TRANSIENCE – AMIGDALA stakeholder engagement workshop

December 10, 2025

AMIGDALA: A proof-of-concept for an integrated industrial modelling framework

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AMIGDALA

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Green deal - delivering broad welfare

Project Objectives support action perspective

AMIGDALA

“Modelling industry transition to climate neutrality, sustainability and circularity”

Place stakeholders’ needs at the centre

Understand decision parameters and control options

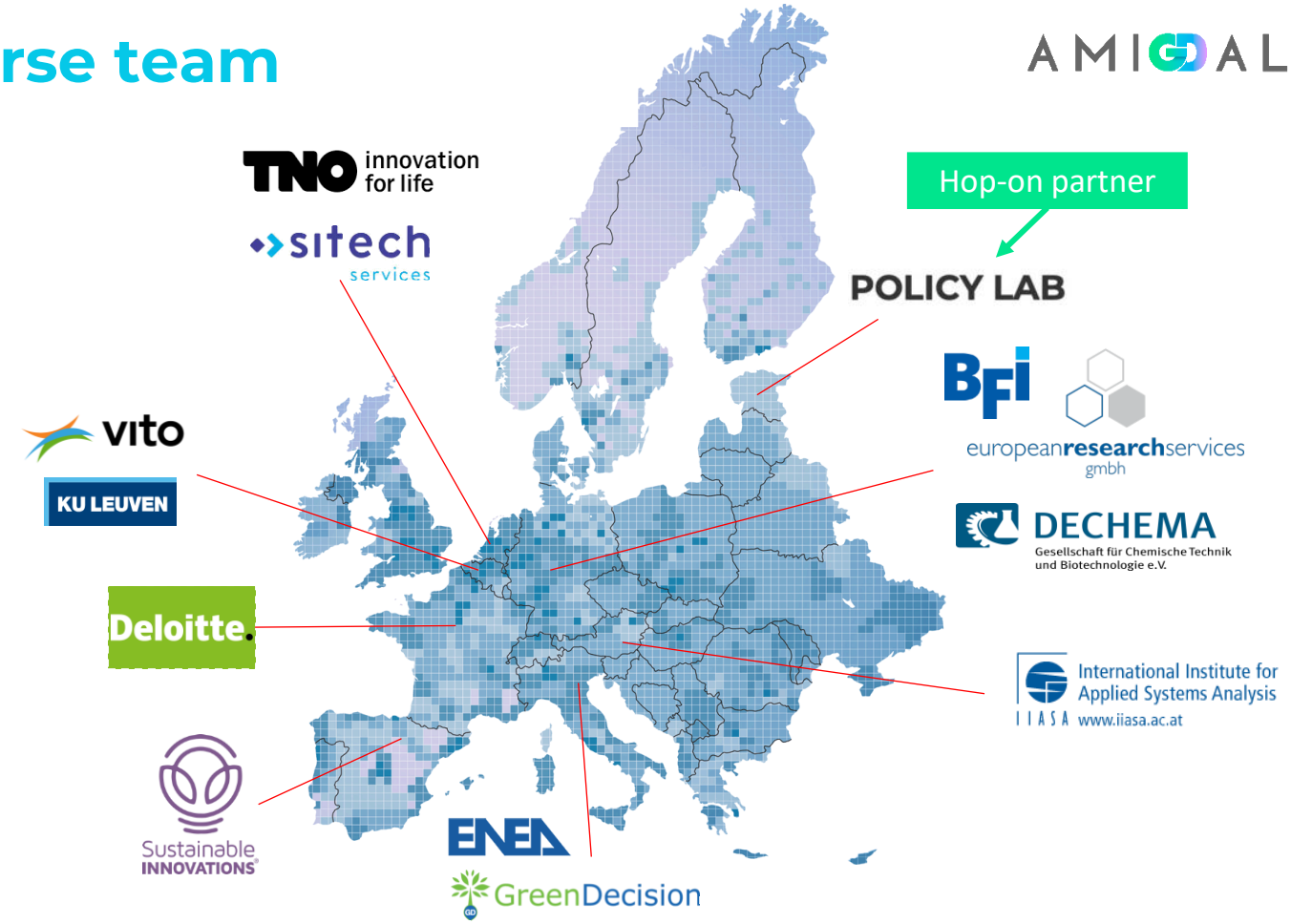
Improve transparency for decisionmakers in government and industry

Integrate established models of economy, trade, energy and industrial production

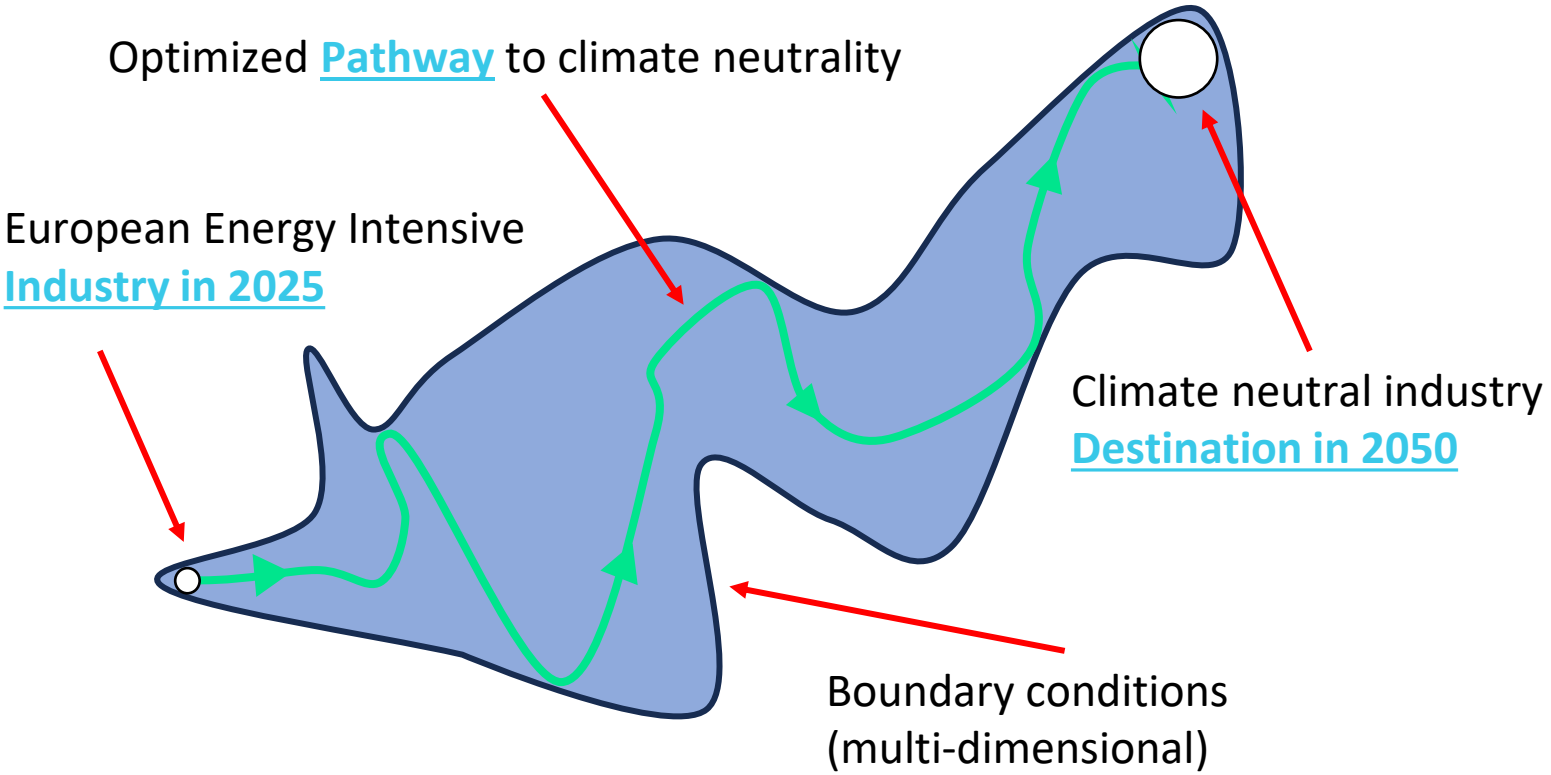
Identify and evaluate pathways towards sustainability by deploying the integrated model.

