Which methodology for sustainability indicators and monitoring of forest-based bioeconomy?

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Sustainable Wood For a Sustainable World (SW4SW)
FAO-Workshop on Wood products
in the sustainable bioeconomy

Funded by: Federal Ministry of Food and Agriculture

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Bioeconomy - Scope

agriculture


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forestry


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fisheries/aquaculture


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material and energetic use


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feed


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food


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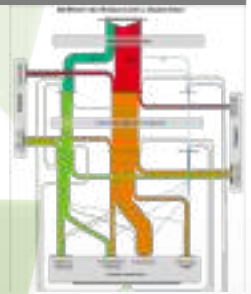
residues

Monitoring: Conceptual Framework

Base year 2015

Definition !§!
- System boundaries
- Operationalisation

Material flows

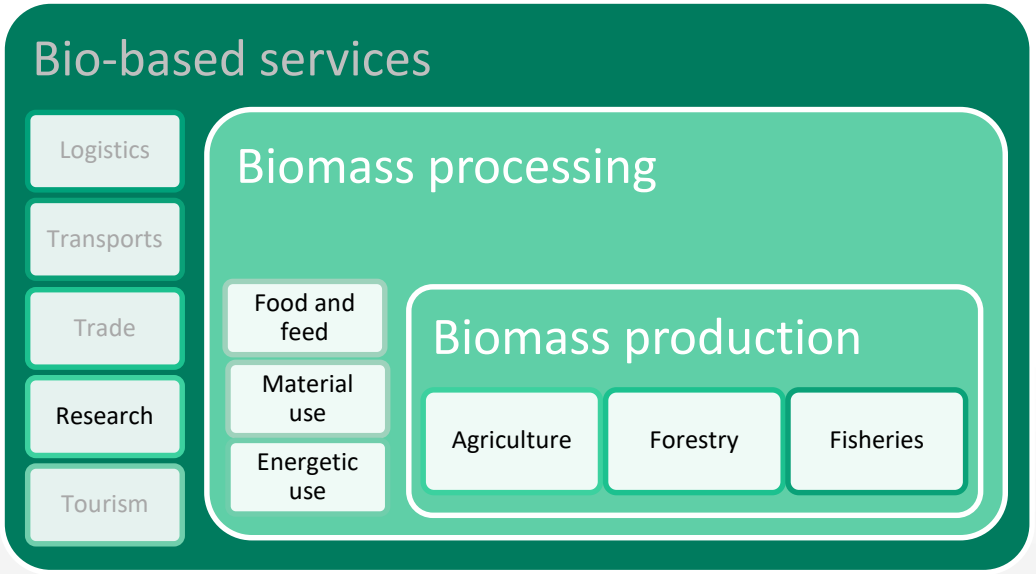


Data base 1001 0100
- Official statistics
- Market reviews

Shares
- Economic activities
- Products

Quantification
- Jobs, gross value added, turnover
- Other sustainability indicators

