

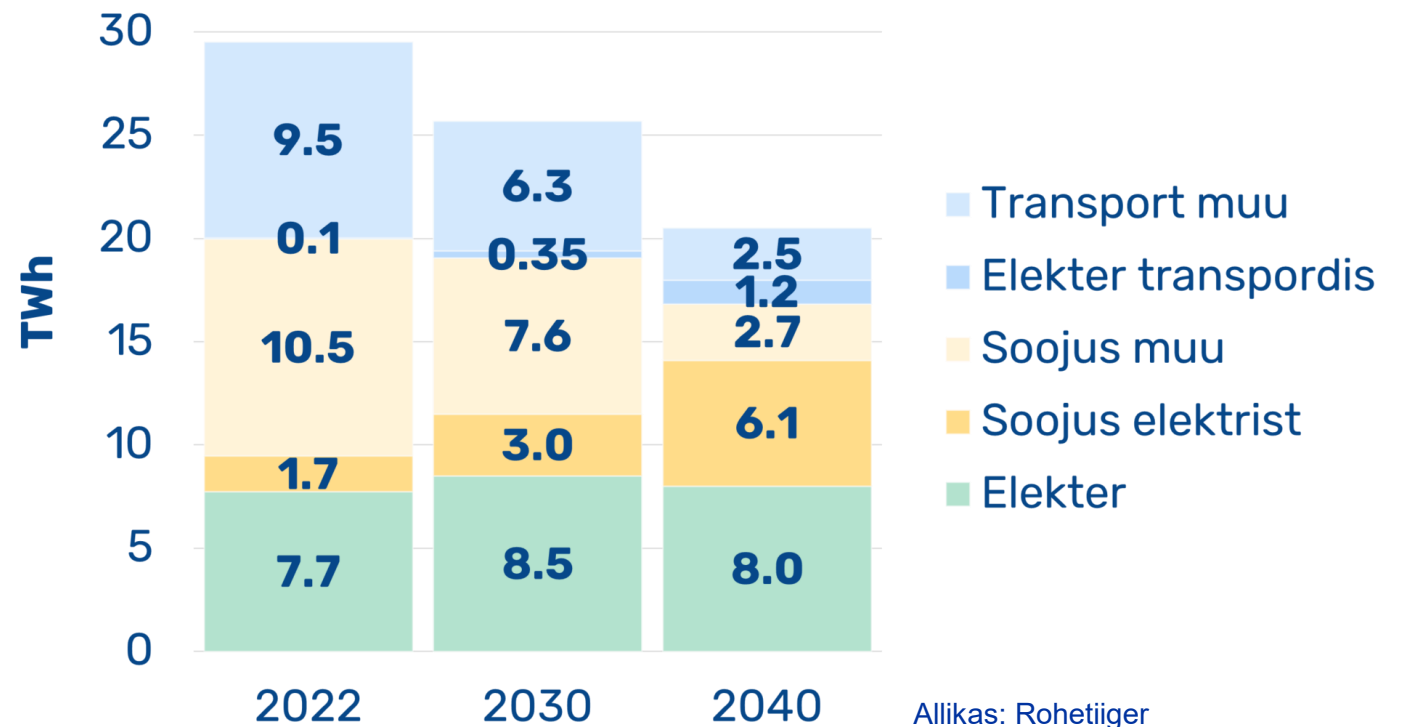
Energiapoliitika strateegilised valikud ja vajadused

Mario Kadastik



Energeetika suur pilt

- Energeetika kogupildist moodustab elekter vaid *ca* veerandi
- Soojus ja transport on kaks suurt sektorit, kus on võimalik bilanssi vähendada targemate / efektiivsemate tehnoloogiate kaudu
- Summaarselt koguenergia mahtu on võimalik kahandada elektrifitseerimise kaudu