Diverse team

AMIGOALA



Modelling pathways towards destinations



(1) Stakeholder needs for information

- Performance indicators (‘needle movers’)
- Decision analysis and user interfaces

(2) Scenario development

(3) Model integration

- Proof of concept results

(4) Planning towards technical completion in Q4-2026

- Tune-in to the needs of stakeholders

Needle mover research

Interviews

15 interviews

Textual analysis

32 indicators organized in 4 contexts and 20 themes

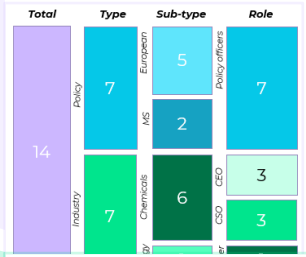
Statistical analysis

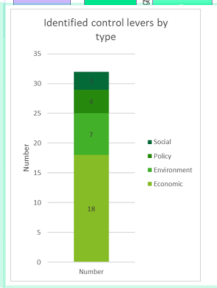
Identification of most recurrent indicators and themes + differences across profiles

Selection

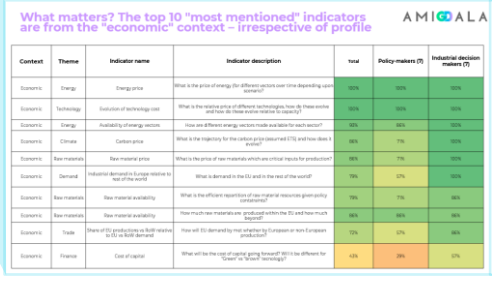
Selection of short-listed indicators

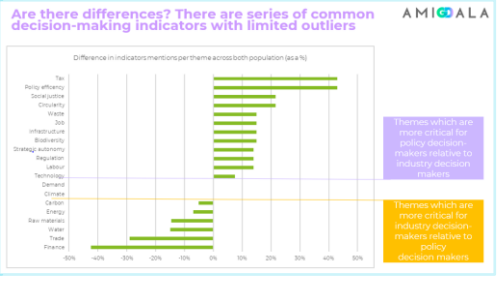
See next slides





Context	Theme	Number of indicators
Economic	Climate	3
Economic	Raw materials	3
Environment	Carbon	3
Economic	Energy	2
Economic	Technology	2
Economic	Demand	2
Economic	Finance	2
Environment	Circularity	2
Social	Social justice	2
Economic	Trade	1
Economic	Labour	1
Economic	Strategic autonomy	1
Economic	Infrastructure	1
Economic	Job	1
Economic	Policy efficency	1
Economic	Tax	1
Environment	Water	1
Environment	Biodiversity	1
Environment	Waste	1
Policy	Regulation	1





