

DTU



Daniel Møller Sneum, Emilie Rosenlund Soysal, Frikk Nesje and
Mark C. Freeman

Discounting assumptions in district energy

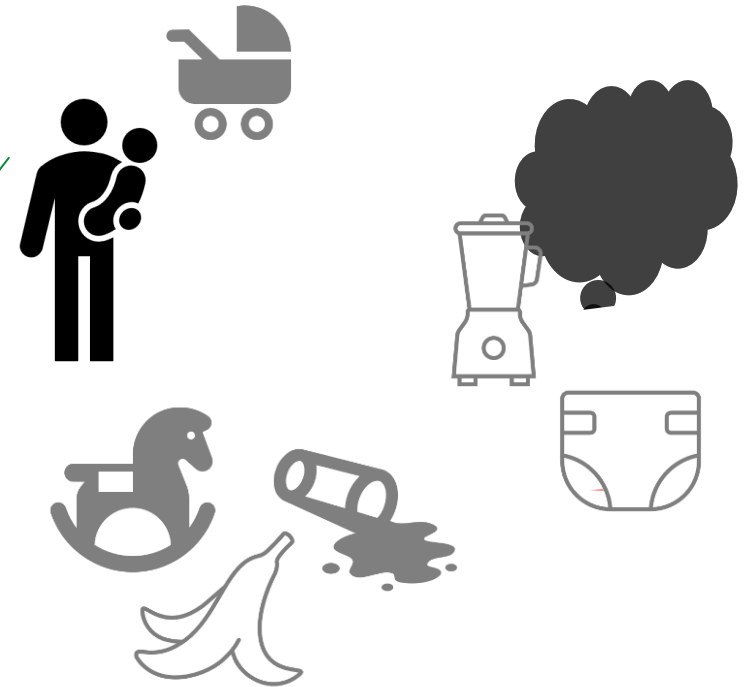
BACKGROUND



Danish
Utility Regulator

Something on discount
rates under green
transition?

Sounds perfect!



Result: Our study + a lot of other interesting studies [in the anthology from March 2021](#).

