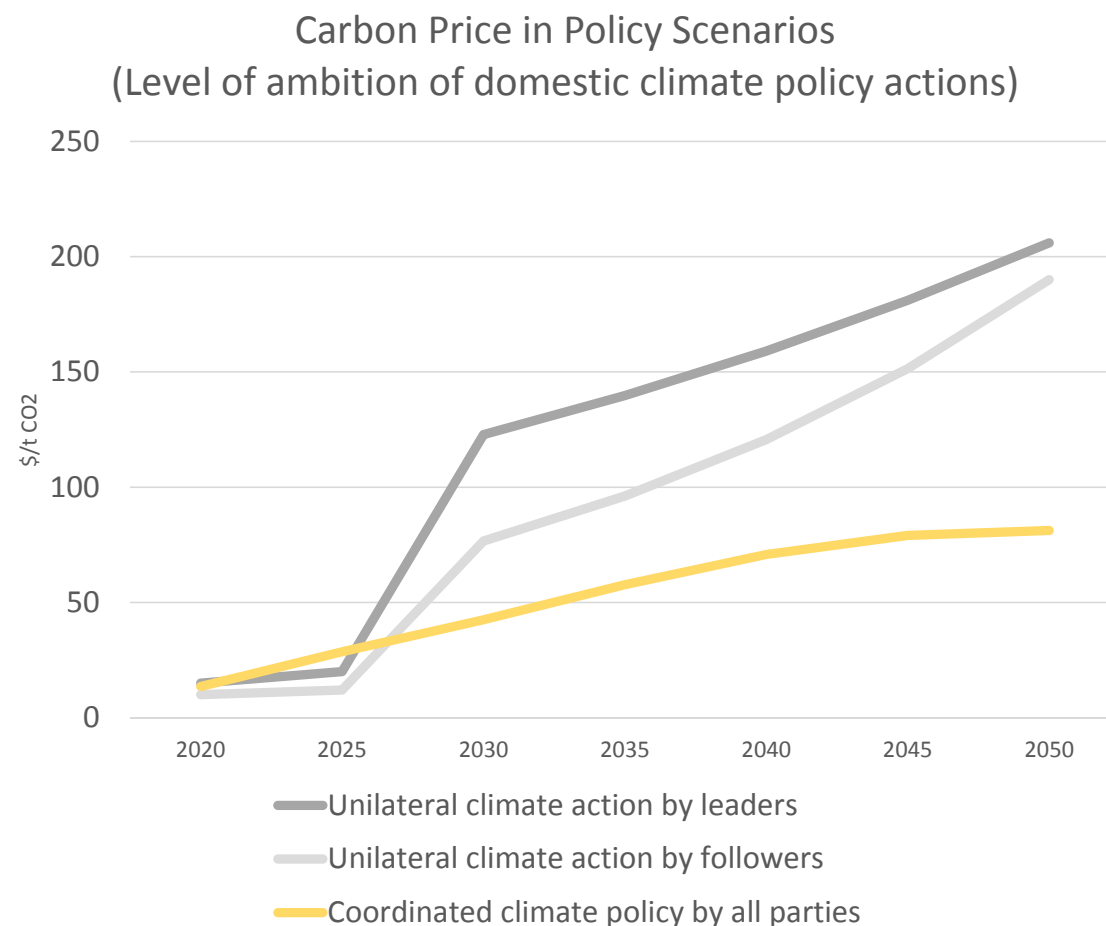
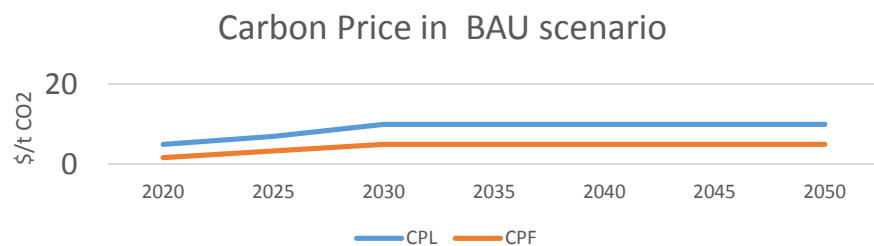
External events and choices for carbon dependent countries



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Level of ambition of domestic climate policies in different scenarios

