

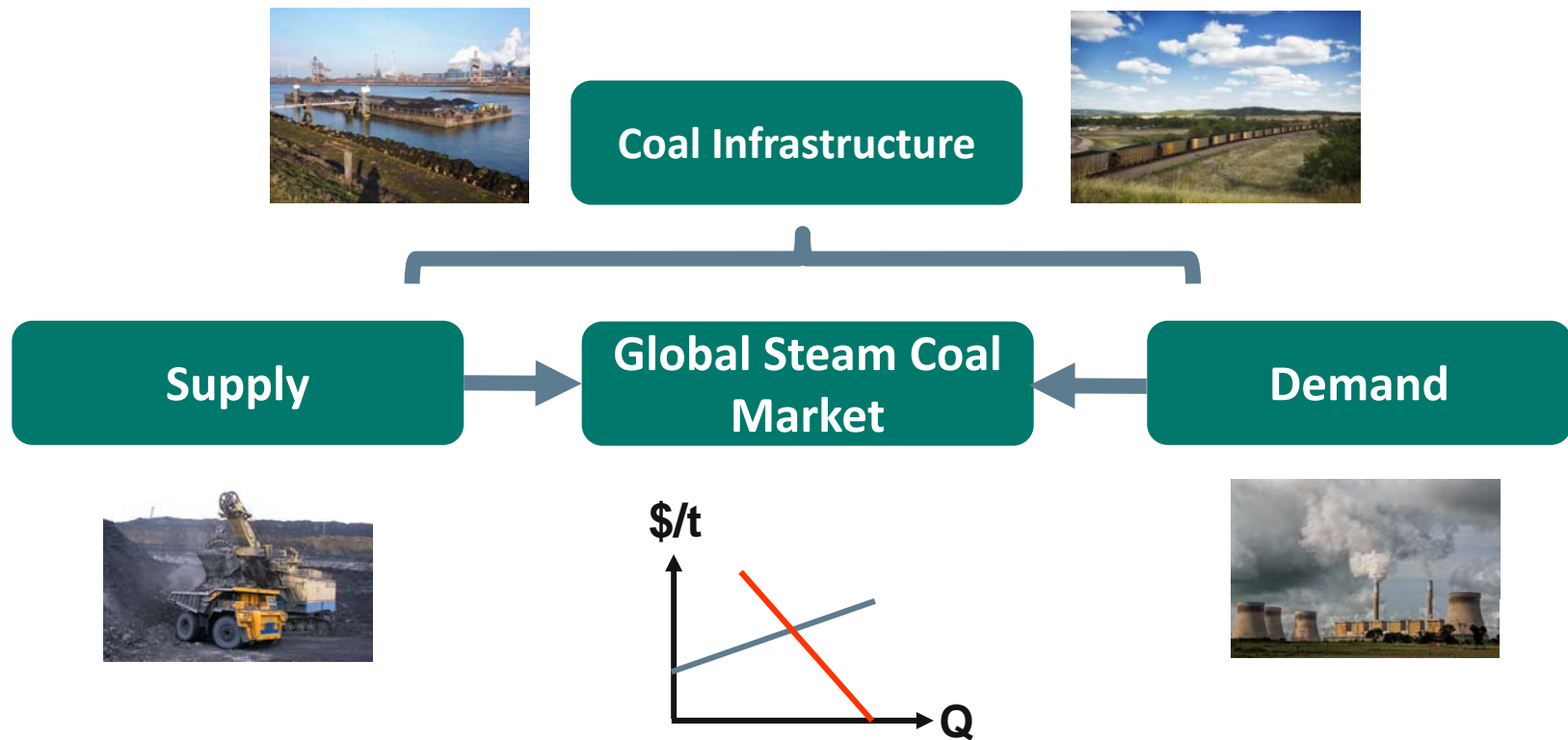
COALMOD-World

Impacts on Global Coal Trade under Alternative Coal Transition Scenarios

[Franziska Holz](#), Ivo Kafemann, Roman Mendelevitch, Tim Scherwath

COALMOD-World Model

A Representation of the Global Coal Value Chain

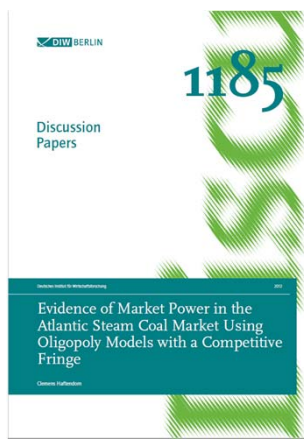


COALMOD-World Model: A unique and established quantitative framework

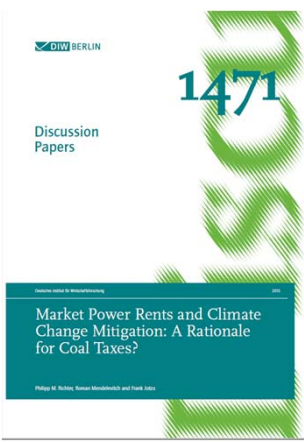


Single-period trade model (2010)

Other forms of market power:



Market power in the Atlantic (2012)



Export and production taxes (2015)

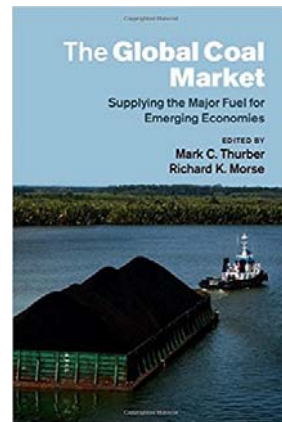
Assuming perfect competition:



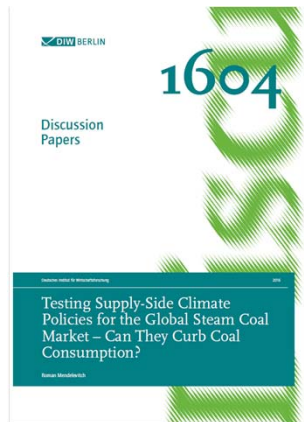
Multi-period global model (2012)



