



# Quality Control in LCA

An auditor's perspective



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# Introduction





# My background



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**>400 LCI datasets** (*Electronics*)

**>1,200 LCA** (*Diverse products*)



**>500 EPD verified** (*PEP Ecopassport®*)



**>2,000** environmental audits/year

**>250** environmental auditors

**>65** countries



# What is an environmental audit

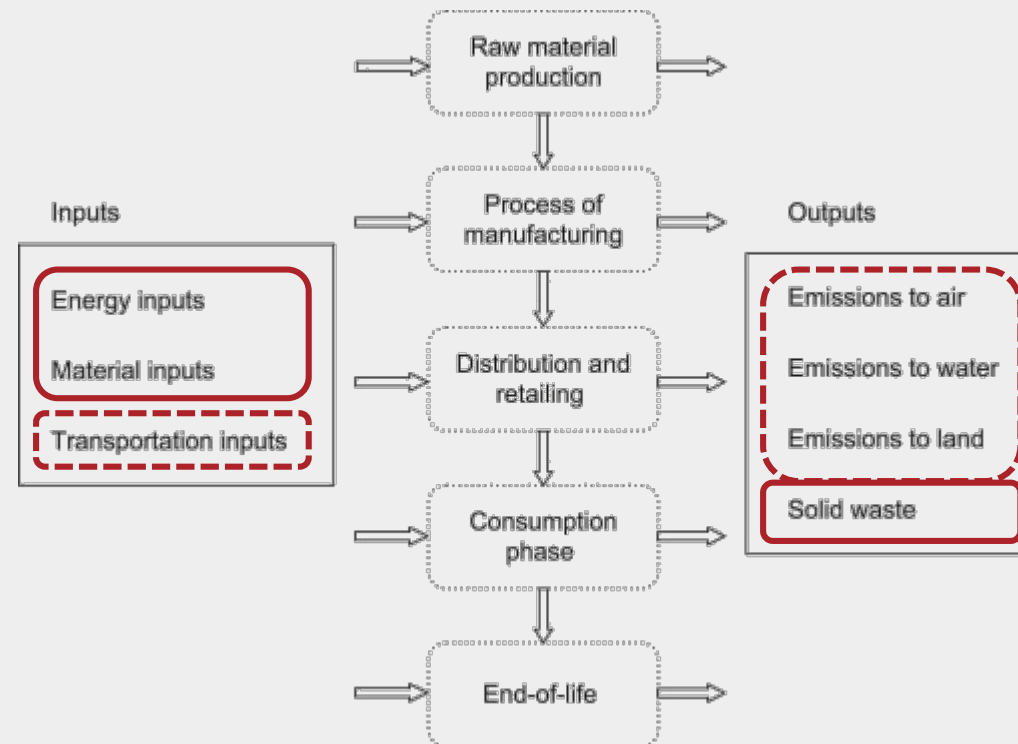
- Environmental assessment of a site conducted by a qualified environmental auditor. The scope of the assessment usually covers:
  - Environmental Management System
  - Energy management,
  - Water management,
  - Wastes management,
  - Wastewater effluent management
  - Air emissions
  - Chemical management
- Most environmental audits also include the collection and verification of quantitative metrics such as the annual electricity and other energy sources consumption, water consumption, wastes production, quantity of wastewater effluent, annual production volumes,...
- These audits are usually requested by Brands, Retailers and Manufacturers to assess the practices of their suppliers





# Link to LCA

- Quantitative metrics (inputs and outputs) covered in the scope of most environmental audits are similar to the data collected:
  - When developing LCI databases
  - During the data collectin phase of an LCA that includes primary data for the manufacturing processes



# Example of quantitative metrics collected during an audit

FACILITY OPERATIONS		
	DESCRIPTION/QUANTITY	UNIT
Products Manufactured	organic fertilizers, biological pesticides	
Annual production volume*	29000	t
Manufacturing Floors (m <sup>2</sup> )	42000	m <sup>2</sup>