Poliitilised valikud ja sisend



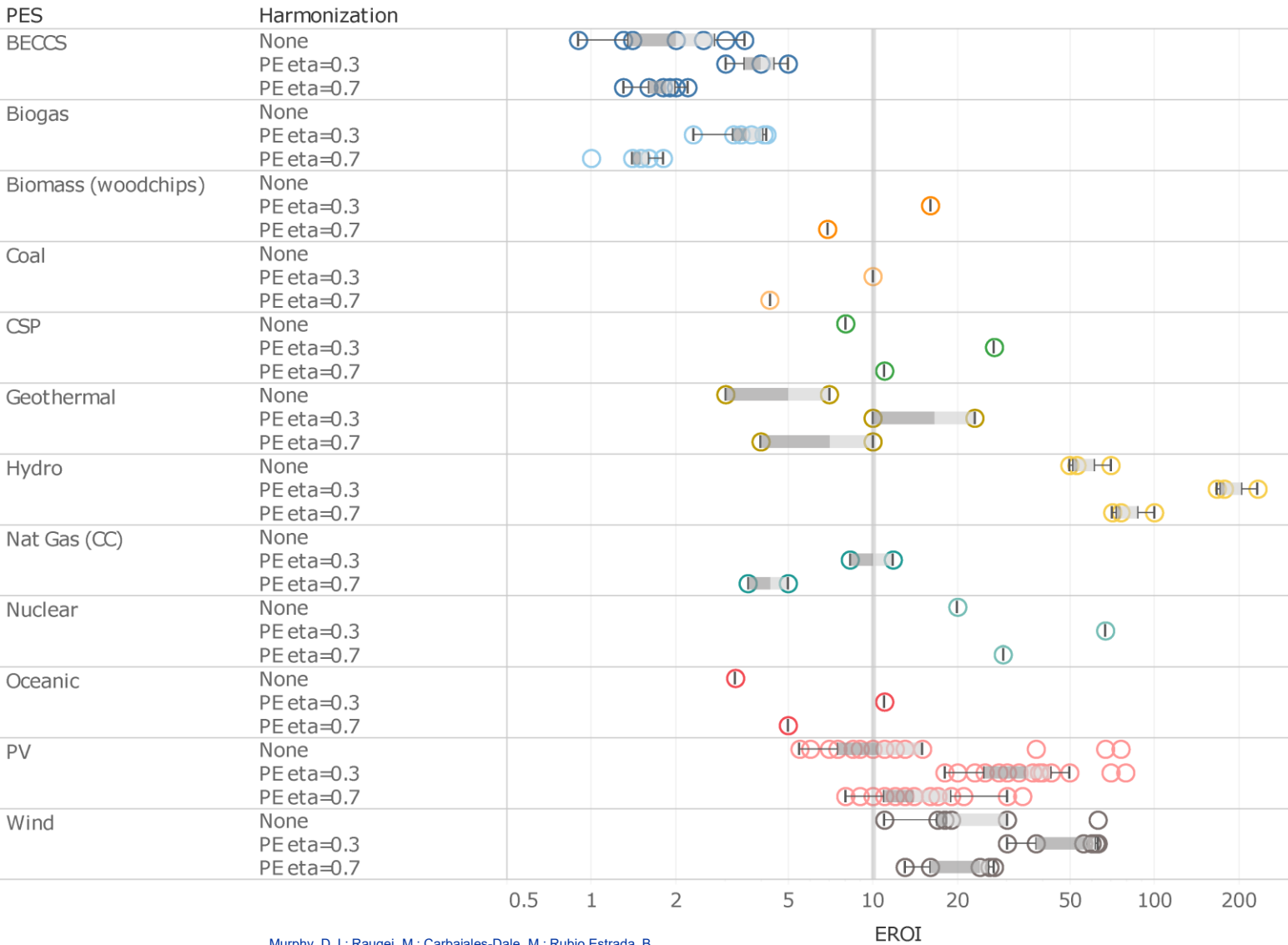
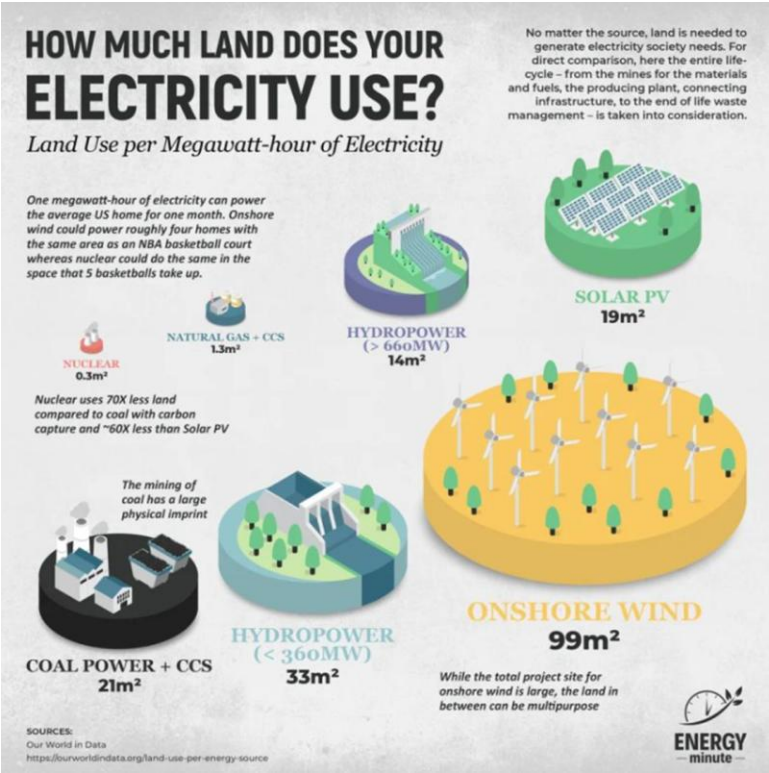
Valikute tegemiseks on vaja faktilist infot

On vaja aru saada otsuste mõju eri komponentidele kogumina

Igal energia kasutusliigil on oma plussid ja miinused, ei saa silma kinni pigistada ja nn *cherry pick*ida neid elemente, mis meeldivad

Poliitika kujundamisel on meil eesmärgid, mida soovime täita, aga peame mõistma milliseid vahendeid on ratsionaalne kasutada kus

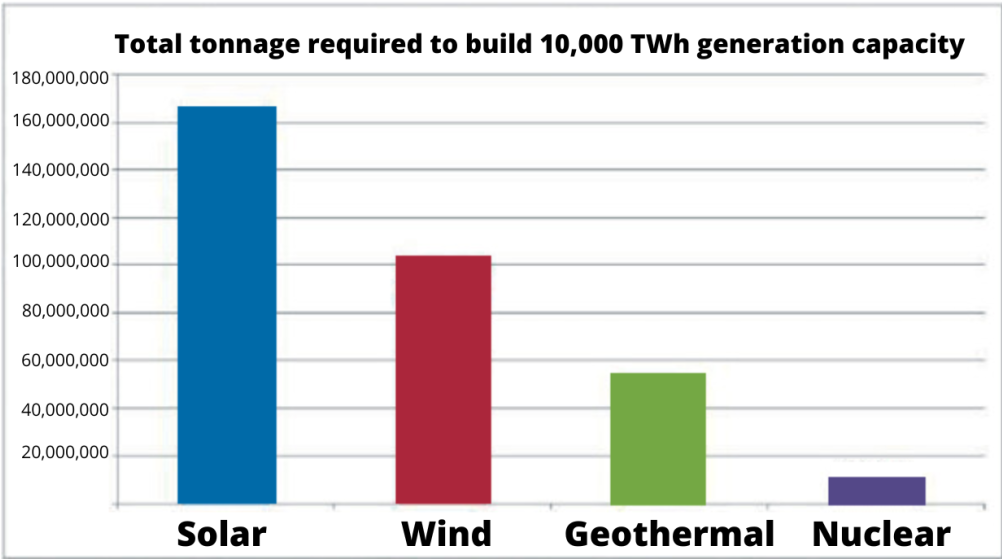
Ressursside efektiivsus



Murphy, D.J.; Raugei, M.; Carbajales-Dale, M.; Rubio Estrada, B.
Energy Return on Investment of Major Energy Carriers: Review and
Harmonization. *Sustainability* **2022**, *14*, 7098.
<https://doi.org/10.3390/su14127098>