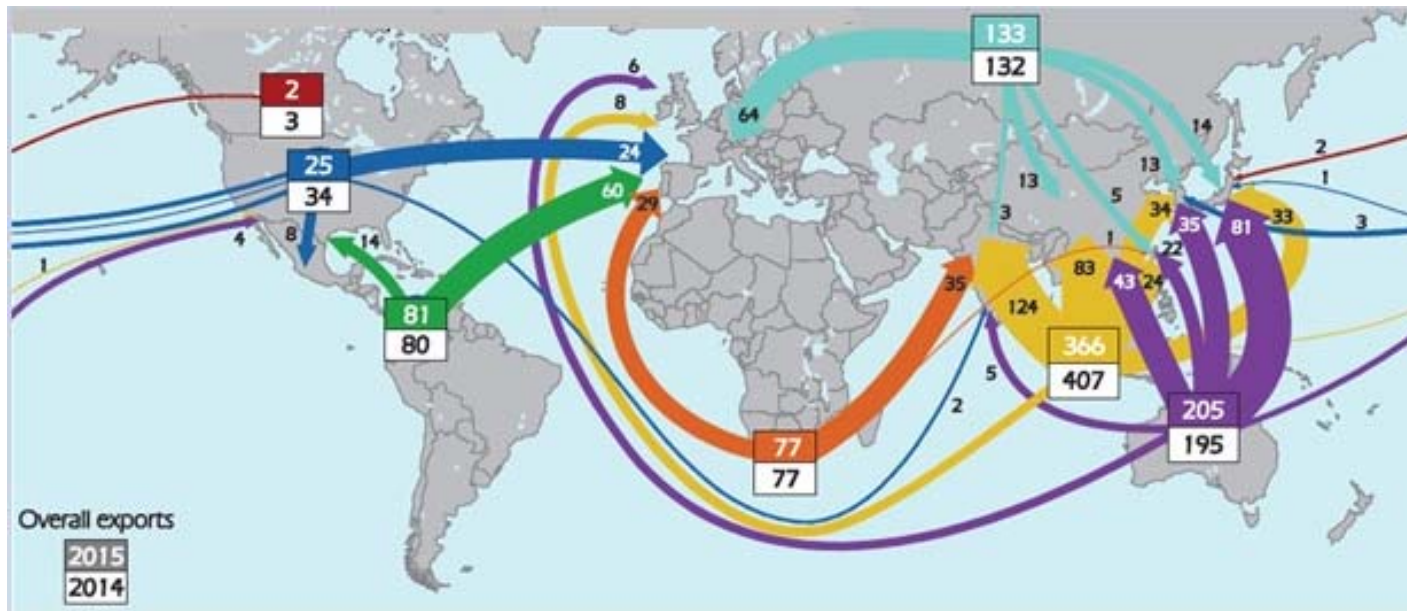
Climate scenarios (2013)



Multi-period global model (2015)



Supply side policies (2016)



Source: IEA (2016b)

Overview of world steam coal market: supply, demand, trade

Major producers in 2015

China (2,970 Mt)
 United States (690 Mt)
 India (590 Mt)
 Indonesia (450 Mt)

World production 5,835 Mt

Major consumers in 2015

China (3,140 Mt)
 India (750 Mt)
 United States (630 Mt)

World consumption 5,850 Mt

Seaborne Trade: 880 Mt (15%)

Source: IEA (2017)

Reference Scenario (NDC):

- Coal consumption based on IEA Coal Information 2012
- Growth rates of coal demand derived from WEO 2016 **New Policy Scenario**
- + Partial equilibrium on regional level due to overarching consistent quantitative framework
- + Incorporating NDC policies in different countries/regions

450 ppm Scenario (2° C):

- Coal consumption based on IEA Coal Information 2012 and growth rates derived from WEO 2016 450 ppm scenario (consistent with the 2° C target)
- Note that the IEA assumes strong use of CCS (430 GW of power plants using CCS in 2040)

Enhanced Coal Transition Scenario (ECT):

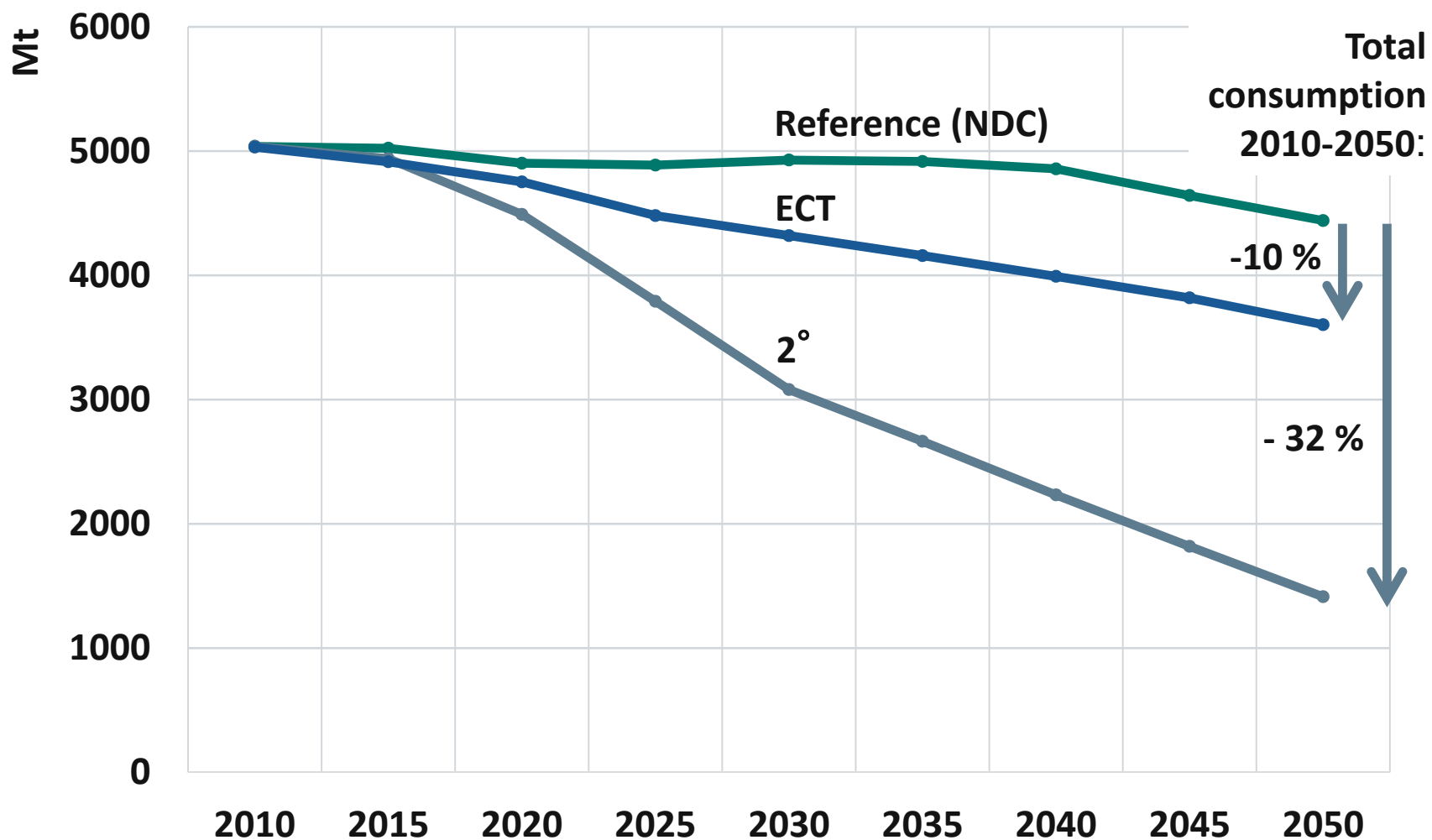
- Enhanced information on national transition scenarios from the project country teams
- Based on NDC scenario
- + Better reflection of drivers of coal transition on country level

