System Dynamics for System Innovation

POLYTROPOS – Progress update

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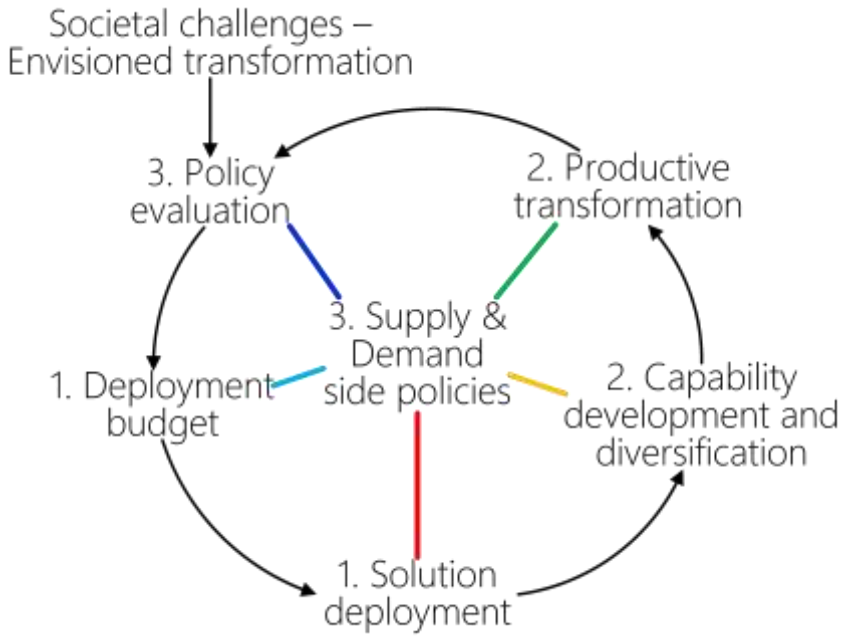
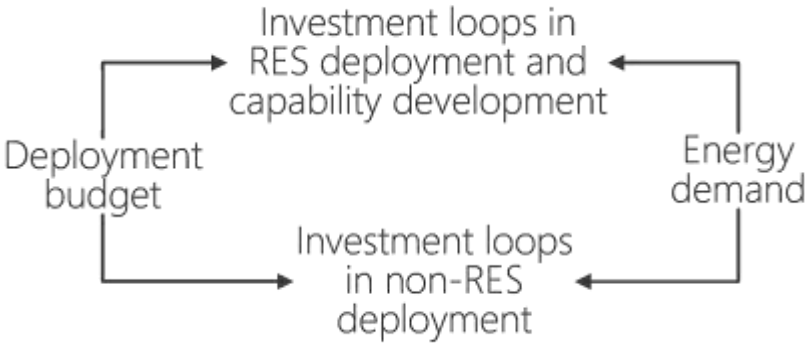
Model Scope

1. Deployment of prospective solutions to societal challenges
2. Exploration of transformative capability accumulation and diversification in new domains/value chains
3. Evaluation of goal-oriented portfolios of policies at EU national and regional levels.



Model Development

- Theory / literature based
- Adapt and apply the model to a simple case
- Adapt to further domain-specific cases:
  - Adapt causal loops to context-specific systems/policies
  - Conduct participatory workshops to fill gaps, develop desirable visions



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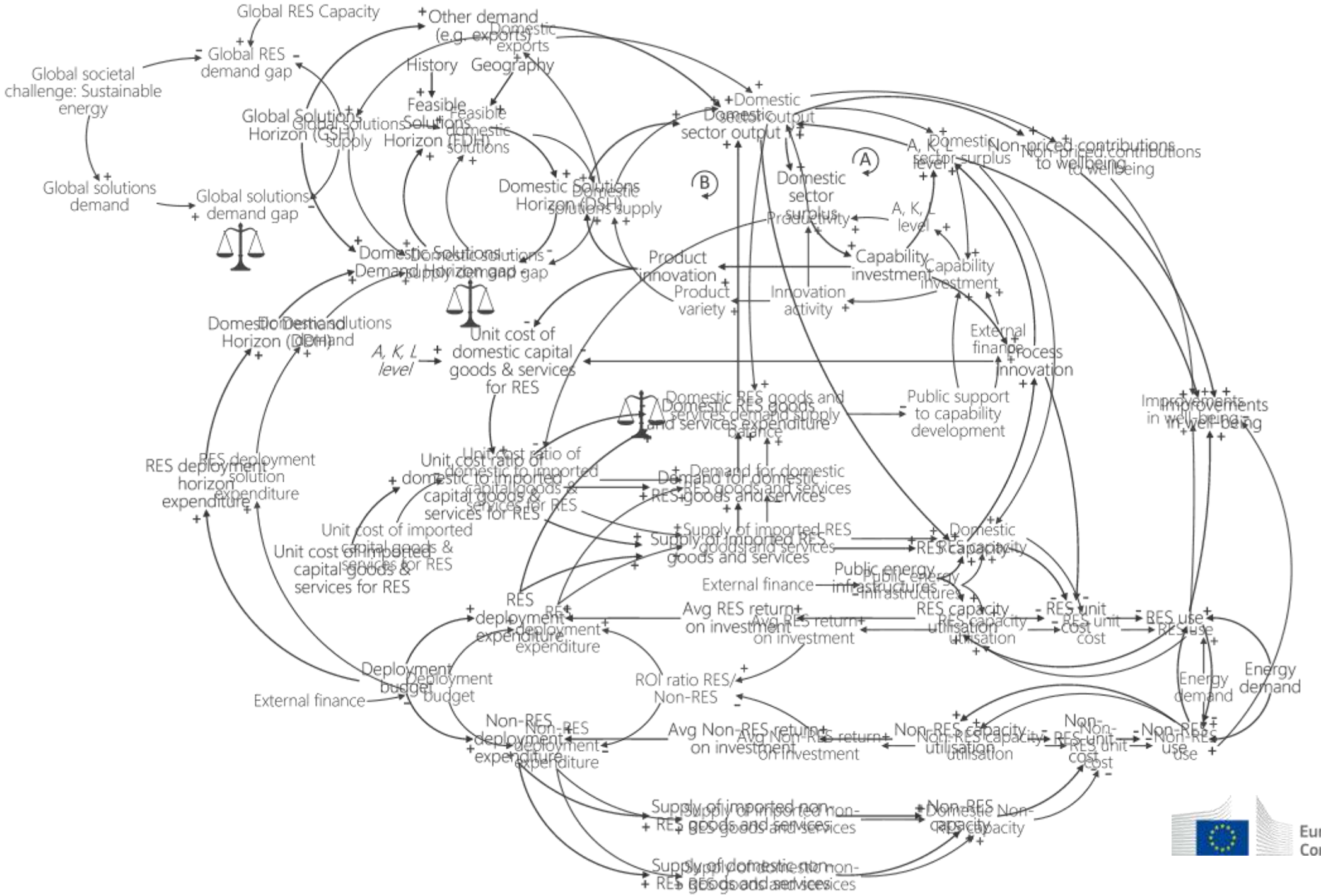