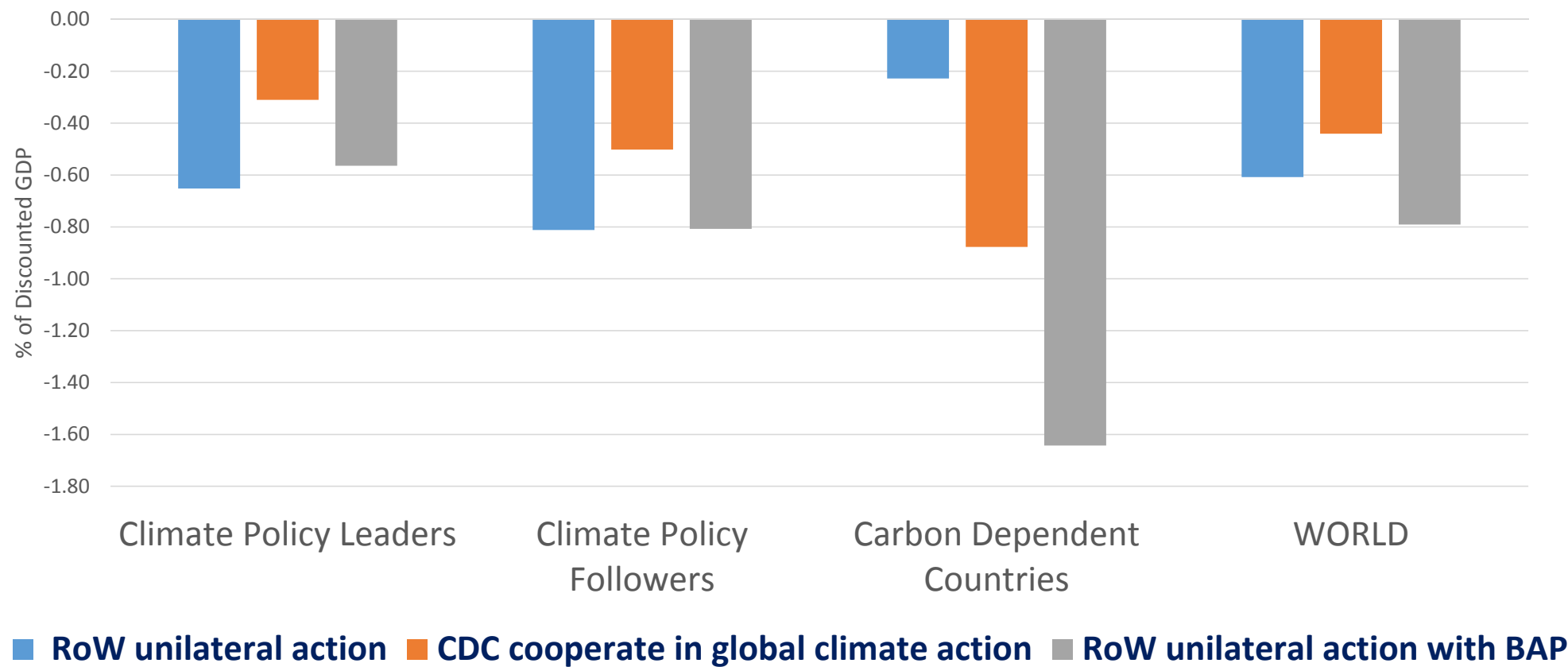
Carbon price in unilateral scenario set to reach the same cumulative 2011-2050 emissions, in principle consistent with 50% of reaching 2 degree climate stabilization target



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The rest of the world has access to policy incentives to encourage cooperation by carbon dependent countries

