

VALIDATION REPORT

toolbot



2021
SL-1302

MEASURING SUSTAINABLE
PRACTICES WITH
IMPACT FORECAST

VALIDATION PROCESS AND POSSIBLE OUTCOMES

Validation is a six step process to determine if a Cif is valid, positive and significant;

1. The team makes and hands in their Climate impact forecast, including all relevant assumptions about their product and process, impact data and calculations, with sources and supporting documents.
2. The expert performs a structured check where all inputs (e.g. impact indicators, functional unit, all assumptions) have to meet specific requirements.
3. The expert drafts the impact story, describing how the company creates impact, mainly to check with the team that the innovation and reduction mechanism is understood. The impact story also serves as a summary and conclusion of the forecast and validation.
4. Team and expert meet for an intake to discuss the draft impact story and structured check to clear up any ambiguity in assumptions, discuss

how to find missing data if any, and to be sure the forecast is an accurate model of the innovation.

5. Time for revision and further research where needed, finalizing the impact story.
6. Expert hands over the results by email, followed up with a call to discuss the result and help the company interpret it, for external communication and in developing the solution.

VALIDATION EXPERT

These Climate impact forecast were validated by a third party Cif licensed LCA expert.

MSc Santeri Lehtonen
March 2021

Table 1 – Possible outcomes of the structured check





Valid		All checks are approved, no questions or concerns remain. Any external information checks out, and the impact is robust; a more detailed LCA should give results in the same range.
Probably valid		At most one input has raised a concern with the expert but it is not a key input, or not too far off, otherwise it is not a priority to resolve the concern.
Likely invalid		At least one key input has raised a concern with the expert, it meets the requirements but the uncertainty may be too high or there is evidence to dispute the claim made here.
Invalid		At least one input does not meet requirements (e.g. an assumption without clarification, data without source, overly optimistic, wrongly scoped or another error) and is rejected

Table 2 – Possible outcomes of a Cif (independent of its validity)








Valid		The forecast shows that the innovation reduces CO ₂ impact (e.g. -1kg CO ₂ eq)
Probably valid		Positive impact is possible within certain, realistic limits of energy or material use
Likely invalid		Insufficient information to give results
Invalid		At least one input does not meet requirements (e.g. an assumption without clarification, data without source, overly optimistic, wrongly scoped or another error) and is rejected
Invalid		At least one input does not meet requirements (e.g. an assumption without clarification, data without source, overly optimistic, wrongly scoped or another error) and is rejected

Table 3 – Significance (independent of validity, applicable to positive impact only)

Significant		The impact is greater than 5 tons per year; compensating for more than one average person
Marginal		The impact is less than 5 tons per year

COMPANY INFORMATION

toolbot
Jan Gerlach
Founder

think.systems UG (haftungsbeschränkt)
Amalienstr. 10
03044 Cottbus

<https://toolbot.de/>

IMPACT STORY

What is the outcome of the validation? A summary of the report, capturing how the company creates impact, compared to which baseline, how much, and how valid this is.

Toolbot provides power tools with automated sharing stations instead of a self-owned power tool. The difference in impact is calculated per year and the total impact of toolbot per year is calculated for 692 times toolbot stations with 50 tools each.

Toolbot is a sharing service of professional power tools within European cities. This replaces the baseline of citizens purchasing of several cheap, low-lifetime tools. An average electric drill only runs 13 minutes in its lifetime. Home power tools are rarely used and are only designed to last a short time. This is the only reason why they can be offered at low prices in the first place. Professional tools on the other hand not only last longer, but their handling is also safer and easier. If one only rarely uses a drill, an angle grinder or a jigsaw, it goes without saying that they do not want to spend hundreds of euros buying it. Borrowing a tool today costs roughly the same as buying a cheap one for just one day. Unfortunately, these tools are mostly of inferior quality, a nuisance to use and, after their short life they are often disposed improperly.

Instead of 100 people buying 100 tools: with toolbot, 100 people share a high-quality tool. This saves us 99% of energy consumption and emissions during manufacture. The same also applies in the long term: since toolbot devices are professionally maintained, they last much longer and only a fraction of the emissions are generated compared to buying a new one.

Toolbot's Climate Impact Potential in Year 5 of business is 494,808 tons of CO₂e. Toolbot conducted their CIF impact assessment with great care and quality.

Toolbot's climate impact forecast is certified as "Valid, positive and significant".