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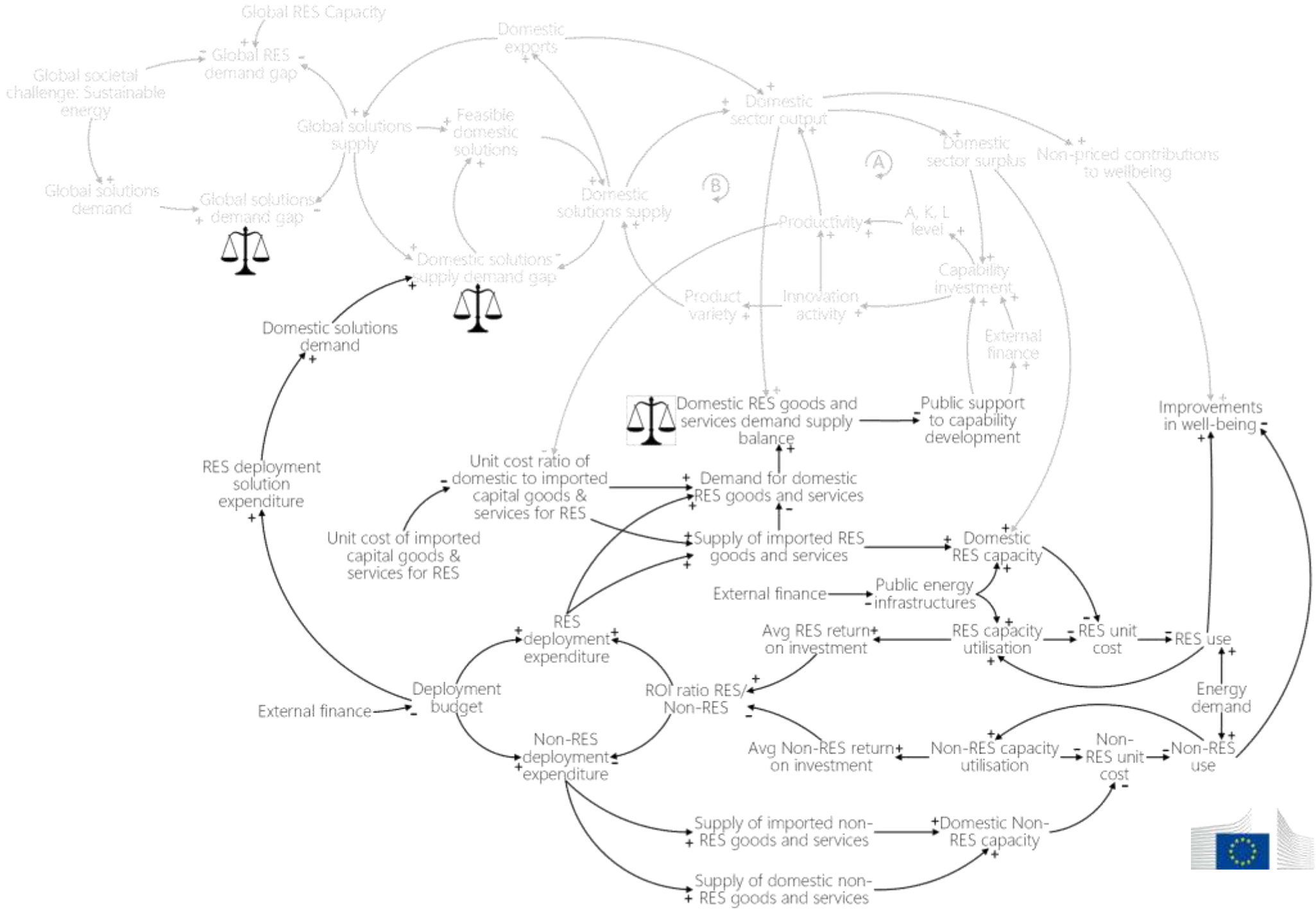