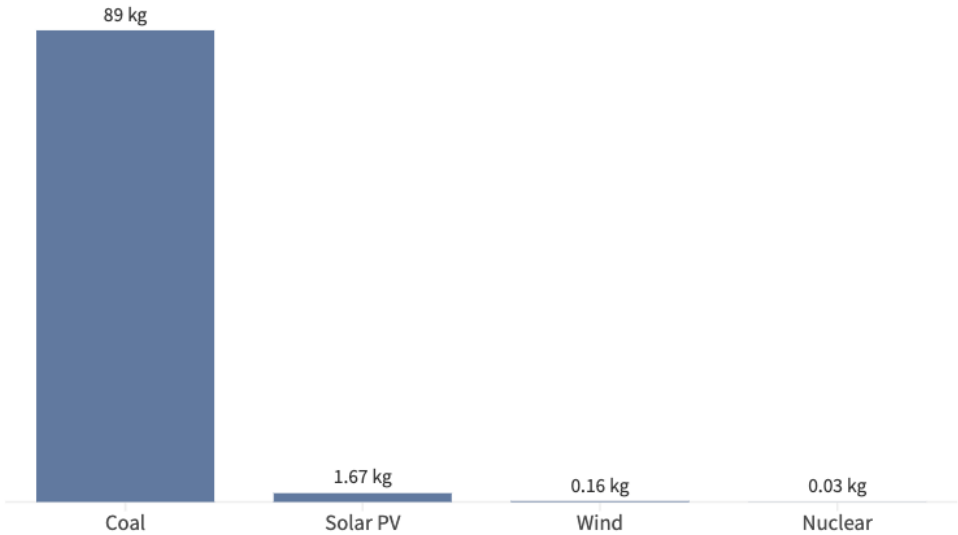
Ressursside efektiivsus



Source: Quadrennial technology review / Chapter 10: Concepts in integrated analysis / September 2015 / www.energy.gov

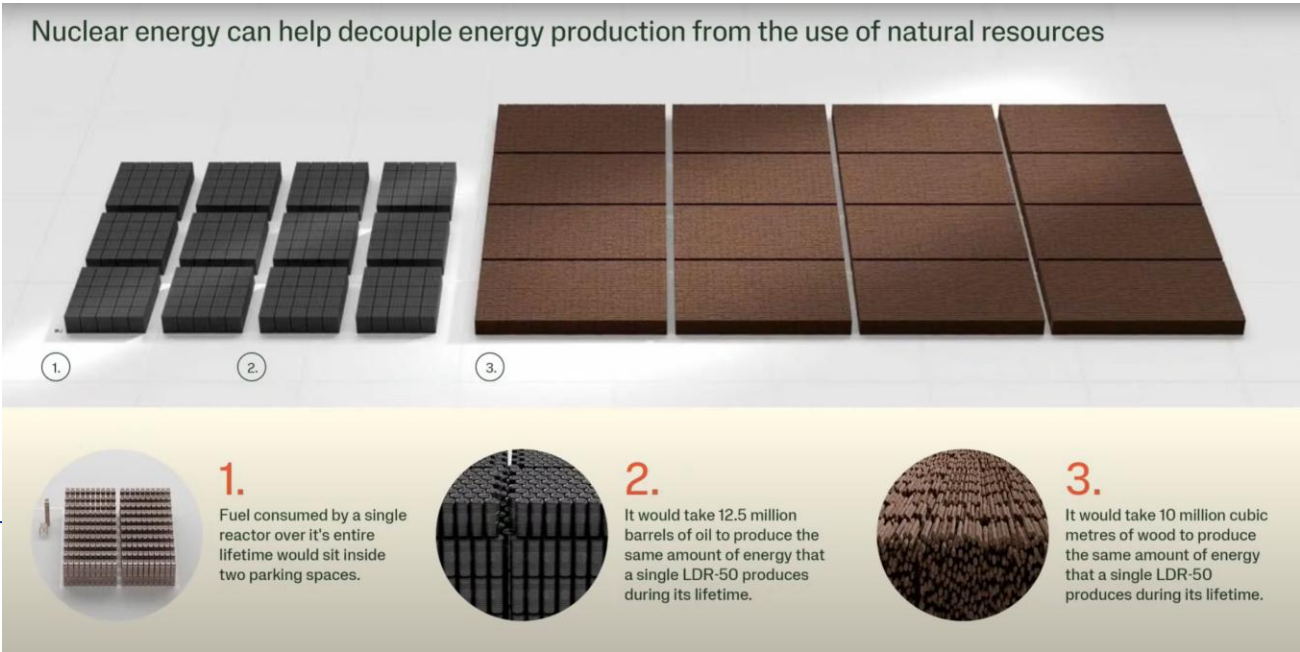
Waste generated per unit of electricity production

Measured in kilograms of waste per megawatt-hour. Waste for solar and wind is in the form of panels and turbine blades. Coal is mostly coal ash. Nuclear is mostly spent or unprocessed fuel.



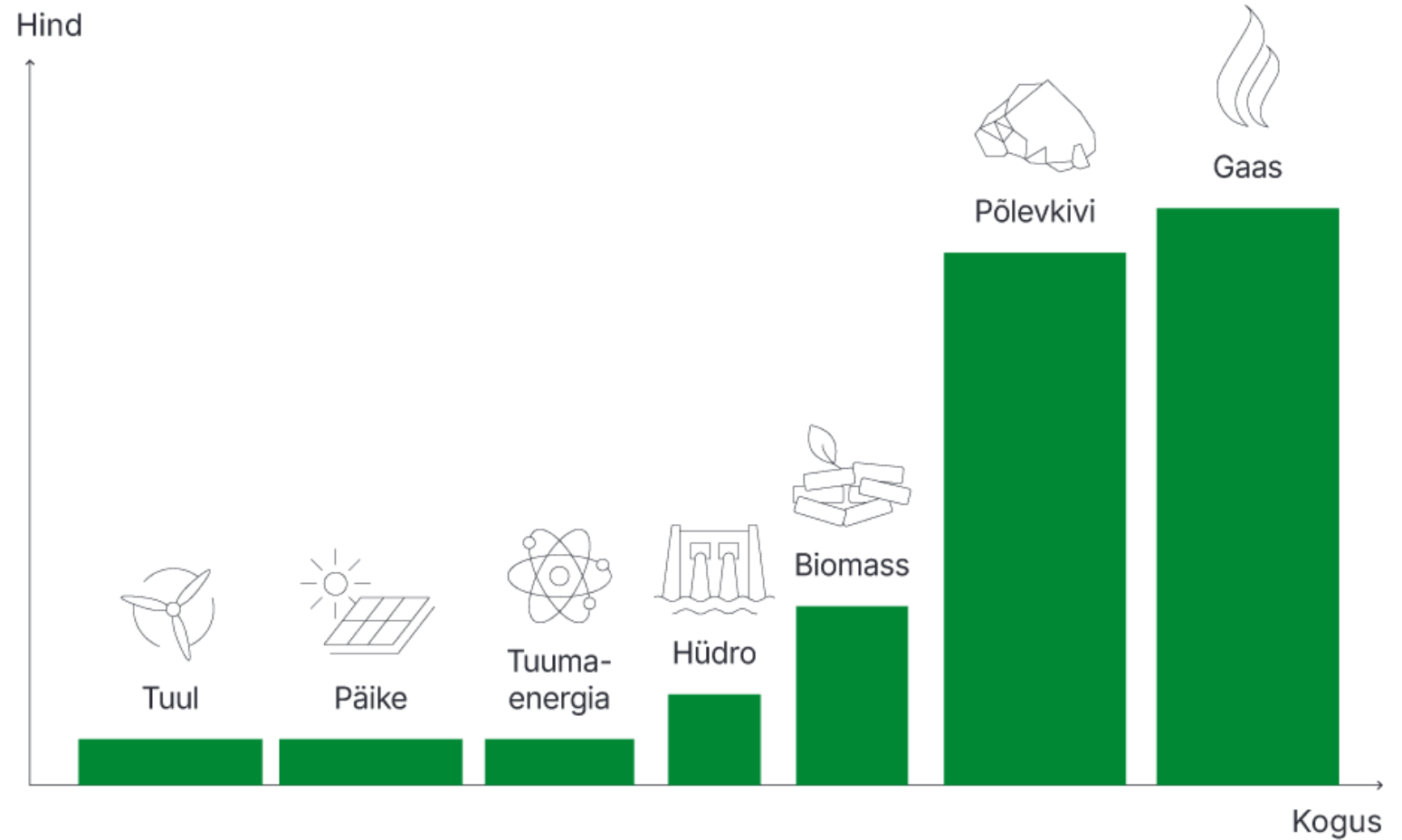
Data source: Calculations by the author based on industry figures; Center for Sustainable Systems, University of Michigan; David Osmond; CleanTechnica; and the EIA • Author: Hannah Ritchie

