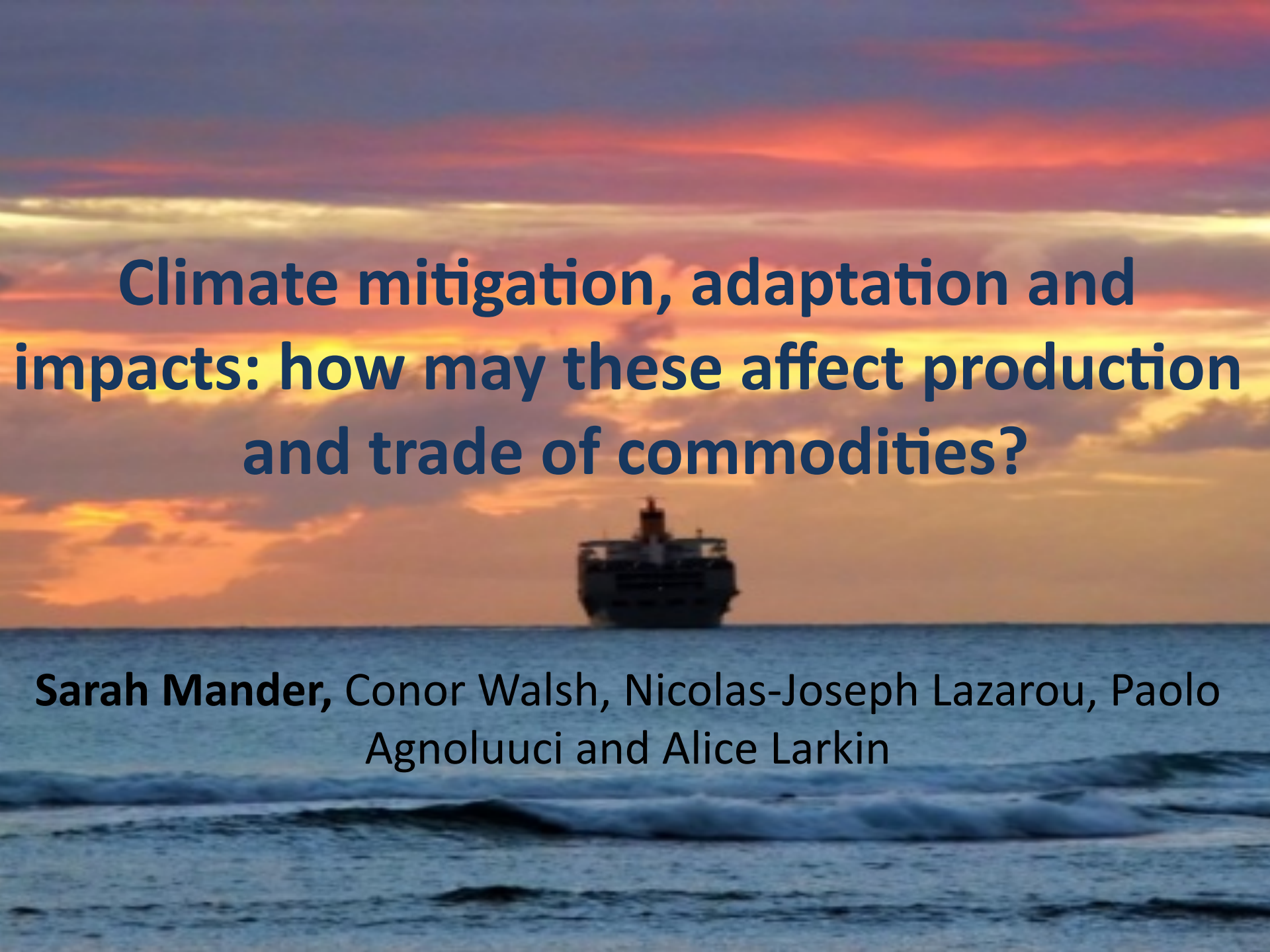


Climate mitigation, adaptation and impacts: how may these affect production and trade of commodities?

