SYSTEMIC JOURNEY INTO THE NEXUS 'OF RESOURCES AND RENEWABLES'

- Integrated Assessment Model (IAM) qualitative explorative stakeholder modeling of the gap between knowledge and action

- Quantitative D3 Model with >4.000 factors to simulate transition of society looking at GHG, environment, economy, welfare, happiness and RMC

- D3 EE model for a closer look at the RMC behind the transition towards renewable energy in Germany

- GEE(R) model to look at the global RMC coming with the transition towards renewable energy ...

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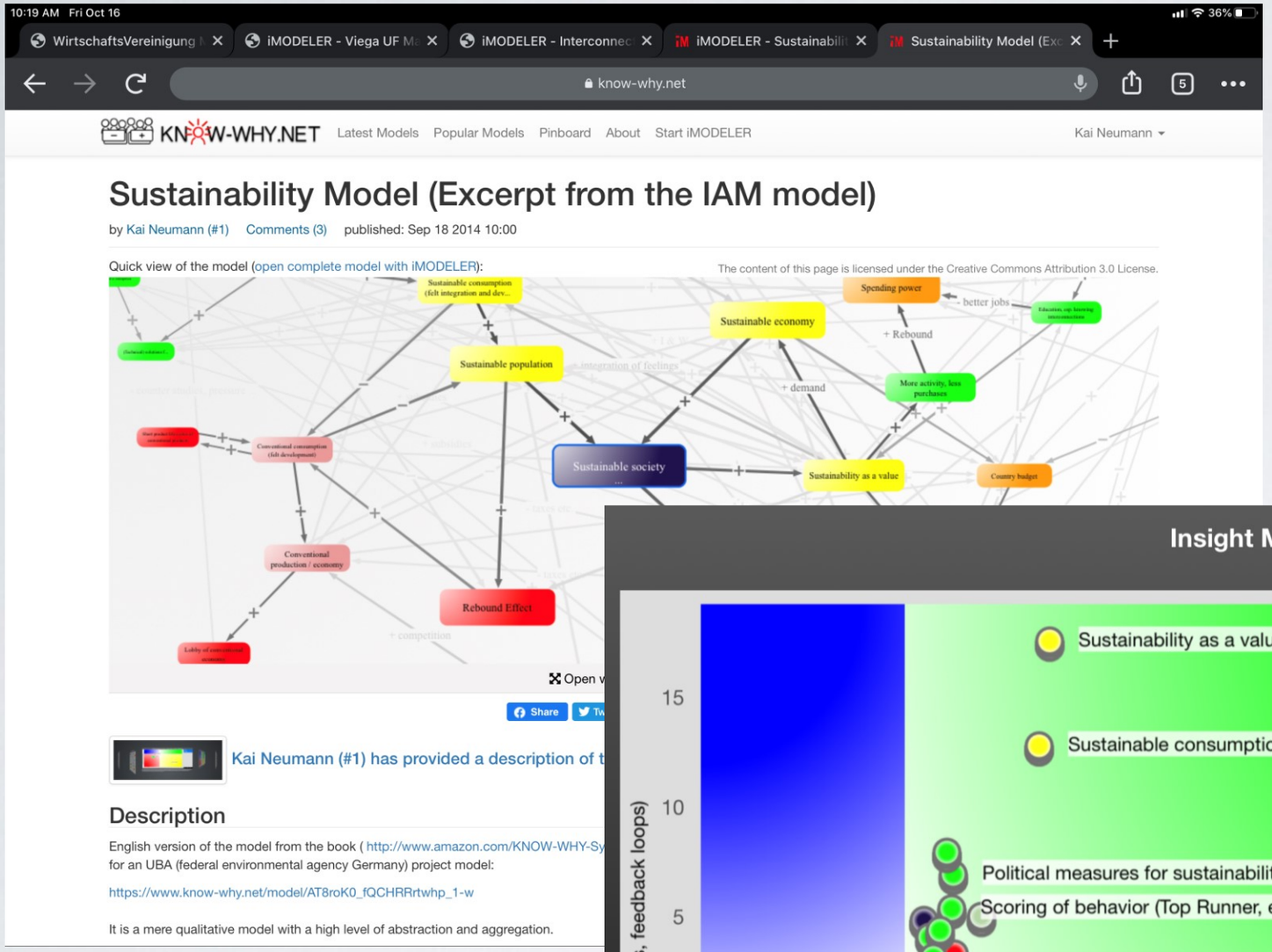
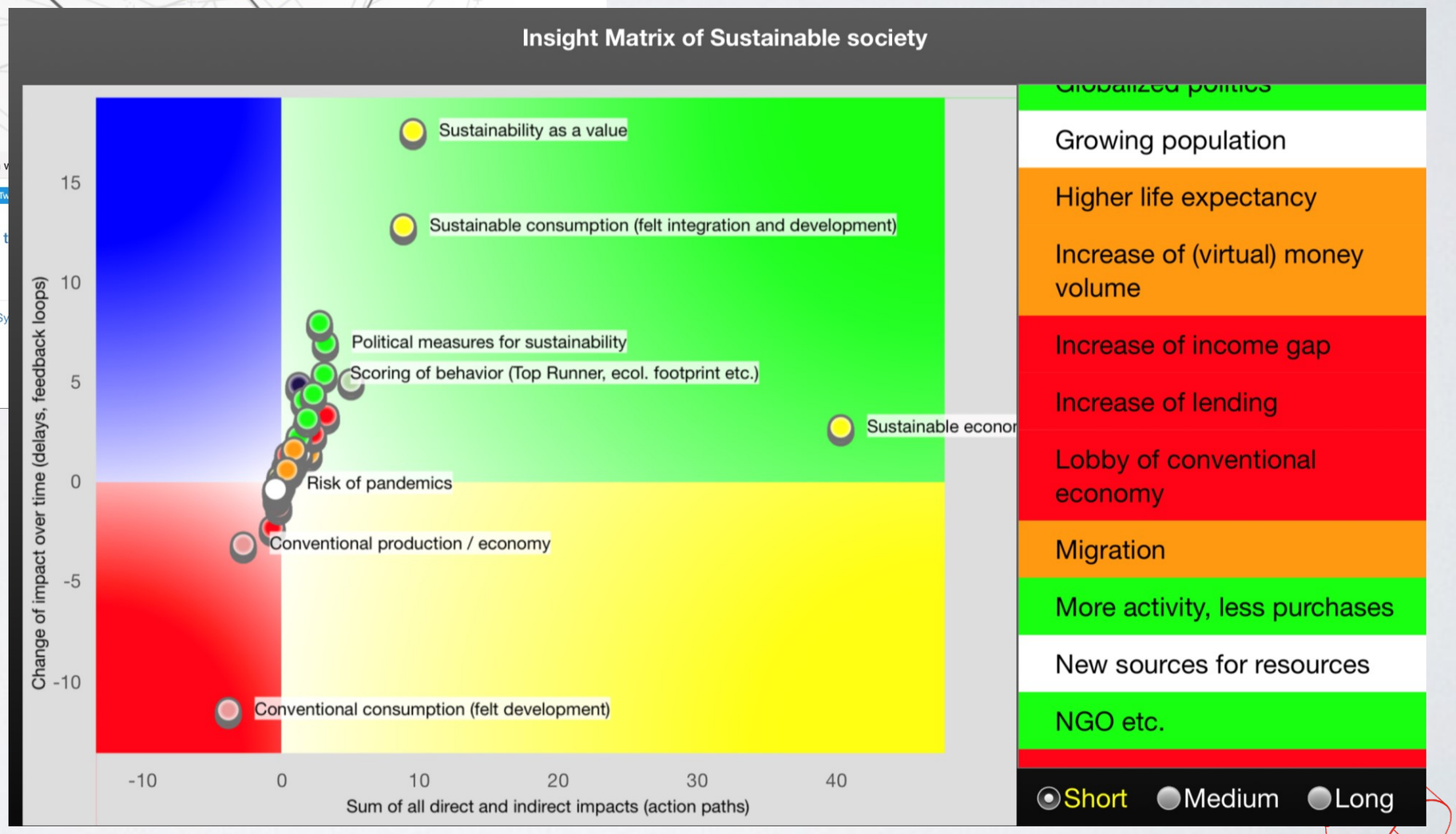
IAM