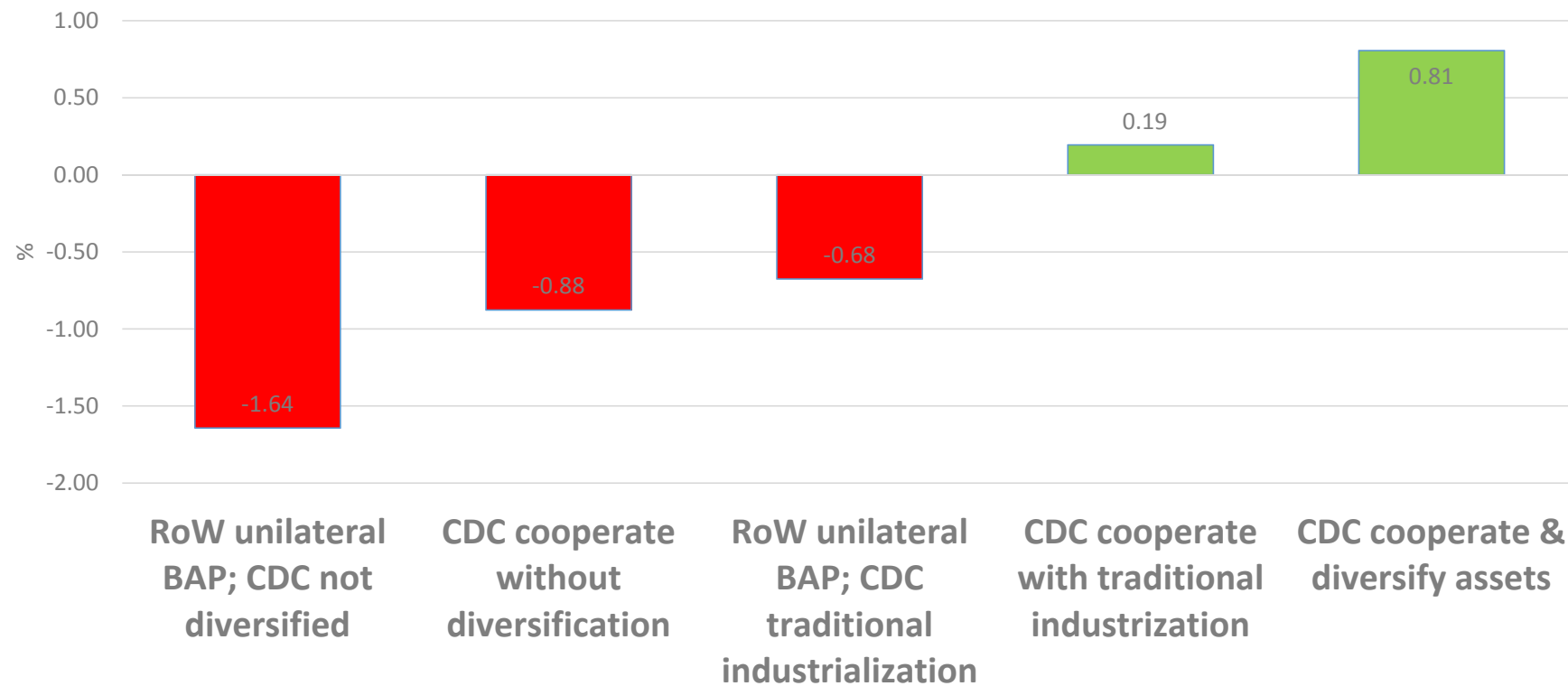
Total % Loss of Discounted GDP compared to BAU



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Diversification and cooperation in global climate action: Synergy for growth