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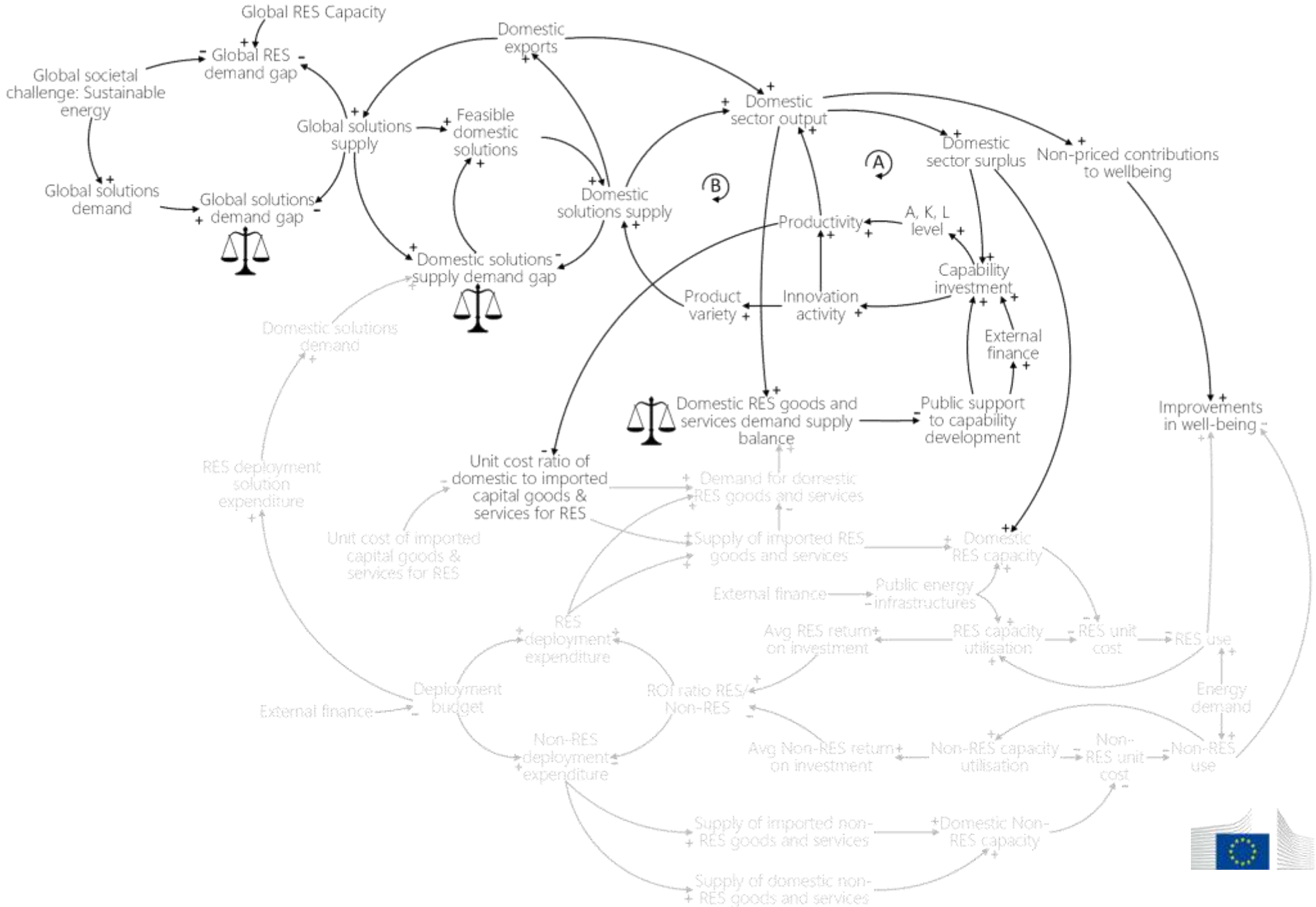