WATER DATA		
	QUANTITY PER YEAR	
Drinking water supplied directly by the municipal sources	6773	m <sup>3</sup>
Non-drinking water supplied directly by the municipal sources		m <sup>3</sup>
Groundwater		m <sup>3</sup>
Surface water (water from wetlands, rivers, lakes, and oceans)		m <sup>3</sup>
Collected rainwater	70	m <sup>3</sup>
Other (please specify)		m <sup>3</sup>
Total Water Consumed	6843	m <sup>3</sup>
Recycled "grey water" (water from wash hand basins, showers and baths recycled on-site for uses such as toilet flushing, landscape irrigation and others)		m <sup>3</sup>
Recycled Process water	93	m <sup>3</sup>
Total Recycled Water	93	m <sup>3</sup>

WASTES DATA		
	QUANTITY PER YEAR	
Non hazardous wastes (sent to landfill or incineration)	97689	kg
Wastes sent to recycling	248700	kg
Hazardous wastes	97186	kg

ENERGY DATA		
	QUANTITY PER YEAR	UNIT
Purchased Electricity	2518011	kWh
Purchased Steam		Metric tons (MT)
Purchased Chilled Water		Cubic meters (m <sup>3</sup> )
Fuel Oil No2		Liters (l)
Fuel Oil No5		Liters (l)
Fuel Oil No6		Liters (l)
Natural Gas	418000	Cubic meters (m <sup>3</sup> )
LPG (Liquefied Petroleum Gas)		Liters (l)
LNG (Liquefied Natural Gas)		Liters (l)
Propane		Cubic meters (m <sup>3</sup> )
Coal		Kilograms (kg)
Diesel	47019	Liters (l)
Gasoline	7452	Liters (l)
Methane		Liters (l)
Ethanol		Liters (l)
Sludge (boiler consumption)		Metric tonnes (MT)
Wood		Kilograms (kg)
Biomass (please specify)		BTU
Geothermal		BTU
Wind		kWh
Solar	88500	kWh