Definition Bioeconomy

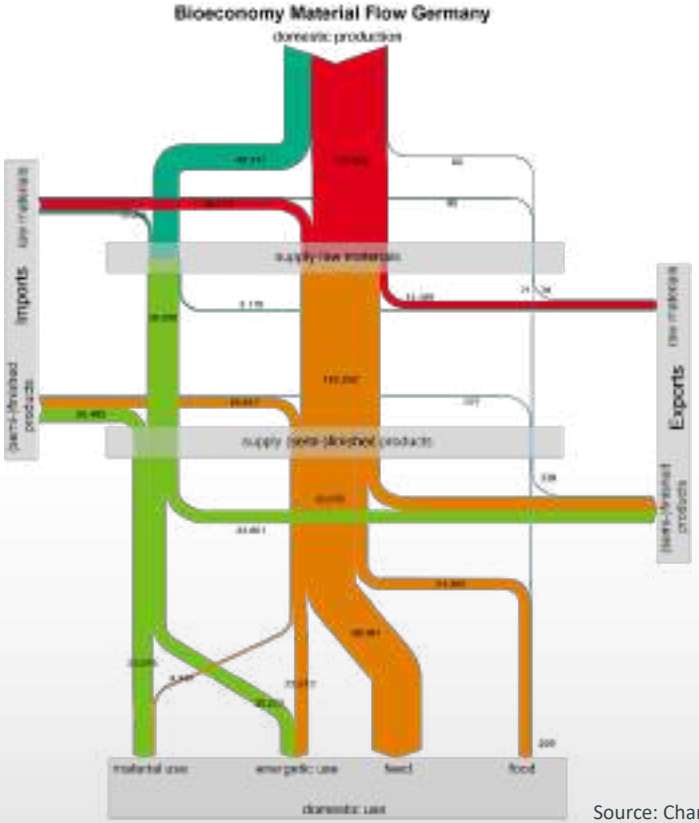


Production of biomass as well as **bio-based manufacturing** of products along value chains and **provision of bio-based services**.

The use of bio-based goods and services differentiated into (i) **food** and (ii) **feed**, (iii) **material** and (iv) **energetic** use.

Additional to **bio-based material flows** it is a major criterion of bioeconomy, that **economic effects** are generated by the (proportionate) use of biomass.