IMPACT FORECAST

Screenshot of the validated Cif file overview (step 5), including strong points, weak points, sensitivity, and Validation result.

Validation	By: Santeri Lehtonen, Started: Mon Mar 22 2021 13:56:28 GMT+0100 (Central European Standard Time), Completed: Mon Mar 22 2021 14:04:52 GMT+0100 (Central European Standard Time)
Strong points	Toolbot will have a positive impact by enabling people to DIY by borrowing tools instead of buying them - thus avoiding the manufacturing of complex technical products. Toolbot's impact forecast assessment does a great job of describing and quantifying an impact scenario in business year 5. The assessment errs on the side of conservative where necessary, shows its math and assumptions.
Sensitivity	The assessment is yet very sensitive to actual behaviour change of citizens (affecting number of users), and the market penetration of toolbot's innovation (affecting number of stations [FUs]). Overall however, toolbot's impact is valid and positive, and will only change in its degree of magnitude, user adoption and market conditions pending.

Production							
-	Cordless Power Drill	✓	40.19 per use	18250	use	✓	-733467
+	PCB = Printed Circuit Board (including ICs)	✓	260.4 per kg	0.05	kg	✓	13.02
+	Steel (21% sec = trade mix average)	✓	2.054 per kg	1	tons	✓	2054
+	ABS (Acrylonitrile butadiene styrene)	✓	3.104 per kg	100	kg	✓	310.4
+	Cordless Power Drill	✓	40.19 per toolbot t	50	toolb	✓	2010
+	Electricity Low Voltage, domestic use General	✓	0.1187 per MJ	1752	kWh	✓	748.7
Use							
+	CO2 per person in assumed mixture above	✓	0.712€ per use	18250	use	✓	13009

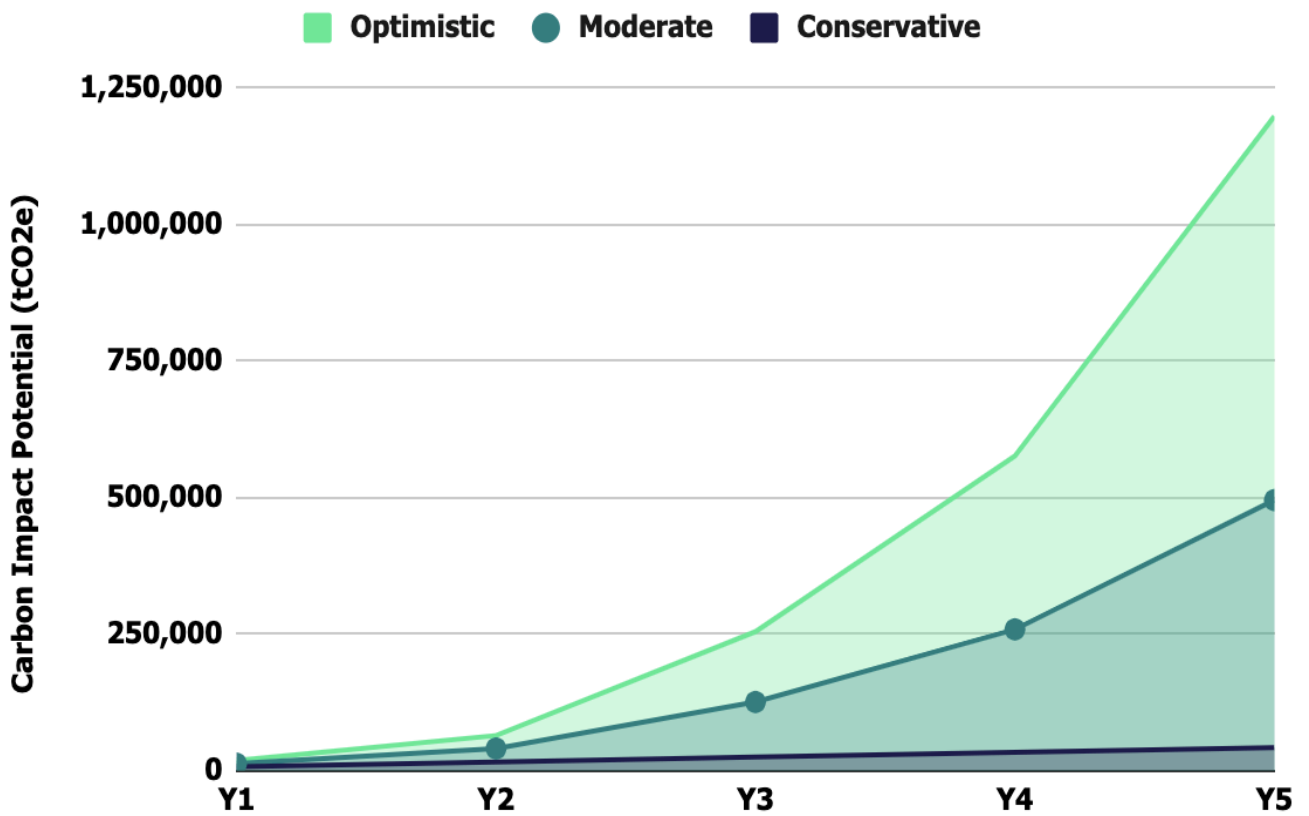
toolbot's total impact per year			Carbon footprint CO ₂ eq.		
eco-costs of human health euro	unknown	Impact per toolbot stations with 50 tools each	-715323 kg		
eco-costs of eco-toxicity euro	unknown		Impact of 692 times toolbot stations with 50 tools each		
eco-costs of resource depletion euro	unknown		-495003 ton		
eco-costs of carbon footprint euro	unknown				
Equivalent to		Impact validation	✓ Valid, positive and significant ✓ All data and assumptions are approved		
22500158 trees		101810 Average humans			
61216	499536	961450	208049	99001	89286
times driving a car around the world	passengers flying London-New York	barrels of oil burnt	EU households annual electricity	elephants mass (5t) of CO ₂	hot air balloons (2800 m ²) of CO ₂