3 parts

PART 1: Discounting basics



PART 2: Discounting assumptions' assumptions

PART 3: Future of socio-economic assessments of district heating



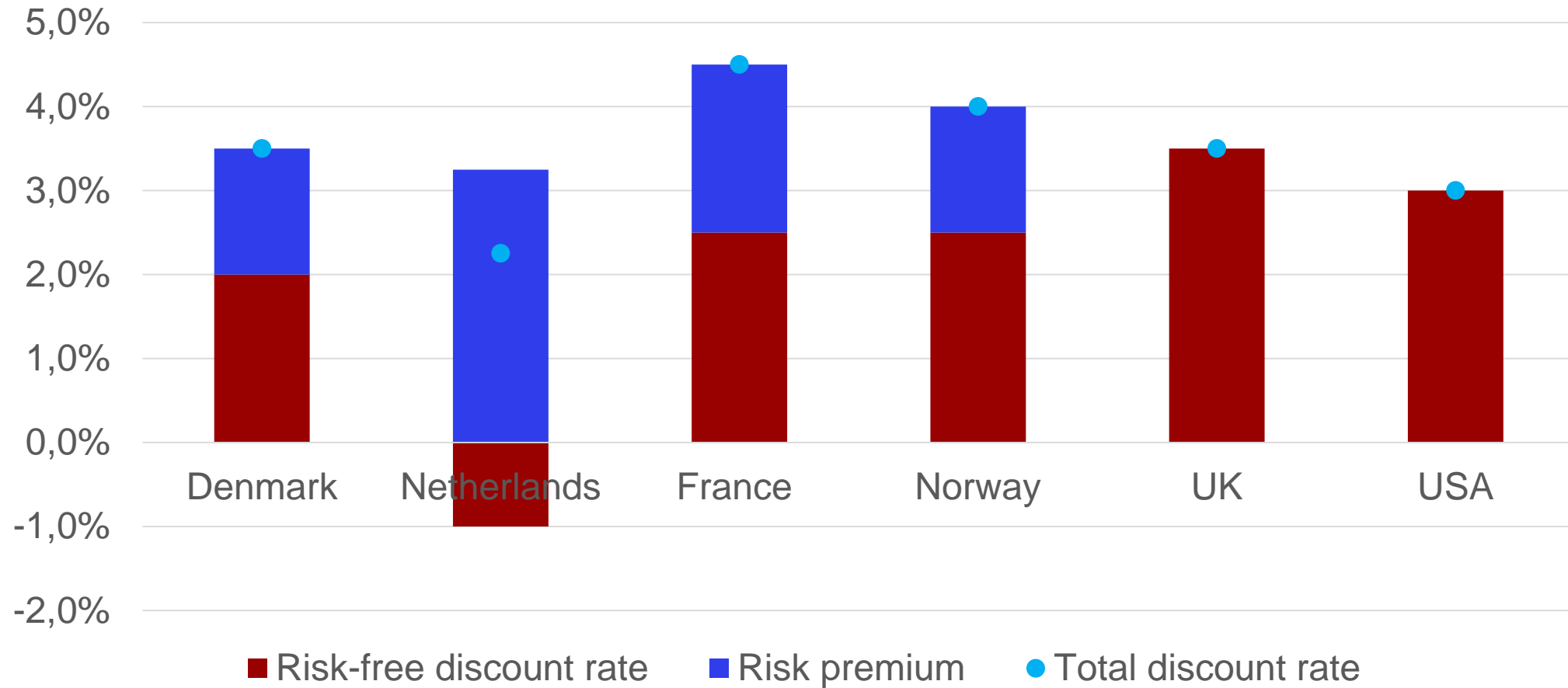
PART 1: DISCOUNTING BASICS

Discounting recap

$$Net\ present\ value = \sum_{t=1}^T \frac{CF_t}{(1 + r)^t}$$



Discount rates - examples

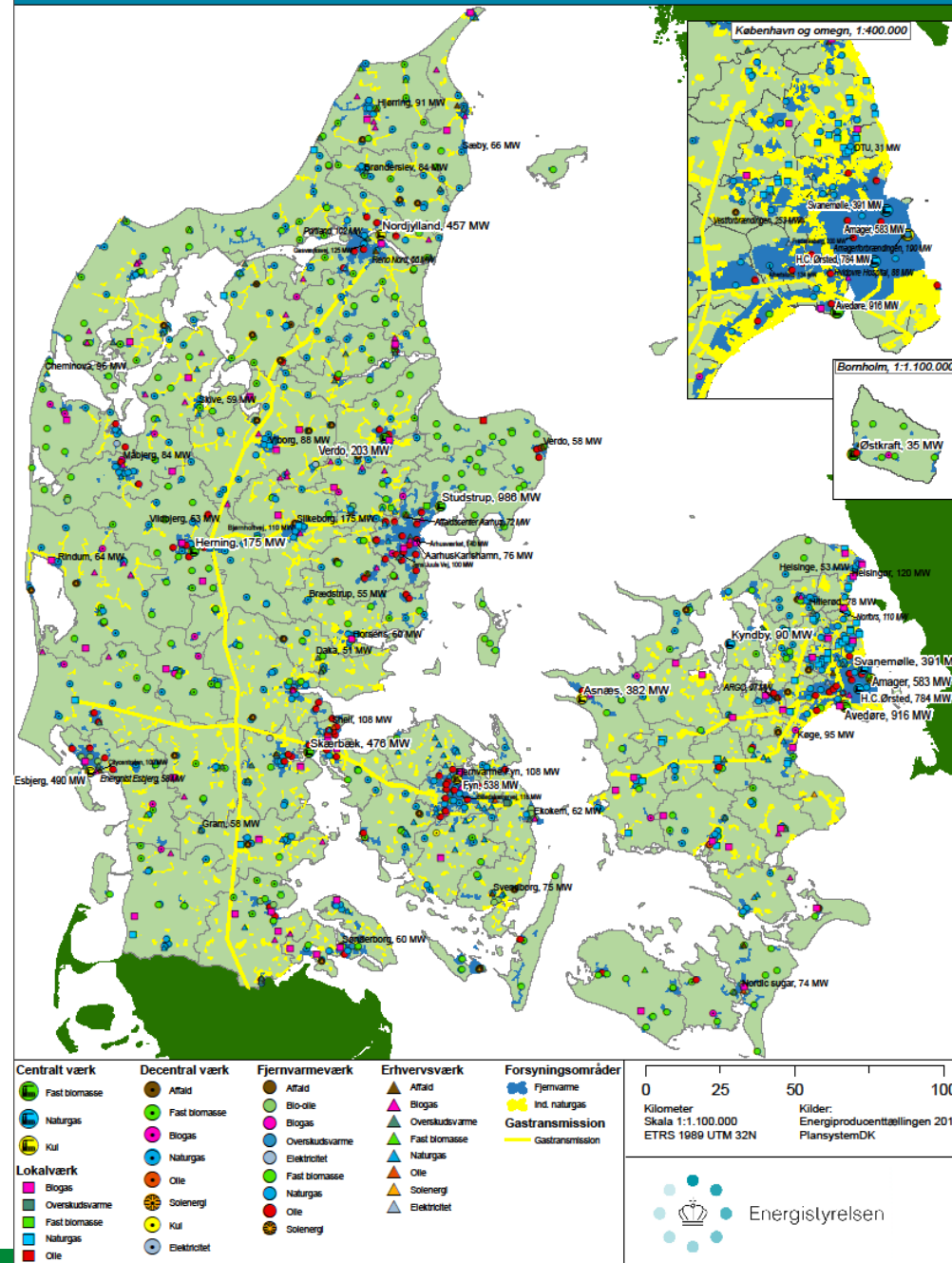


PART 2: DISCOUNTING ASSUMPTIONS' ASSUMPTIONS



Why social discounting in district heating?