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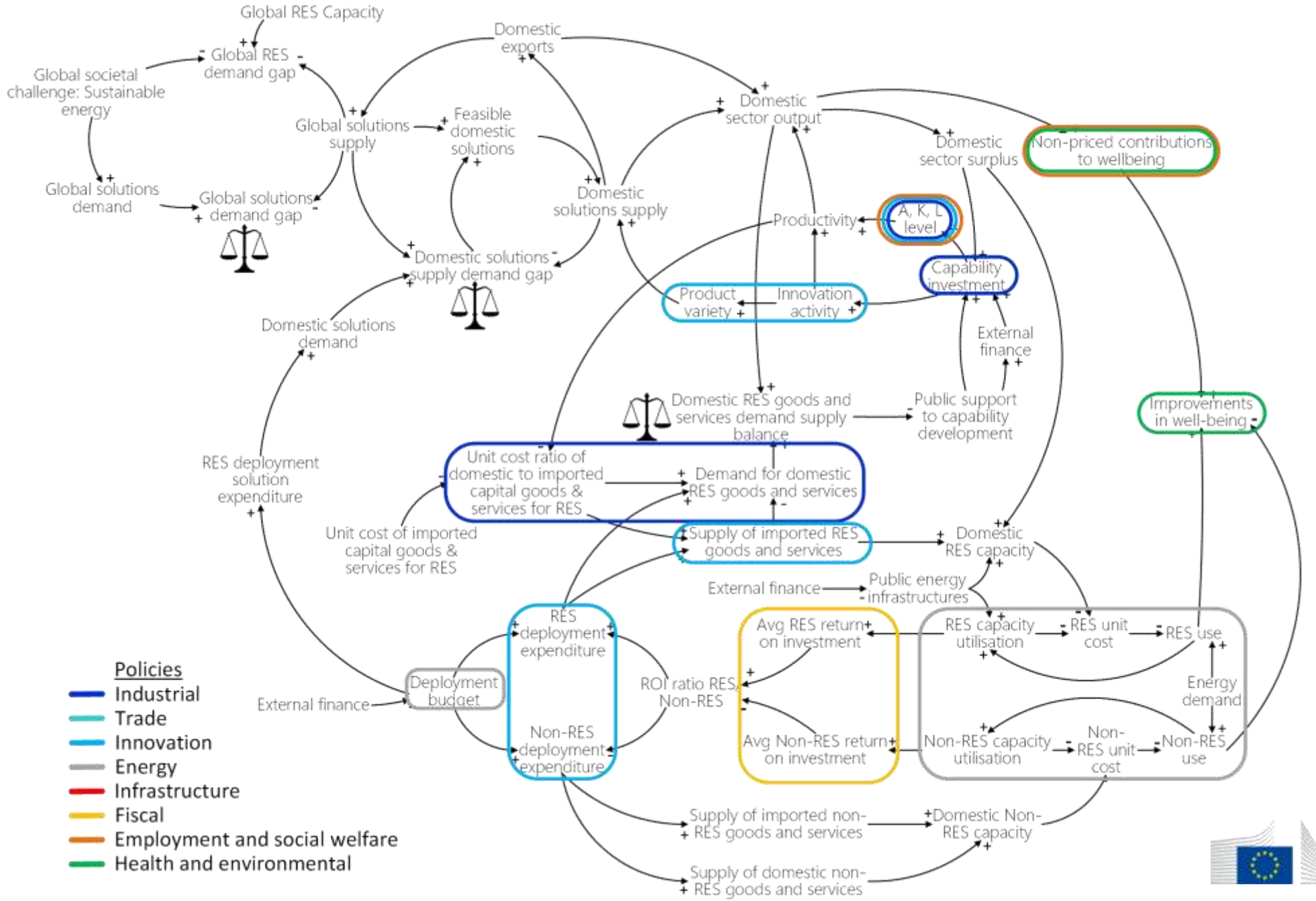

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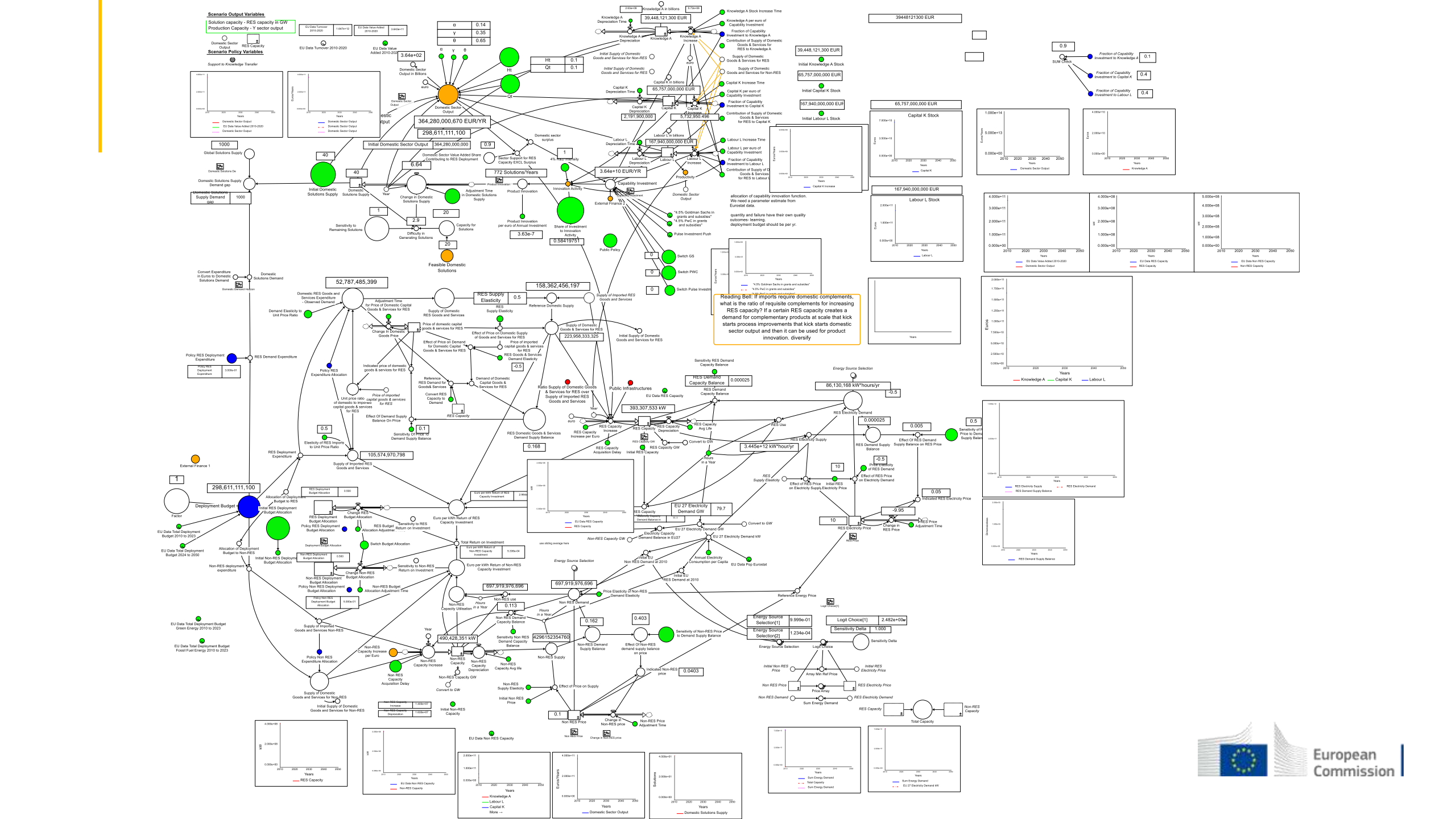