Nuclear energy can help decouple energy production from the use of natural resources



Hind turul

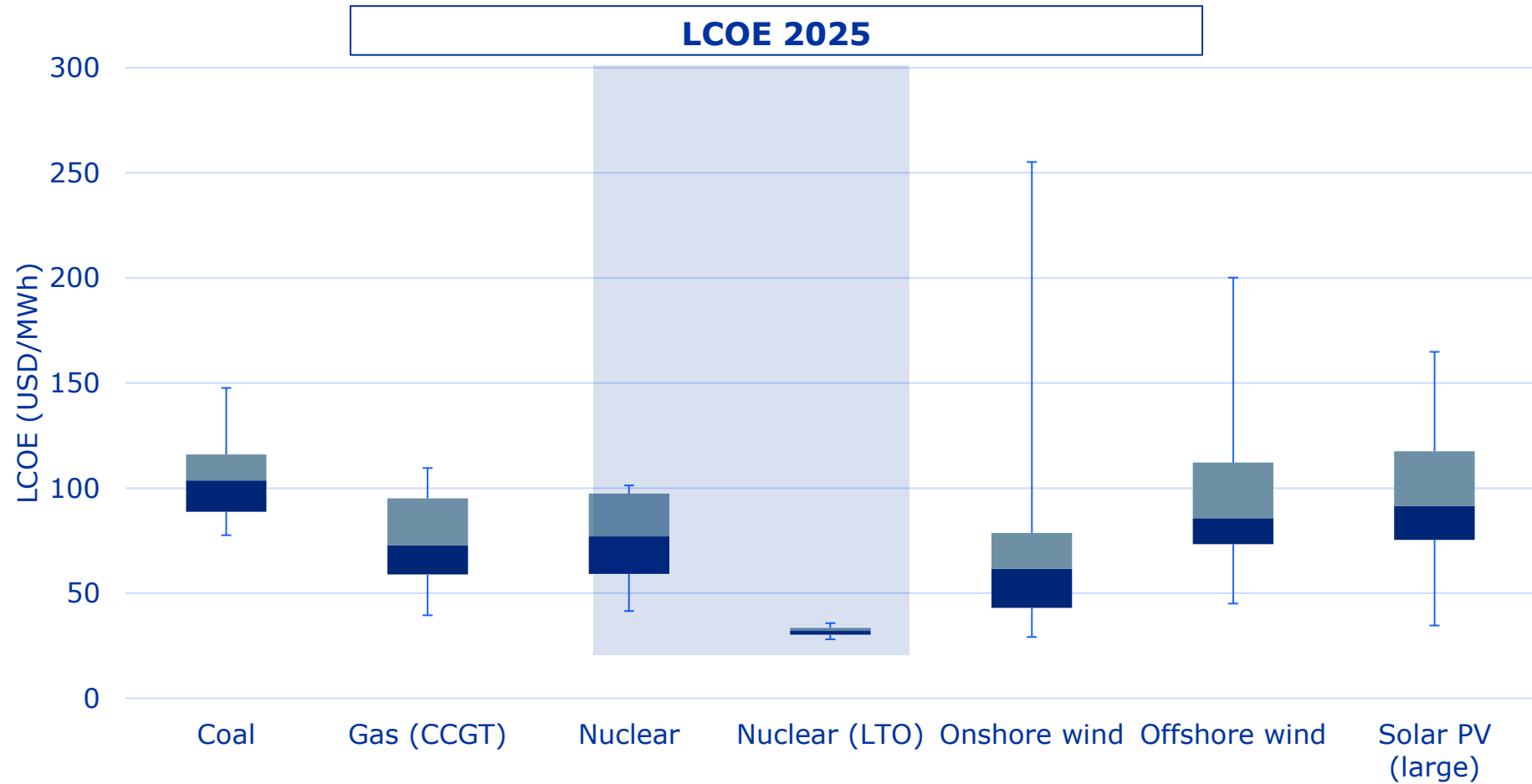
Turuhind kujuneb kalleima pakkumise järgi, mida rohkem on soodsaid pakkujaid, seda madalam hind



Allikas: Enefit



Kogukulu



Allikas: IEA/NEA (2020)