Sarah Mander, Conor Walsh, Nicolas-Joseph Lazarou, Paolo Agnoluuci and Alice Larkin

Overview

- Climate change context
- Scenarios
- Our method
- Production results
- Summary

The Paris Agreement

- To hold…. “the increase in the global average temperature to well below 2 °C above pre-industrial levels”
- “… to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels”.
- This suggests:
  - A radical mitigation agenda
  - No historical precedent
  - Rapid transition to low carbon infrastructure (including energy)
  - Fundamental shift towards low-GHG agriculture

Current trends – heading for 4°C

- Sum of national pledges on emission reductions (INDCs) equate to >3.5 - 4 °C
- Current emission trends could result in 4 °C as early as 2060, more likely by 2100
- This suggests:
  - » Incremental changes to business as usual
  - » Continued fossil fuel use
  - » The need for adaptation to uncertain climate impacts
- There is huge contrast between the future we say we aspire to, and the one we are heading for
- Scenarios are a way of exploring these futures

What are scenarios?

- Scenarios are not forecasts
- Scenarios are not predictions
- Scenarios **are** visions which allow researchers/decision makers to explore possible futures
- They provide a structured framework to allow different assumptions to be brought to life
- They facilitate communication between different actors

Scenarios are 'learning machines'

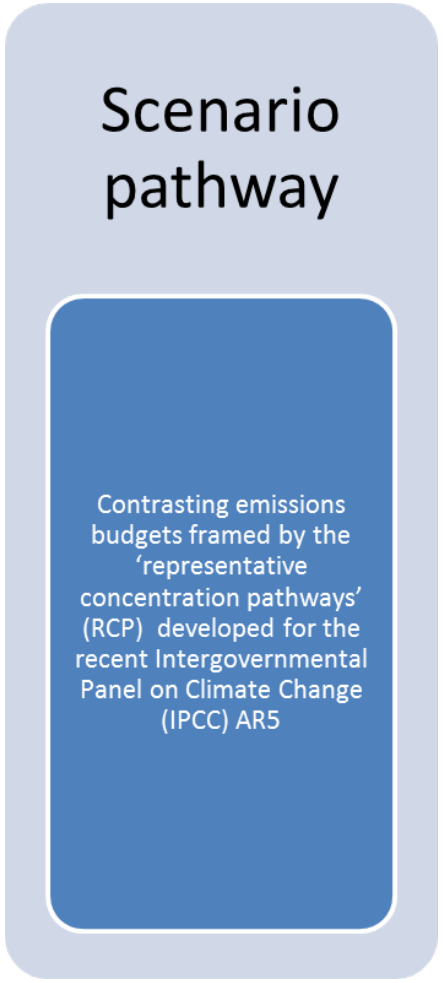
The SCC scenarios (1)

- Building mitigation and climate impact **scenarios for the shipping system while taking into account implications for international trade**

The SCC scenarios (2)

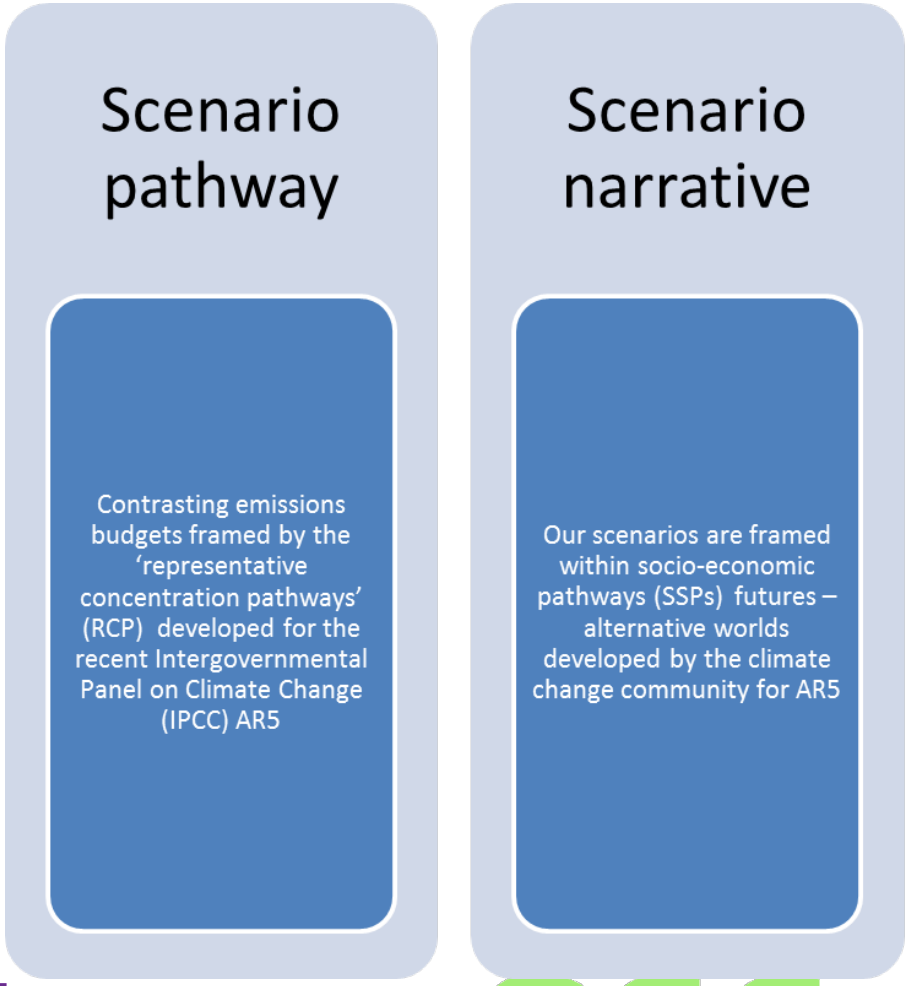
Narrative	• Frame the scenarios • Differentiate between scenarios • Aids communication • Informs the quantitative model assumptions
Trade assumptions	• By ship type e.g. wet bulk, container etc. • Quantity shipped • Distance shipped
Ship technology	• New technology • Operations • Informed by theme 1
External factors	• Other non-trade model inputs • E.g fuel price • Informed by theme 3

