

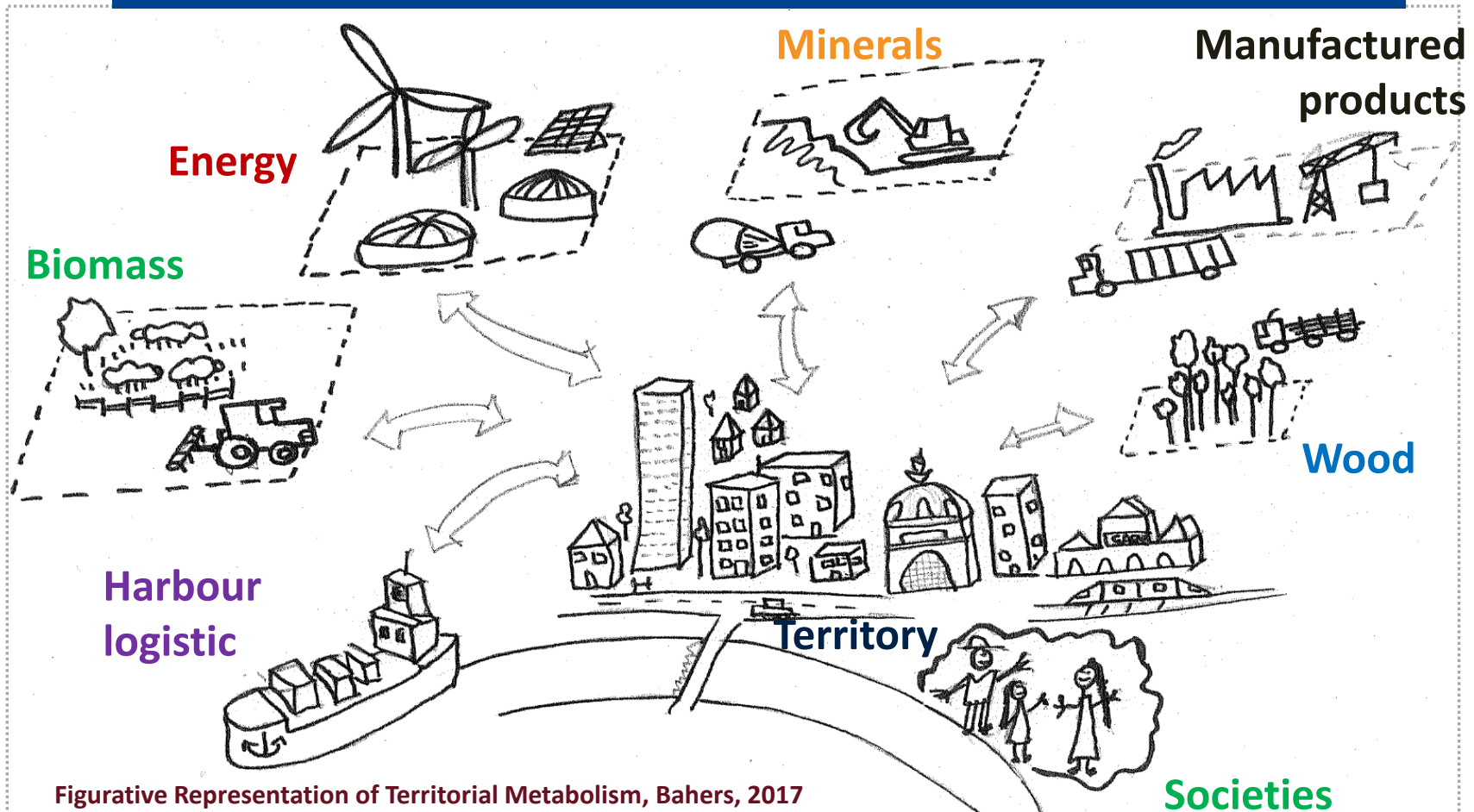
**Political-industrial Ecology of urban
energy metabolism:
metabolic relationships between cities and
hinterlands and waste-biomass-energy
nexus
in Nantes St Nazaire (France) and
Gothenburg (Sweden)**

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Research Hypothesis: Territorialization of Urban Metabolism...