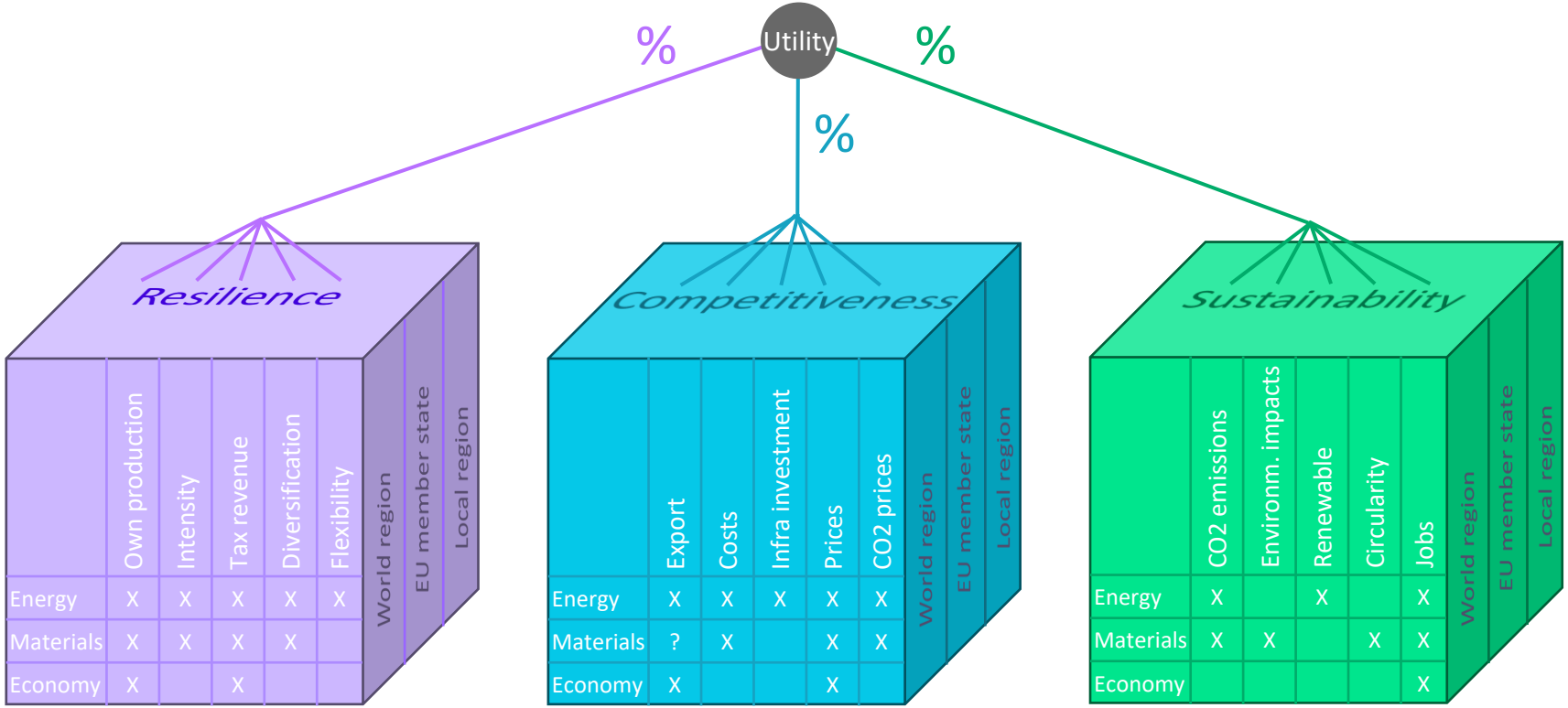
Some needle movers are difficult

	#	KEY PERFORMANCE INDICATOR (KPI)	
INDUSTRY	1	Energy mix evolution and price	Low
	2	Availability & cost of technology	Low
	3	Raw material and feedstock availability and cost	High
BOTH	4	Demand evolution in Europe and globally + Trade balance	Medium
POLICY	5	Carbon price trajectory	Low
	6	Industry emission reduction	Low
	7	Job creation	High
	8	Tax revenue + cost to public sector	High
	9	Wider environmental impact	High

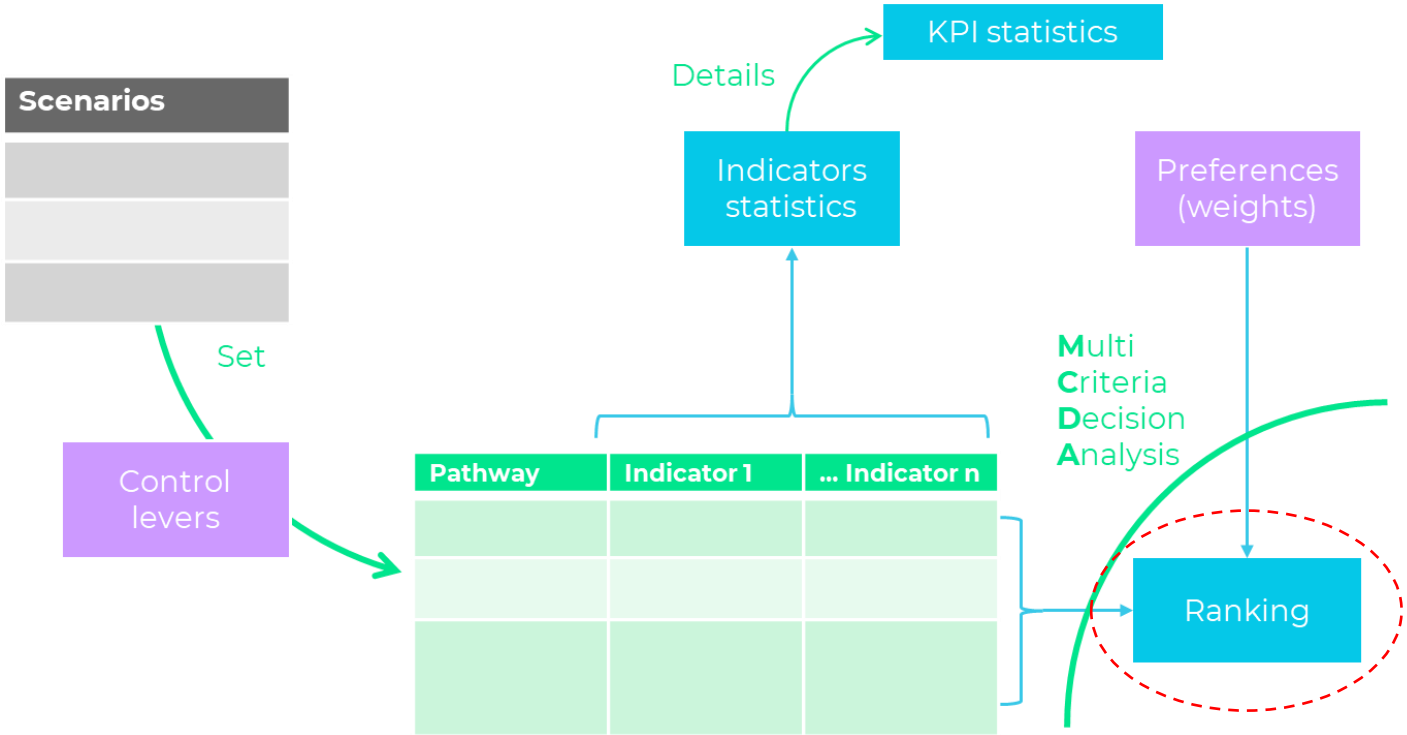
Source : D-Dashboard Excel Prototype – MetaData and based on Difficulty (given model output) in 20250207_Data_requests4indicators+linkwithdecisionframework+ease+whatmodel.xlsx