Enhanced Coal Transition Scenario 2 (ECT 2):

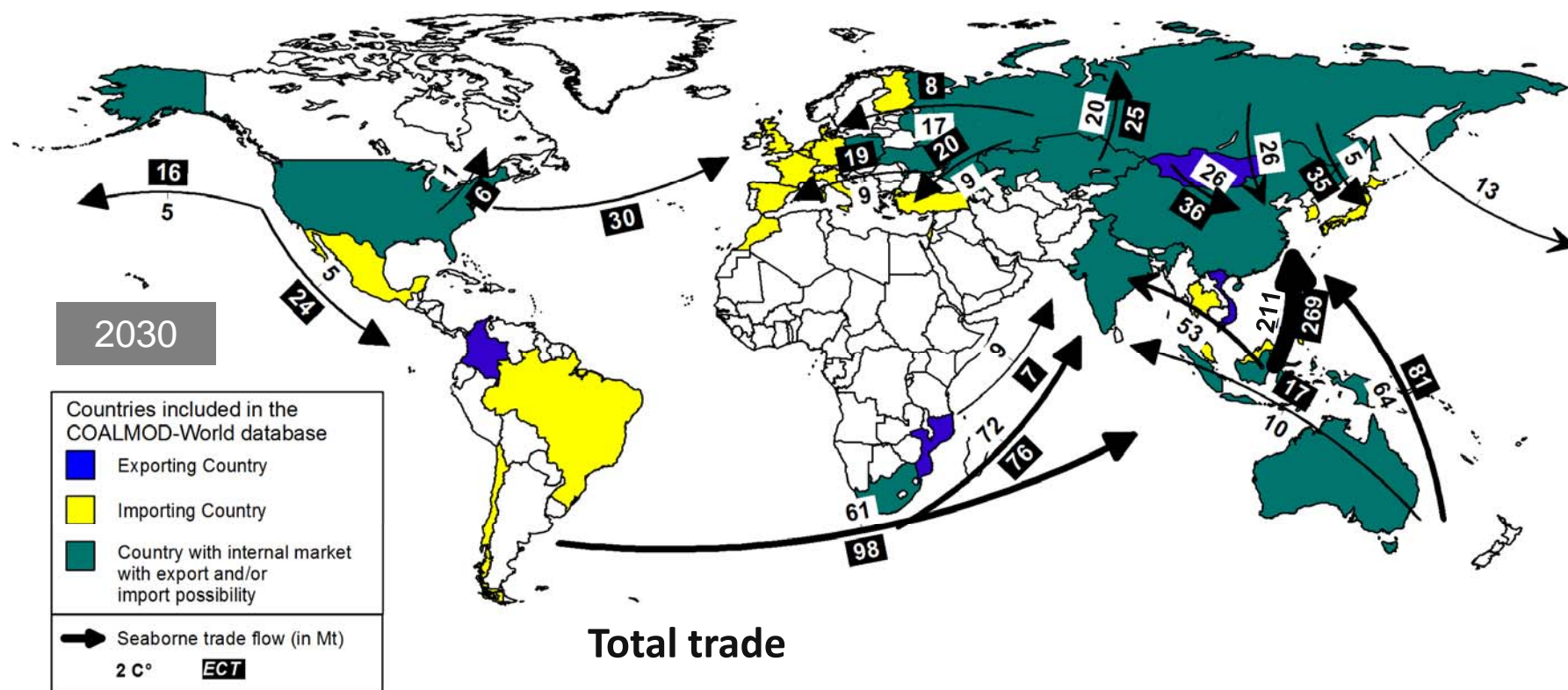
- As ECT, except for India and China
- + Adequate reflection of drivers of coal transition on country level