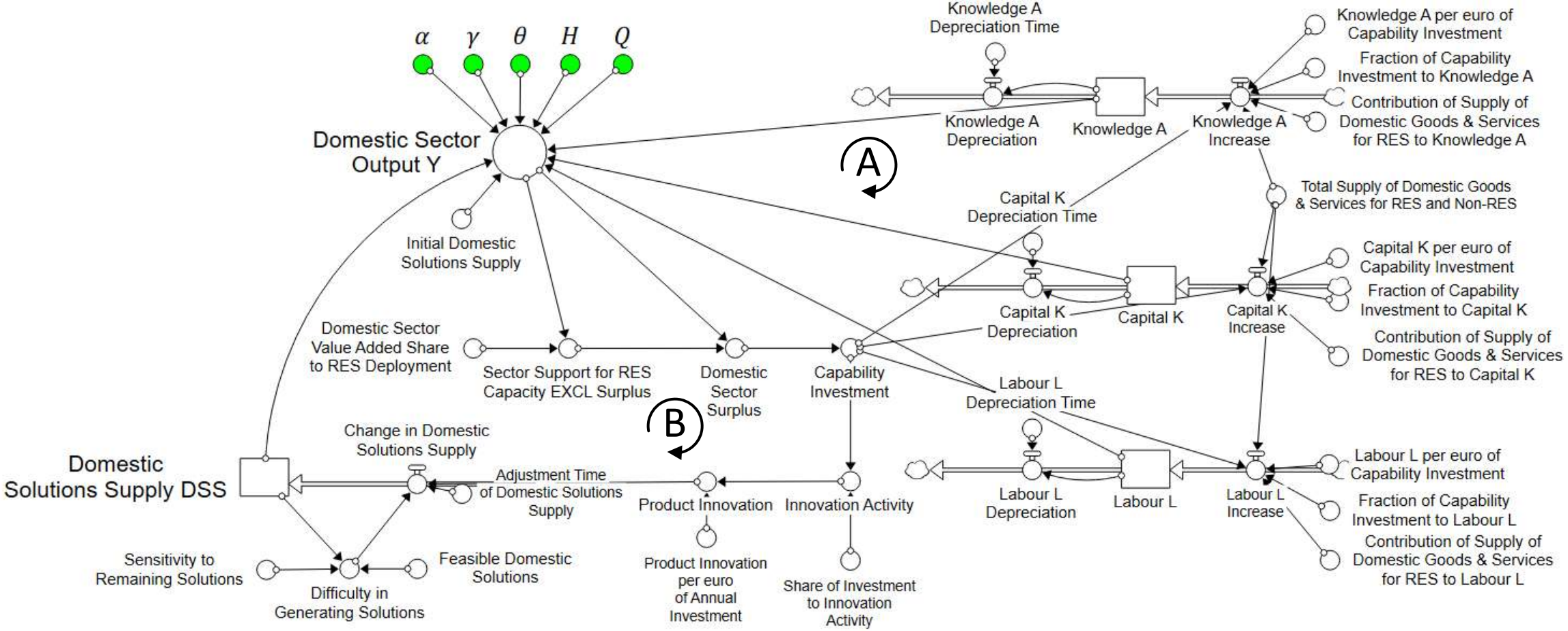

$$Y = DSS_t \, A_t^{\alpha} (Q_t K_t)^{\gamma} (H_t L_t)^{\theta}$$

Domestic Solutions Supply (DSS): scaling factor of production

Q = 0.1 : technical progress embodied in capital

H = 0.1 : technical progress embodied in labour

$\alpha + \gamma + \theta > 1$ for endogenous growth

$\gamma + \theta = 1$, $\alpha = 0.14$ $\gamma = 0.35$, $\theta = 0.65$

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Questions, feedback, remarks, omissions