Mapping of model output on key dimensions

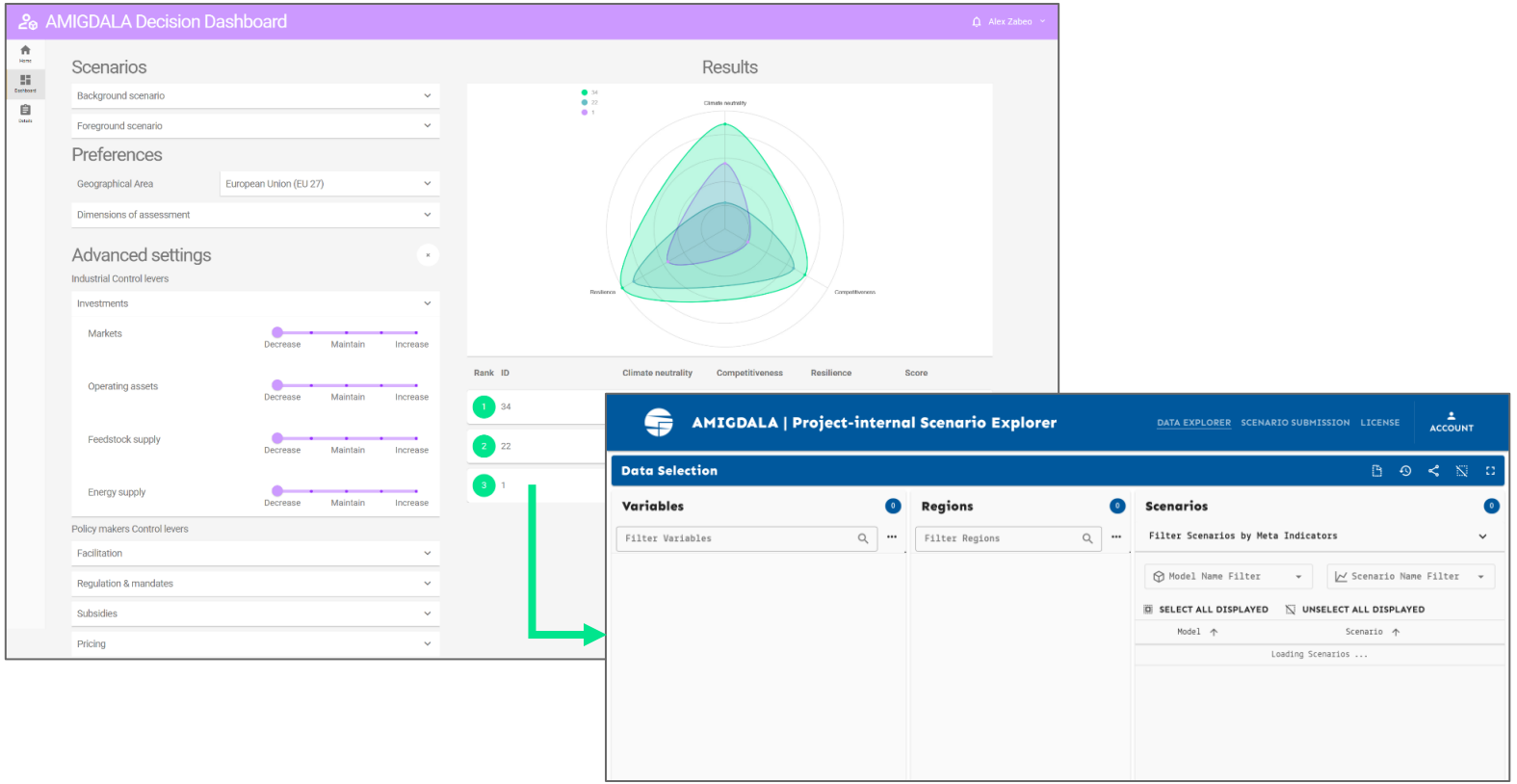
Sustainability, Competitiveness, Resilience



Ranking of outcomes by ‘Needle Movers’



Scenario decision dashboard and model output data-browser



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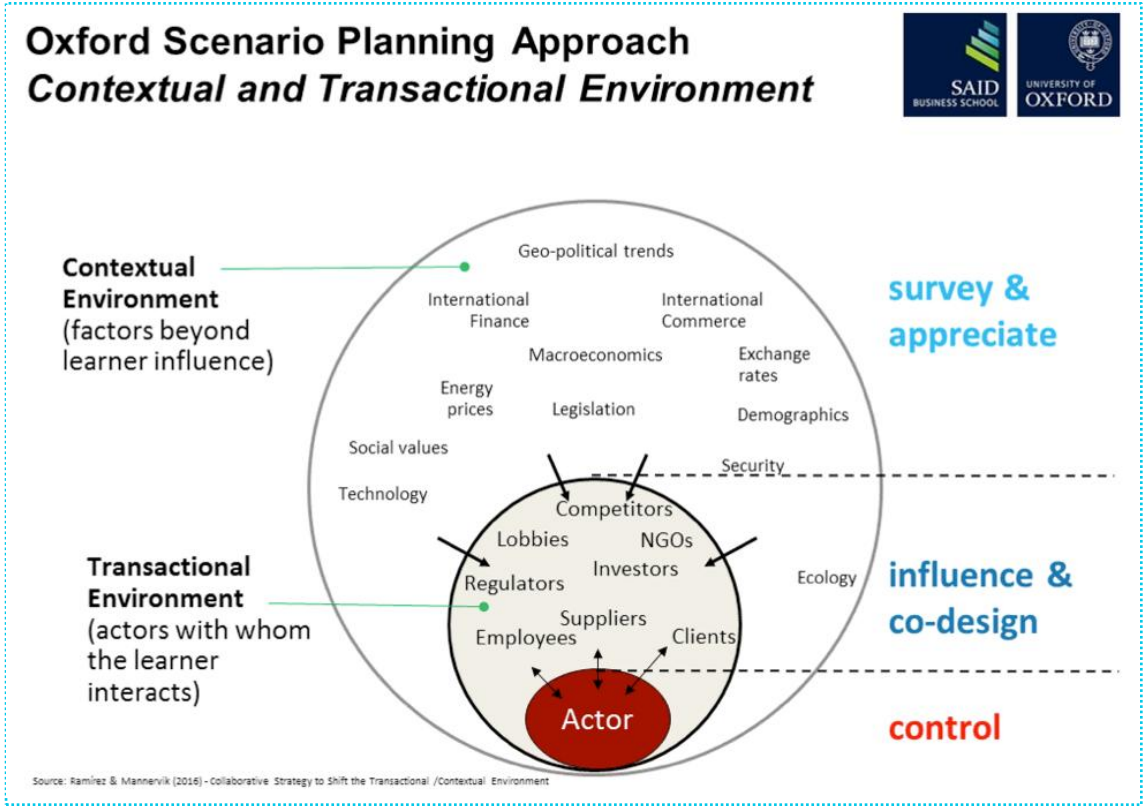
Scenario approach