IMPACT PROJECTION

The forecast for year 1 and N functional units. The projection multiplies the impact per functional unit with N for y2, y3, y4 and y5 from the business plan, to make an impact projection.

toolbot projects to serve 12,629,000 users across 692 stations across several major cities in the European Union in their fifth business according to their moderate business scenario. This results in a Climate Impact Potential of 494,808 tons of CO₂e (cumulatively 930,267 tCO₂e over a five-year period).

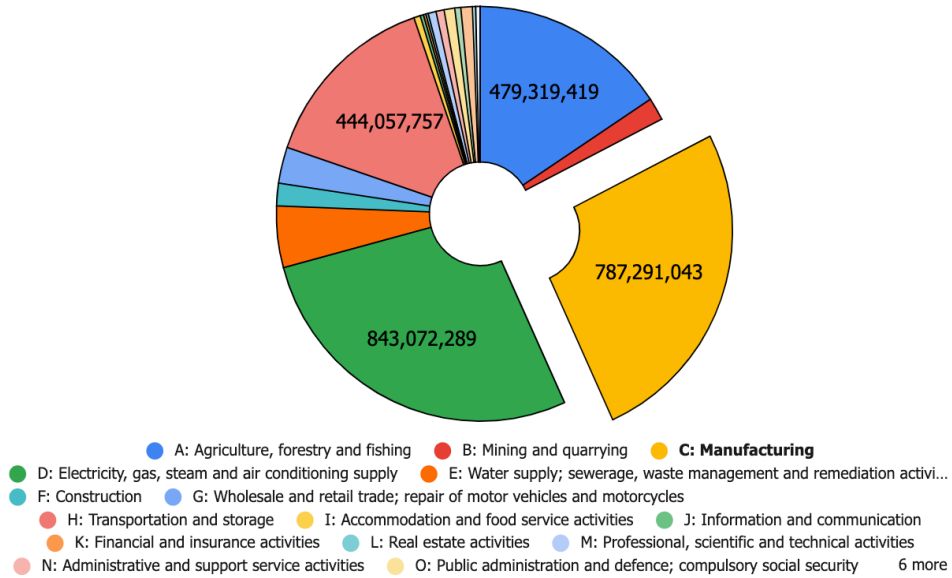
For comparison, the Conservative scenario assumes only 58 stations in year 5, resulting in a 92% decrease in the Climate Impact Potential (41,472 tCO₂e).