... As an indicator of the links between supply and consumption territories



See : Barles, 2010; Pincetl et al., 2012 on Urban metabolism and Brenner, 2020 on Metabolic hinterlands

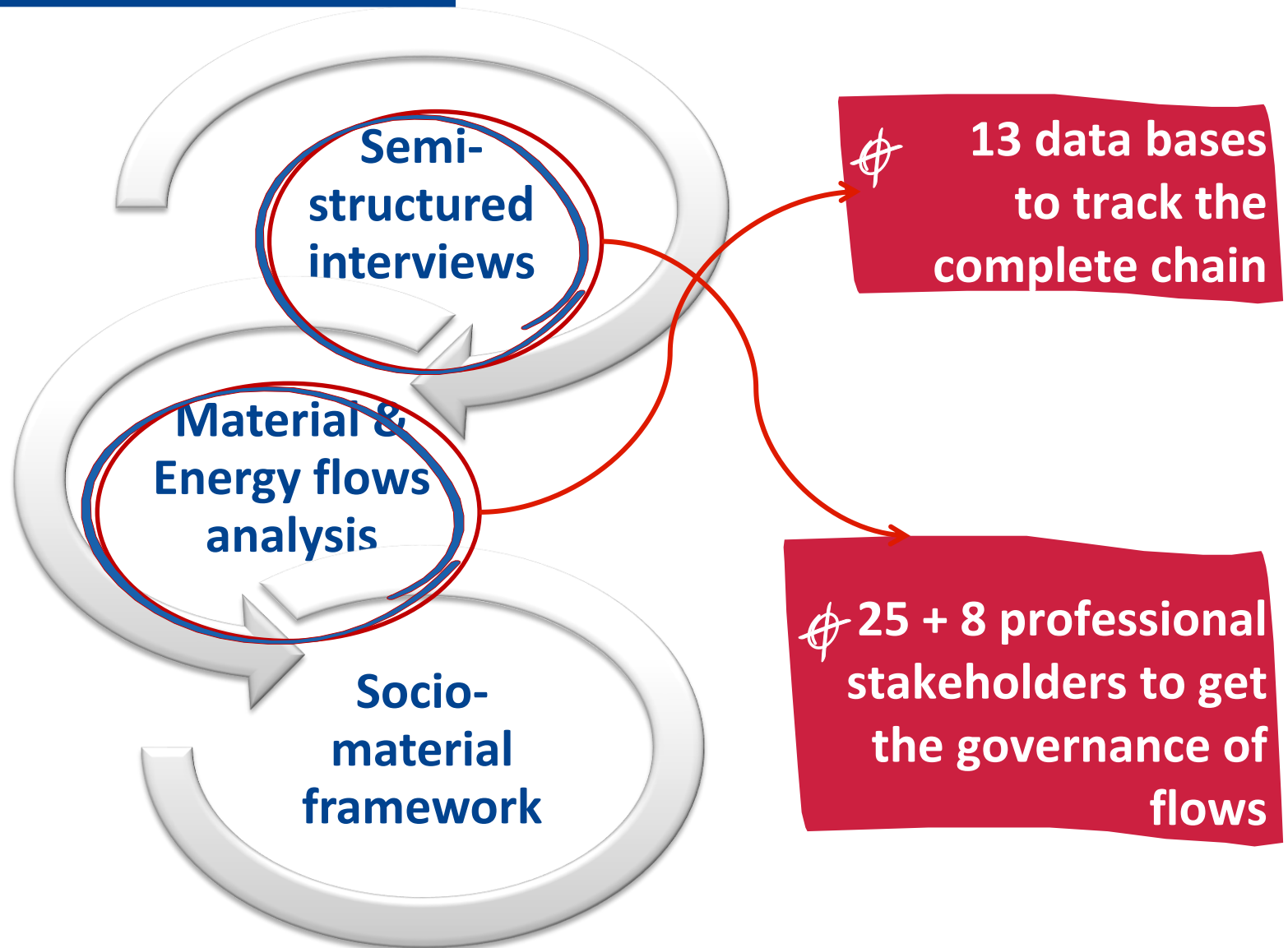
Examining metabolic relationships between cities and hinterlands

What are the natures of these socio-material links?

Are they based on synergies and cooperation, or, on the contrary, on unbalanced power and conflicts?