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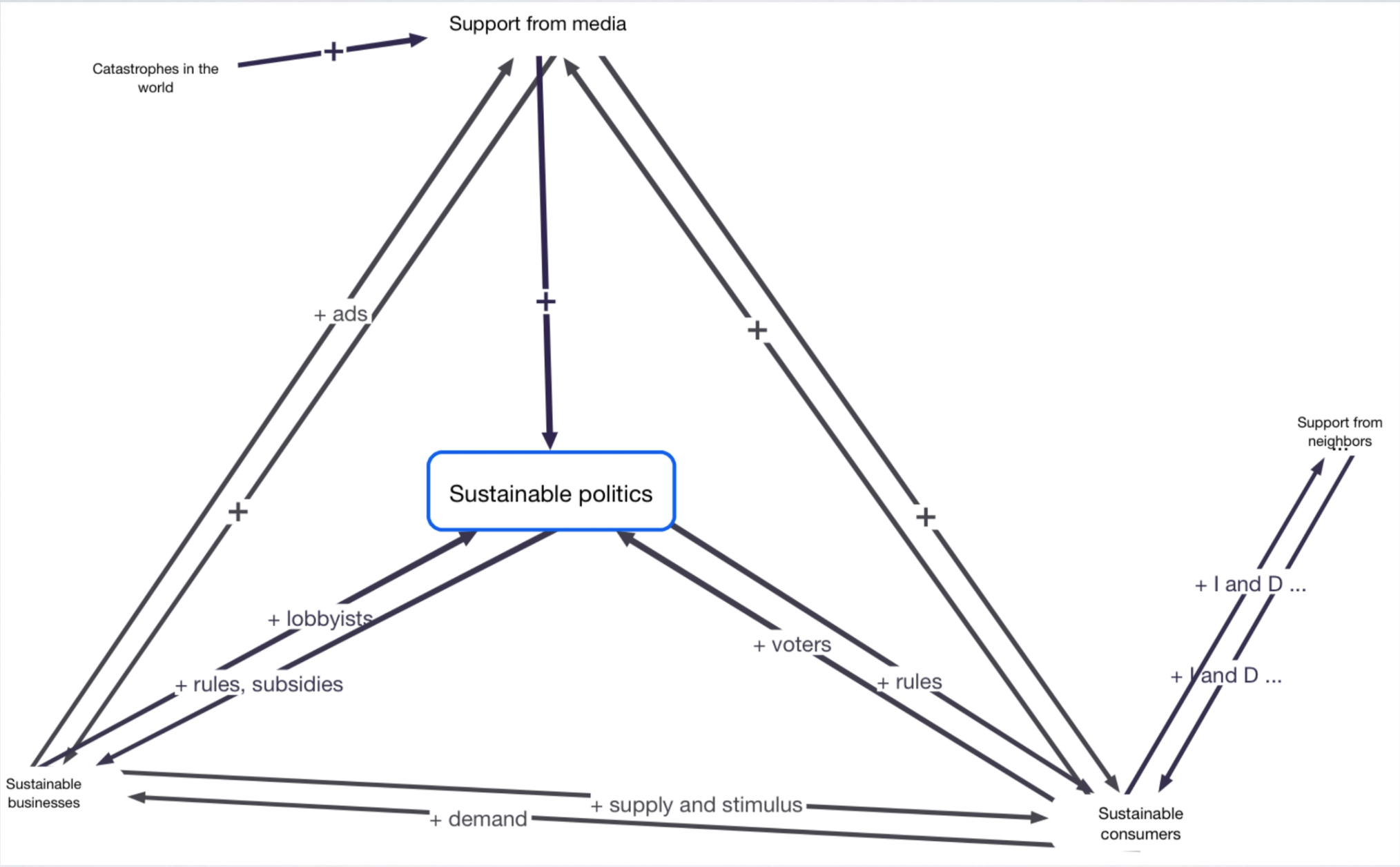
LOCK-IN EFFECT (FROM IAM)



"It's the psychology, stupid!"

