

ECEEE Conference

Financial Carbon Footprint **Calculating Banks' Scope 3** **Emissions of assets and loans**

presentation of a loan-model für climate impacts

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Relevance of Financial Institutions for Climate

- ☐ low direct GHG emissions – esp. in relation to their total revenue
- ☐ high indirect (induced or shared) GHG emissions – esp. in the value chain
- ☐ banks are encouraged and required to increase their share of “green” investments

Goal: Quantify the GHG emissions of investments, loans and equities.

Challenges of GHG accounting for banks

- ☐ very few and only large actors report their Carbon Footprint
- ☐ Scope 3 emissions (value chain emissions) are often not accounted for or cannot be accounted in a consistent manner
- ☐ SME usually do not have the means to report their Carbon Footprint

Carbon Footprint of a German Bank (GLS Bank)

Scope of the project

Quantification of the most relevant Scope 3 emissions differentiated into

- ☐ loans according to the bank's own classification system
(restricted to sustainable activities; mainly SMEs) loan-model
presented
- ☐ shareholdings (mainly renewable energy production)
- ☐ shares
- ☐ green, social and sustainability bonds

Challenge: Accounting and attributing for Scope 1, 2 & 3 emissions of involved companies on a value-added basis with low data availability

Models, Methods and Data

- ☐ loan-model (MRIO-M), Green Bond Model, Agricultural Model
- ☐ LCA, I/O-Tables, sampling, hybrid-approaches
- ☐ Exiobase, Ecoinvent, GRI reports, financial statements and literature

Loan Model

Hybrid-Approach

- ❑ **Basis (MRIO-M):**
global input-output-model allocated to 1mEUR of output
- ❑ **Scope 1/2/3 (allocation):**
 - ❑ attribution of direct emissions to Germany vs. Rest-of-World
 - ❑ definition of scope 2 activities (mainly energy provision)
 - ❑ shares for scope 3
- ❑ **Loan portfolio:**
matching of economic activities with loan classification (ca. 70 loan classes)
- ❑ **Results (intensities):**
Scope 1/2/3 emissions per mEUR for each loan class
as well as avoided emissions