Trade scenario method (1)



- Mitigation – framed by a 2°C emission pathway (RCP2.6)
- Adaptation – framed by a 4°C emission pathway (RCP8.5)

Trade scenario method (2)



Trade scenario method (3)

	Adaptation challenge	Mitigation challenge
SSP1: Taking the green road (sustainability) 2DC	Low – policy orientated towards sustainability; rapid development; high human capital; reduced inequality	Low – environmental awareness; actual or potential low carbon technology change; effective institutions and international co-operation
SSP2: Middle of the road 2DC, 4DC	Moderate challenges to adaptation as a result of moderate development trends	Moderate challenges to mitigation as a result of moderate development trends
SSP5: Taking the highway (fossil fuelled development) 4DC	High economic growth assisting adaptation capacity	Mitigation challenges dominate – high energy demand; fossil fuel dominated energy supply; lack of international co-operation

Trade scenario method (4)

Scenario pathway

Contrasting emissions budgets framed by the 'representative concentration pathways' (RCP) developed for the recent Intergovernmental Panel on Climate Change (IPCC) AR5

Scenario narrative

Our scenarios are framed within socio-economic pathways (SSPs) futures – alternative worlds developed by the climate change community for AR5

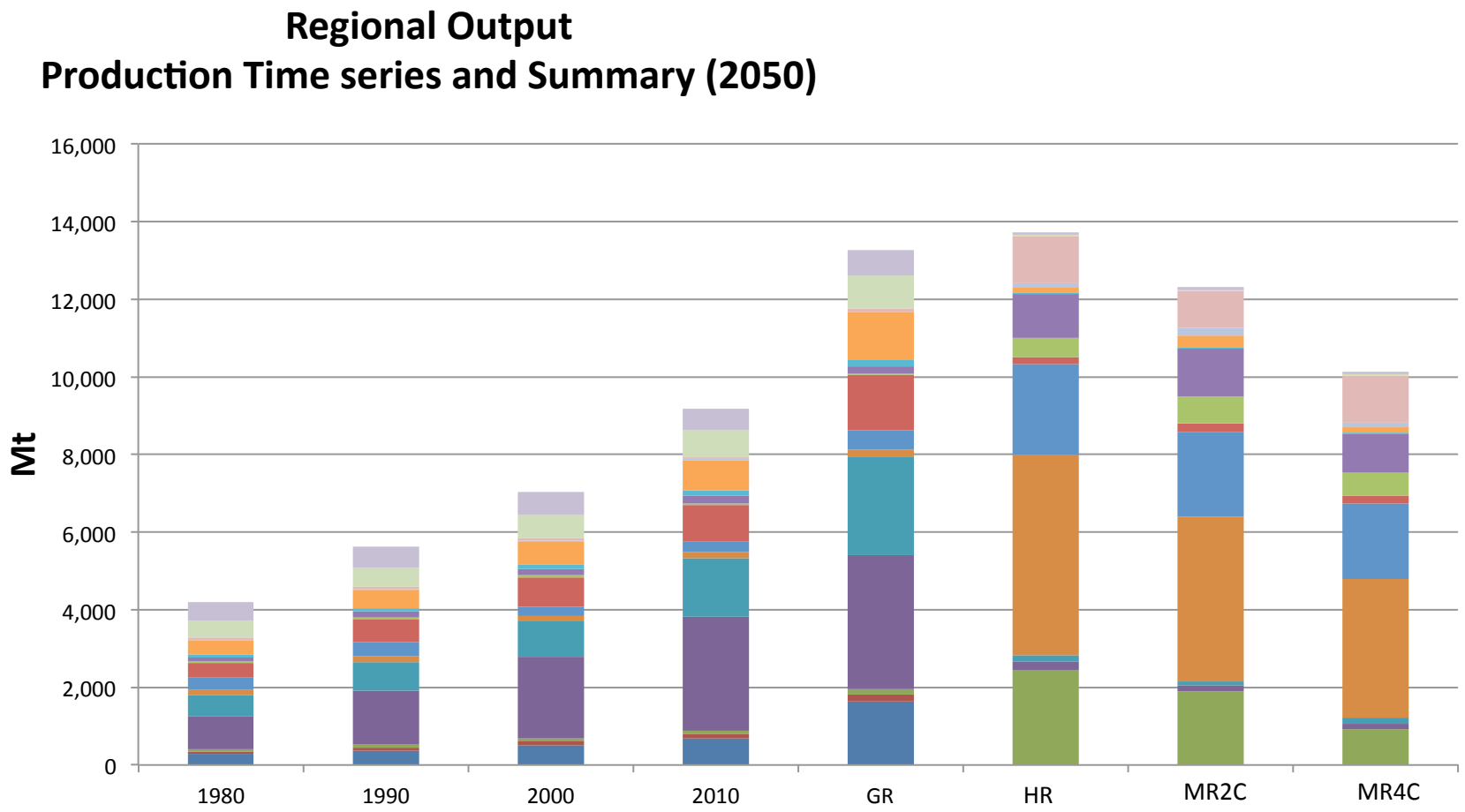
Trade quantification

Based on the econometric analysis:

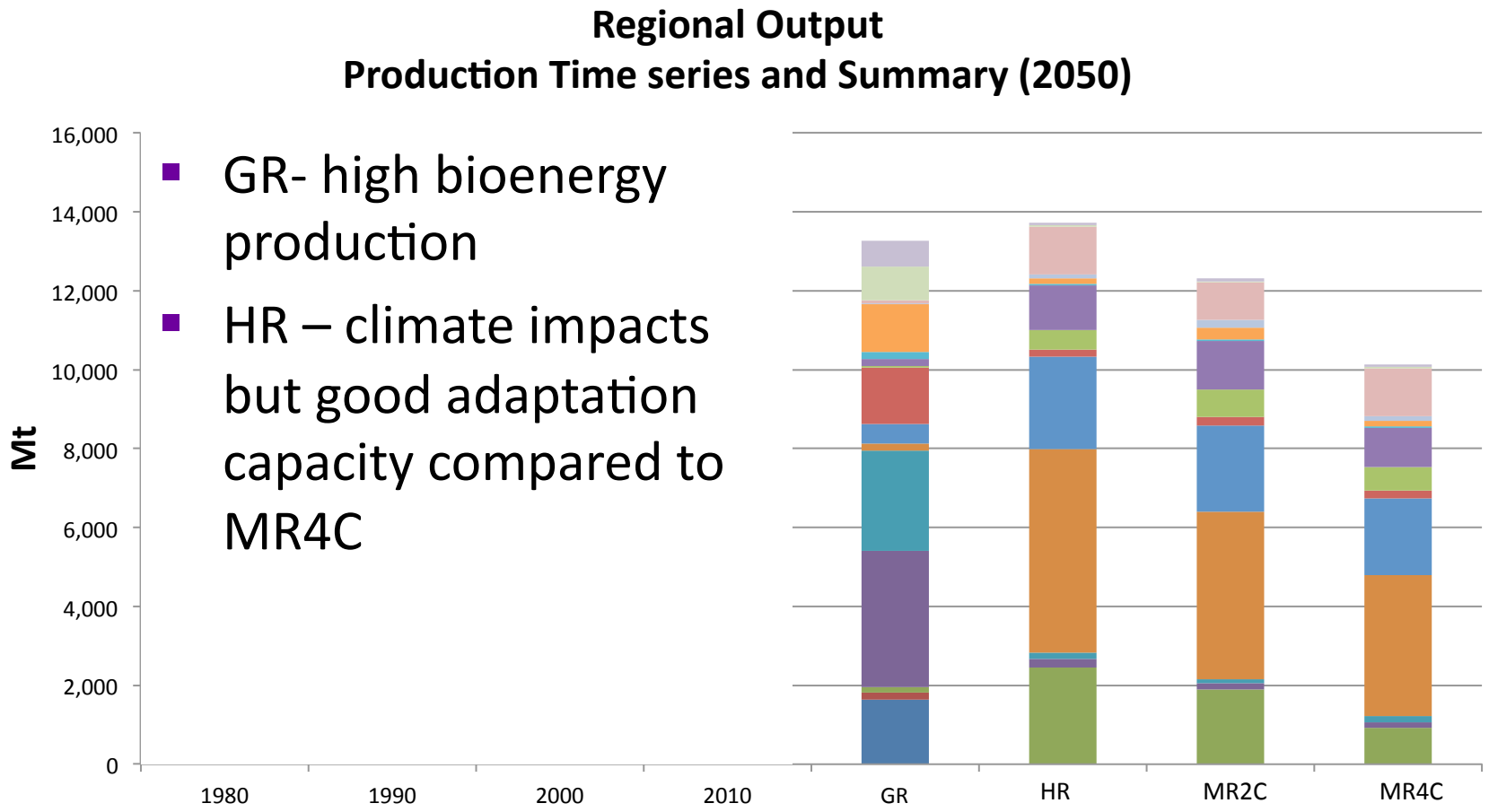
Exports between 2 nations are a function of national GDP (taken from SSP database), transport costs (defined by SCC project) and a commodity specific element