Material flow of the German bioeconomy



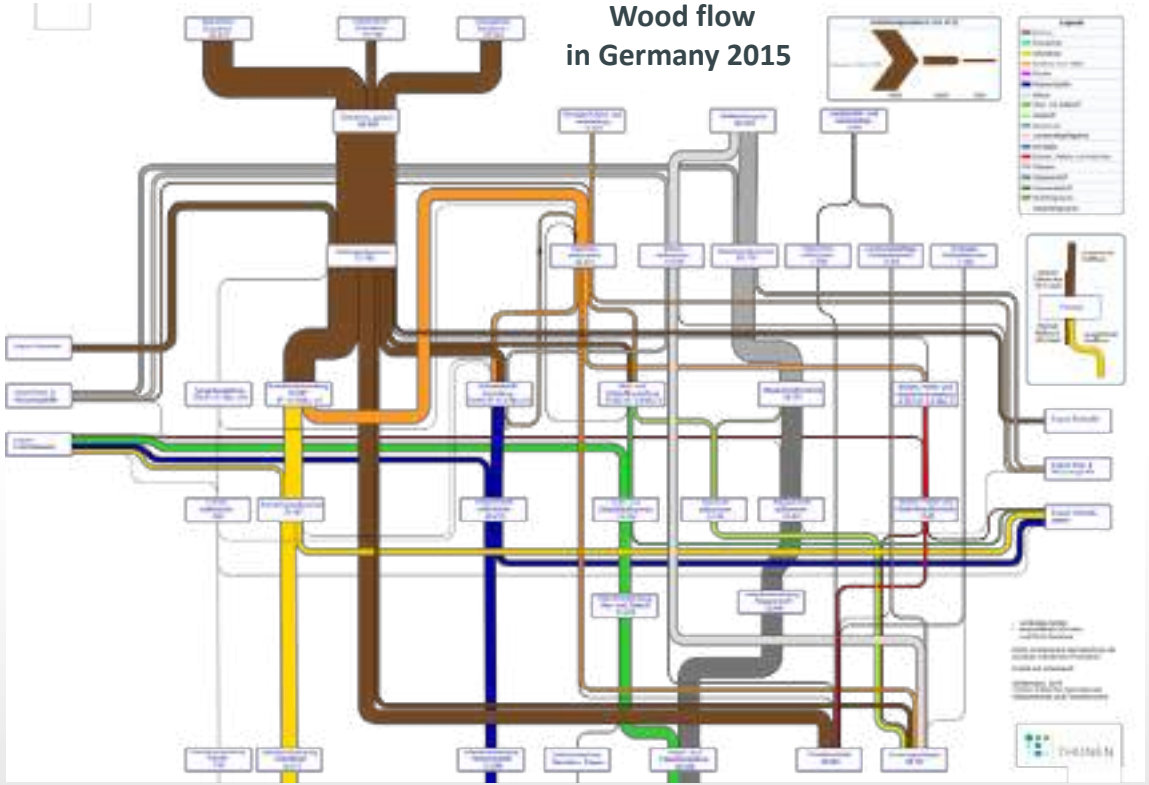
Results overview*

[Mill. t dry mass]	wood	agri	fish	total
Domestic production	48.2	136.6	0.1	184.9
Imports	32.4	38.9	0.6	72.0
Exports	26.6	37.6	0.4	64.6
Material	34.0	4.3	0.02	38.3
Energetic	25.3	23.2	0	48.5
Feed	0	88.9	<0.01	88.9
Food	0	21.4	0.3	21.6
Total domestic use	59.3	137.8	0.3	197.4

Source: Chart & table: Preliminary results MoBi-project

* Preliminary results 2015

Material flow of wood in the German bioeconomy



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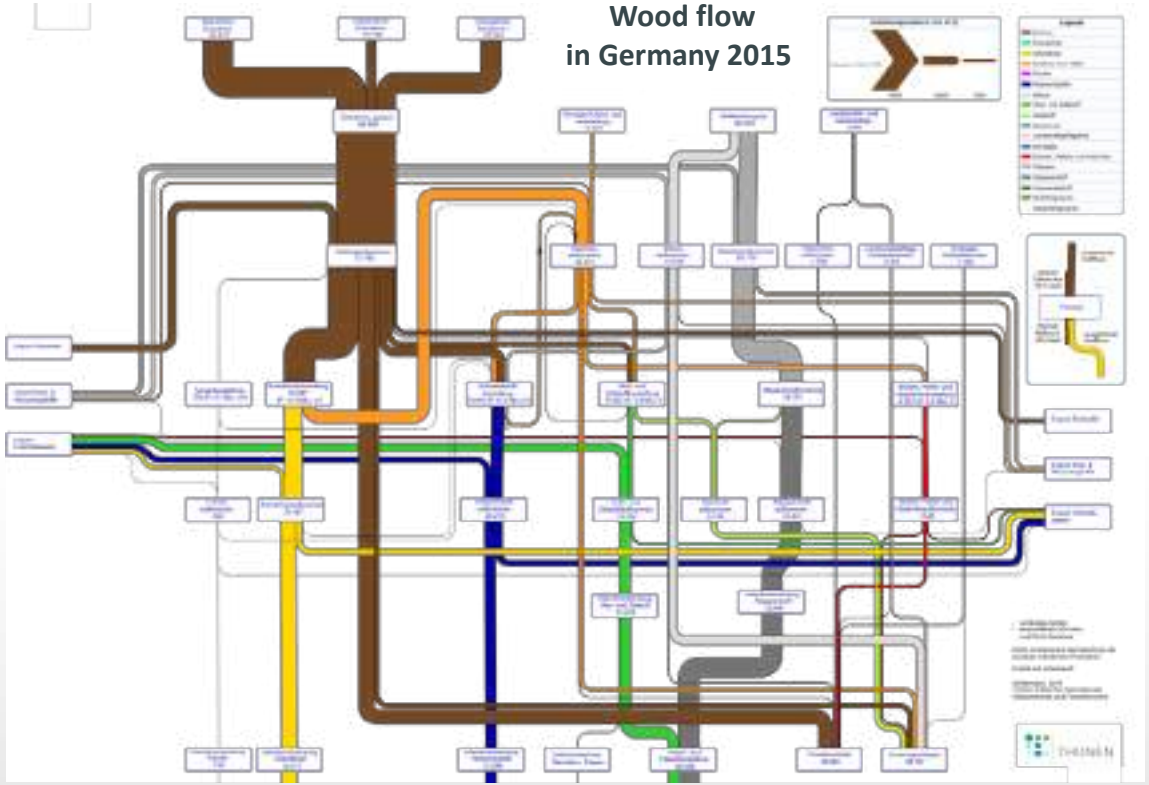
Material flows and data base



→ Material flows are basis for detecting the way of bio-based raw materials via all value chains and processing steps until final use.