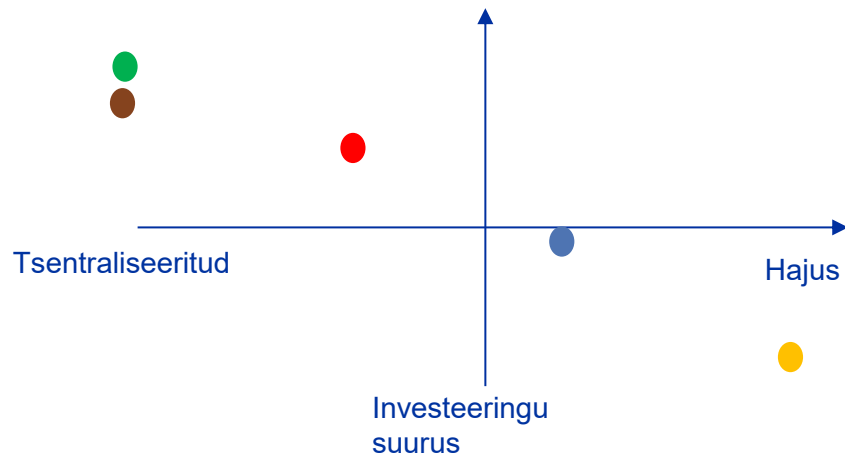
Kaalumiskohad

Süsteemi efektiivsus – ressursside parem kasutus

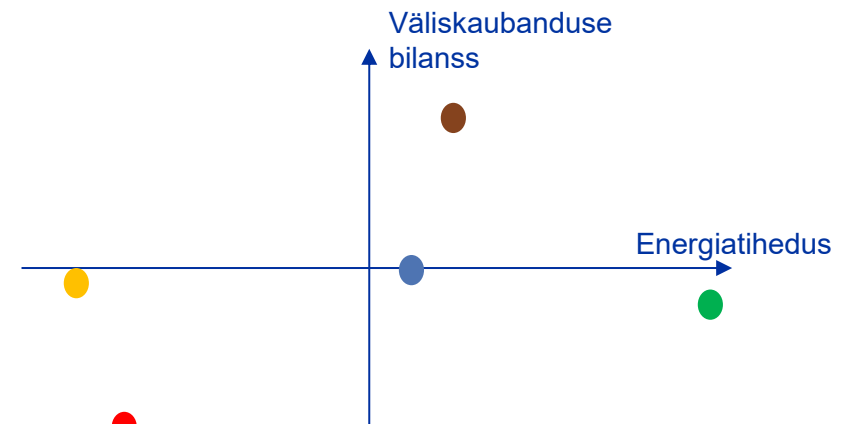
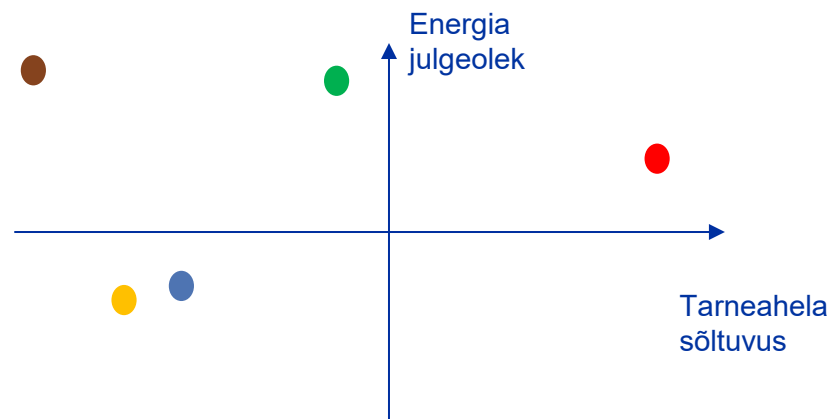
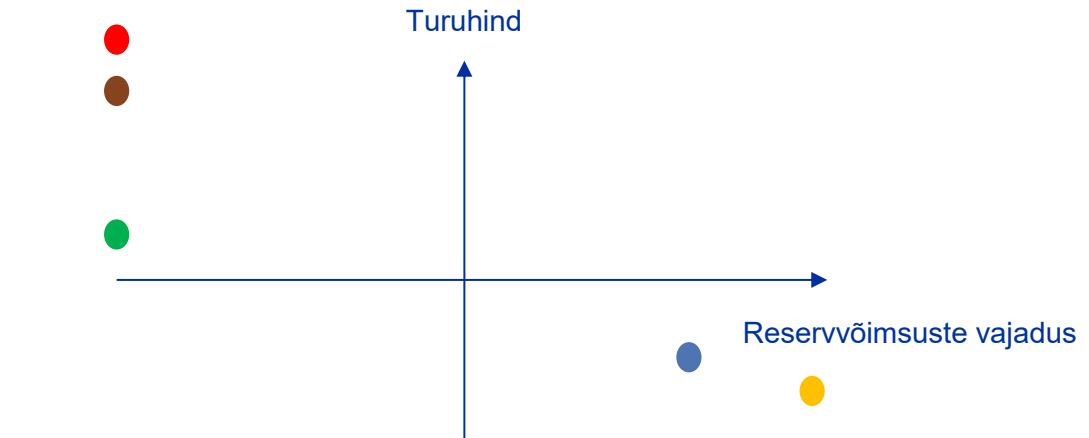
Väliskaubanduse bilanss ja julgeolek ehk ise hakkama saamine

Majanduse konkurentsivõime ehk kättesaadav elekter ja selle koguhind

Seosed



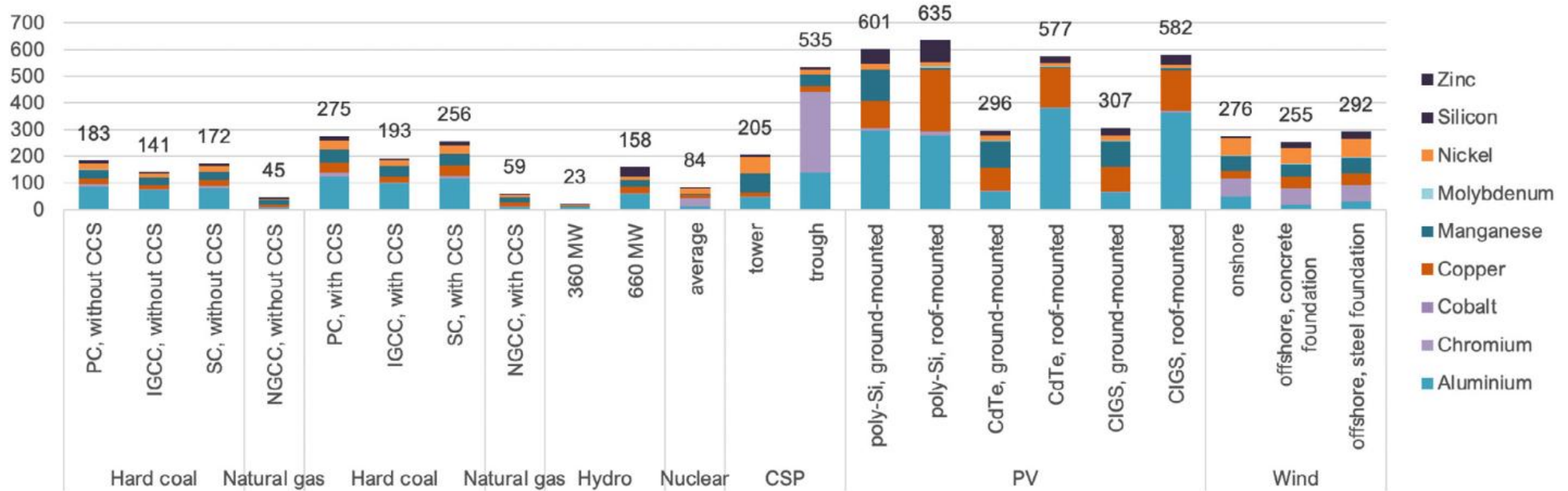
- Päike
- Tuul
- Tuum
- Põlevkivi
- Gaas