Thank you

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Simulation Scenarios

Assumptions

1. IEA Net Zero Forecast - Deployment budget to 2050
2. RES budget → Deployment budget by 2040

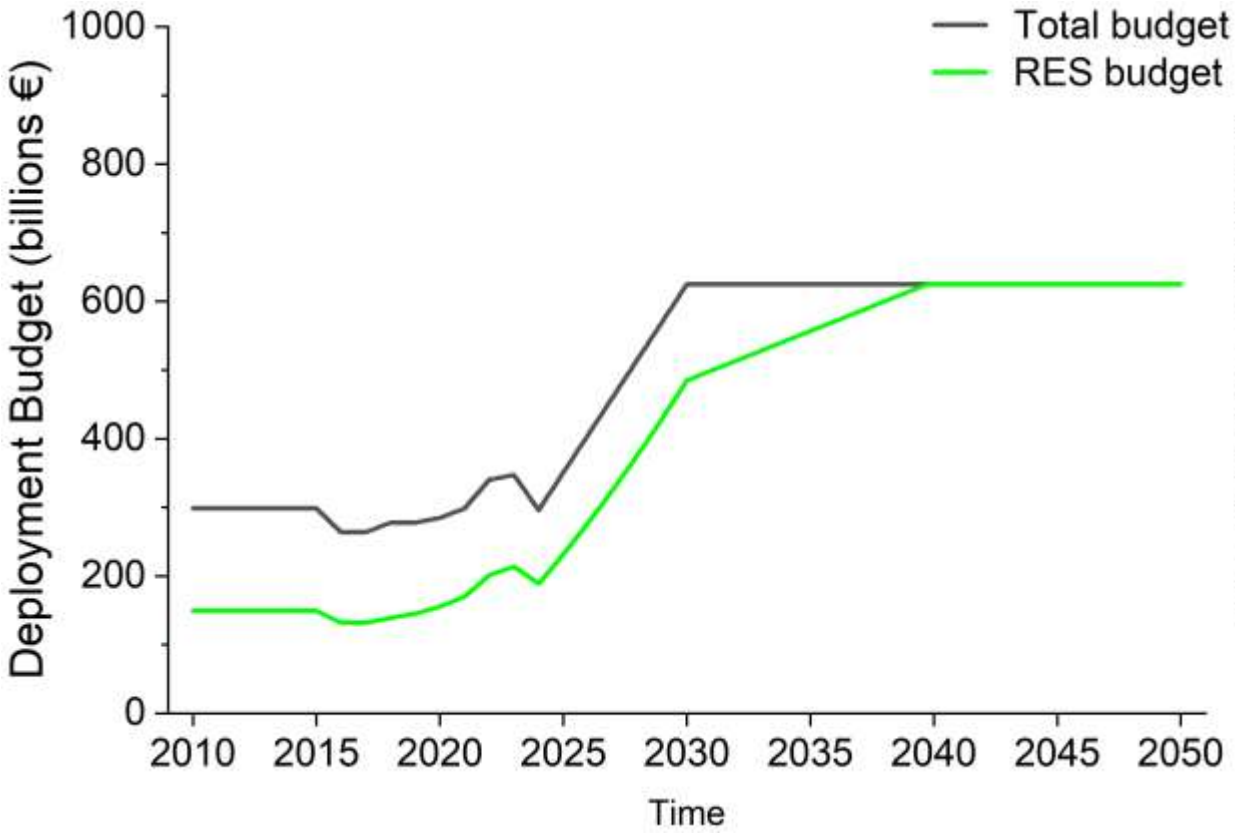
Scenarios at the EU 27 Level

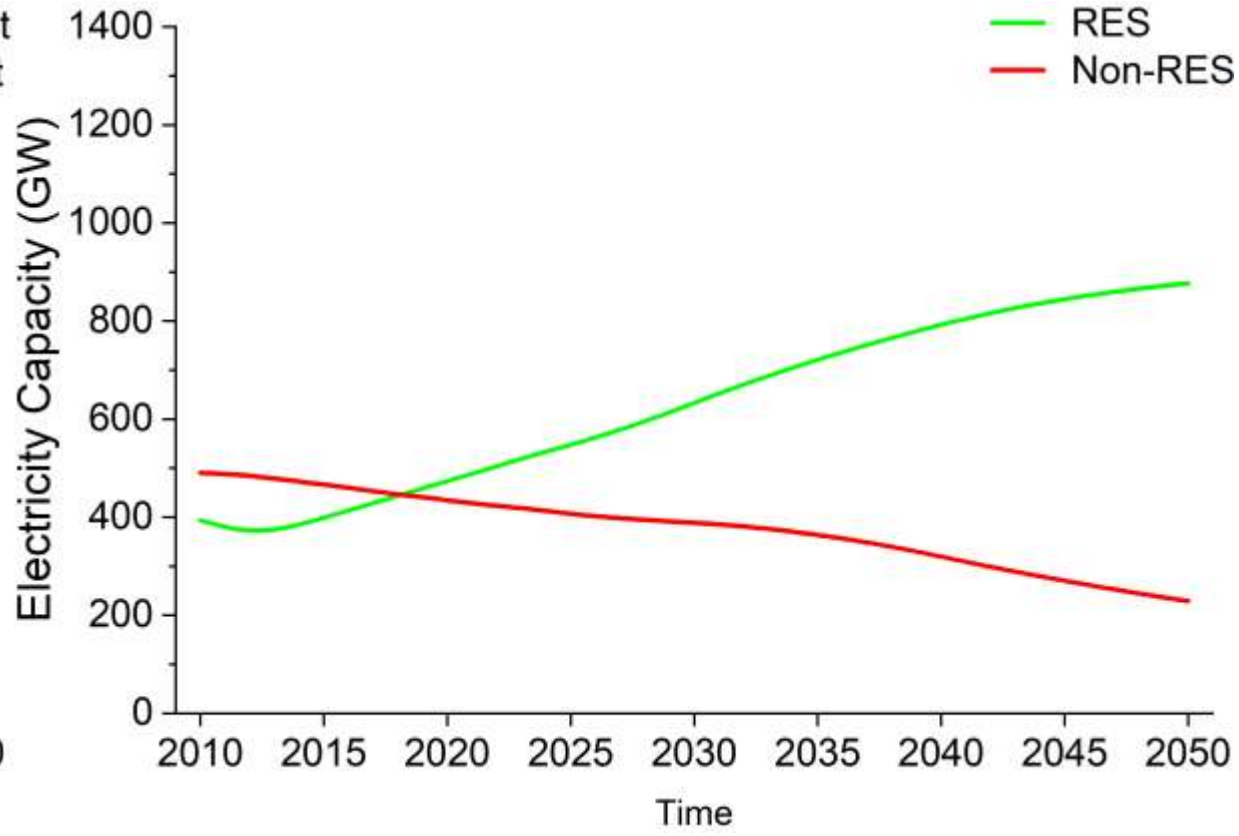
1. Reference: Business as usual – No new policies
2. Projection max
3. Projection min

