



INSTITUT FÜR ENERGIE-
UND UMWELTFORSCHUNG
HEIDELBERG



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Implementation of GBEP indicators

Lessons learnt for the GBEP TFS work on Indicator Guidance in Germany

International Workshop of the GBEP Task Force on Sustainability

Linkages between the Sustainable Development Goals (SDG) and the GBEP Sustainability Indicators for Bioenergy (GSI)



July 3-4, 2017 in Bonn, Germany

Horst Fehrenbach | ifeu

Objectives of the German GSI application

- To assess the feasibility of evaluating the 24 indicators in Germany.
- Contributing lessons learned to help enhancing the applicability and practicality of the indicators and ensures their broad dissemination
- to gain insight into the state of sustainability of the bioenergy sector in Germany.
- To assess the availability and reliability of the data for relevant sustainability aspects and shows data gaps and needs for further research.



| ENVIRONMENTAL PILLAR | SOCIAL PILLAR | ECONOMIC PILLAR |
|---|--|--|
| 1. Lifecycle greenhouse gas (GHG) emissions | 9. Allocation and tenure of land for new bioenergy production | 17. Productivity |
| 2. Soil quality | 10. Price and supply of national food basket | 18. Net energy balance |
| 3. Harvest levels of wood resources | 11. Change in income | 19. Gross value added |
| 4) Emissions of non-GHG, air pollutants, including air toxics (NO _x , SO ₂ , ...) | 12. Jobs in the bioenergy Sector | 20. Change in the consumption of fossil fuels and traditional use of biomass |
| 5. Water use and efficiency | 13. Change in unpaid time spent by women and children collecting biomass | 21. Training and re-qualification of the workforce |
| 6. Water quality | 14. Bioenergy used to expand access to modern energy services | 22. Energy diversity |
| 7. Biological diversity in the landscape | 15. Change in mortality and burden of disease attributable to indoor smoke | 23. Infrastructure and logistics for distribution of bioenergy |
| 8. Land use and land-use change related to bioenergy feed stock production | 16. Incidence of occupational injury, illness and fatalities | 24. Capacity and flexibility of use of bioenergy |

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the crossed indicators are considered to be **not relevant for the situation in Germany**

Results

| | Indicator | Result | Validity | Remarks | | | | | | | | | | |
|---------------------------------|---------------------------------|---|---------------------|---|-------------------|----|------|-----|---------------|----|-----|-----|------|---|
| Environmental indicators | | | | | | | | | | | | | | |
| 1 | GHG | - 65,678 Mt CO _{2eq} * | good | Upstream emissions from imported biomass are included; emissions from land use change in Germany (grassland conversion) are included | | | | | | | | | | |
| 2 | Soil quality | | low | Not enough data on soil enhancing measures available; the obligation for a balanced humus content ensures a minimum soil quality threshold | | | | | | | | | | |
| 3 | Harvest level of wood resources | <ul style="list-style-type: none"> • Volume: 52.3 Mm³/year • Share of annual increment: 55 % • bioenergy as share of harvest: 42% | medium | Sub-indicator "Bioenergy as share of annual increment" should be added to reflect that the annual wood increment is more stable as a base for the percentage. Harvest levels might fluctuate due to non-energy demands. | | | | | | | | | | |
| 4 | Air pollutants [kt/year] | <table border="0"> <tr> <td>SO_{2eq}:</td> <td>181</td> </tr> <tr> <td>SO₂:</td> <td>49</td> </tr> <tr> <td>NOx:</td> <td>170</td> </tr> <tr> <td>Particulates:</td> <td>17</td> </tr> <tr> <td>CO:</td> <td>243</td> </tr> </table> | SO _{2eq} : | 181 | SO ₂ : | 49 | NOx: | 170 | Particulates: | 17 | CO: | 243 | good | Upstream emissions from imported biomass are included |
| SO _{2eq} : | 181 | | | | | | | | | | | | | |
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| Particulates: | 17 | | | | | | | | | | | | | |
| CO: | 243 | | | | | | | | | | | | | |

Findings

- In general, the GBEP indicators are mostly applicable and cover the whole scope of bioenergy sustainability in Germany
- However, many indicators lack of an evidence-based approach to attribute effects of bioenergy against effects from biomass used for food, feed or other purposes.

Issues:

- Attribution to bioenergy
- How to deal with imported bioenergy

Additional information proposed

The authors propose:

- **new sub-indicators for Indicator 3: “Harvest level of wood resources”**
the suggested new sub-Indicator 3.4 "Bioenergy as share of annual increment" to reflect that (typically) the annual wood increment is more stable as a base for the percentage. Harvest levels might fluctuate due to non-energy demands, and natural disturbances such as droughts, storms etc.
- **new sub-indicator for Indicator 7: “Biodiversity”**
“Intensified use” of grasslands for bioenergy (biogas) and forests should be considered as a further GBEP sub-indicator for biological diversity impacts in the landscape.
- two (sub-)indicators that allow reflecting changes in farm structures (sizes and ownership structures) and the influence on land rentals and prices.