# Audits analytics



Understanding data quality through data analytics

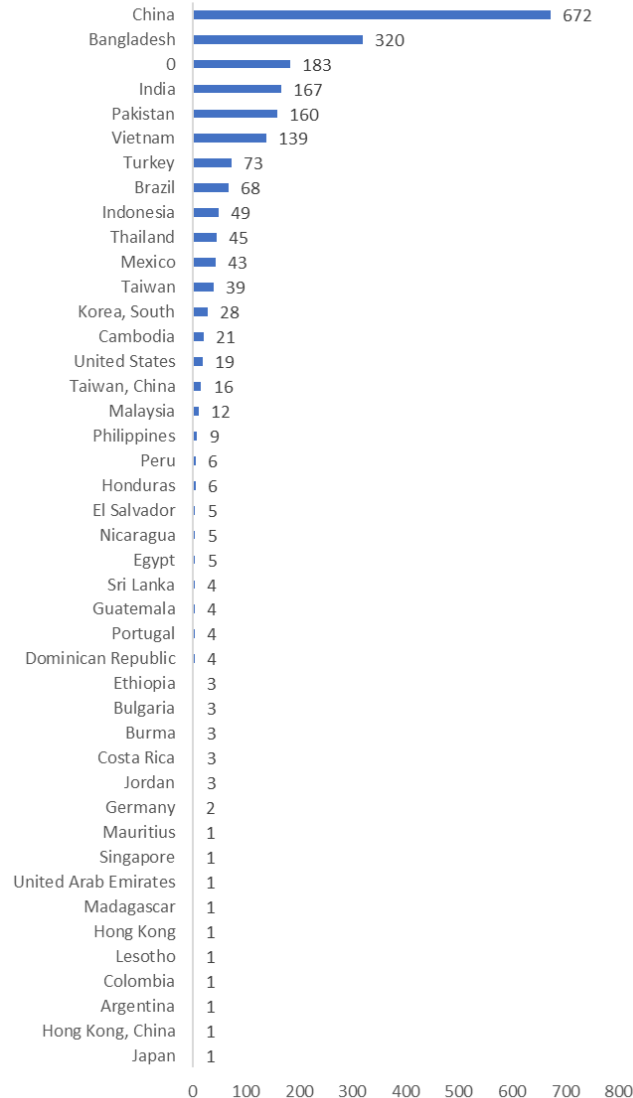
**SGS**





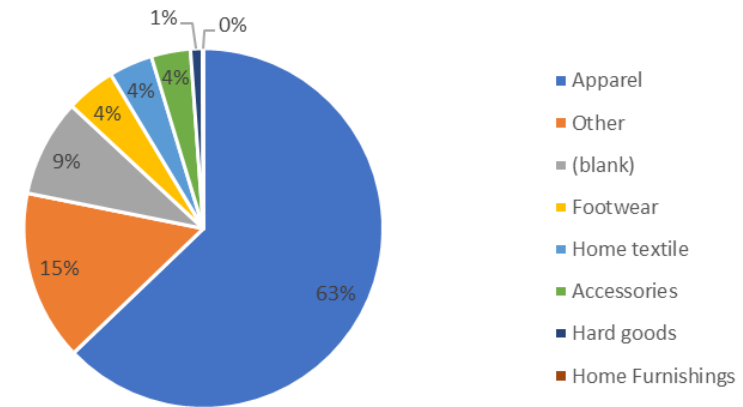
# Data analytics – sample overview

Audits per country



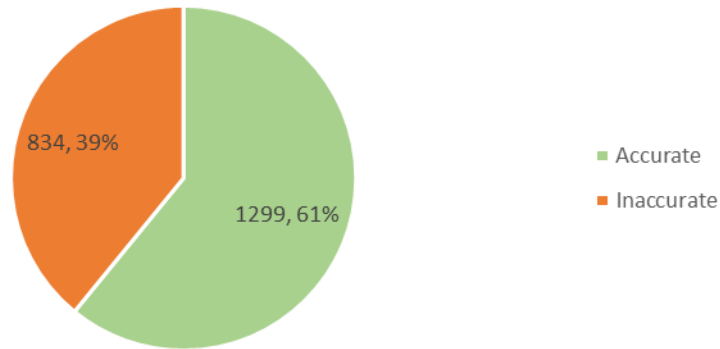
2,133 audits analysed

Number of audits per industry sector

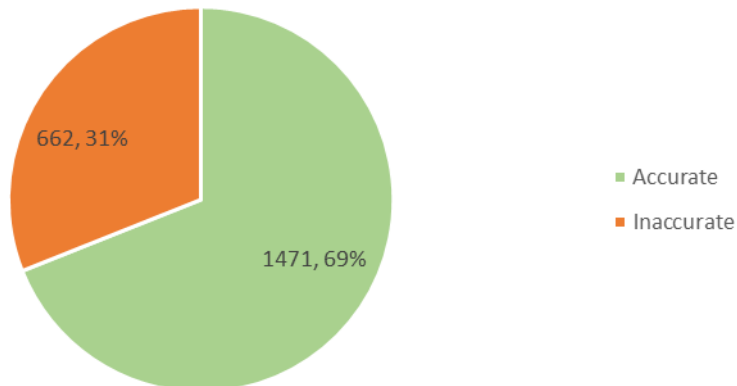


# Data quality analysis

Accuracy of the quantity of the purchased electricity reported



Accuracy of the water consumption reported



- **39%** of the audits identified inaccuracies in the **electricity consumption** self reported by the sites
- **31%** of the audits identified inaccuracies in the **water consumption** reported by the sites
- Overall, **80%** of the audits we conduct have inaccuracies one or more of the quantitative metrics reported by the sites
- Source of the inaccuracies identified:
  - Errors when consolidating the monthly data for the annual reporting
  - Errors with the units reported (ex: liter instead of m3,...)
  - Missing energy / water sources

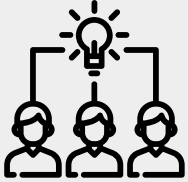
*Note: we estimate that the level of inaccuracies is under estimated as in many cases auditors do not have time to review properly the quantitative metrics*

*The magnitude of the inaccuracies is significant and would impact the LCA results*