→ It should be possible to transfer the knowledge of material flows to regularly available (statistical) data:

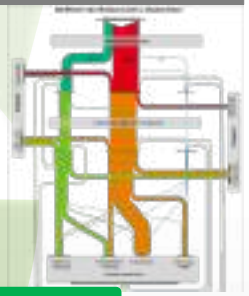
- Orientation on official statistics
- Identification of relevant data sources
- Deduce bio-based shares in material flows

Monitoring: Conceptual Framework

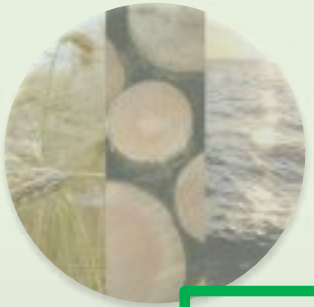
Base year 2015

Definition !§!
- System boundaries
- Operationalisation

Material flows



Quantification
- Jobs, gross value added, turnover
- Other sustainability indicators



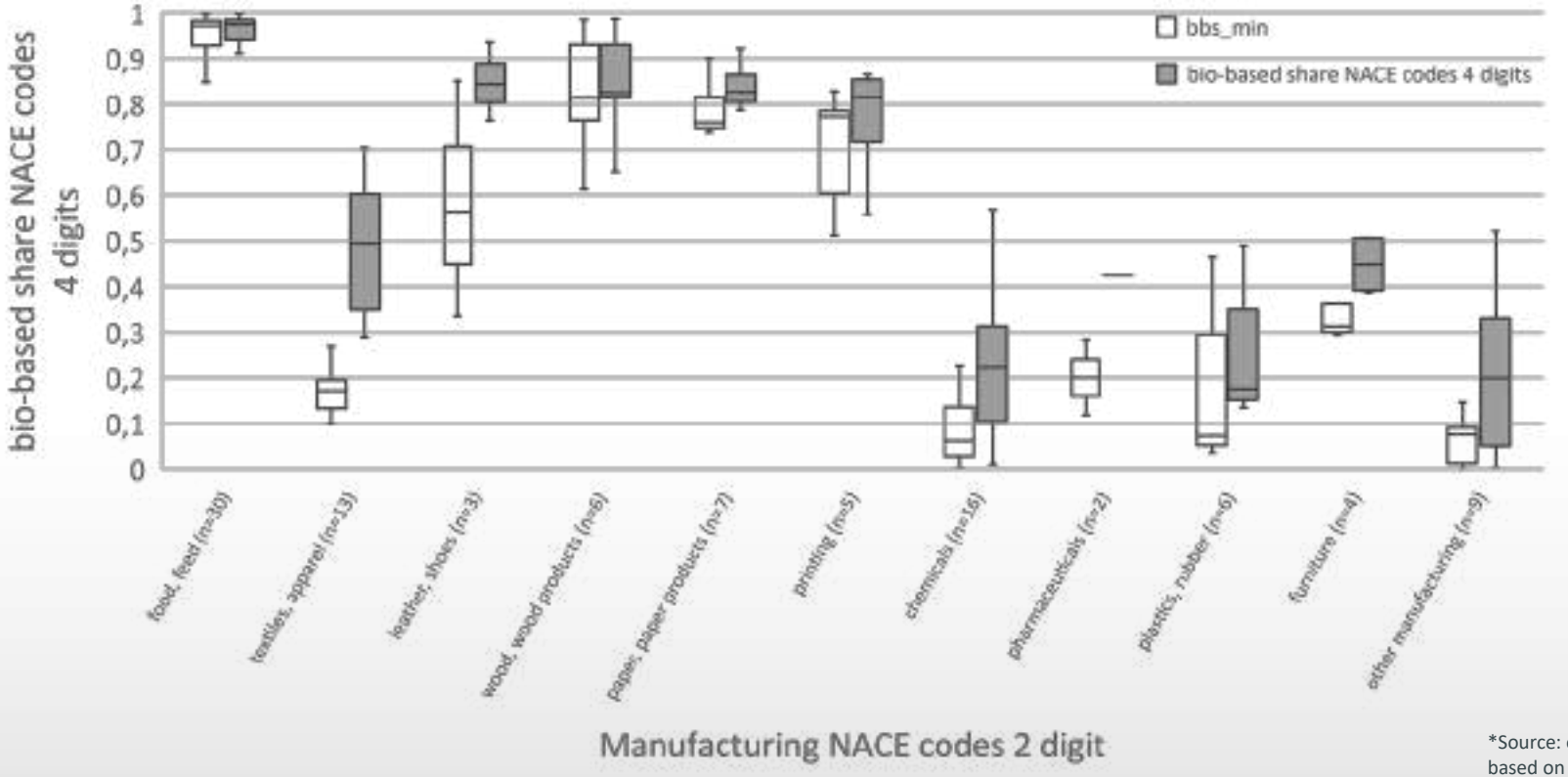
Data base 1001 0100
- Official statistics
- Market reviews