Ressursikasutus eri liikidel

- Sisend materjali vajadus
- Energia väärindamise efektiivsus
- Maakasutus
- Jäätmed / utiliseerimine

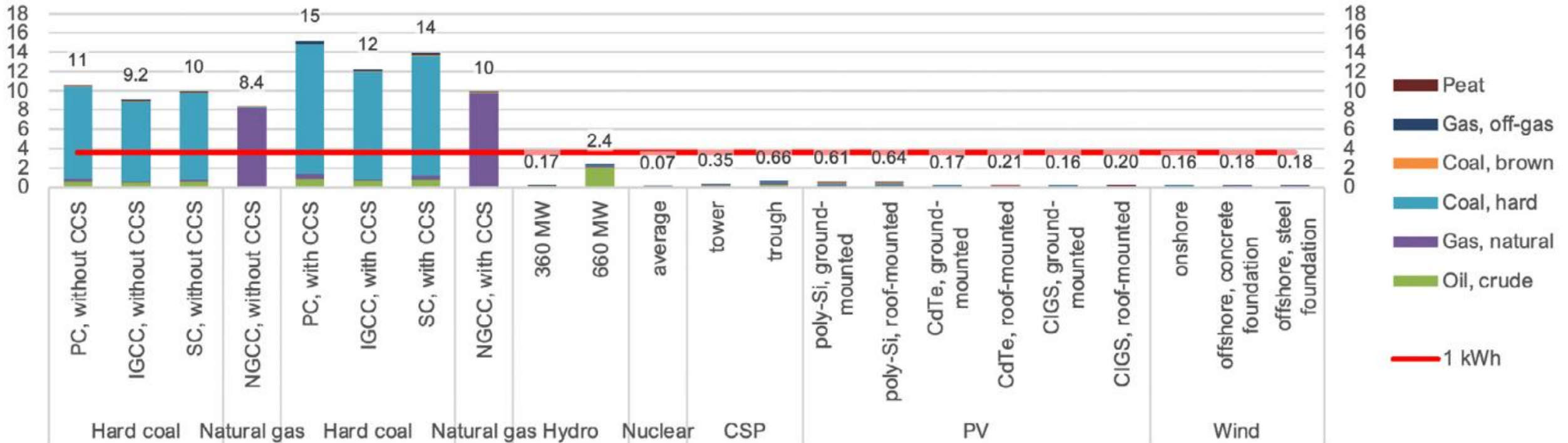
Material requirements, in g per MWh



Allikas: UNECE raport Carbon Neutrality in the UNECE Region: Integrated Life-cycle Assessment of Electricity Sources



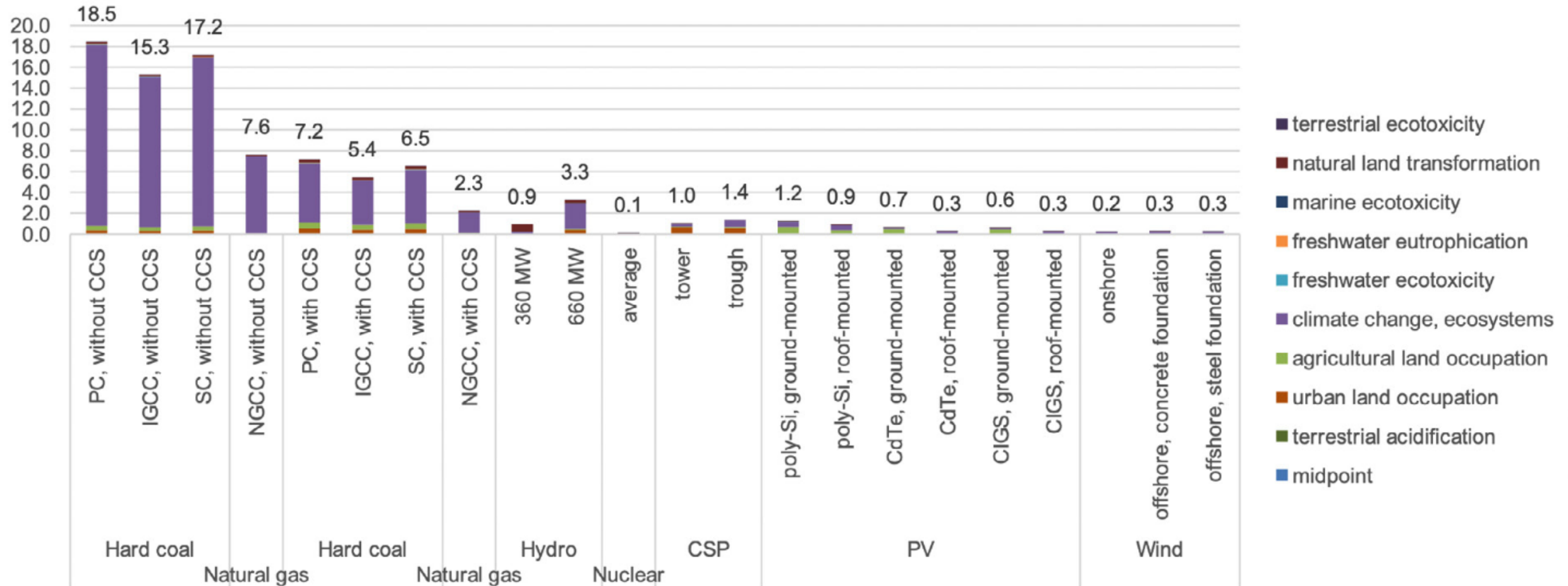
Lifecycle cumulative energy demand, fossils, in MJ/kWh