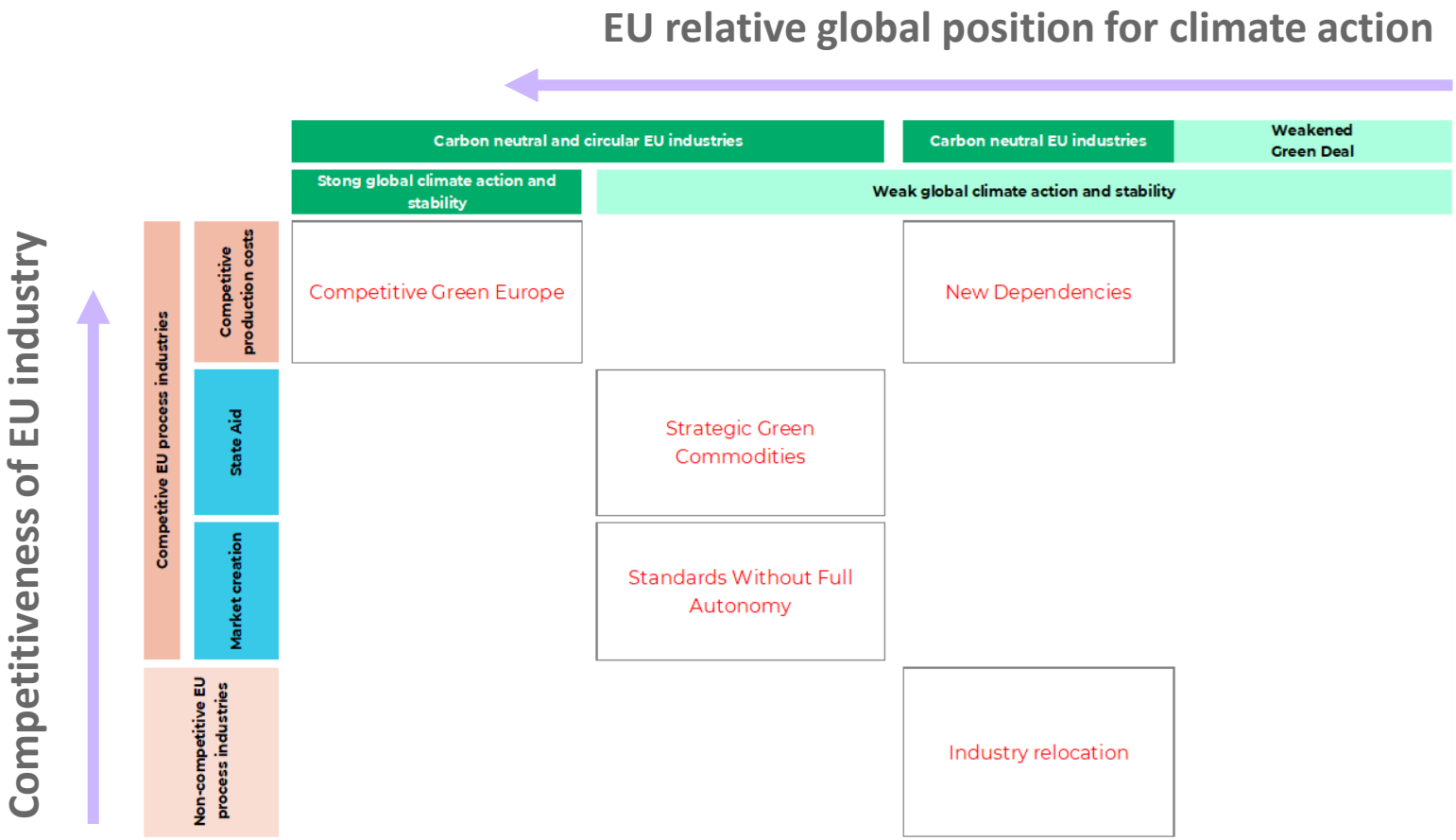


Background (context for EU)

Foreground (EU ambitions and control levers)

Aspirational EU destinations

AMIGALA



Background, and foreground of EU ambitions

Background

- Global climate ambition
- Fossil fuel prices
- Global cleantech innovation pace
- Consumer trends & low-carbon preferences (sustainability awareness)

- Geopolitical stability & supply chain security ("Geopolitical fragmentation and global trade volatility*")
- Climate risks and environmental shocks*
- Global technological race in low-carbon industry*

Foreground

EU policy ambitions linked to process industries

- Develop **climate neutral** EU process industries
- Develop **circular** EU process industries
- Striving for **competitive production costs**, particular energy
- Spur **demand for low carbon products** in the EU(create markets)
- Spur investment for clean production in **strategic commodities**
- Spur investment for the production of **net-zero technologies** required for the energy transition
- To maintain a **balanced trade balance** on strategic commodities and net-zero technologies
- Reduce **dependence on energy imports** to strengthen EU resilience

(*) Tiits, M., Tiik, J. M., Kalvet, T., Koeppen, M., Vladimirov, M., Maki, N., Arsani, A., Langkau, S., & Kunze, S. (2025). Global Megatrends and Major Uncertainties for the Green Growth. Data-driven Roadmaps for Catalyzing Green Growth in Eastern Europe. Tartu: Institute of Baltic Studies, https://doi.org/10.23657/g3ec-7b90

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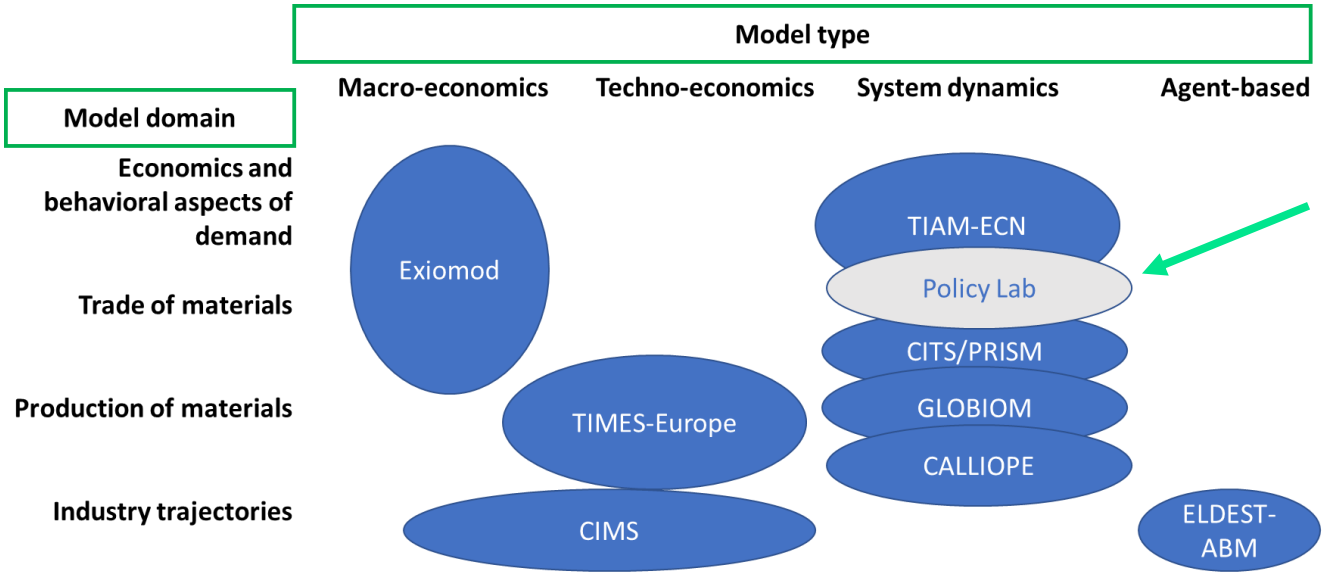
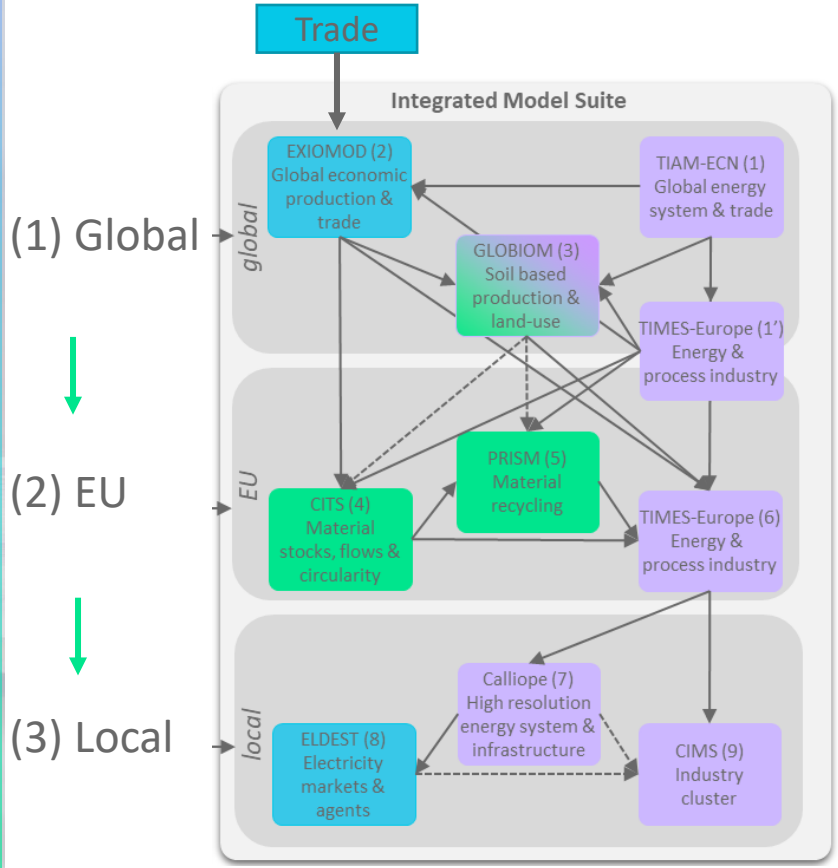
Model-set to describe the system