Commodity specific element developed on basis of the historical case studies and assessment of indirect impacts of climate change work

Results (1) - Agriculture

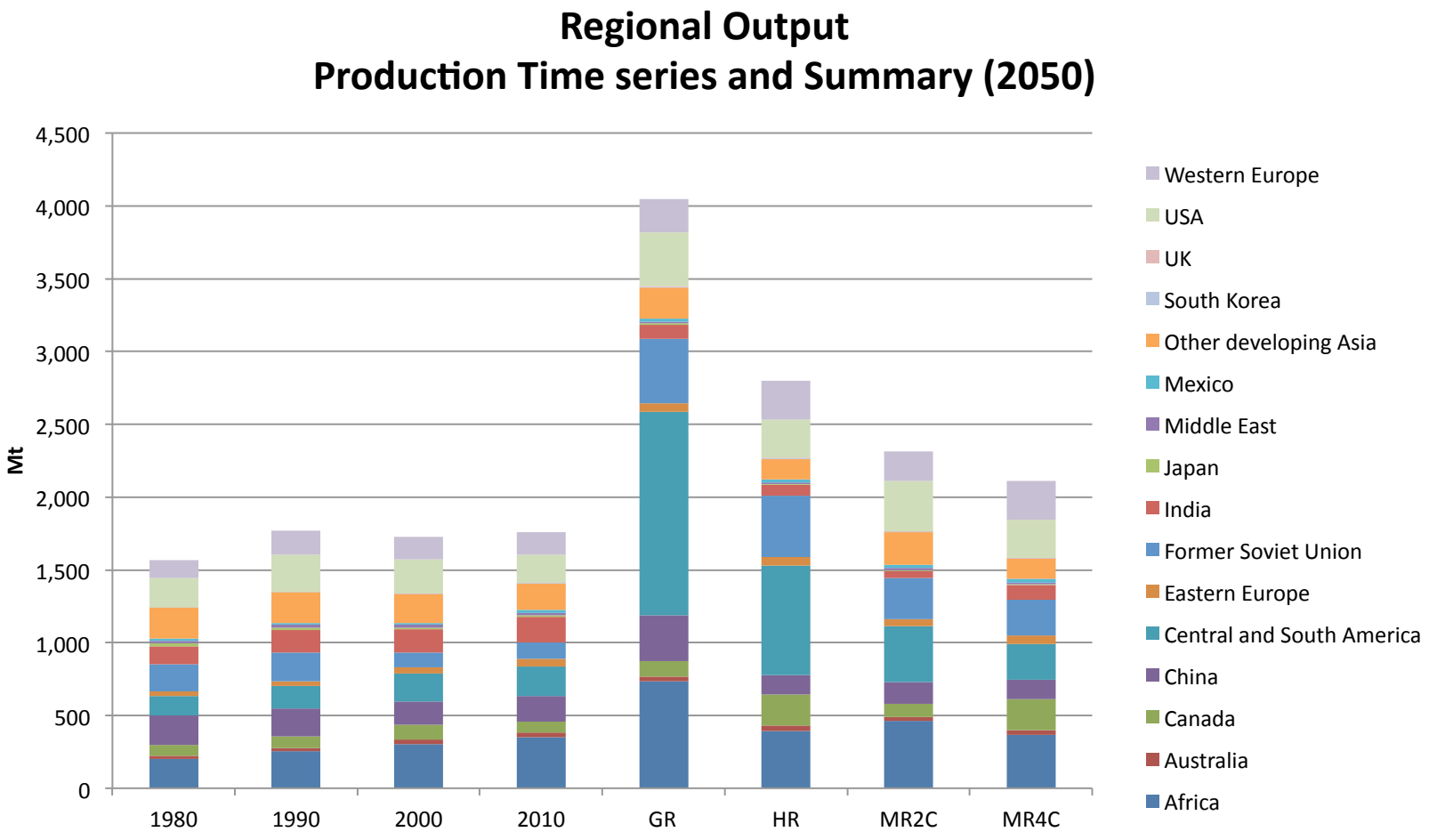