} 4.5% of GDP in grants and subsidies

4. 4% R&D Intensity – Target
5. Capability investment pulse 2020-2030
6. Scenarios 4 and 5

Results: Deployment Budget & Electricity Capacity





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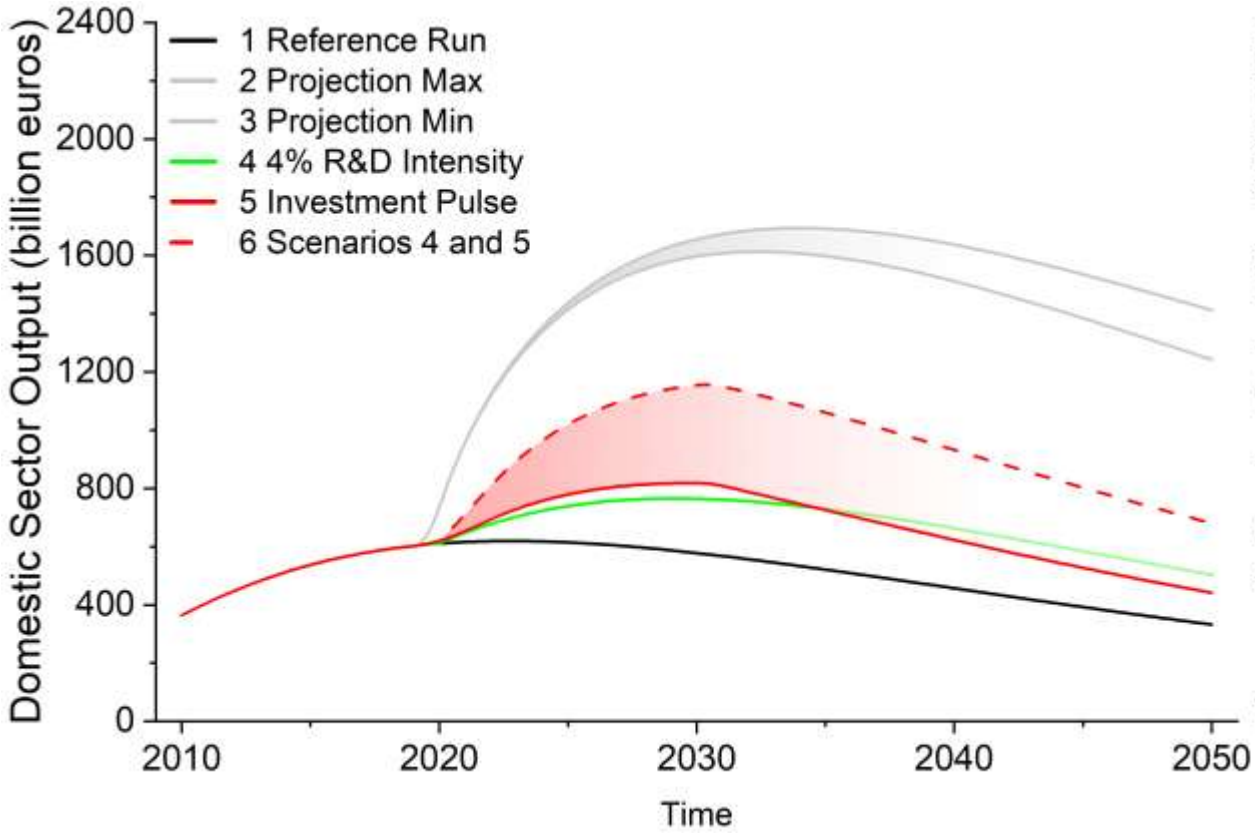
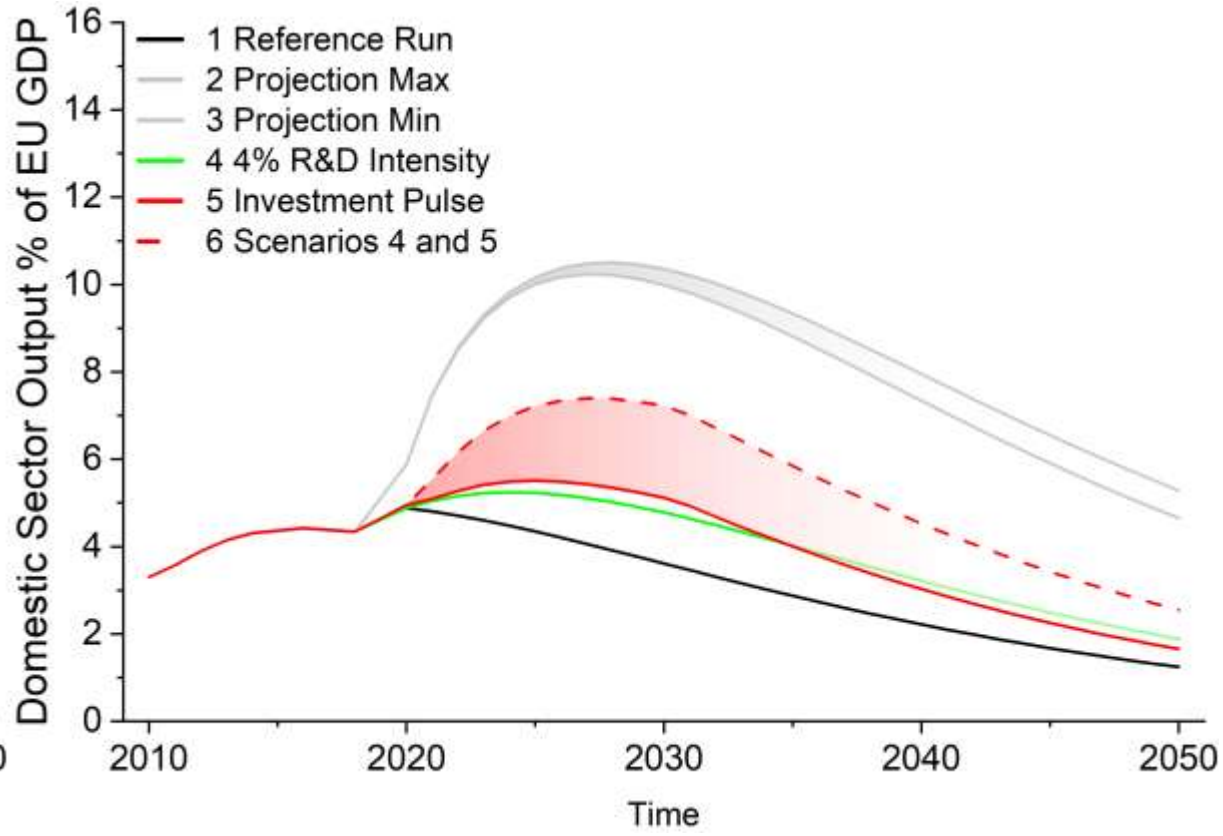
Scenarios: Production Capability