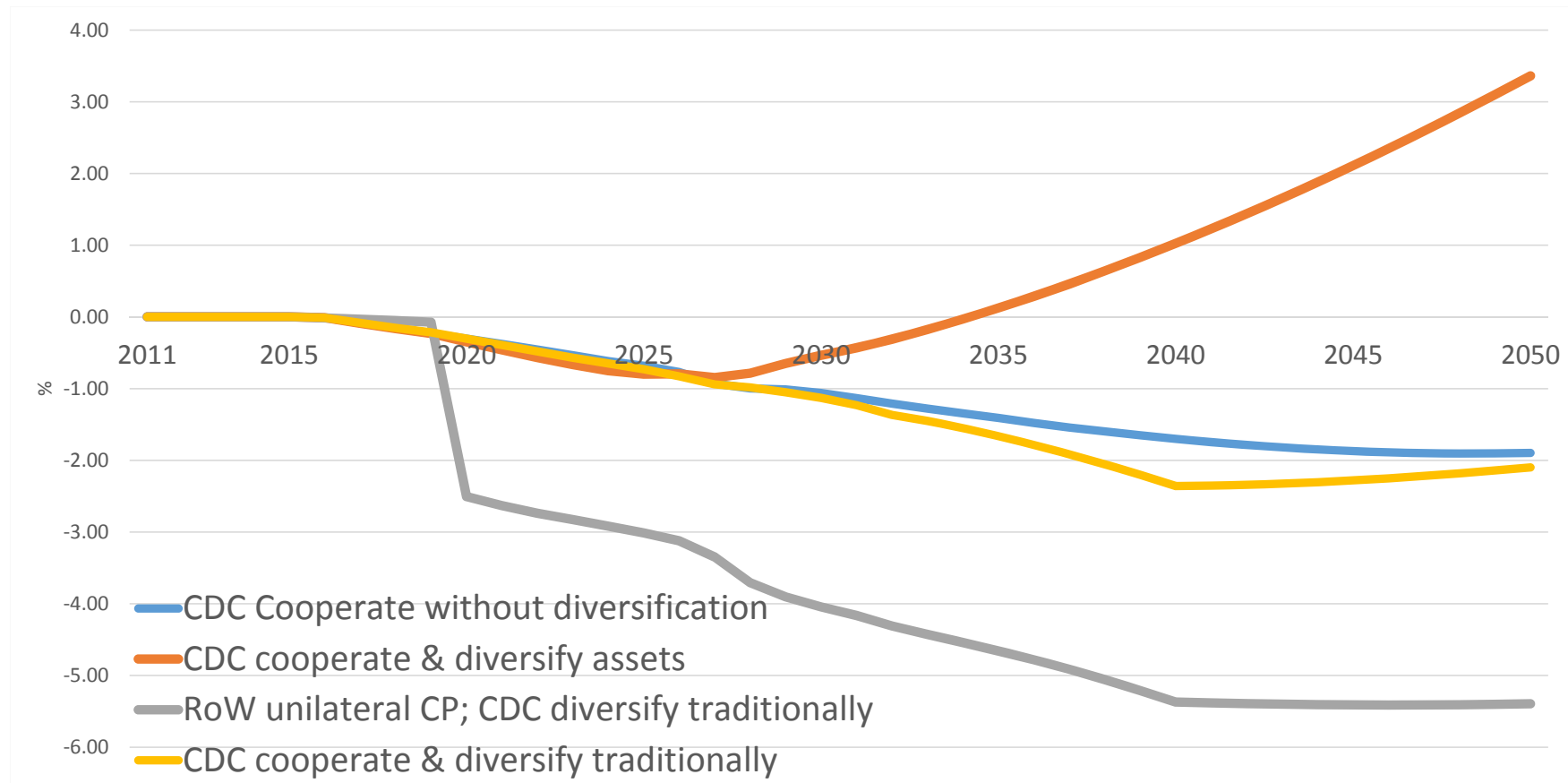
***Total Discounted GDP gains and losses for Carbon Intensive Countries
in % relative to the BAU scenario***



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Assets diversification and cooperation best risk hedge for the welfare of the people