Shares
- Economic activities
- products

Economic activities (NACE) and bio-based shares

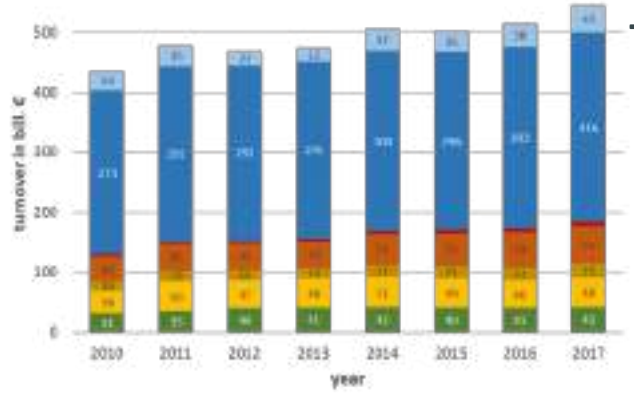
NACE code	Description	Bio-based share	Data source
A (01, 02, 03)	agriculture & hunting, forestry & timber harvesting, fisheries & aquaculture	100%	
C	manufacturing	Bio-based inputs into economic activities	Fed. Stat. Materials and Goods received; Production Statistics
D	energy	Percentage of biomass in energy production	Environmental accounting; dedicated energy statistics
F	construction		
41.20	construction of residential and non-residential buildings	Share of wood construction	Federal Statistics on building permits
43.32.0 43.91.2	joinery installation erection of frames and constructional timberworks	100%	
I	accommodation and food service activities		
M	professional, scientific and technical activities (freelance)		
72.11.0	research and experimental development on biotechnology	100%	
72.19.0	other research and experimental development on natural sciences and engineering	Internal expenses in natural and agricultural research	Federal statistics on expenses of public institutions

Bio-based shares in Manufacturing

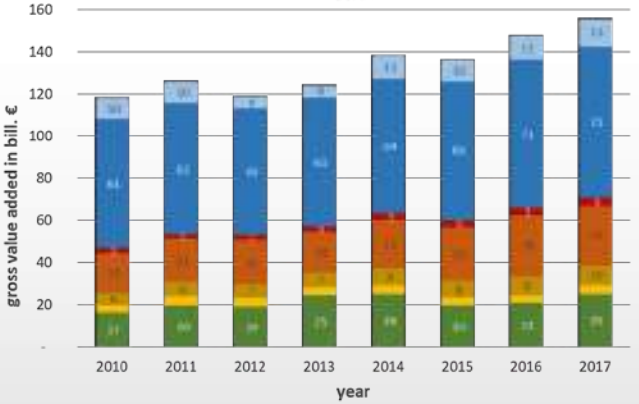


*Source: own calculations based on Iost et al. (2019)