Top-
Down

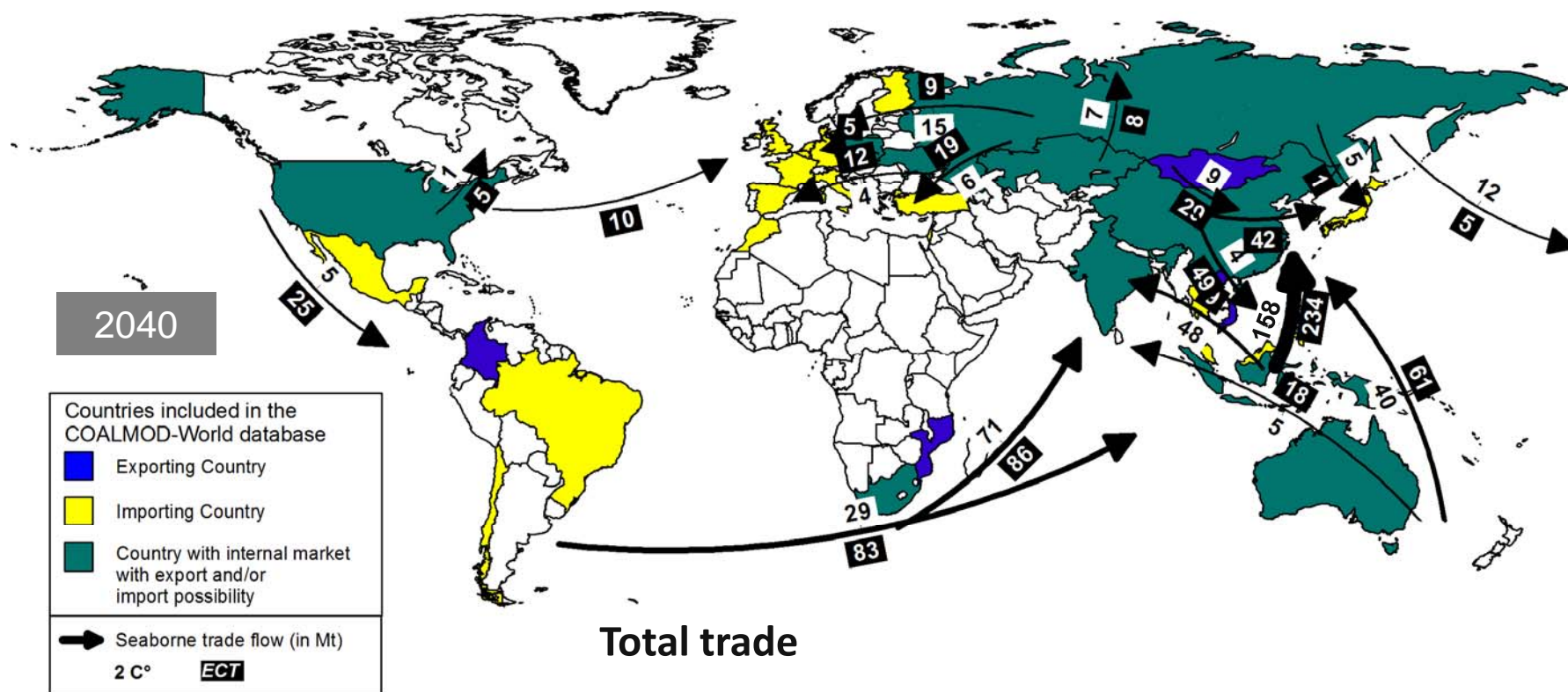
Bottom
- up



Ongoing trend: the shift to Asia and especially India



High-cost suppliers (to Asia) increasingly lose market share, even more so in lower-demand 2° C climate scenario.