Core challenge of coupling = define model run sequence, feedback and iterations



Model coupling on three levels



Economy

(Trade AI gravity model)
EXIOMOD
ELDEST

Energy

TIAM-ECN
TIMES-Europe
CALLIOPE
CIMS

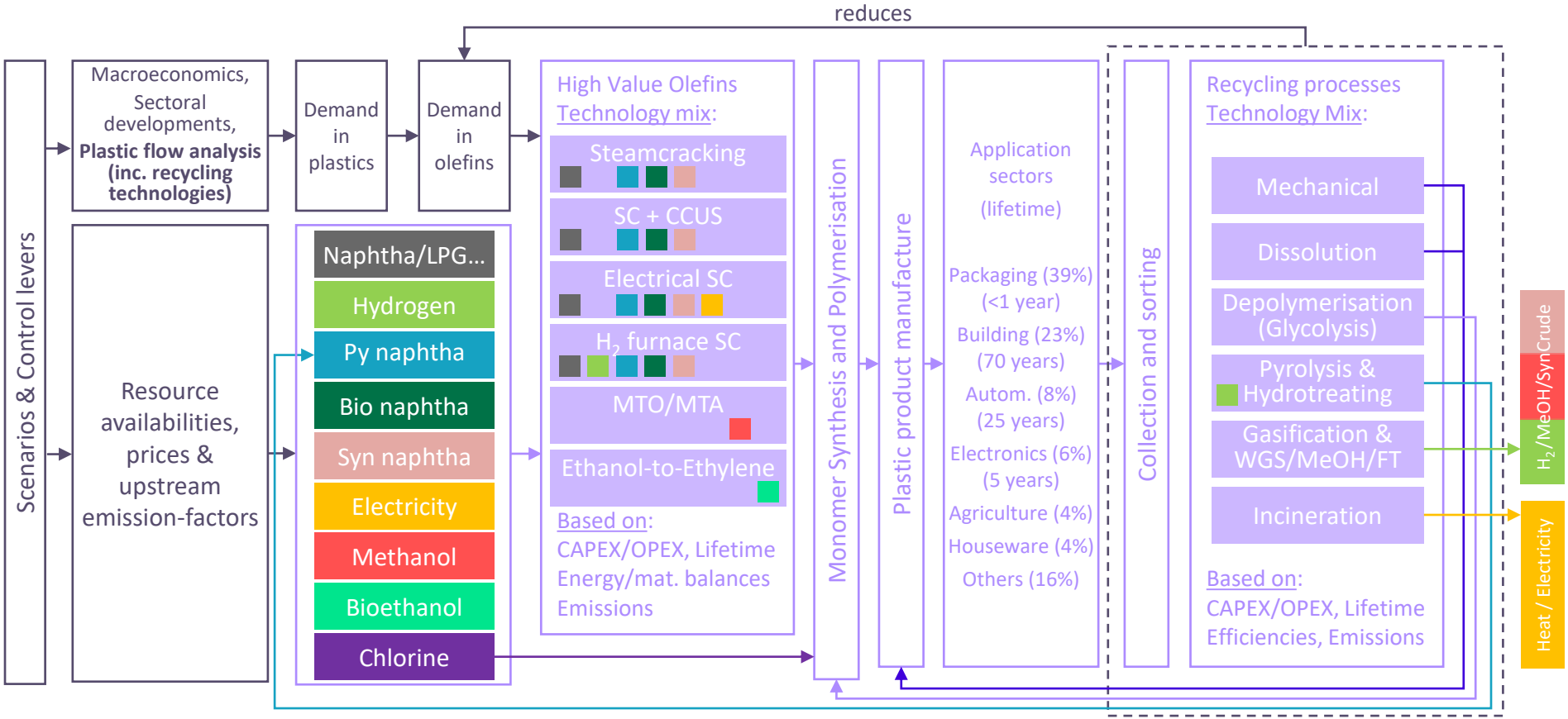
Material

GLOBIOM
CITS
PRISM

Model integration

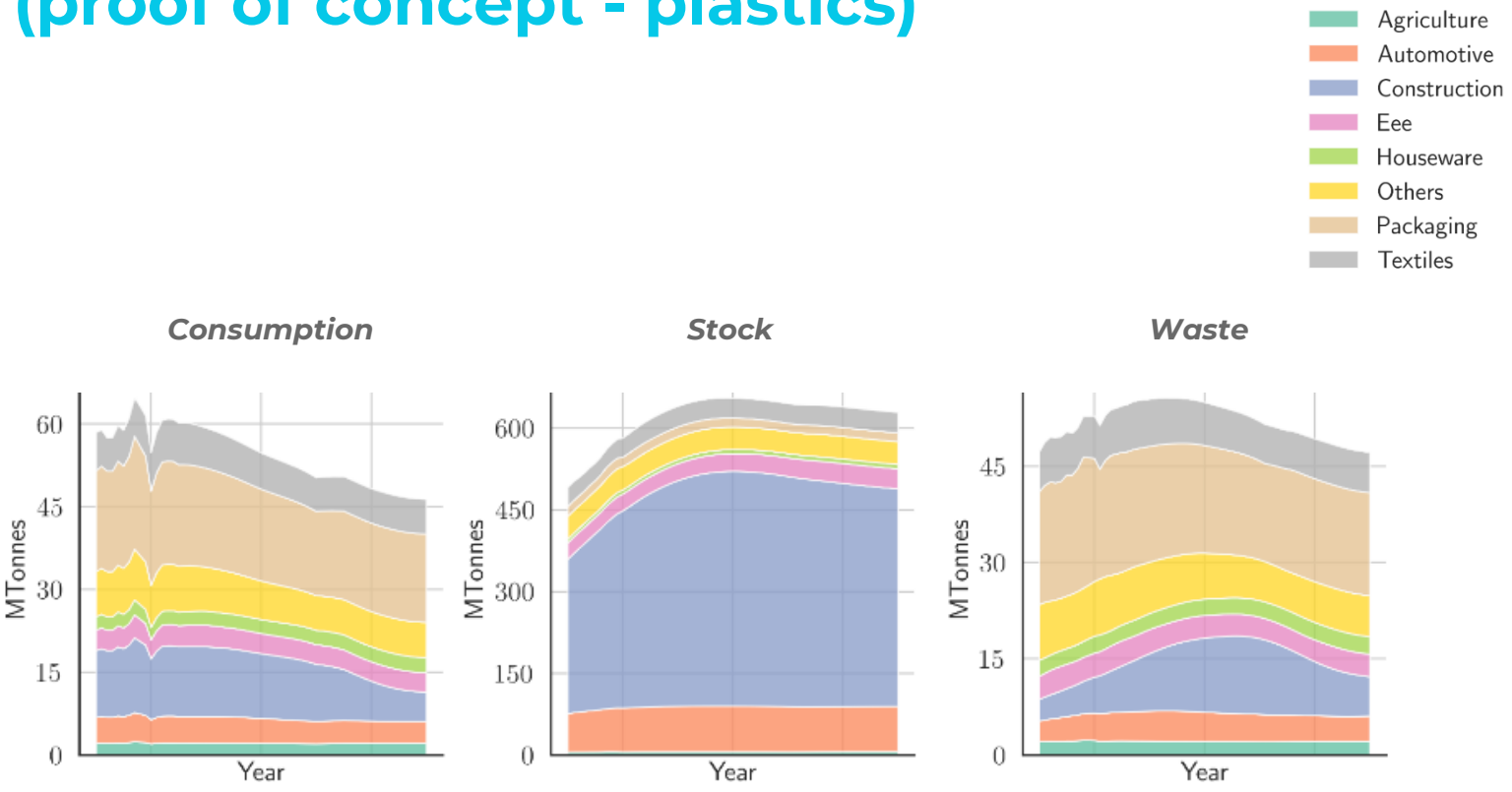
- Fewer assumptions
- Cross-domain consistency