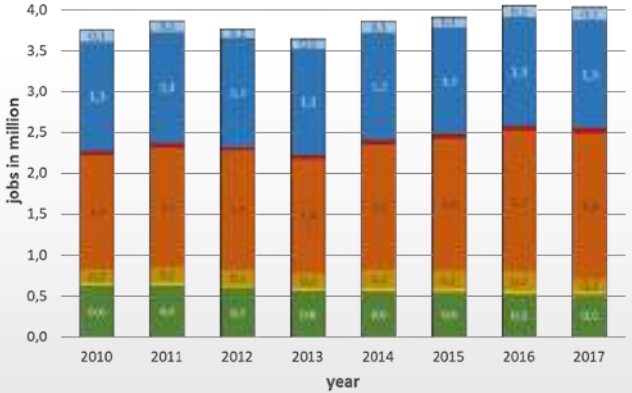
Quantification of German Bioeconomy: Time series*



Turnover



GVA



Jobs

- manufacturing (max)
- manufacturing
- research
- food/beverage services
- construction
- energy
- agri, forest, fish

*Source: Preliminary results of MoBi-project

Sustainability assessment

Primary Sector

Secundary Sector

Tertiary Sector

Bioeconomy

→ Which indicators are related to bioeconomy?

→ What is the aim of the sustainability assessment?

→ Which indicators can be quantified based on existing data?

Sustainability assessment

We base our assessment on
‚Germany's National Sustainable Development Strategy'
to identify indicators related to bioeconomy

- 8 directly applicable
- 16 Quantification possible
- 3 Data availability not sufficient

…27 out of 66 (sub)indicators for monitoring the progress of SDGs

Sustainability assessment: Example 1

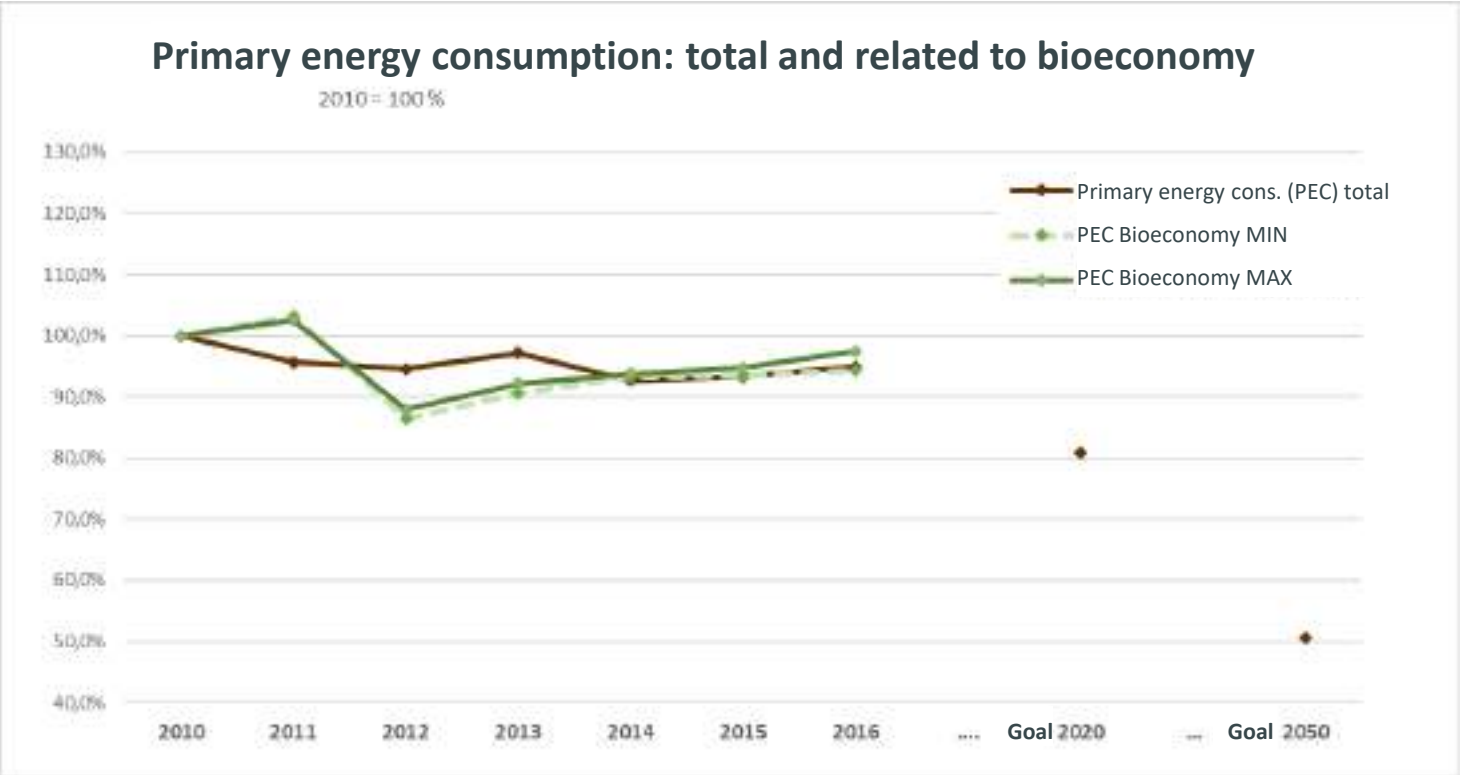
Indicators of national sustainability development strategy