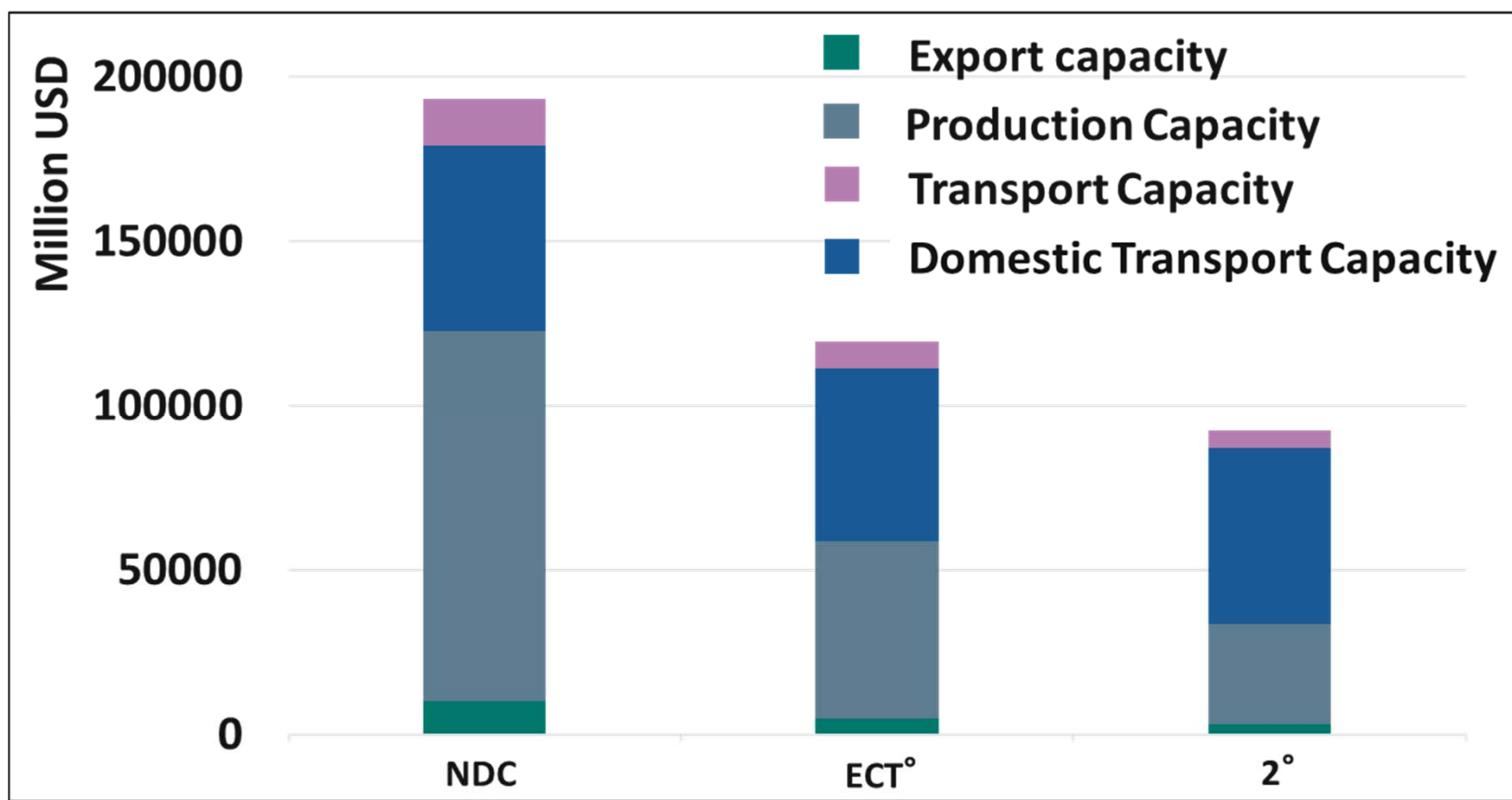


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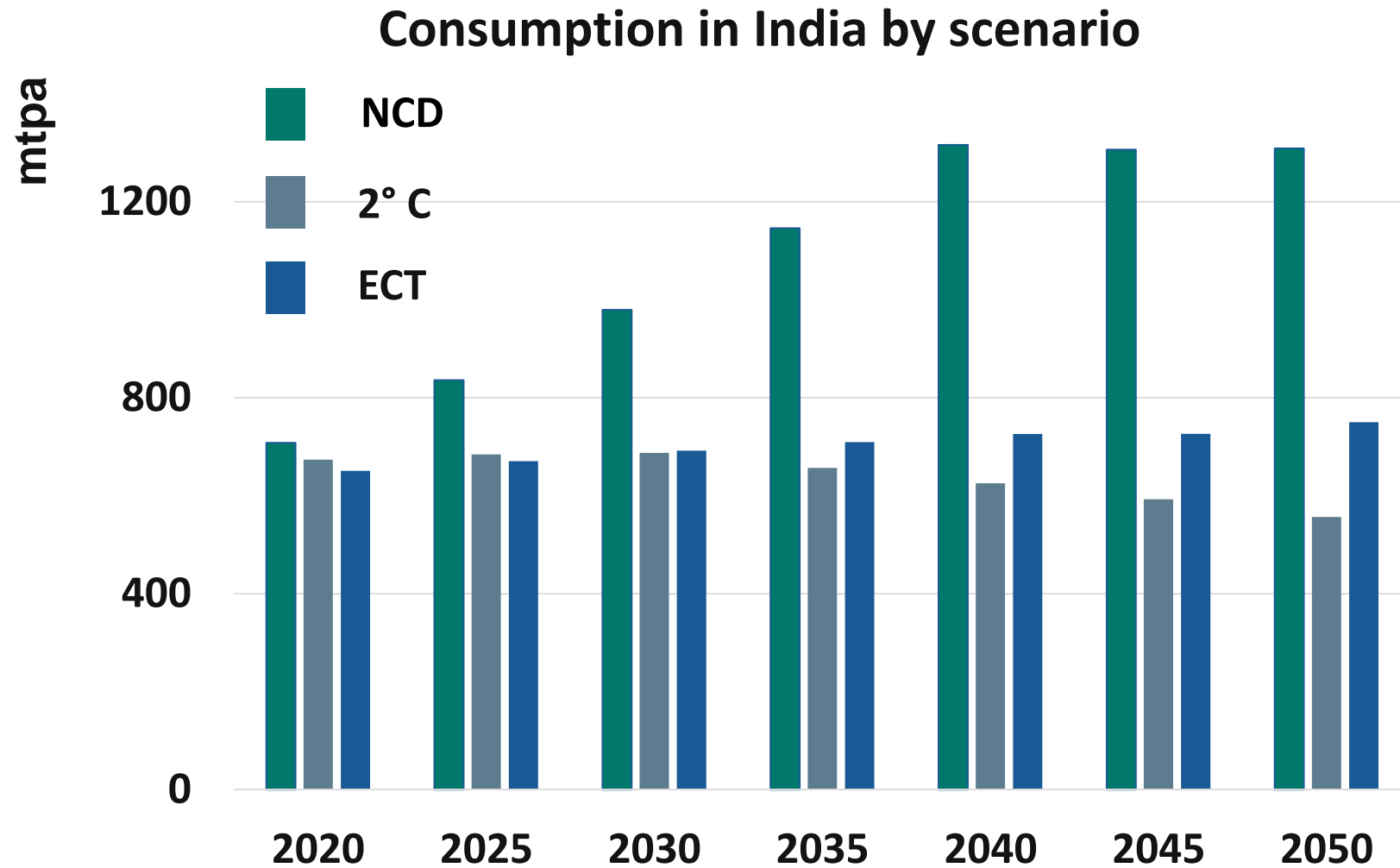
COALMOD-World Results: Investments in the Coal Value Chain

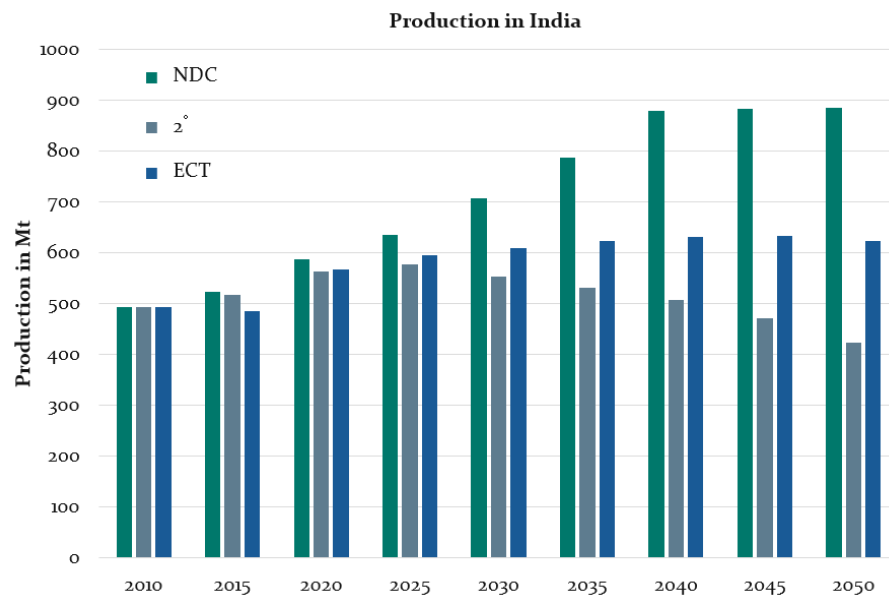
In climate-friendly scenarios, investments compensate for mine mortality and remove transport bottlenecks.