# Example of data extracted from audit reports

Verified	Country	Version	Electricity consumption 2019 (kWh -self assessment)	Electricity consumption 2019 (kWh - verified)	Accuracy - Electricity	Difference	Water consumption 2019 (m3 - self assessment)	Water consumption 2019 (m3 - verified)	Accuracy - Water	Difference - Water
TRUE	China	fem2019	1.39E+05	1.31E+06	Inaccurate	846%	1.42E+04	1.19E+07	Inaccurate	83693%
TRUE	China	fem2019	2.92E+07	3.37E+07	Inaccurate	16%	4.13E+07	4.13E+07	Accurate	0%
TRUE	China	fem2018	6.21E+06	6.96E+06	Inaccurate	12%	2.03E+07	2.03E+07	Accurate	0%
TRUE	China	fem2018	2.55E+08	4.20E+06	Inaccurate	-98%	5.28E+08	5.28E+08	Accurate	0%
TRUE	China	fem2018	7.94E+07	2.61E+08	Inaccurate	229%	2.47E+08	2.47E+08	Accurate	0%
TRUE	China	fem2020	2.84E+06	8.55E+06	Inaccurate	201%	3.70E+07	4.15E+07	Inaccurate	12%
TRUE	China	fem2018	5.92E+09	3.99E+08	Inaccurate	-93%	3.85E+08	3.85E+08	Accurate	0%
TRUE	Thailand	fem2019	9.77E+07	9.33E+06	Inaccurate	-90%	1.42E+07	1.42E+07	Accurate	0%
TRUE	China	fem2019	9.30E+07	8.38E+07	Inaccurate	-10%	3.51E+08	4.51E+07	Inaccurate	-87%
TRUE	Vietnam	fem2019	3.39E+06	9.92E+06	Inaccurate	193%	3.78E+07	3.95E+07	Inaccurate	5%
TRUE	China	fem2018	4.65E+07	4.89E+07	Inaccurate	5%	1.09E+08	1.60E+08	Inaccurate	47%
TRUE	China	fem2019	1.01E+08	1.09E+08	Inaccurate	8%	1.41E+09	1.25E+09	Inaccurate	-11%
TRUE	China	fem2019	3.60E+00	1.20E+07	Inaccurate	333551500%	5.15E+07	5.42E+07	Inaccurate	5%
TRUE	China	fem2019	2.92E+07	3.21E+07	Inaccurate	10%	1.95E+08	1.95E+08	Accurate	0%
TRUE	China	fem2019	1.14E+07	1.36E+07	Inaccurate	20%	1.36E+08	1.36E+08	Accurate	0%
TRUE	India	fem2019	4.02E+06	3.72E+06	Inaccurate	-7%	1.57E+07	1.87E+06	Inaccurate	-88%
TRUE	Mexico	fem2018	2.96E+03	2.96E+06	Inaccurate	99900%	2.80E+06	1.52E+06	Inaccurate	-46%
TRUE	China	fem2019	1.28E+06	2.43E+06	Inaccurate	90%	1.83E+07	1.17E+07	Inaccurate	-36%
TRUE	China	fem2018	6.20E+06	5.43E+06	Inaccurate	-12%	1.00E+06	1.57E+08	Inaccurate	15638%
TRUE	China	fem2019	1.39E+05	1.31E+06	Inaccurate	846%	1.42E+04	1.19E+07	Inaccurate	83693%
TRUE	China	fem2018	6.21E+06	6.96E+06	Inaccurate	12%	2.03E+07	2.03E+07	Accurate	0%
TRUE	China	fem2019	1.48E+07	2.08E+07	Inaccurate	41%	4.00E+03	1.13E+07	Inaccurate	283400%
TRUE	Peru	fem2019	5.62E+05	2.78E+05	Inaccurate	-51%	1.80E+06	1.18E+07	Inaccurate	558%

# Discussion



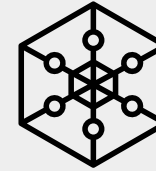
## Data collection

Data collection for LCI databases development and Data collection in LCA usually relies on self-declared data. Quantitative metrics are rarely verified (review of the bills, monitoring of the consumptions,...)



## Learning from environmental audits

The quality of self-reported data is poor. 80% of self-reported data at the site level includes inaccuracies with a magnitude that can significantly impact the results of an LCA



## Opportunities

Leveraging auditing capabilities to support the data collection for LCI database development and LCA:

- Cost effective (auditors are local)
- Auditors speak the local language
- Reduction of the data collection time
- Increase of the quality of primary data



# Thank you!

Do you have any questions?

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