SDG 7 Affordable and Clean Energy

Indicator 7.1b Primary energy consumption

Aim of indicator (in Germany): Reduction of 20 % until 2020 and of 50 % until 2050, each compared to 2008

Sustainability assessment: Result 1*



*Source: Preliminary results of MoBi-project

Sustainability assessment: Example 2

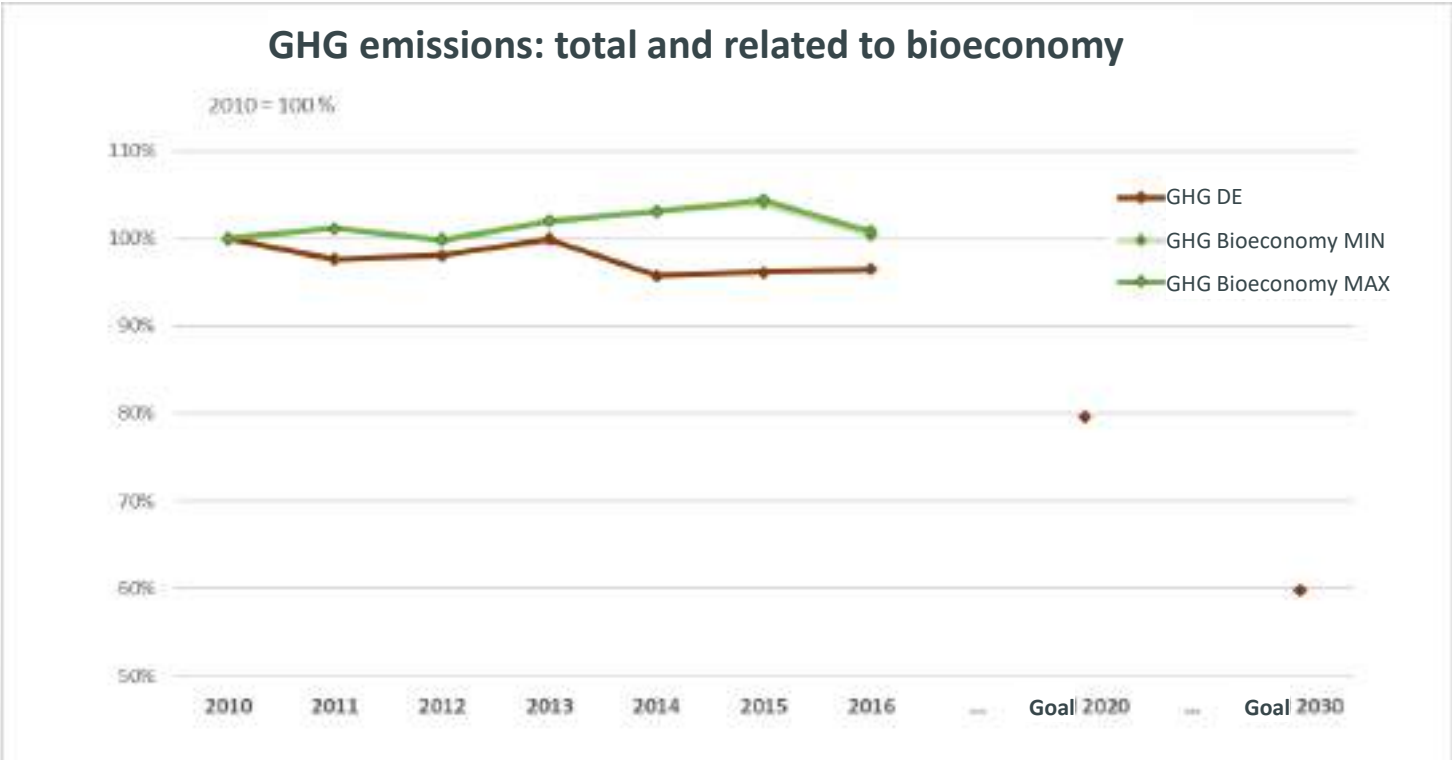
Indicators of national sustainability development strategy

