



The value of CCS: socio-economic impacts

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Value ≠ cost



Can we measure social value?

- We need more than just a discussion around technologies...
- Wider social impacts are becoming popular (COP24, UN SDGs)
- How do we account for social equity in evolving energy systems?
- It's an intertwined word...

Sustainable development





INTEGRATED dimensions

INTERTWINED socio-ecological Systems

Folke, C et al., (2016). Social-ecological resilience and biospherebased sustainability science. Ecology and Society 21(3):41.

Jobs and Economic Development Impact (JEDI)



US coal sector technology transition



US Employment

< 100 < 500 < 1000 > 1000



Patrizio et al. (2018)

US trade-offs: BAU vs 2° target



Socially equitable energy systems in Europe

- Over the last decade, the EU has pursued a proactive climate policy (20-20-20 targets), resulting in high level of renewable energy penetration and energy efficiency increase.
- Local communities and stakeholders across Europe, are increasingly advocating the need for the transition to low carbon society to be <u>socially just</u>.
- The new European Strategic Agenda (2019-2024) promote a green transition that poses keen attention to social issues.
- The inevitable consideration of how best to value alternative approaches requires a broadening of focus from *project cost metrics* to a <u>wider societal perspective</u>.



ESO - JEDI framework



Energy transition pathways in Poland

Least cost energy system transition in Poland

If CCS is not allowed, Poland will have an **overbuilt and underutilised** power system.



BAU

Renewables and Storage

Least cost versus social value maximization



In the pure least cost scenario, Polish power system is dominated by thermal plants

Domestic coal brings the **greatest value to the economy,** even in a carbon constrained scenario.

Minimizing cost

Maximizing social value

Critical sectors for the Polish economy

GenSto

PHSto

InterSto

■ InterImp

Wind-Offshore

Wind-Onshore

CCGT-PostCCS

CCGT-PostCCS(Ret)

Coal-PostCCS(Ret)

GVA to TSC ratio

Coal-PostCCS

Solar

Hydro

OCGT

CCGT

BECCS

Bio

Coal

Nuclear



Benefits are maximized with greatest share of domestic natural gas, allowing to reduce the share of nuclear and imported electricity



Pursuing a net-zero strategy, while focusing on strategic industrial sectors, increase the economic competitivness (higher GVA/TSC), thus the social benefits.

Concluding remarks

 Traditional cost metrics (least cost approach) cannot capture socioeconomic impacts of energy systems trasitions. We must focus on metrics that reflect other values (GDP growth and employment creation)

- Low carbon and just energy transition can be achieved by:
 - Promote deployment of thermal power plant by deploying CCS
 - Integrating strategic sectors (e.g gas industry) in national economy





Thank you!

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