Improving consumer scope 2 emission accounting practices and decision-making

Problem: Companies can easily reduce their reported electricity-related (scope 2) emissions without contributing to actual, real-world *emission mitigation*. They can do so while following current standards and guidelines. This act of *greenwashing* (intended or not) leads to these companies missing out on opportunities for *effective emission reduction*. Also, the companies *risks* increase: consumer and investor pressure mounts, costs of capital rises and exposure to more stringent future legislation increases.

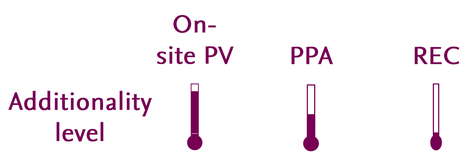
Need: Comprehensive *guidance on which measures effectively reduce scope 2 emissions*, and which ones don't, would help companies avoid greenwashing and actually contribute to emission mitigation.

Proposed solution: I suggest an approach that addresses *four major shortcomings* in current scope 2 emission accounting and reporting standards and guidelines: 1) Lack of additionality, 2) Insufficient temporal resolution, 3) Misaligned incentives and 4) Incomplete grid emissions. Below, I describe each shortcoming in more detail, how the shortcomings relate to one another, and how I think they can be addressed.

Lack of additionality

Problem:
- Market-based approach – easy to reach zero scope 2 emissions
- Even when electricity supply lacks *additionality*
- Additionality = switch causes real world emission reductions

Proposed solution:
- Method to evaluate additionality
- Applied to supply sources
- (Semi-)quantitative



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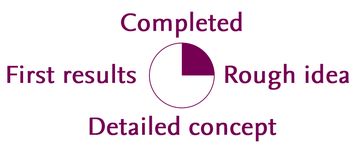
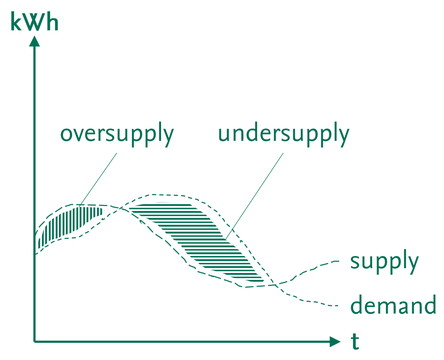


Open questions:
- What are best practices in other fields for evaluating additionality (e.g. carbon offsetting)?
- What are the most promising existing approaches to evaluate additionality of RES?

Insufficient temporal resolution

Problem:
- Generation and consumption are currently matched annually
- Hourly fluctuations are not captured
- Grid emissions during times of undersupply are neglected

Proposed solution:
- Method for hourly accounting
- Includes avoided emissions (oversupply) & additional emissions (undersupply)
- Considers grid losses



Progress:

Open questions:
- How do I properly account for avoided emissions?

Which sources are additional?

Hourly consumption & emissions

How to calculate grid EF?

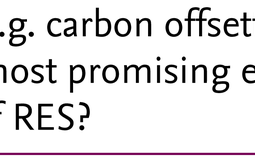
Incomplete grid emissions

Problem:
- Grid EF is used to calculate location-based emissions
- Institutions that publish grid EF use differing methods
- Companies can pick the grid EF that suits them

Proposed solution:
- Methodological recommendations for grid EF calculation

	Recommended	
Impact metric	CO_2e	CO_2
System boundaries	LC	Op
Temporal resolution	Hourly	Annual
Grid connection	MAP	MAP+AP
Consider heat co-gen	yes	no
Include all losses (e.g. TD)	yes	no
Include imports/exports	yes	no

Progress:

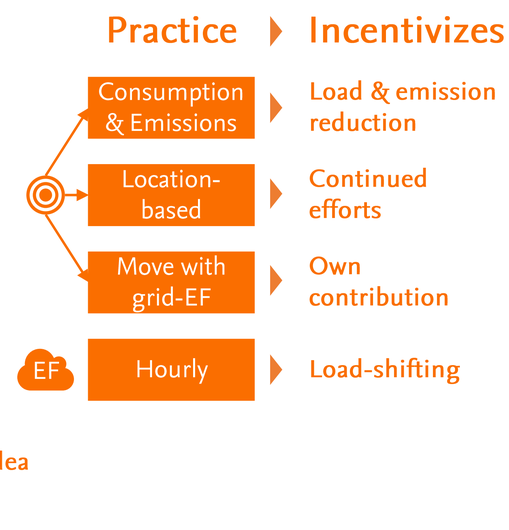


Open questions:
- Which spatial resolution is the best choice for EF calculation (e.g. country, bidding zone)?

Misaligned incentives

Problem:
- Market-based approach – easy to reach zero scope 2 emissions
- Zero emissions = zero incentive to reduce/shift load
- Even though reducing/shifting load would have real effect

Proposed solution:
- Novel target-setting practice
- Aligns consumption & emission targets



Progress:

Open questions:
- Am I missing any misaligned incentives in emission accounting and target-setting?

AP: Auto-producer
AR5: Fifth Assessment Report (by the IPCC)
CO_2e: Carbon dioxide equivalents
EEA: European Environmental Agency
EF: Emission Factor
IEA: International Energy Agency
IPCC: Intergovernmental Panel on Climate Change
LC: Life cycle
MAP: Main-activity producer
Op: Operational
PPA: Power purchase agreement
REC: Renewable energy certificate
RES: Renewable energy source
TD: Transformation & distribution
UBA: Umweltbundesamt

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