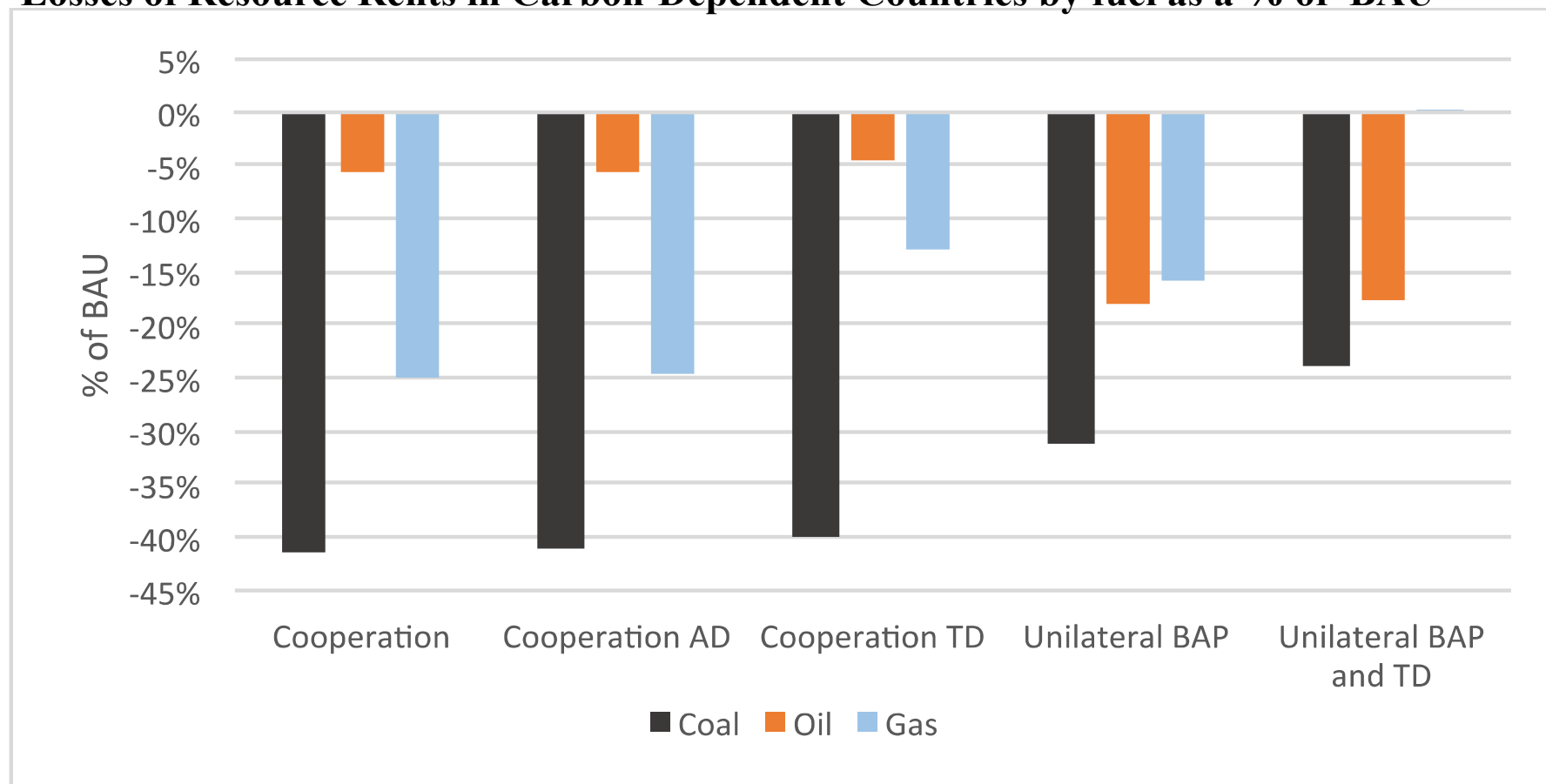
Real Consumption (Households and Government) against BAU (discounted over 2015-2050)