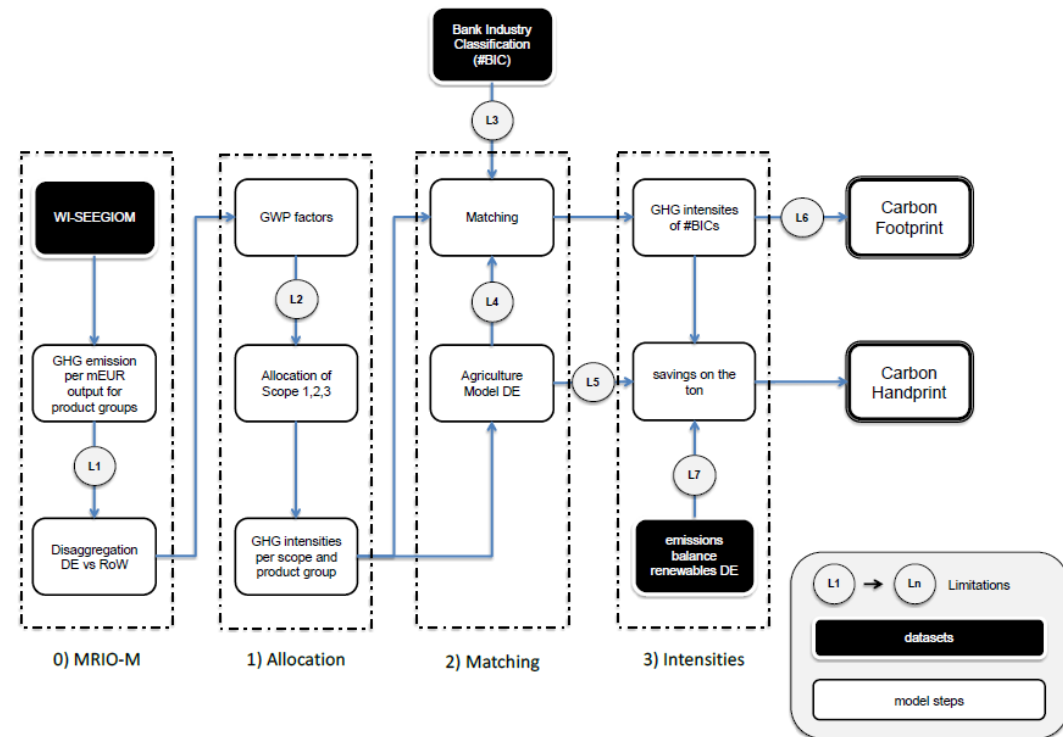
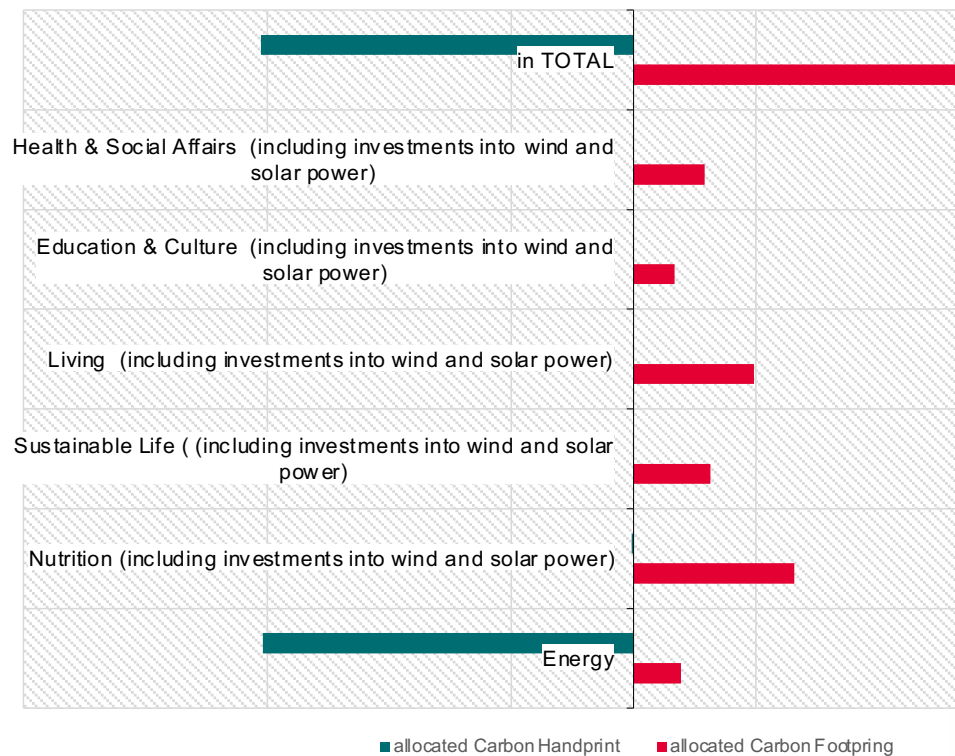


Figure 5: Model framework and model steps (see section on limitations for L1 to L7)

(L1: disaggregation level; L2: accuracy of allocation ; L3: quality of compability; L4: completeness of statistics; L5: accuracy of LCA factors; L6: attribution to bank; L7: lack of physical data)