Example: Plastics industry flowchart

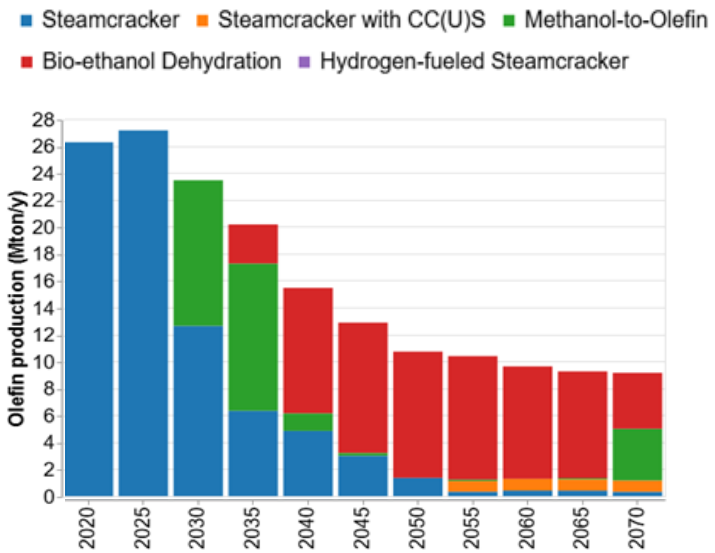


FT: Fischer-Tropsch; MTO: Methanol-to-Olefins; MTA: Methanol-to-Aromatics; Py naphtha: pyrolysis naphtha (from mixed plastic waste); WGS: Water Gas Shift

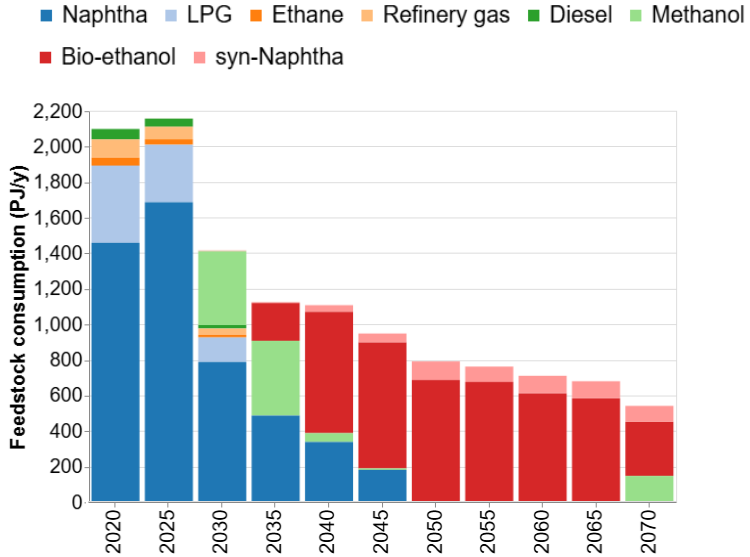
Material flows by sector (proof of concept - plastics)



Production technology and feedstock (proof of concept - plastics)