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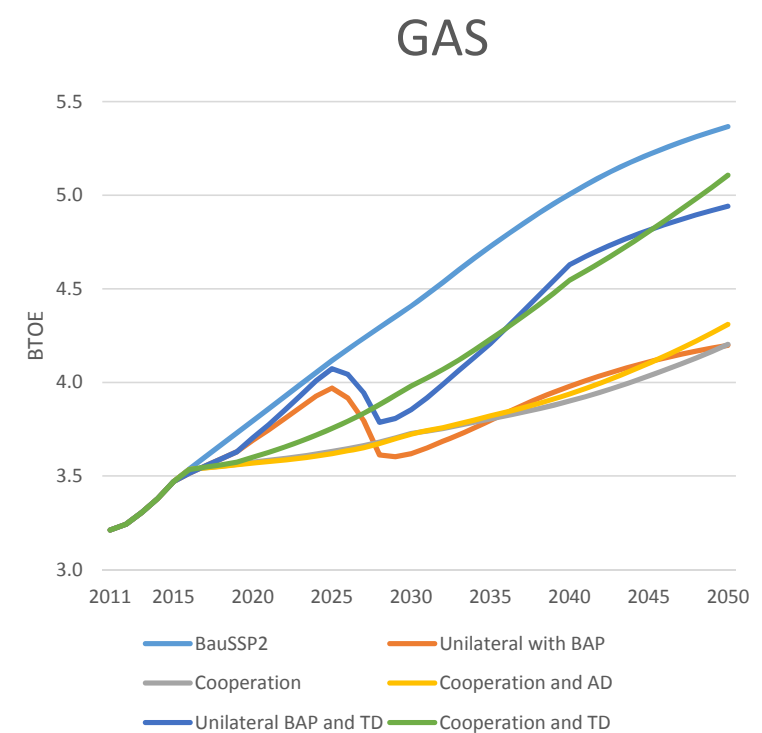
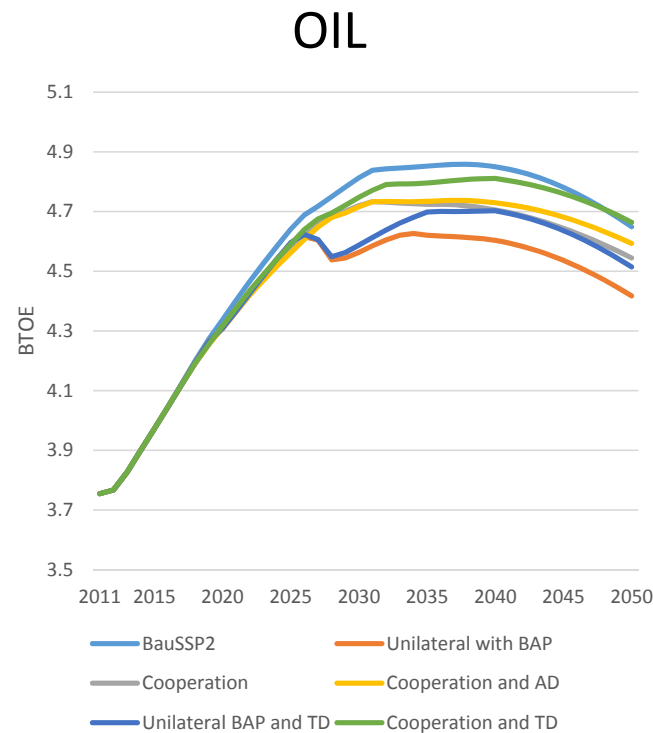
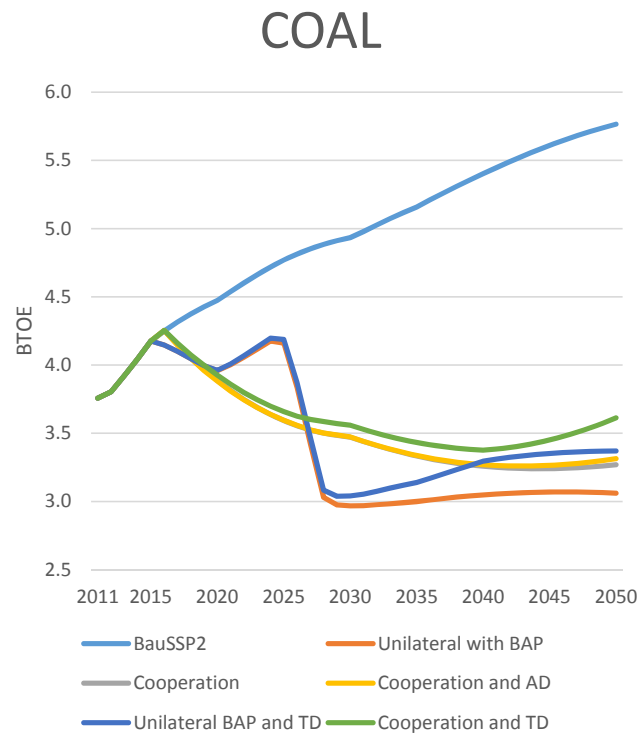
Traditional diversification reduces loss of reserves value, although effective coping strategies vary by fuel

Losses of Resource Rents in Carbon-Dependent Countries by fuel as a % of BAU



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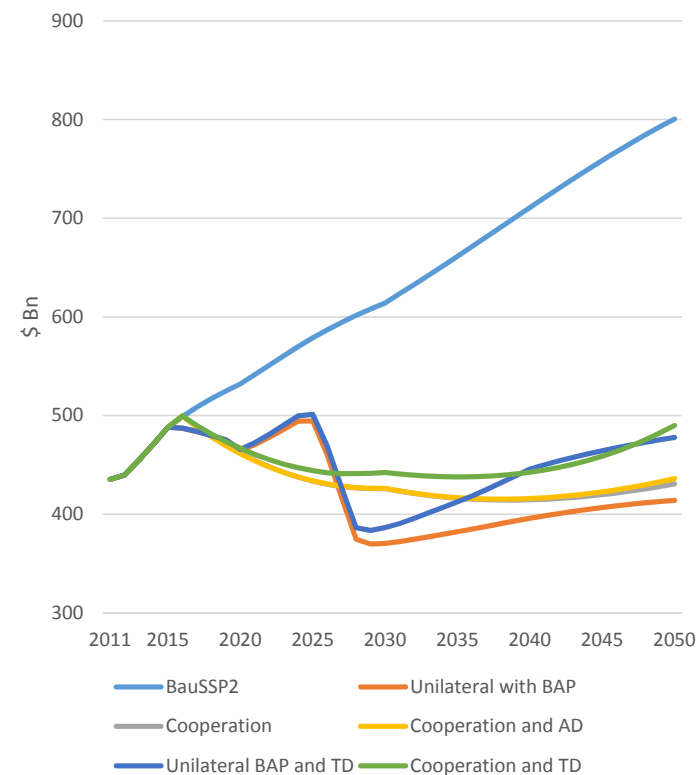
Quantity of global fuel demand under different scenarios (in BTOE)