Results (1) - Agriculture

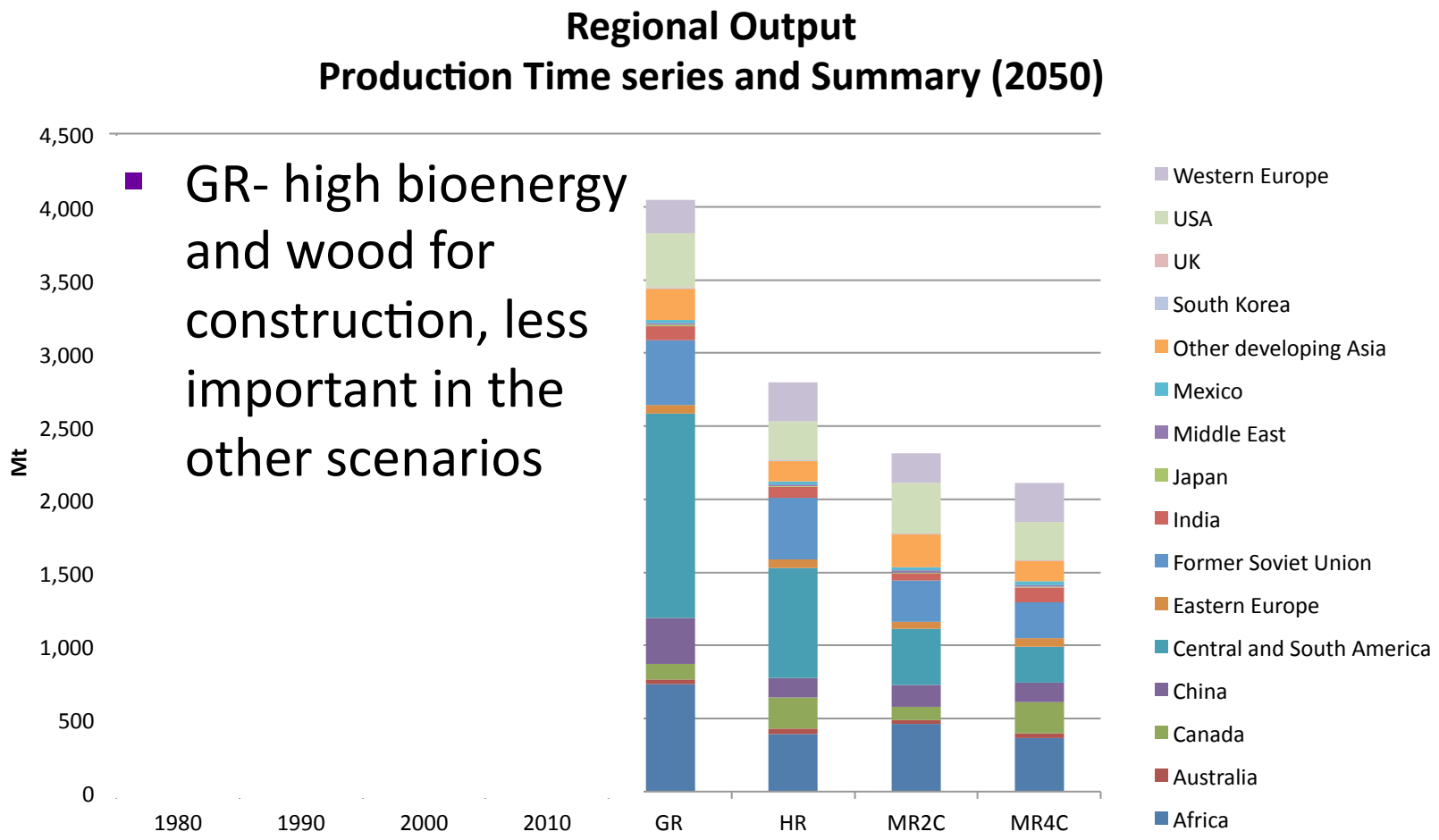


- GR- high bioenergy production
- HR – climate impacts but good adaptation capacity compared to MR4C