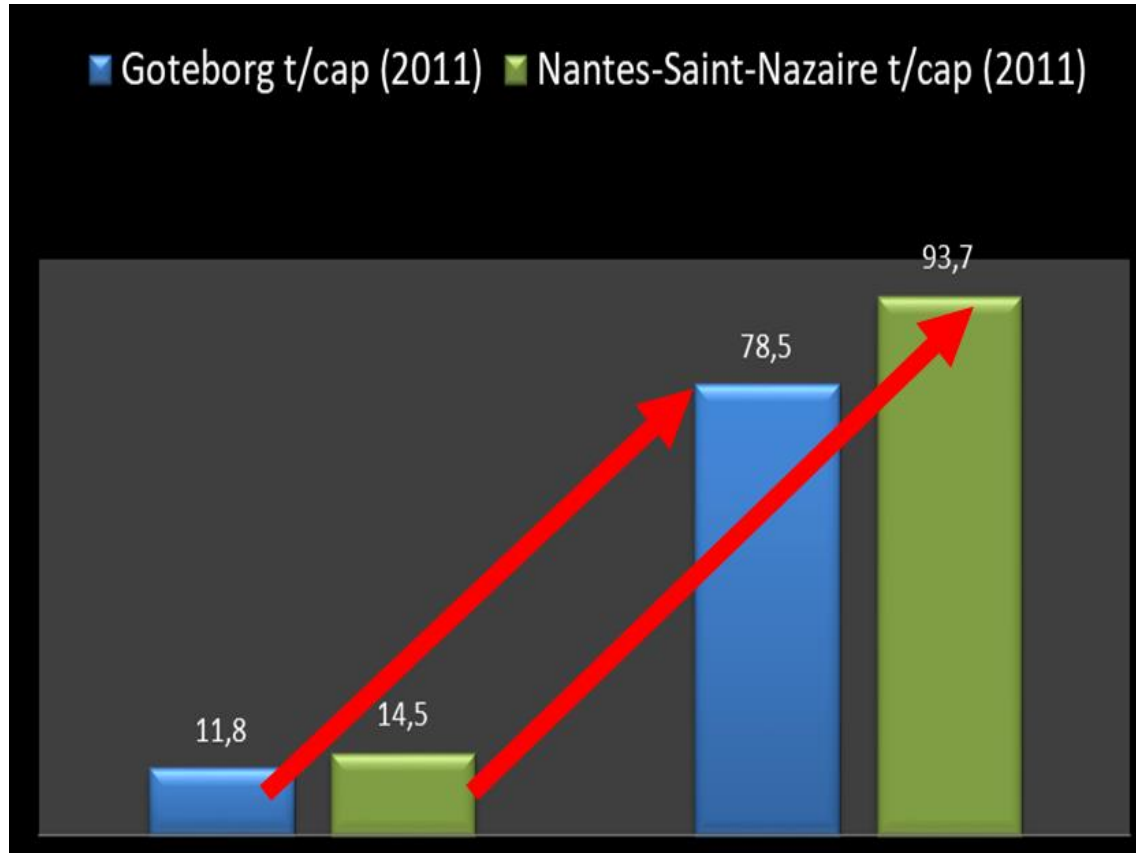
Methodology: the Political-Industrial Ecology



Case study: Nantes St Nazaire (France) and Gothenburg (Sweden)