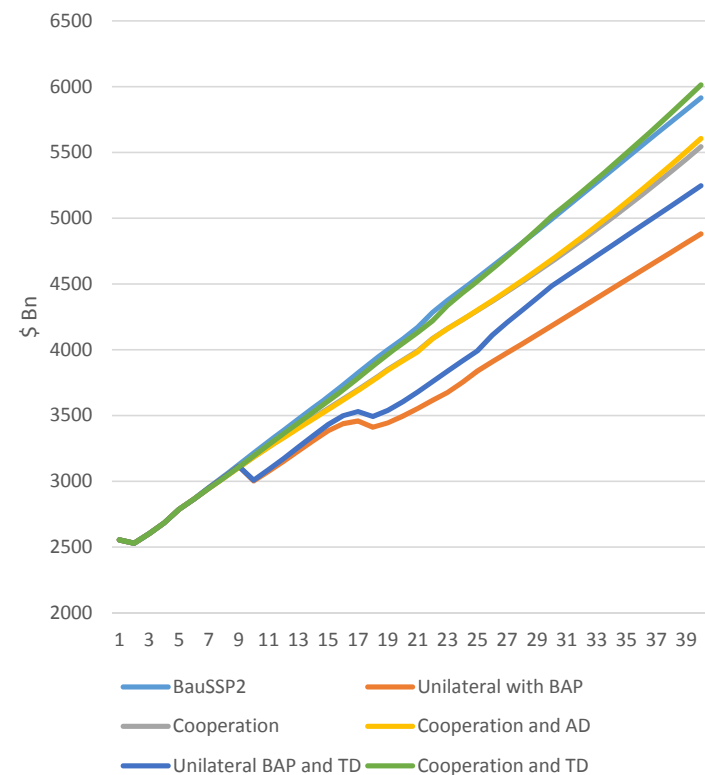
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Value of global fuel demand under different scenarios (in \$Bn)