Loan Model Results

caused and avoided GHG emissions



BIK# (1 st digit removed)	GHG emissions of loan recipients (before allocation)			
	Total	Scope 1	Scope 2	Scope 3
...
#430	282.9 t/EURm	23.3 t/EURm	28.7 t/EURm	230.9 t/EURm
#110	712.0 t/EURm	108.9 t/EURm	152.9 t/EURm	450.1 t/EURm
#120	184.5 t/EURm	161.9 t/EURm	0.0 t/EURm	22.5 t/EURm
#130	712.0 t/EURm	108.9 t/EURm	152.9 t/EURm	450.1 t/EURm
#210	1,665.3 t/EURm	26.2 t/EURm	584.5 t/EURm	1,054.6 t/EURm
#250	519.1 t/EURm	20.5 t/EURm	108.1 t/EURm	390.5 t/EURm
#110	526.5 t/EURm	29.7 t/EURm	93.9 t/EURm	402.9 t/EURm
#120	571.8 t/EURm	114.3 t/EURm	59.9 t/EURm	397.5 t/EURm
#130	712.0 t/EURm	128.6 t/EURm	104.7 t/EURm	374.4 t/EURm
#140	222.5 t/EURm	102.8 t/EURm	4.0 t/EURm	115.6 t/EURm
#150	244.0 t/EURm	117.0 t/EURm	16.8 t/EURm	110.1 t/EURm
#160	663.0 t/EURm	418.5 t/EURm	102.1 t/EURm	142.4 t/EURm
#170	624.3 t/EURm	288.9 t/EURm	69.1 t/EURm	266.4 t/EURm
#180	712.0 t/EURm	128.6 t/EURm	104.7 t/EURm	374.4 t/EURm
...

Loan Model

Application & Limitations

Application

- ☐ robust estimation of GHG emissions of loan portfolios
- ☐ portfolios with large number of loans or loans to SMEs
- ☐ cause-effect of economic output rather than state-of-economy
- ☐ applicable for any economy-/activity-based loan classification

Limitations

- ☐ database is aggregated, focused on industries and dates back a couple of years (e.g. no digital services or purely organic farming)
- ☐ matching to loan classes often not possible on a 1:1 basis
- ☐ double-counting of second order effects cannot be entirely avoided (scope 3 of scope 3 emissions)
- ☐ loans to industries do not necessarily reflect the actual investment (e.g. loan for constructing a factory building)

Validation

- ☐ reported GHG results are available in commercial databases and can be used to validate allocation and attribution rules
- ☐ country-specific or industry-specific results can be extracted and compared to GHG statistics

Refinement

- ☐ iterative allocation of scopes and comparison with validation data
- ☐ sampling by country, industry, company size
- ☐ additional models to disaggregate the output of relevant industries (e.g. using building typologies and statistics for construction industry)

Extension

- ☐ adding a satellite-module for different types of investments (esp. if this information is collected and available)
- ☐ adding indicators based on material throughput or household consumption