Material and energy footprints of cities



Direct consumption

Material and energy footprints

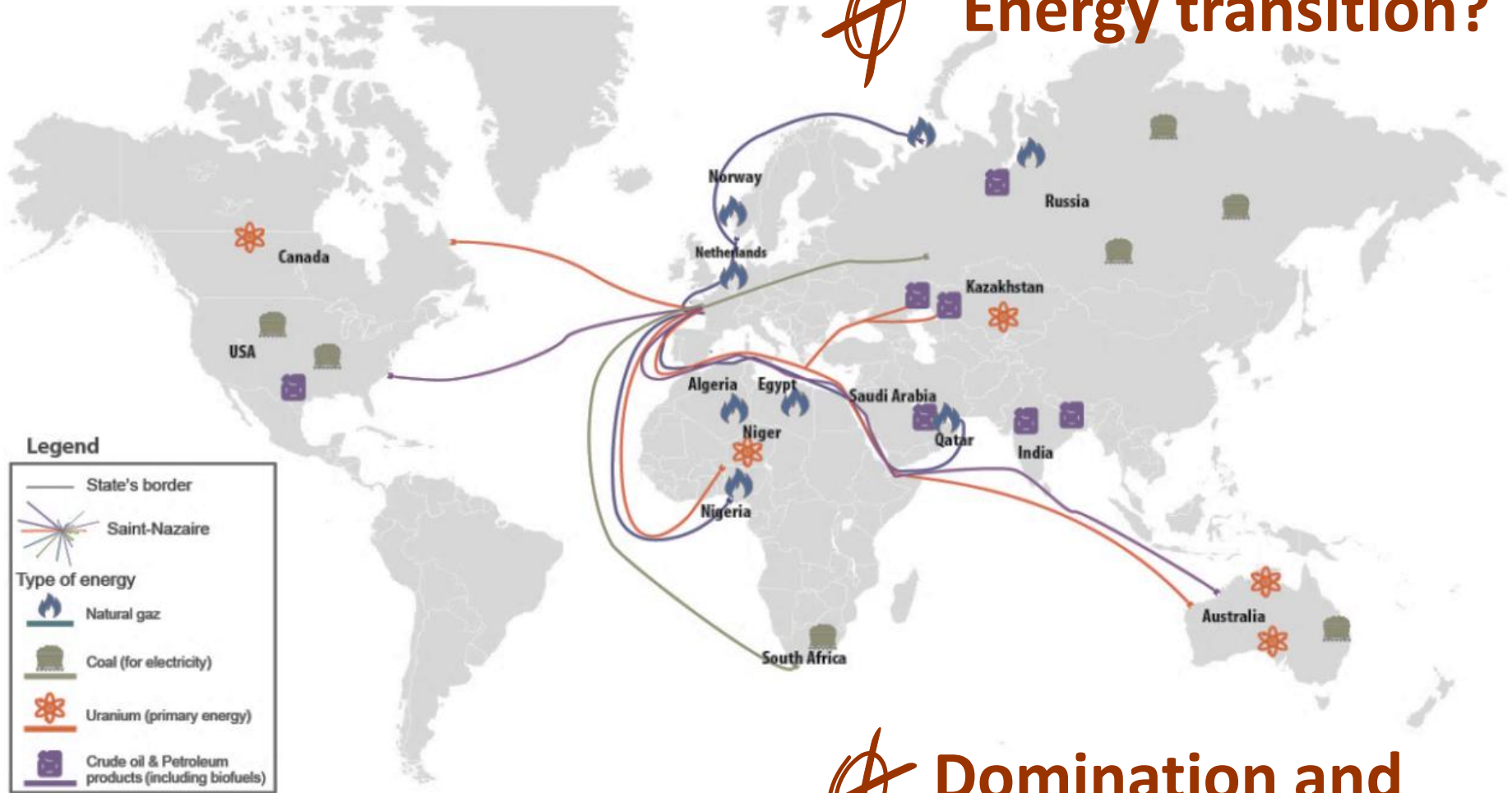
~~Factor 6~~

~~Externalized impacts~~

~~Role of hidden flows~~

Dependency on a distant hinterland

~~Energy transition?~~



~~Domination and post-coloniality~~

Author: Bahers, Sources: CARENE, BASEMIS, GRAND PORT, AILE, World Nuclear Association, USGS, © : projet OPTIMISME, UMR ESO CNRS, 2018

Waste-biomass-energy nexus?

Major transition for a major infrastructure:

Cordemais coal plant



Biogas development in
the Goteborg region



Waste-biomass-energy nexus in France: Power conflicts at the local scale

Major transition for a major infrastructure: *Cordemais* coal plant (France)

*""Cordemais: we try not to interfere, we are neither for nor against ... but territorial **projects of this type and short energy circuits do not go in the same direction** ""*

*"Regarding biomass, there is pressure on the resource. If Cordemais turns into a biomass plant, within a radius of 600 km, **it will hurt!**"*

Waste-biomass-energy nexus in France:

Power conflicts at the local scale

Conflicts between supply territories and consumption territories

*"Concerning the biomass plant and the energy network, people are tired of **supplying the "bourgeois society"** with their infrastructure of which they are so proud. If there were no rural areas like us, there would be no streams. Moreover, it starts to be **a serious problem because all the wood is going through!** "*

Waste-biomass-energy nexus in Sweden : the contradictions of energy transition

Biogas development in the Goteborg region

""Thanks to SUVs, biogas from waste is on the rise ""

"We collect the waste up to 100km away "

"We will not collect enough food waste, and reach enough profitability with biogas" → Institutional lock-in because of commitment to incineration (Corvellec, Zapata, Zapata, 2013)

Waste-biomass-energy nexus

Similarities

- Need to collect waste from a distance
- Reinforce relationships of domination
- Centralized (not autonomous) infrastructures
- Does not question the metabolism of the capitalocene

Divergences

- Acceptability and conflict in waste-to-energy infrastructure

Conclusion

Drivers of metabolic relationships

- A discrepancy between flows and actors
- Not enough for an infrastructure to claim renewable energy-based operations to avoid **metabolic conflicts**
- Energy consumption and atmospheric emissions from supply territories are disconnected from consumption activities → the role of **hidden flows**

New Political Ecologies of Renewable Energy

- « **Political-industrial ecology** » of energy through relation between cities and hinterlands

Political-industrial Ecology of urban energy metabolism: metabolic relationships between cities and hinterlands and waste-biomass-energy nexus in Nantes St Nazaire (France) and Gothenburg (Sweden)

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