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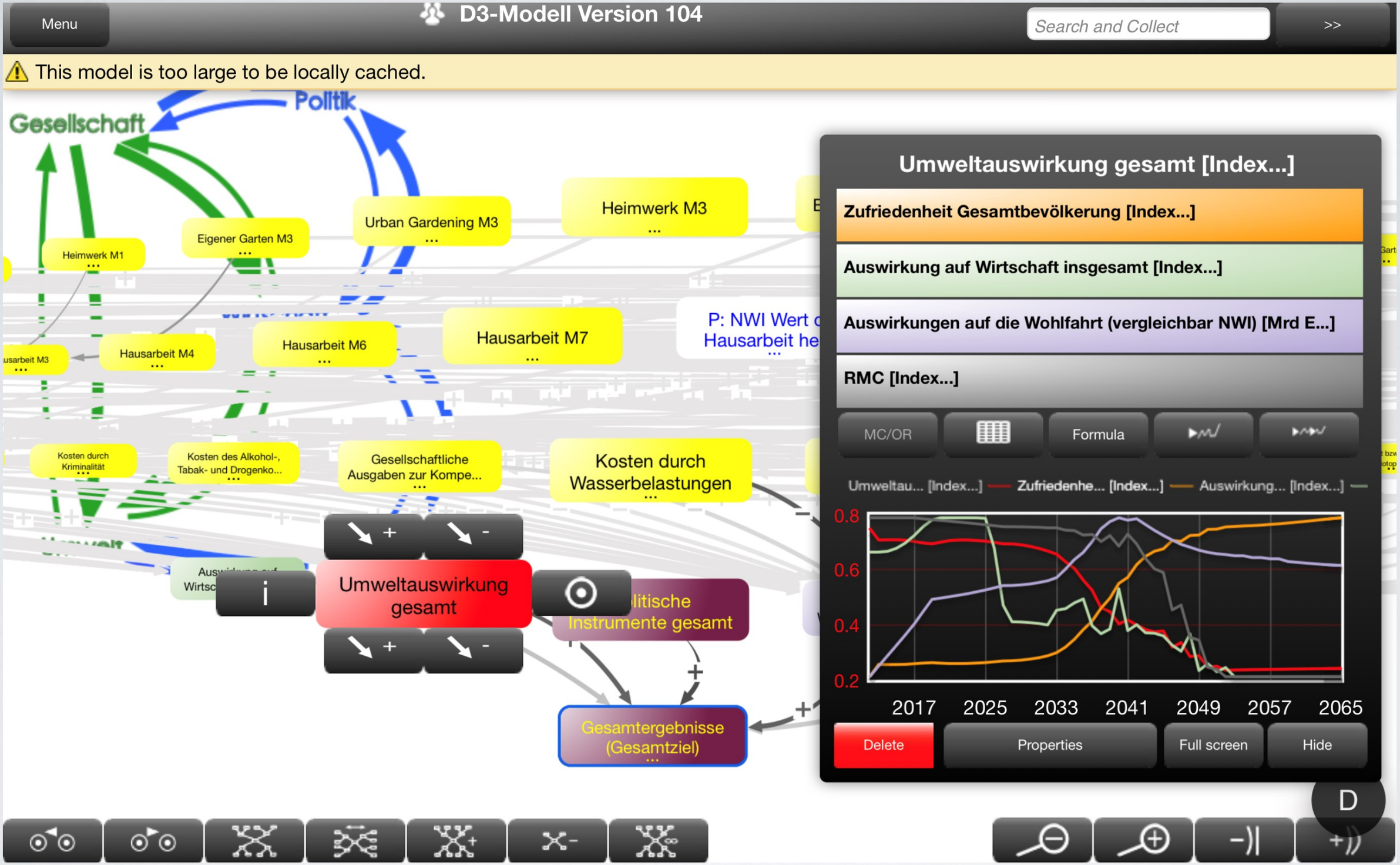
D3 MODEL



Spillover-effects once we score sustainable behavior to serve our biopsychological needs

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D3 MODEL

- Happiness goes up (since new values are easier to achieve)
- Economy goes up to go down (sufficiency after green investments)
- Welfare goes up and then slightly down
- Impact on environment later is clearly reduced
- Raw material consumption goes down with a circular economy

Spillover-effects once we score sustainable behavior to serve our biopsychological needs