Olefins **production technology**



Feedstock for olefins production

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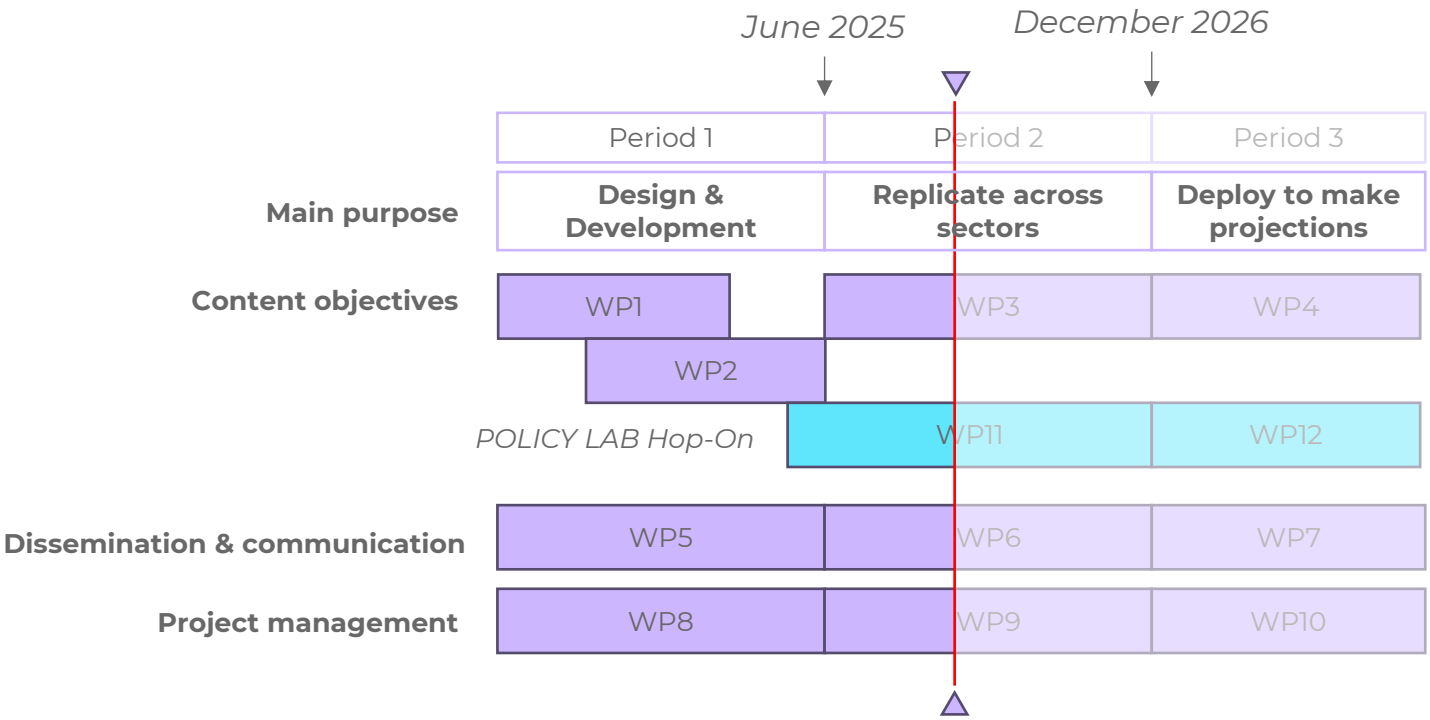
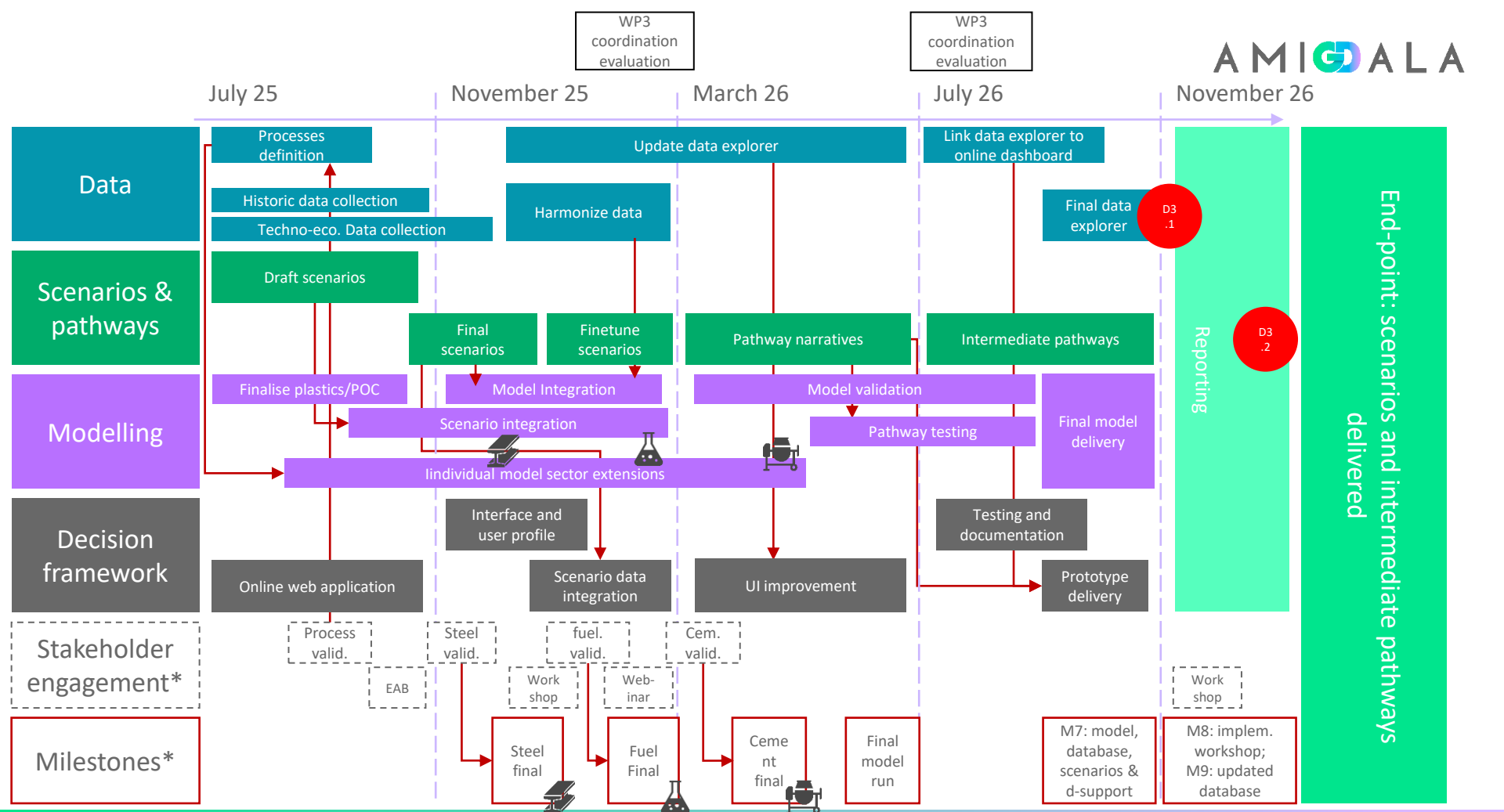
Project in replication phase





*Sectors are divided in steel = steel & chemicals; fuel = fuel & non-ferrous, cement = cement, glass & paper

Fine-tuning to the needs

outreach and engagement

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CLIMATE

ASPIRE

PROCESSES4PLANET RESEARCH ASSOCIATION

SCIENCE & INNOVATION

TRADE

ENV

European Commission

Directorate-General for Energy

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