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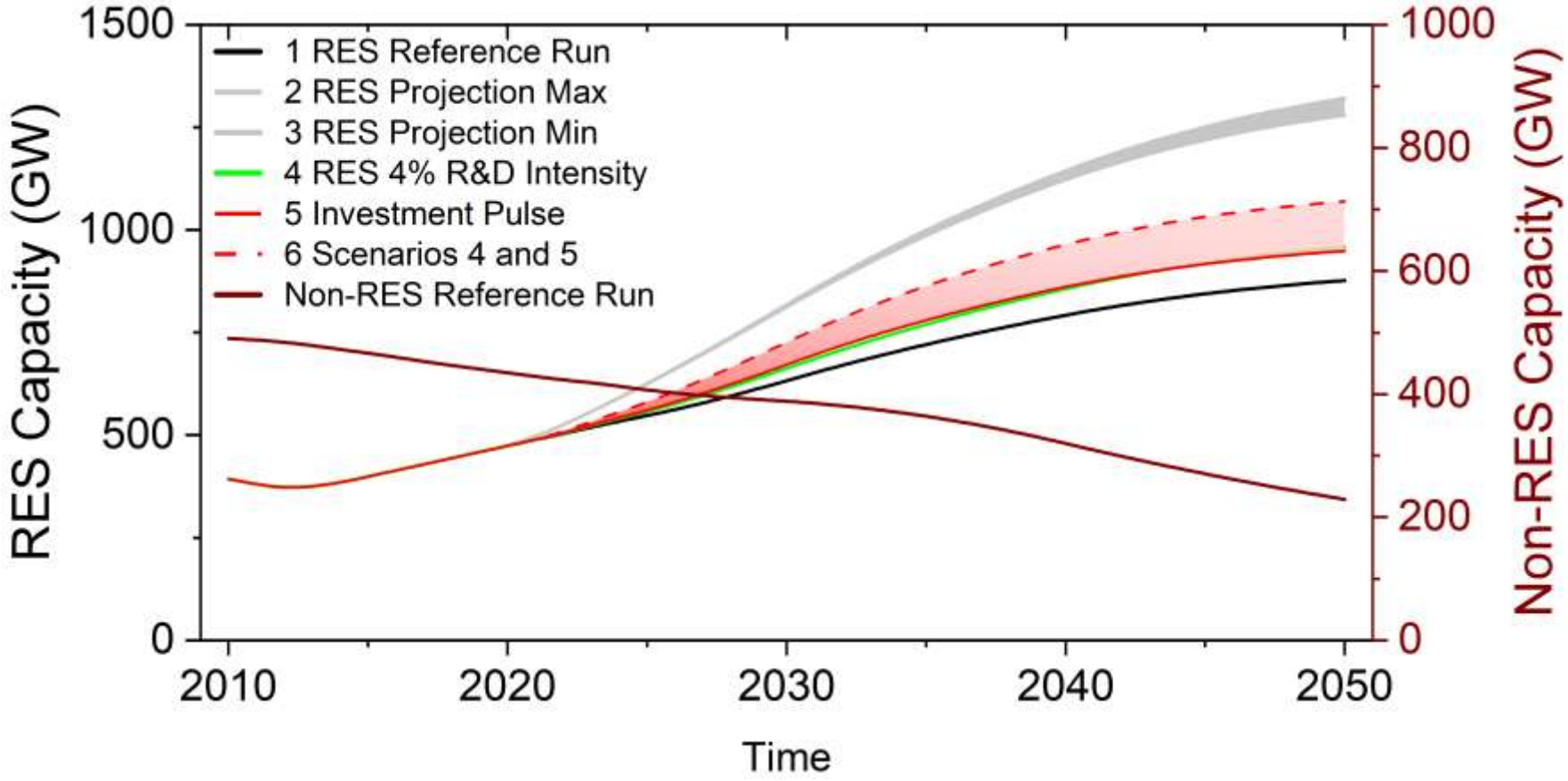
Scenarios: Electricity Capacity



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