- Why aren't taxes sufficient?
- Danish North Sea gas project (tax revenue) + probably political control

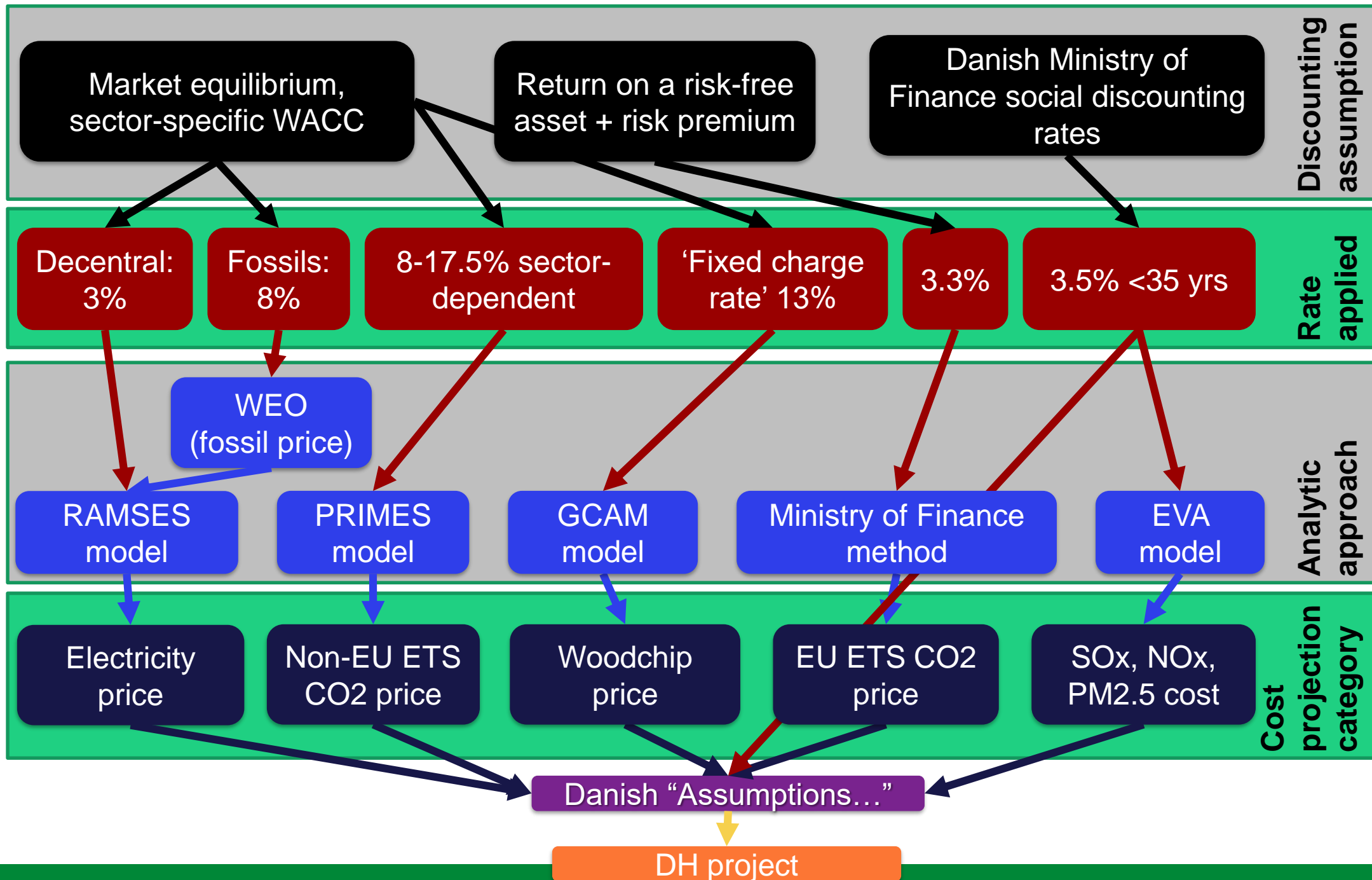


Danish *Assumptions* *for socioeconomic* *analyses*

- Defines quantitative inputs to be used for Danish DH projects
- Example – electricity:

2019-prices DKK/MWh	Raw socio-economic price of electricity
2019	350
2020	370
2021	360
2022	360
2023	380
2024	390
2025	400
2026	
2027	