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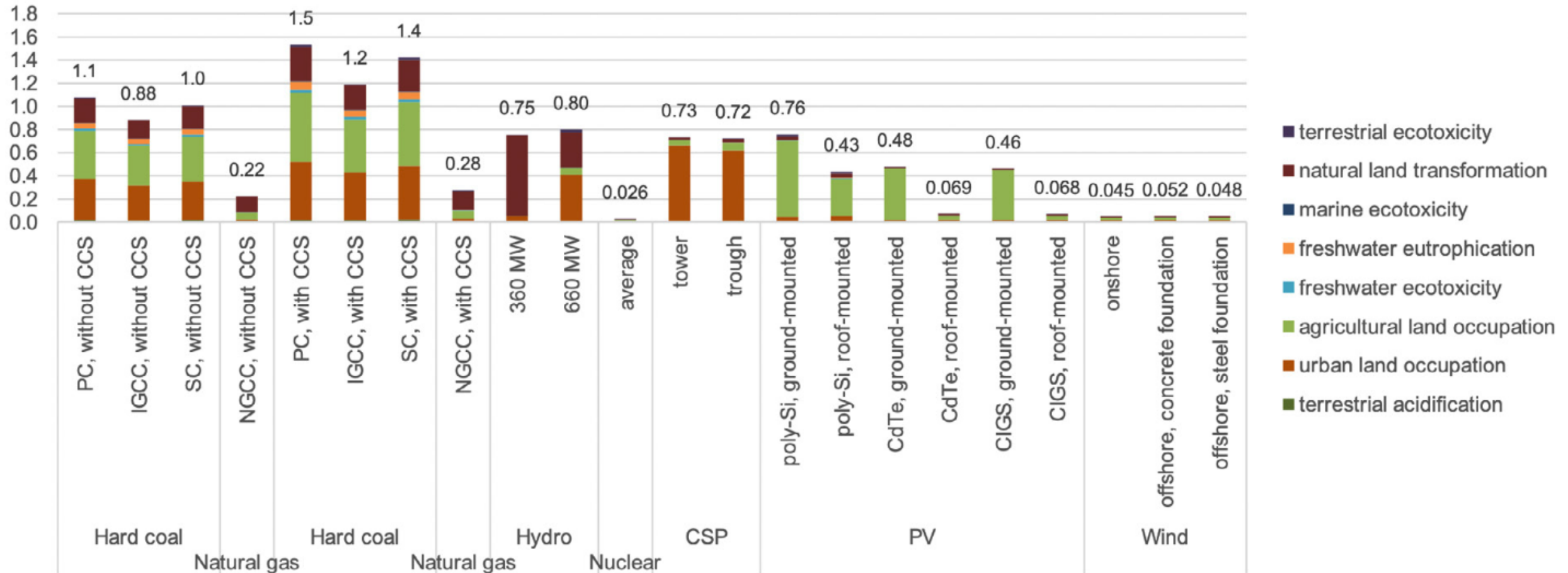
Lifecycle impact on ecosystems, per MWh, in pointes



Allikas: UNECE raport Carbon Neutrality in the UNECE Region: Integrated Life-cycle Assessment of Electricity Sources



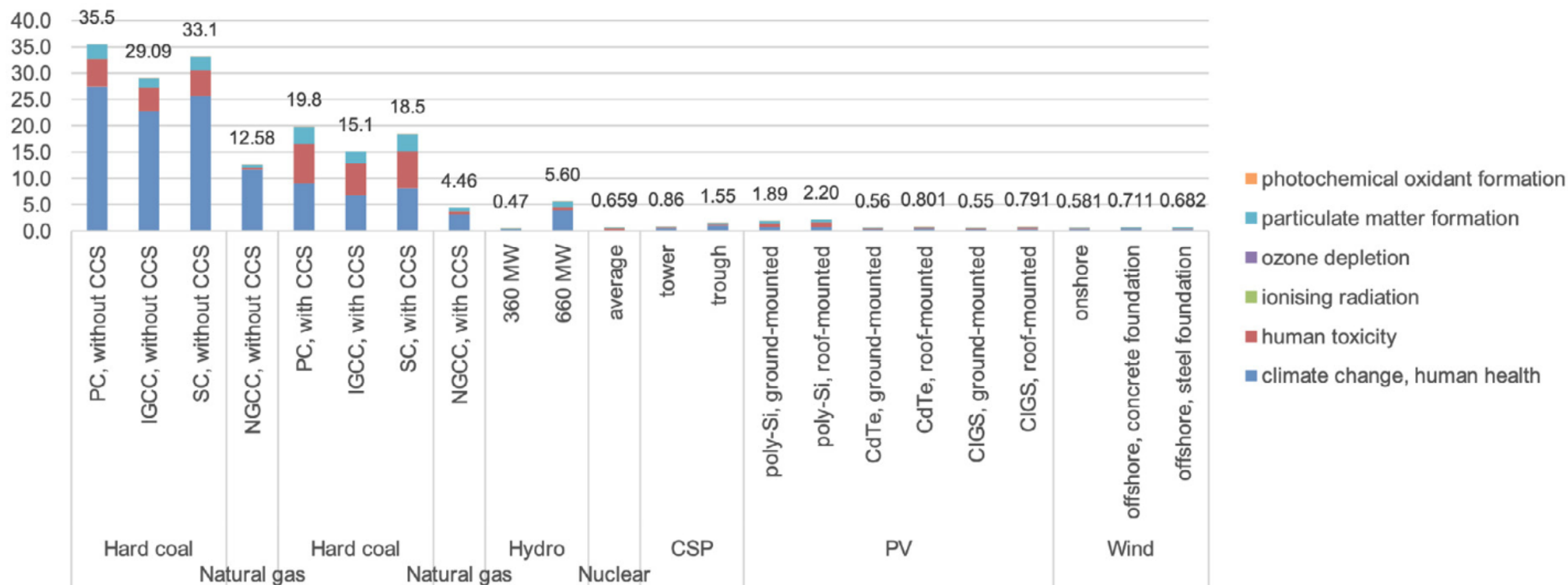
Life cycle impacts on ecosystems, no climate change, per MWh, in pointes



Allikas: UNECE raport Carbon Neutrality in the UNECE Region: Integrated Life-cycle Assessment of Electricity Sources