Results (2) - Forestry



Results (2) - Forestry



- GR- high bioenergy and wood for construction, less important in the other scenarios

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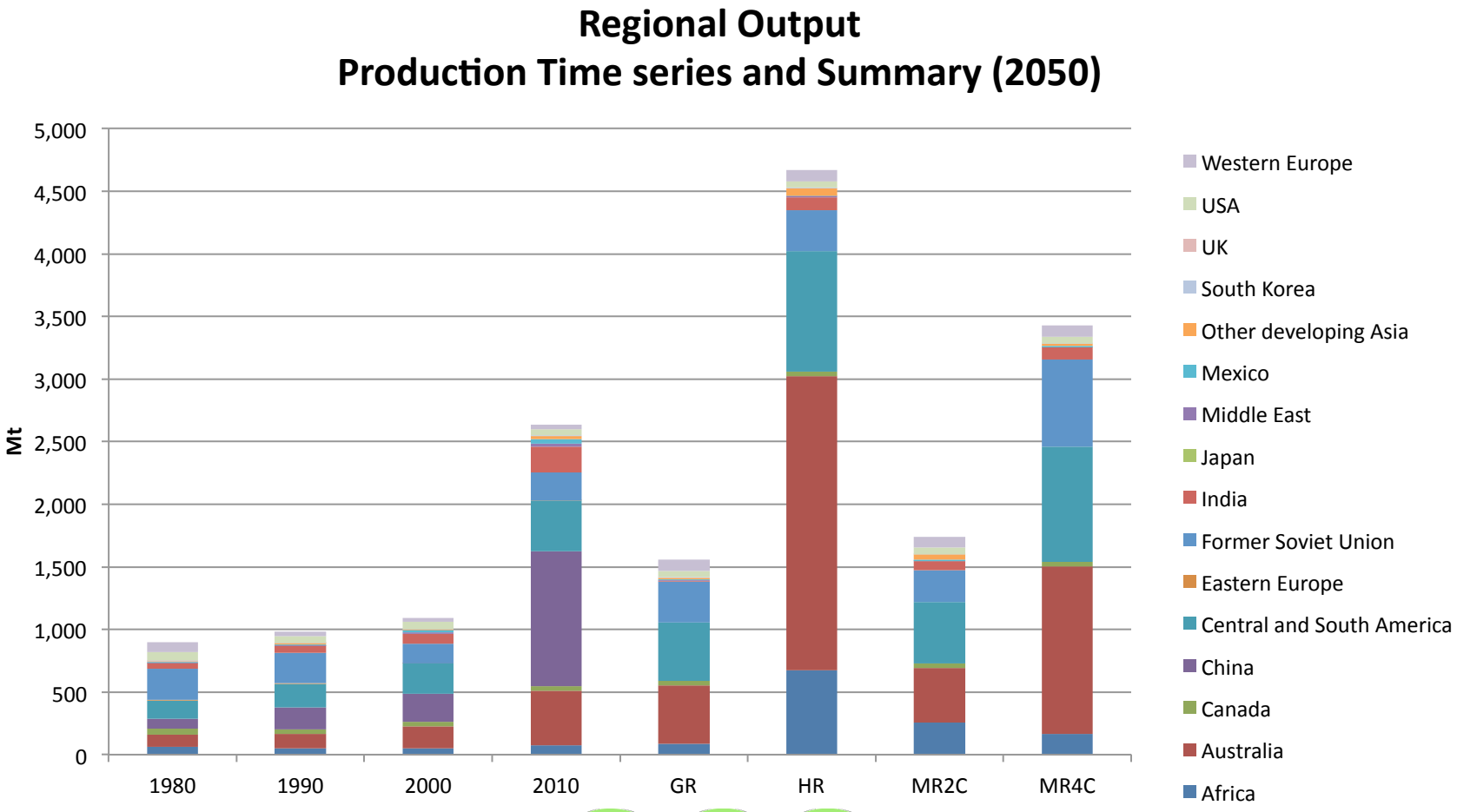
Results (3) – Iron ore