PART 2 CONCLUSION

Danish Assumptions for socioeconomic analyses



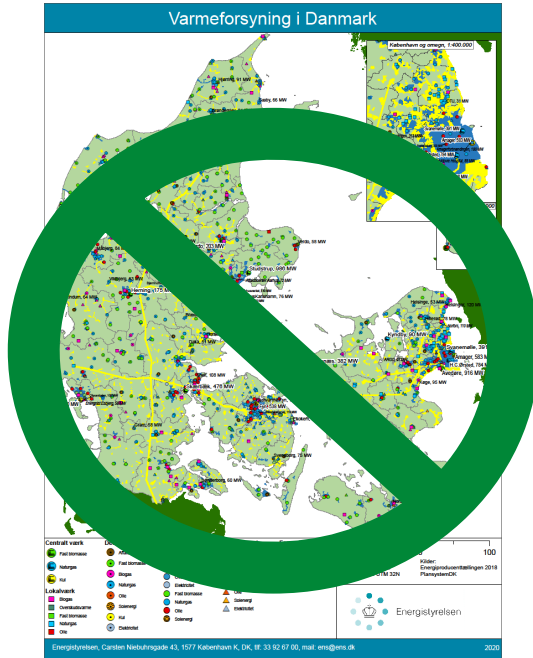
No common methodology/point of reference in the analytic approaches, but overall



If “socioeconomic” = Denmark

PART 3: FUTURE OF SOCIOECONOMIC ASSESSMENTS OF DISTRICT HEATING

CONTINUED NEED FOR SOCIOECONOMIC ASSESSMENT OF DH?



Fossil gas project shrinking



Fossil alternatives no longer required in the assessments



Mandatory connection to DH no longer required for new areas

IN 2021: NO NEED FOR SOCIOECONOMIC ASSESSMENT OF DISTRICT HEATING

If mandatory connection to DH for existing consumers = definitely not (because unlevel playing-field with competing alternatives)

Bekendtgørelse af lov om varmeforsyning¹⁾

Herved bekendtgøres lov om varmeforsyning, jf. lovbekendtgørelse nr. 120 af 6. februar 2020.²⁾

Kapitel 1

Formål og definition

§ 1. Lovens formål er at fremme den mest ~~samfundsekonomiske~~, herunder miljøvenlige, anvendelse af energi til bygningers opvarmning og forsyning med varmt vand og inden for disse rammer at formindske energiforsyningens afhængighed af fossile brændsler.

Stk. 2. Tilrettelæggelsen af varmeforsyningen skal i overensstemmelse med de i stk. 1 nævnte formål ske med henblik på at fremme samproduktionen af varme og elektricitet mest muligt.

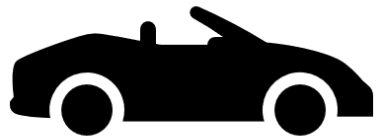
IF WE REMOVE SOCIOECONOMIC ASSESSMENT DISTRICT HEATING = A CAR

Danish heat supply will be dictated by

- Market prices of energy and technologies
- Subsidies and taxes
- Consumer sentiment
- State of the market

Is that good or bad?

Markets tend to deliver on cost-minimisation, but not on systems-thinking.



WILL THE MARKET SOLVE IT?

Private disc. rates/IRR in district heating: ~10-20%

- 14-18%

- Note: estimated numbers. Duedahl and Gullev. HotCool no. 1 2019

- Towards 20%

- Hawkey D, Webb J, Bell H, McCrone D, Tingey M, Winskel M. Sustainable Urban Energy Policy - Heat and the city. 1st ed. Abingdon, Oxon: Routledge; 2016.

- 10-12%

- Colmenar-Santos A, Borge-Díez D, Rodríguez S. District heating and cooling networks in the European Union. Dist. Heat. Cool. Networks Eur. Union, 2017, p. 1–149. doi:10.1007/978-3-319-57502-8.

For renewables (example)

- 8-9%

- https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2020/Nov/IRENA_Mobilising_institutional_capital_2020.pdf

NOT IF HIGHER IRR (=BETTER INVESTMENT) IN COMPETING SECTORS

CONCLUSION

IF we remove socioeconomic assessments, there should be backstops to ensure societally desirable outcomes, including

- Quick and efficient assessment of taxes/subsidies
- Clear and strong price signals to reduce environmental damage
- Public information to mitigate heat users' bounded rationality
- Measures to mitigate fuel poverty
- Long-term national strategy to give clear investment signals



And there could be requirements for new heat supply projects to encompass assessments of not just technology alternatives, but also OWNERSHIP alternatives

- PPPs
- **PcoopPs** (mediated by a public intervener like in California)
- And anything in between...



**This presentation has been made possible by the
HEAT4.0 project**

THANKS!

COMMENTS, PLEASE!

Where am I wrong?

Where am I right?