Life cycle impacts on human health, per MWh, in pointes



Allikas: UNECE raport Carbon Neutrality in the UNECE Region: Integrated Life-cycle Assessment of Electricity Sources

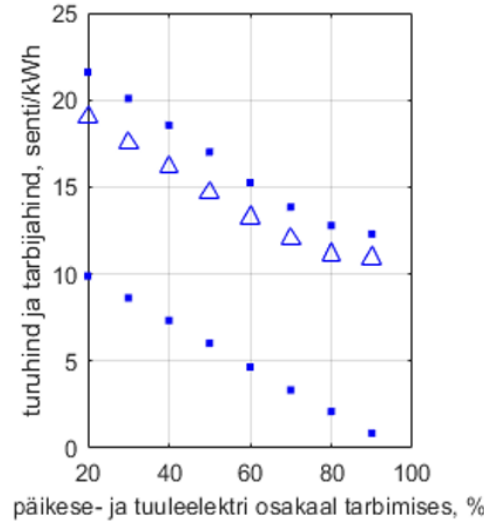


TalTech uuringust

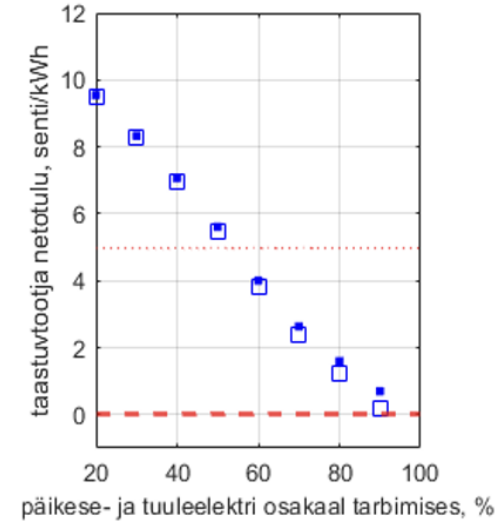
Päikese- ja tuuleelektri kasv:

- langetab elektri hind tarbijale
- kannibaliseerib tuule- ja päikeseelektri tootjate kasumit
- Vähendab põlevkivi elektri käivet ja kahandab riigi maksutulust
- Dünaamika muutub kui osakaal kasvab üle 60%!
- Päikese- ja tuuleelektri LCOE ~50€/MWh jääb katmata kui osakaal on üle 50%.

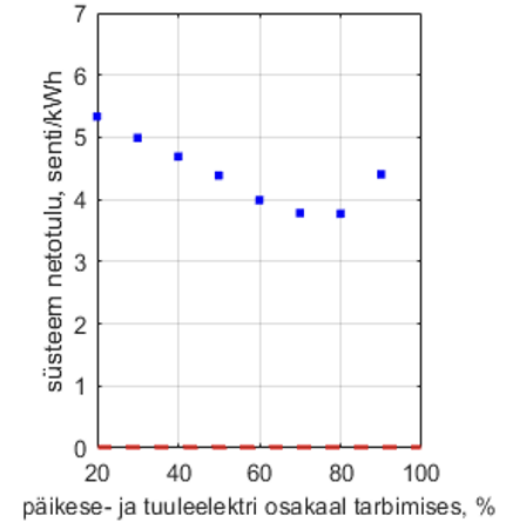
Tarbija



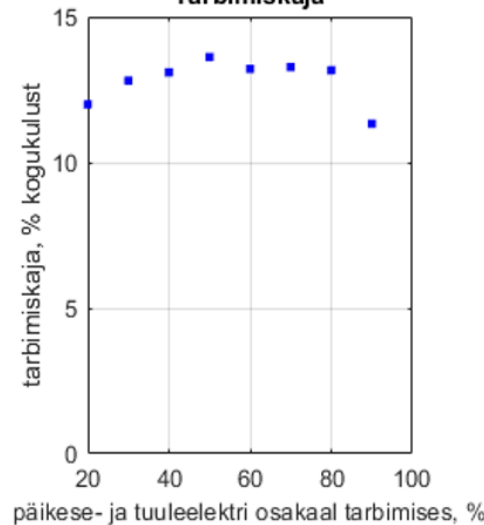
Päikese- ja tuuleelektri tootja



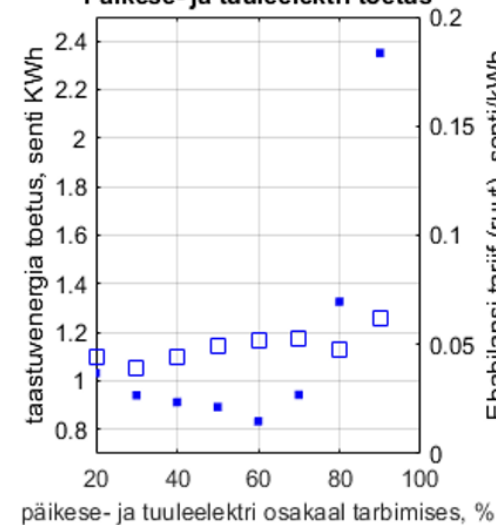
Energiasüsteem (riik)



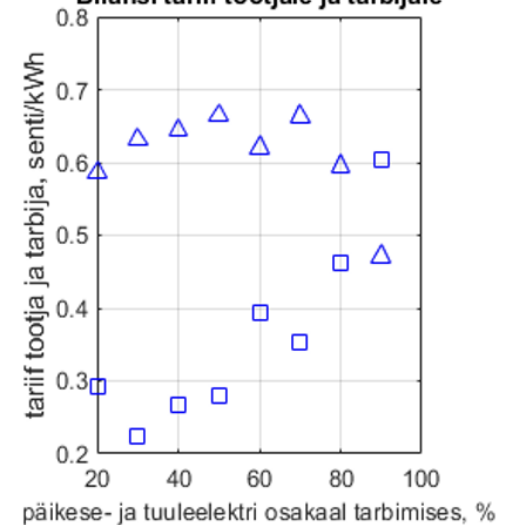
Tarbimiskaja



Päikese- ja tuuleelektri toetus



Bilansi tariif tootjale ja tarbijale



Kokkuvõtteks

Igal energialiigil on oma koht ja mõte

Liigiti väga erinev ressursikasutus, tootlikkus, hind

Poliitilised eesmärgid pikemaks perioodiks, prioriteedid, selle järgi saab teha energeetika plaani

Igal liigil on lisaks plussidele ka miinused, küll aga võib see sõltuda meie poliitilisest kalduvusest