Even in a NDC world such as in the ECT scenario, investment needs can be considerably reduced compared to the reference case.



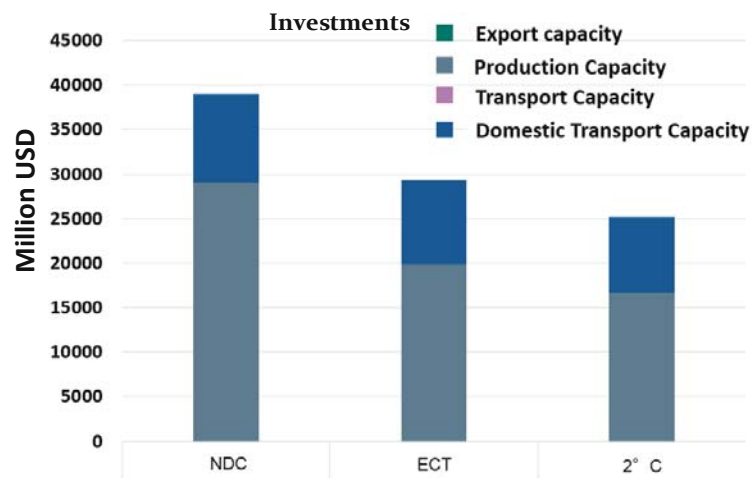
A Detailed Look at India





India's expansions plans for its domestic coal production are adding uncertainty for exporters to India

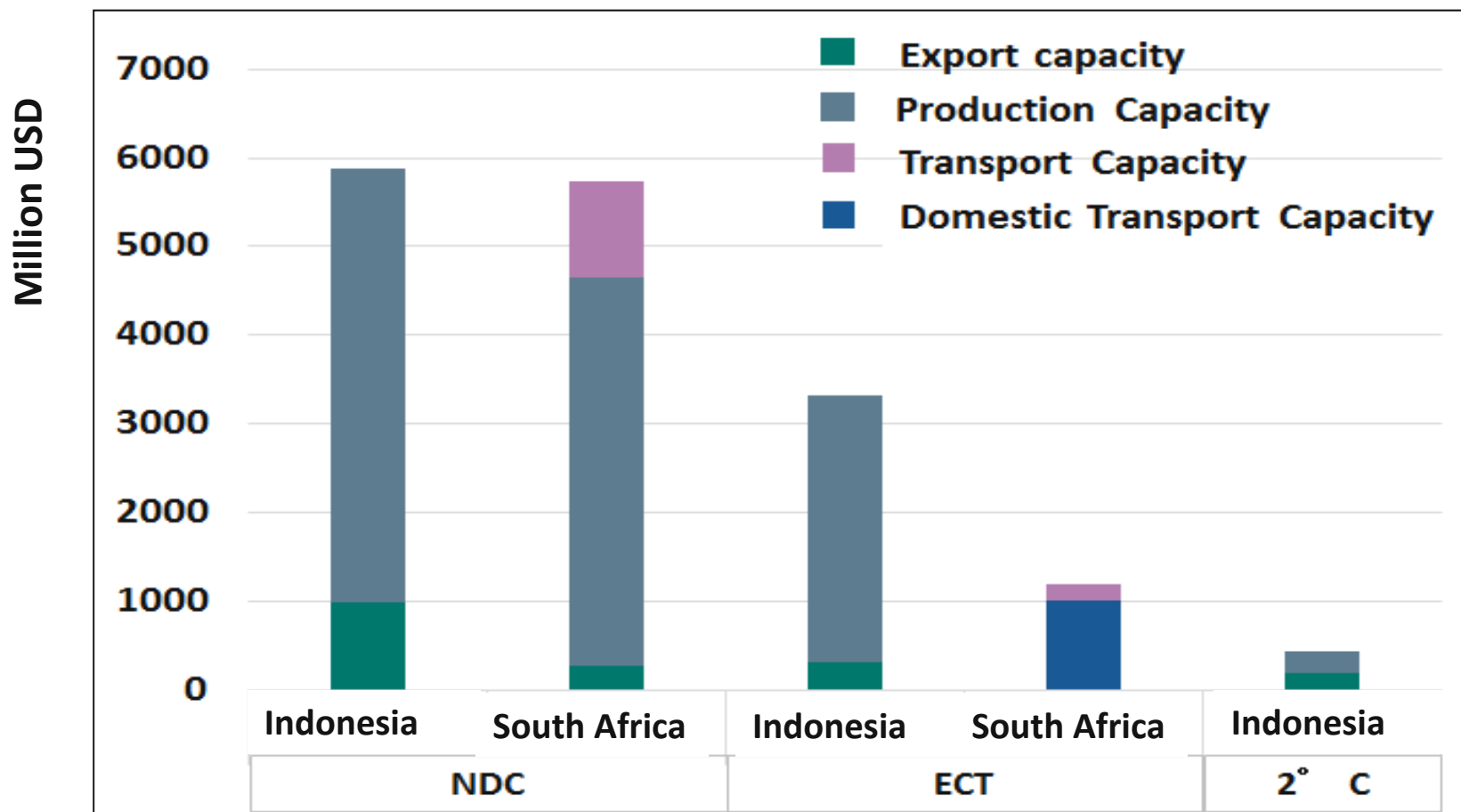
In addition, Indian coal companies are looking for coal production capacities outside of India (cf. Adani investment in Australia)