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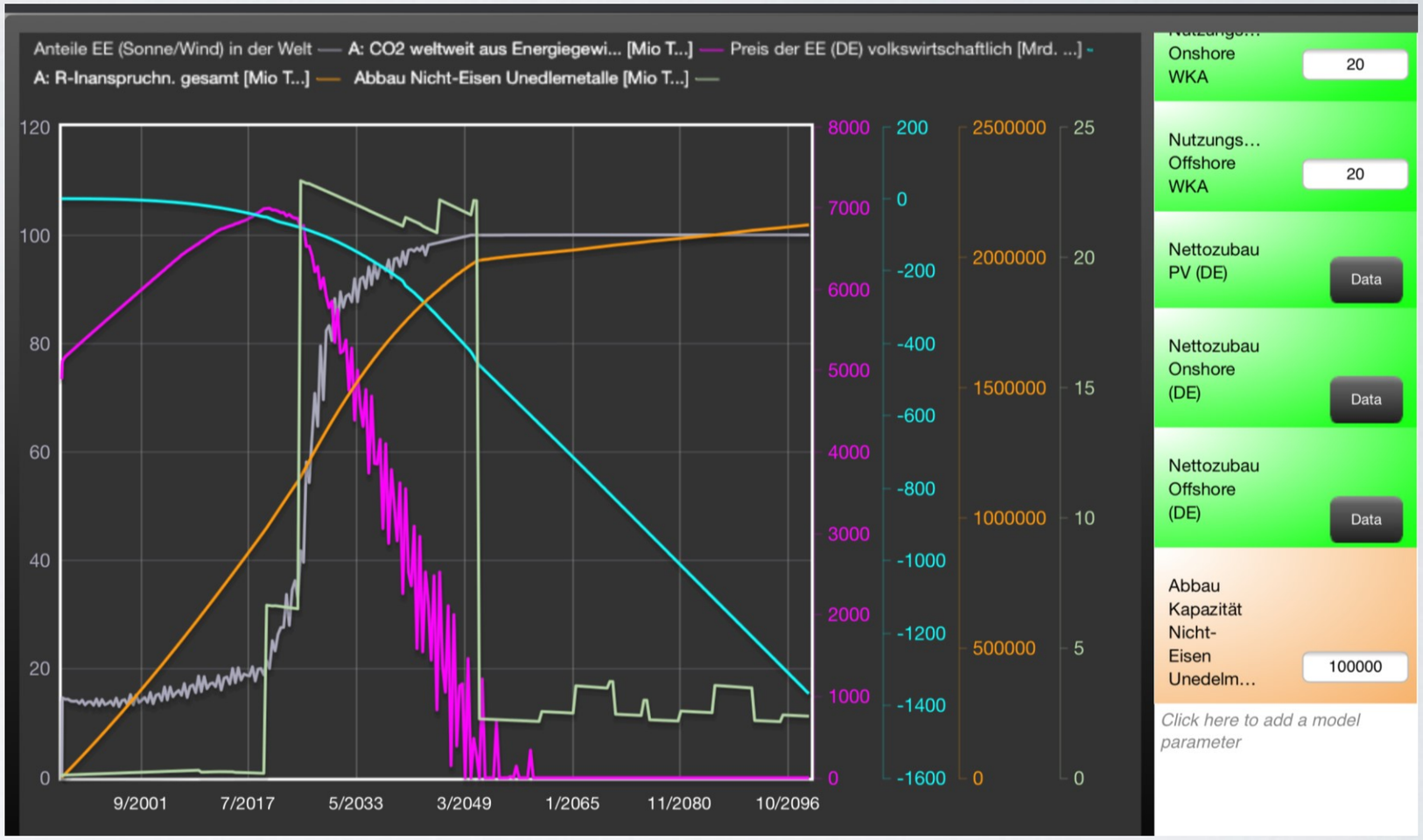
GEE(R) MODEL

- Using the World Energy Outlook as a baseline for the demand...
- ... there would be enough raw materials in the world ...
- ... but not less expansive high grade ...
- ... and with the need for enormous mining and processing capacities.
- Implications are winners and losers (currently examined with the ICARE project with Ecologic) with game theoretical aspects
- And an overall benefit for the economy despite rising energy prices