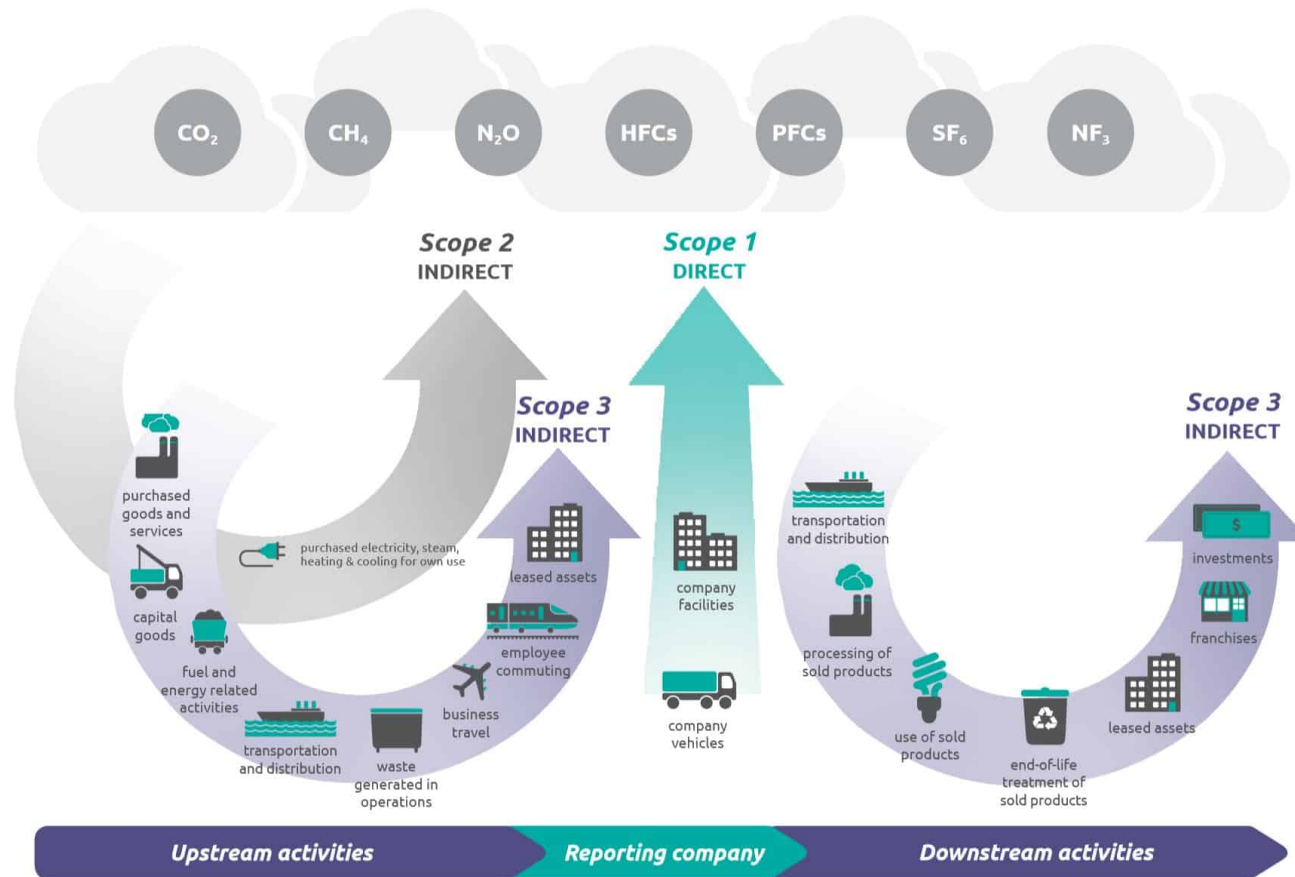
Thank You
for Your Attention

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Back-Up

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GHG Protocol Scopes



Project Results

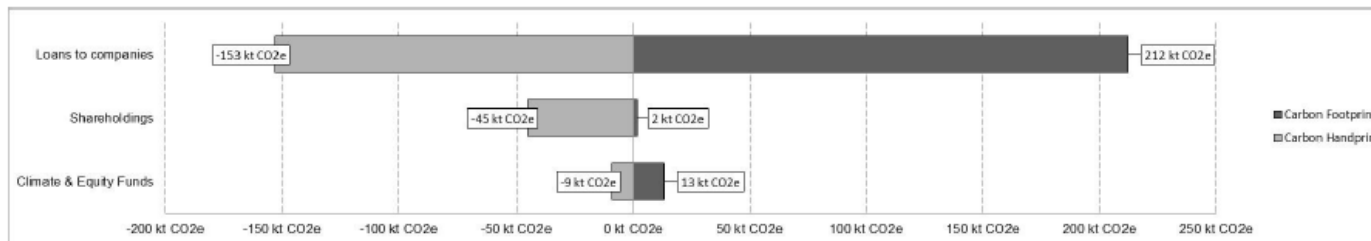


Figure 3: Carbon Footprint & Carbon Handprint of GLS Bank Assets (Climate & Equity Funds, Shareholdings, Loan Portfolio)