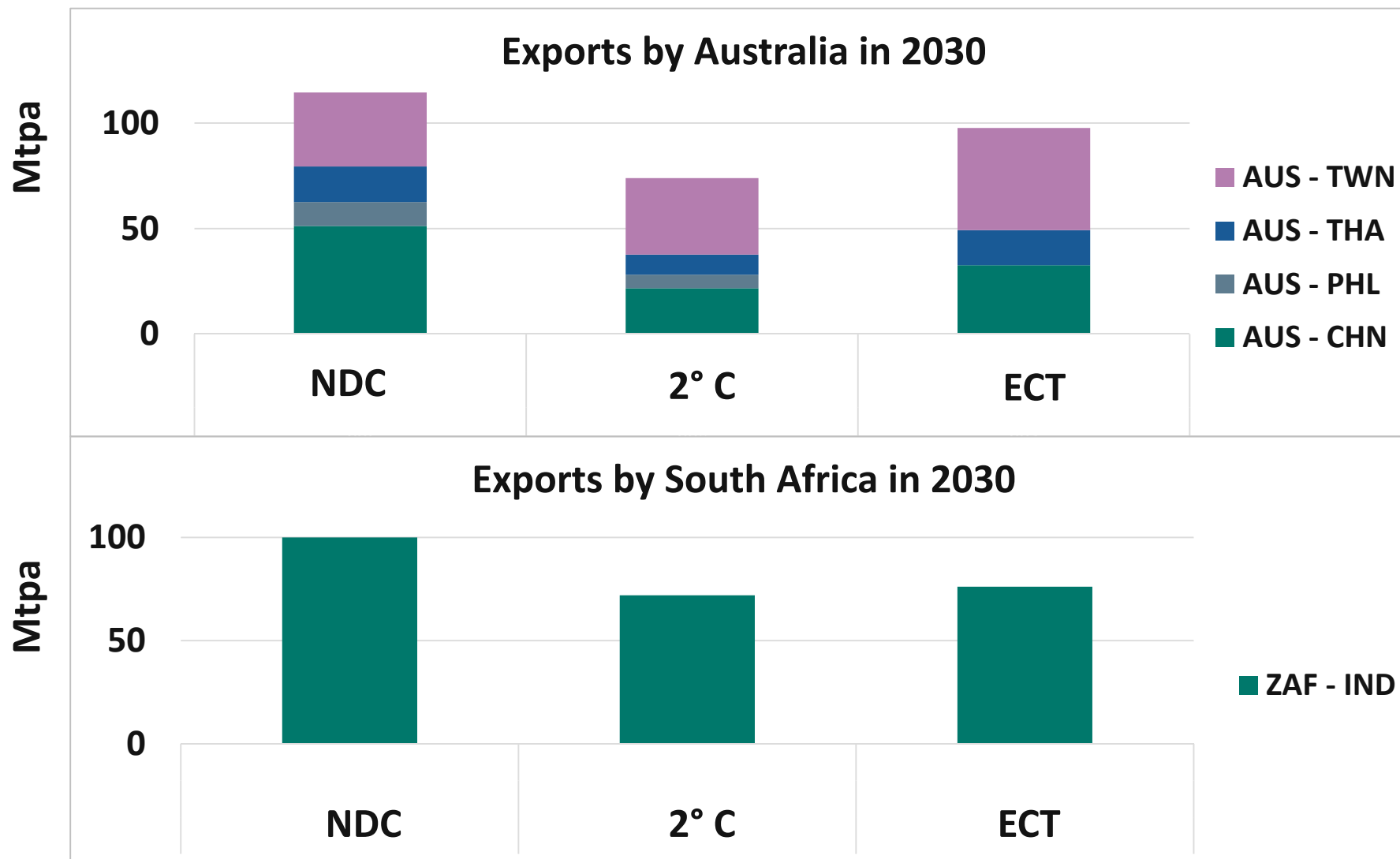


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Investments in Key Exporting Countries to India