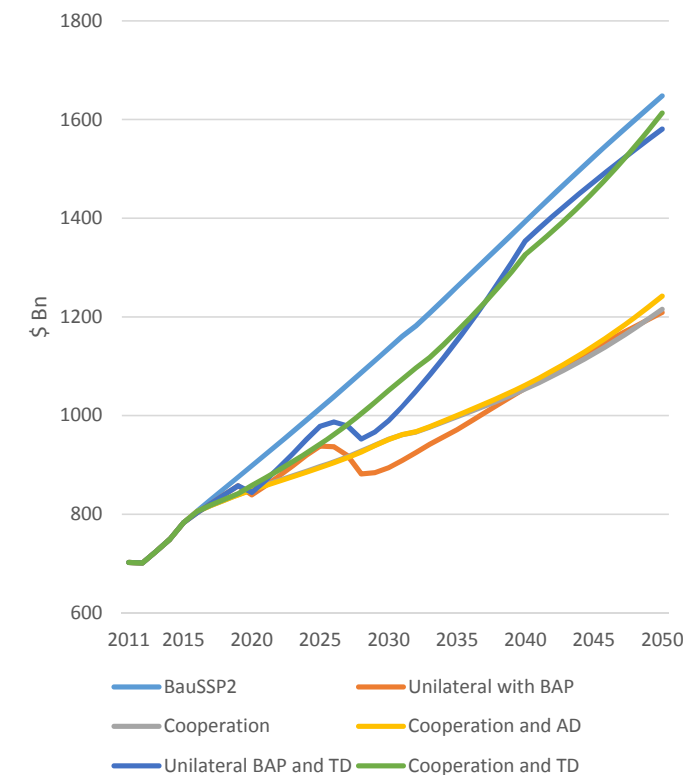
COAL



OIL



GAS

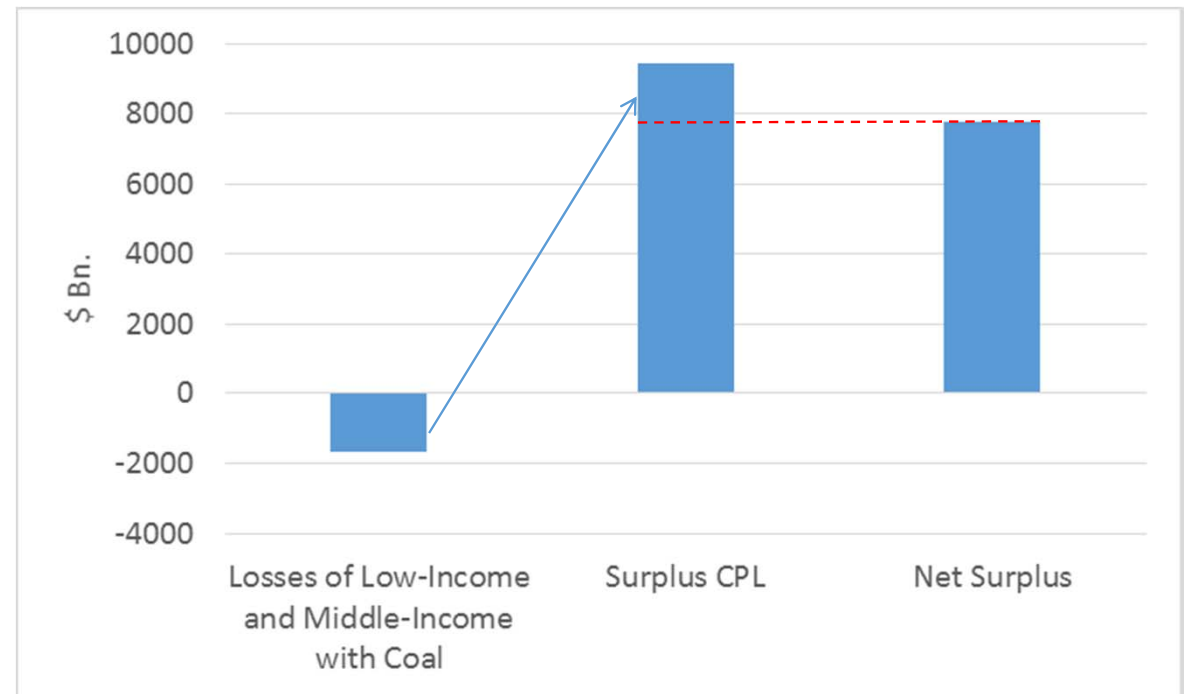


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Some low- and middle-income economies may need help to cope with near-term cost of diversification and climate policy actions

- Low-income countries with large, untapped oil/gas reserves and middle-income countries with coal reserves may face challenges finance diversification
- Leaders of climate action would have enough savings due to global cooperation on climate policy to help in transition

Gains and losses of the total discounted value added from cooperation for selected regions



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Diversification and climate policy action: Conclusions for carbon dependent nations

- Cooperation in global climate policy action looks worrisome if carbon-dependent countries remain dependent on fossil fuels and vulnerable. But it looks attractive from where these countries want to be – diversified and resilient.
- For carbon dependent countries diversification often means mitigation
- But how to diversify matters:
 - **Traditional economic diversification** through carbon intensive downstream industrialization may preserve some value of gas and hedge against cyclical volatilities;
 - **Broad asset diversification** increases productivity, economic flexibility and better hedges against risks of deep structural transformations if triggered by climate response measures
 - **Dynamic, adaptive diversification paths** needed
- Existing oil and gas exporters should be able to finance diversification from increasing resource revenues even in 2 degree scenarios, although competition may tighten
- Low- and middle-income economies with large, but yet untapped fossil fuel reserves in the ground, may find challenging to finance diversification.
- Savings from the global cooperation enjoyed by the leaders of climate action would be enough to help them diversify

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