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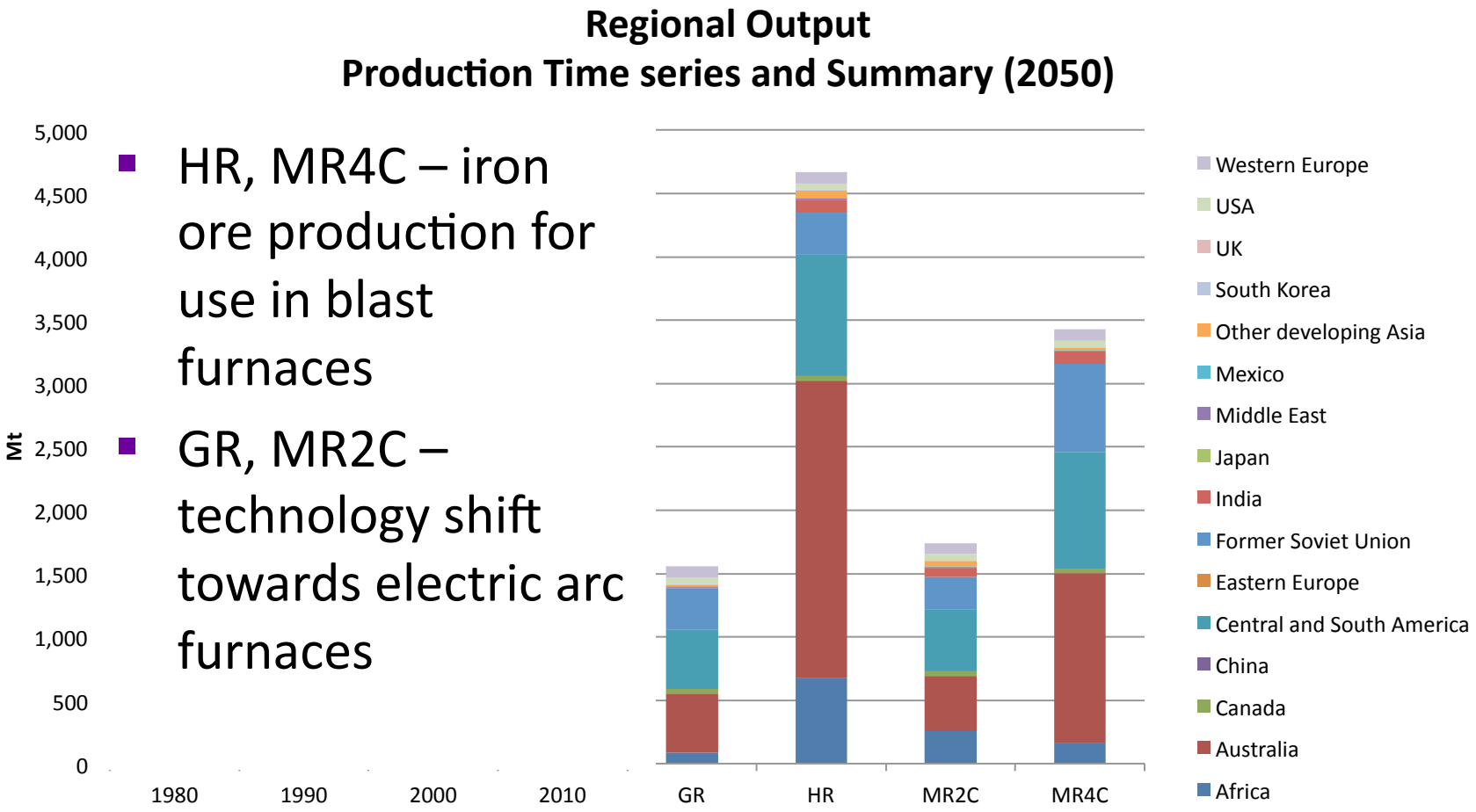
Results (3) – Iron ore

- HR, MR4C – iron ore production for use in blast furnaces
- GR, MR2C – technology shift towards electric arc furnaces



Summary - 2°C or 4°C?

- The future will be a departure from the present, either because we:
  - » Pursue radical mitigation in line with 2°C
  - » Face the impacts, and their consequences, in line with 4°C
- In either case, this will impact on production of commodities, and their trade (our next step)

Thank you

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