Risk of asset stranding may arise quickly

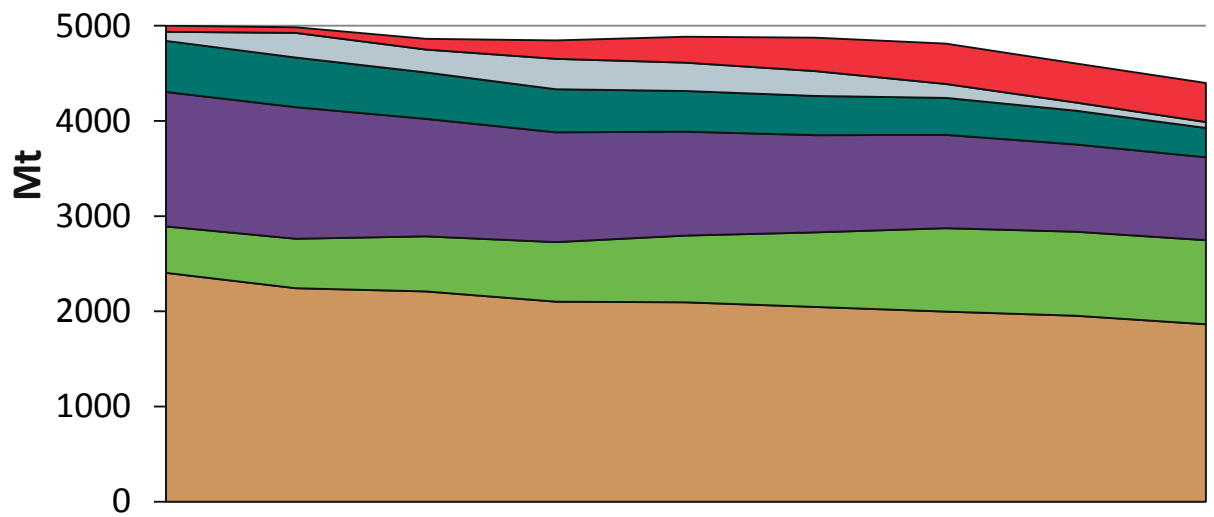




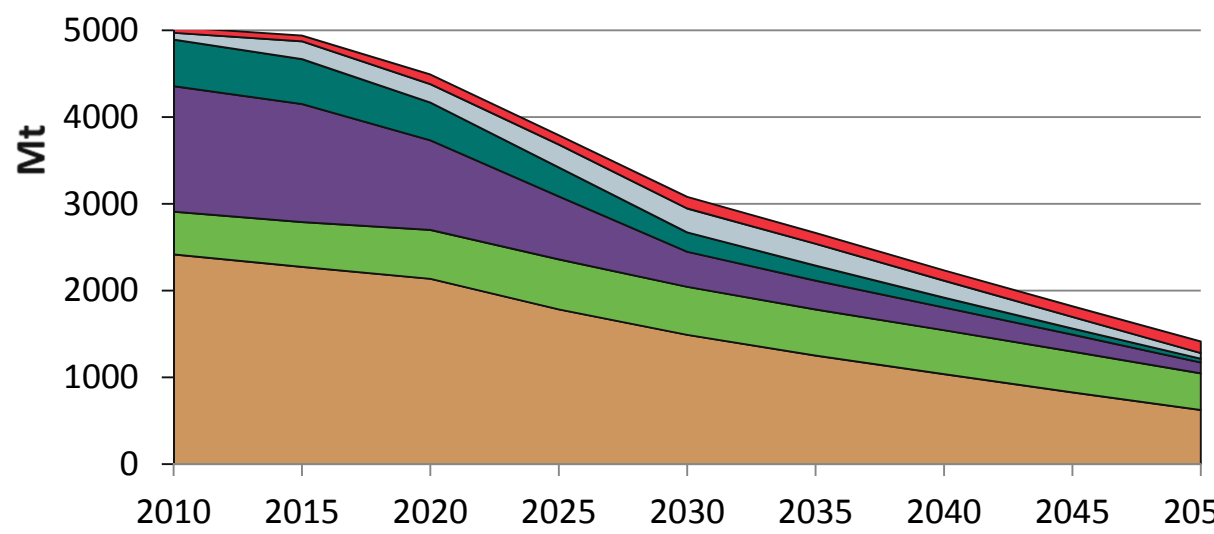
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Summarizing COALMOD Results: Reference vs. 2° C Scenario

Reference (NDC)



2° C

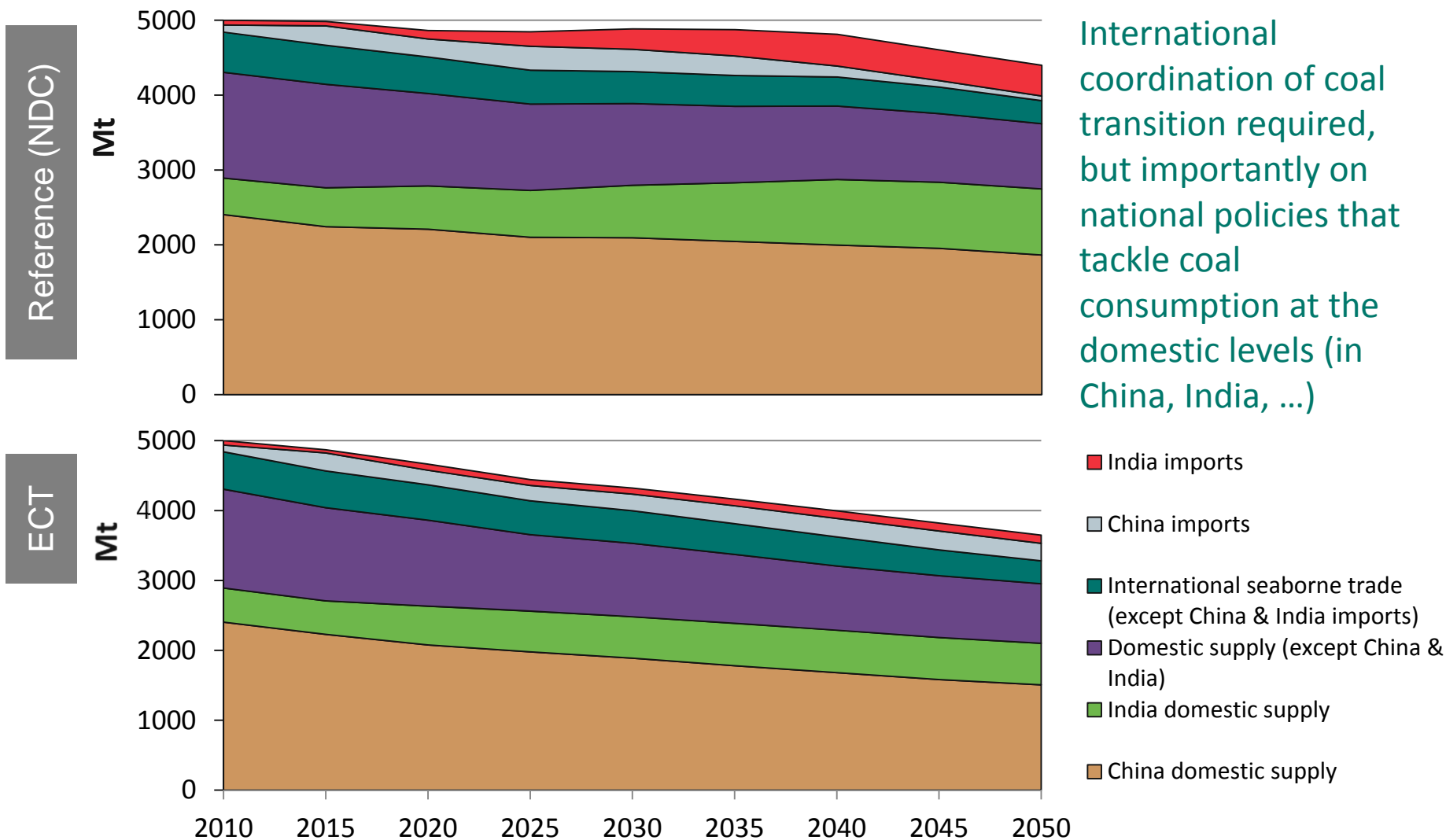


Shift to Asia – in particular India – in all scenarios.
China remains the largest coal consumer in all scenarios

- India imports
- China imports
- International seaborne trade (except China & India imports)
- Domestic supply (except China & India)
- India domestic supply
- China domestic supply

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Summarizing COALMOD Results: Reference vs. ECT Scenario



- Global coal market modeling shows that there is a broad range of possible futures that are NDC-compatible
- Additional policies are needed to close the gap between NDC/ECT and 2° scenarios
- Governments need to take into account that stakeholders might oppose – even low-ambitious – climate policies because of the fear of losing market shares and foregoing revenues from reserves and capacities (asset stranding)
 - In particular in South Africa, but also Australia, Indonesia, ...
 - Overcapacity from high investments and rising concentration on market → Pressure on prices and revenues → Transition policies should address this “revenue gap”

Insights from a Global Coal Model

Thank you very much for
your attention!

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