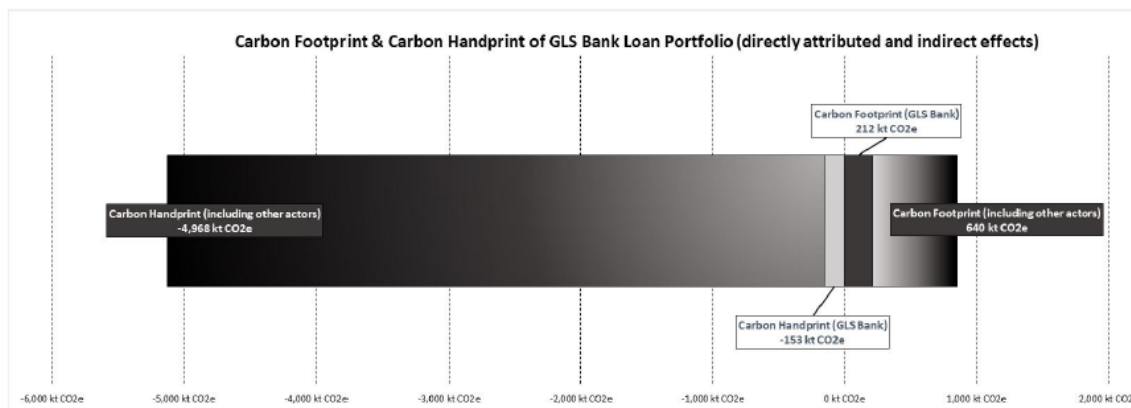


Figure 4: Carbon Footprint & Carbon Handprint of GLS Bank Loan Portfolio (directly attributed and indirect effects)

Teubler & Köhlert (2020): Financial Carbon Footprint: Calculating Banks' Scope 3 Emissions of assets and loans; ECEEE conference; Wuppertal Institut.

Loan Model

Effects of Limitations

Table 4: Description and impact of model limitations (source: own compilation)

Nr	Issue	Effects on accuracy of model	Possible solution
L1	The disaggregation into only two regions (DE/RoW) results in higher uncertainties between sectors in the rest of the world	Small deviations for emissions that are not attributed directly to the bank (Scope 3 emissions of loan recipients)	Disaggregation into all regions or at least between Germany, Europe and the rest of the world
L2	Non-conformity between scopes of companies (GHG protocol) and product groups in MRIO-Tables	Small deviations of GHG intensities per scope for industries with low emissions from energy consumption, but medium or even large deviations for industries with high energy demand	Samples of real GRI reports of companies in crucial industries could provide a more specific allocation key for scope 2 versus scope 1 and scope 3 emissions
L3	Low comparability for some bank industry categories with MRIO product groups.	Some bank industry categories exhibit higher uncertainties regarding their GHG intensity. These represent a small portion of the current loan portfolio but could be more relevant in other portfolios (e.g. loans for recycling companies).	Matching is currently related to bank industries, while in fact many loans are not direct investments in that sector (e.g. buying a PV roof installation for a farm building). Future assessment could focus more on the purpose of a loan instead of the sector of the loan recipient (e.g. loans for machines or loans for raw materials)
L4	Product groups in the MRIO-M cover only parts of the overall agricultural sector in Germany. In addition, data on the value added by organic farming is not sufficient to capture all farming products	Small deviations on the Carbon Footprint of loan recipients	Inclusion of additional statistics for organic farming and further disaggregation on value added from products versus value added from services in the agricultural sector
L5	Savings on the ton by agricultural products are based on very few products. Additionally, GHG effects are based on farming conditions in the UK	Medium deviations on the Carbon Handprint of loan recipients	Additional bottom-up modelling of farming products (in particular for fruits and processed food products) would improve data quality and reduce uncertainties for the Carbon Handprint
L6	The attribution assumptions simplify the issue of double counting in GHG protocols. They therefore do not necessarily represent the responsibility of the bank (for both Carbon Footprint and Carbon Handprint)	Large deviations for both Carbon Footprint and Carbon Handprint. However, re-adjustment of reported values (e.g. with different shares of attribution) requires only minimum effort	There is currently no attribution rule that is commonly agreed upon. Double-counting might be avoided by looking into more detailed loan data (in particular for portfolios with energy producers) or by clustering and weighting assets in the portfolio compared to the overall economy.
L7	Using the overall emission balance of Germany is inferior to using data of actual physical systems because investments, earnings and physical output are not directly proportional	Small (electricity) to medium deviations (other energy providers) for the Carbon Handprint of loan recipients	A bottom-up model that combines the emissions of different types of energy providers with reliable data on investments, earnings and labor costs could enhance the model by linking the physical output to the economic output

Teubler & Köhlert (2020): Financial Carbon Footprint: Calculating Banks' Scope 3 Emissions of assets and loans; ECEEE conference; Wuppertal Institut.