SDG 13 Climate Action

Indicator 13.1.a Greenhouse Gas Emissions

Aim of indicator (in Germany): Reduction of at least 40 % until 2020, of at least 55 % until 2030 and of at least 70 % until 2040, each compared to 1990

Sustainability assessment: Result 2*



*Source: Preliminary results of MoBi-project

Conclusions and challenges

→ Develop a common understanding of the term bioeconomy

→ Visualise material flows for understanding of biomass processing and value chains

BUT: depicting final uses remains a huge challenge

→ Data needs require close collaboration between statistical agencies and research

BUT: restricted data availability due to non-disclosure policy
(maybe also changes in statistical classification systems are needed)

→ Definition of specific sustainability goals for bioeconomy and selection of adequate indicators – in a participatory process – are recommended

→ Bioeconomy as an open concept → dynamic with regard to new products and processes

Thank you for your attention!

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The Johann Heinrich von Thünen Institute, Federal Research Institute for Rural Areas, Forestry and Fisheries – Thünen Institute in brief – consists of 14 specialized institutes that carry out research and provide policy advice in the fields of economy, ecology and technology.

Rome,
10.-11.12.2019

Annex

Sources:

Iost S, Labonte NT, Banse M, Geng N, Jochem DI, Schweinle J, Weber SA, Weimar H (2019): German Bioeconomy: Economic Importance and Concept of Measurement. German J Agric Econ 68(4):275-288.

Weimar H (2011; 2019): Der Holzfluss in der Bundesrepublik Deutschland 2009: Methode und Ergebnis der Modellierung des Stoffflusses von Holz. Hamburg: vTI, 36 p, Arbeitsber Inst Ökon Forst Holzwirtsch vTI 2011/06 (https://literatur.thuenen.de/digbib_extern/bitv/dn049777.pdf); aktualisiert 2019.

Mobi-project: Thünen Working Paper in progress on „German approach for monitoring the bioeconomy - Resources and Sustainability / Biomass production“ (to be published in spring 2020 at https://www.thuenen.de/en/info-desk/publications/thuenen-working-paper)

Pictures:

Slide 1, slide: Field: agri benchmark/Tanja Möllmann; Forest: Thünen-Institut/Erik Grüneberg; Fish: Thünen-Institut/Birgit Suer; Timber: Thünen-Institut/Michael Welling; Biogasplant: Thünen-Institut/Michael Welling; Food: Thünen-Institut/Christina Waitkus

Slide19: Stemwood: aid/Peter Meyer; Forest: Thünen-Institut/Markus Dög; Timber: Thünen-Institut/Michael Welling