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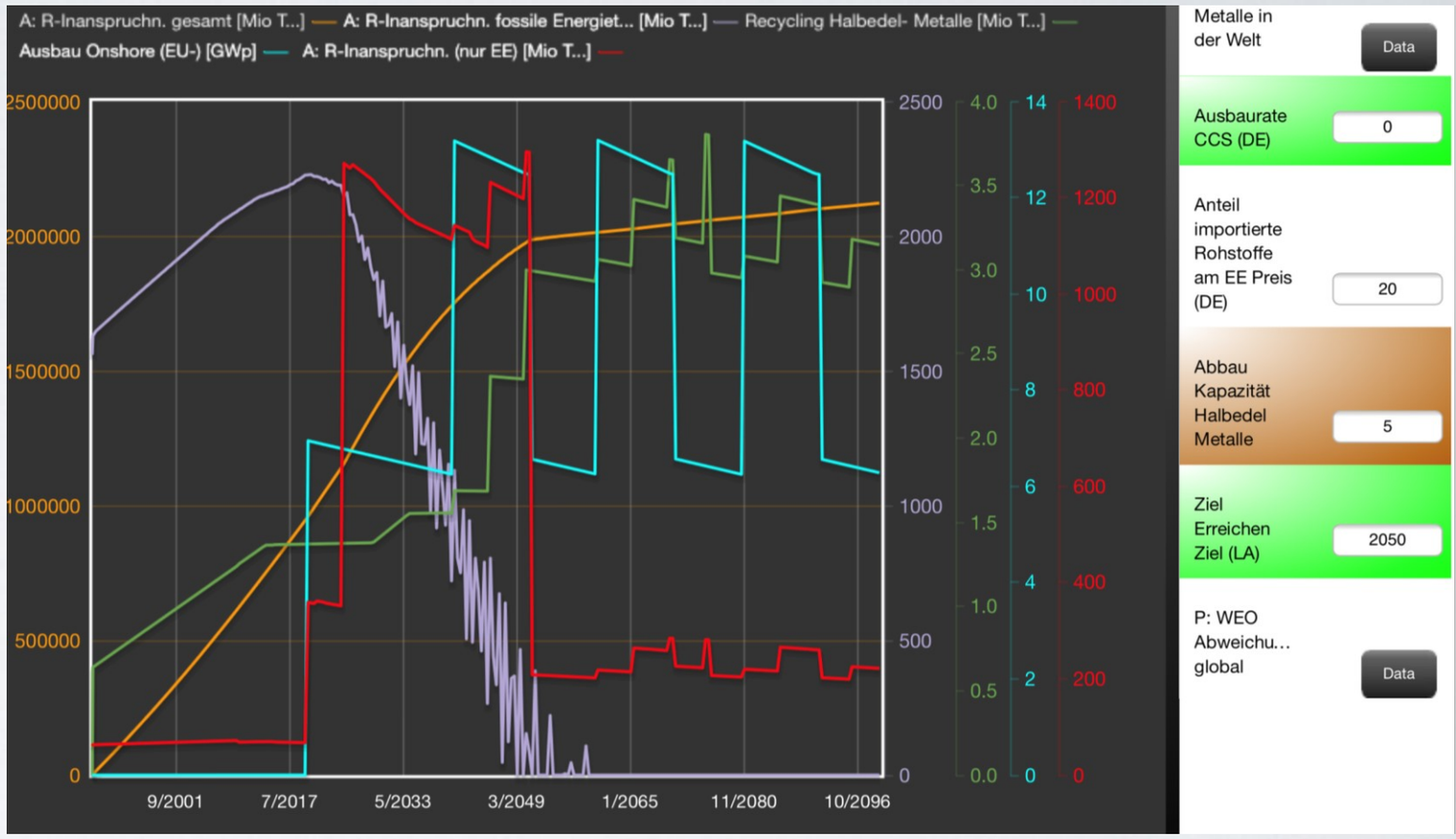
GEE(R) BECOMING ICARE

- System dynamics modeling in contrast to rather discrete calculations show interesting dynamics ...
- ... e.g. the doubling of needed capacities when net construction and repowering come together ...
- ... with implications for prices if there are not enough capacities or unused ones ...
- ... what could well lead to some form of resignation



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IMPLICATIONS FOR THE NEXUS

- Increase implementation of renewables now to take all the advantages of an early start (don't wait for later leapfrogging)
- Expect the need to support other parts of the world later (unless there is some concerted global action now)
- Rebound: resources we do not use others will ....
- ... efficiency means less resources for a later domestic value creation in a circular economy ...
- ... however: for geopolitical reasons we should distribute resources and value creation more evenly.
- In the long run it is the nexus between climate change and a global and local bio economy (featured with the ICARE model)

SCIENTIFICALLY

- Grounded Theory (to be falsified) with no alternative if we have to look into the future

- A connection could be proofed to be wrong...

- ... or a factor missing ...

- ... but there is no empirical evidence for future developments.

Abductive Logic