SECTOR SLICER

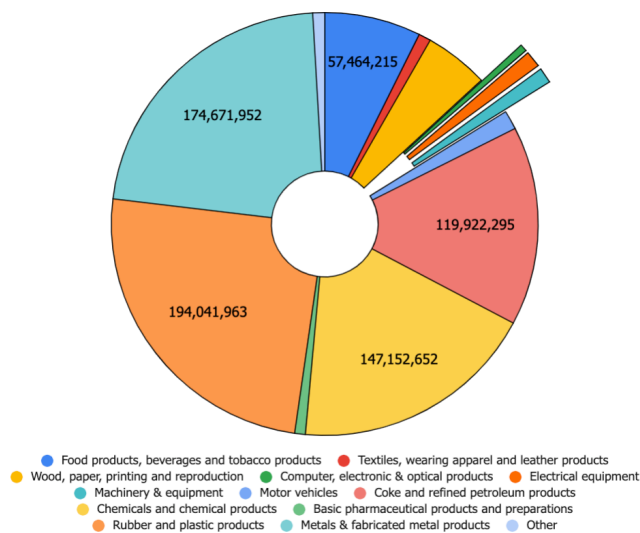
Shows the impact that a business can have on the emissions produced in their beachhead market. It shows the percentage of the beachhead market that the business can tackle, depending on how broad or specific their scope is.

GHG per Sector in the EU-27 (tCO2e)
[OECD, 2021]



toolbot focuses on the ‘Manufacturing’ sector, giving them a total addressable impact of over 26% of the total GHG emissions of the EU-27, amounting to 787 megatons of CO2e.

GHG Manufacturing sector in EU-27 (tCO2e)
[OECD, 2021]



From the total Manufacturing emissions in EU-27, toolbot addresses the manufacturing of: “Computer, electronic & optical products”, “Electrical equipment”, and “Machinery & equipment”, totalling 3% of Manufacturing related emissions (10 megatons of CO2e). As many power tools are manufactured out of the EU, toolbot’s total addressable emissions can be much higher than this.

TRANSFORMATIVE POTENTIAL

In what has been established as “conventional trade”, consumers buy goods, gaining full ownership of them. However in increasing instances, consumers are buying the right for temporary access to goods. This is called the sharing economy or in some cases ‘the collaborative economy’. The trend for such systems for a variety of different sectors and purposes, from real estate to clothing, is steadily increasing in Europe. The total value of the sharing economy is estimated in exceeding 28 billion euros (Munkøe, 2017).

The trend is likely to keep up in this direction, as the use of smart devices is increasing, and usability of sharing platform services is improving. Services such as the Facebook Marketplace have brought awareness of and access to such sharing models to the masses. Due to the aforementioned trends, the threshold for the average person to try out similar services has been (and continues to be) lowered. The sharing economy also creates new opportunities for companies and entrepreneurs. Due to its collaborative nature and in-built resource efficiency, the sharing economy can significantly contribute to the circular economy and sustainable prosperity (European Commission, 2016).

Consequently, it can be attested that toolbot's business will continue to be relevant and in-sync with consumer trends. The positive climate impacts of toolbot will therefore similarly continue to rise, especially as they extend their service to other product groups besides power tools: toys, sports equipment, cleaning equipment, media.

Does the validity of these results depend on foreseeable future changes? Is the baseline expected to change in the future? Does the difference in impact for this innovation tend up or down in the next decades? Is it just more of the same or could it change the system?

As product lifetime, repairability and shareability will become sought-after features on power tools (and other products), hardware product development will naturally shift towards more durable, high-efficiency and low-carbon designs. This is incentivised also as lifetime and repairability allow for continuous revenue over one-time sales.

The sharing economy will also enable high-quality products and tools to be used by wider audiences and income classes. This empowers people not only to engage in DIY (adding value within e.g. the arts and real estate), but also creates equity, prosperity and access across society. As people continue to own less items themselves, space is freed in apartments for other uses and activities.

Toolbot and other services enabling the emergence of the collaborative economy will be an integral part in the transition towards a circular, equitable and sustainable future.

SOURCES

What is the outcome of the validation? A summary of the report, capturing how the company creates impact, compared to which baseline, how much, and how valid this is.

European Commission, 2016. A European agenda for the collaborative economy. Brussels, 2.6.2016. COM(2016) 356 final. {SWD(2016) 184 final}

European Power Tool Association (EPTA), 2020. EPTA-Recharge Report2009-20.

Munkøe, M.M., 2017. Regulating the European sharing economy: State of play and challenges. Intereconomics, 52(1), pp.38-44.

Umweltbundesamt, 2018. Vergleich der durchschnittlichen Emissionen einzelner Verkehrsmittel im Personenverkehr in Deutschland - Bezugsjahr 2018 tabelle. [online]. Available at: https://www.umweltbundesamt.de/sites/default/files/medien/366/bilder/dateien/vergleich_der_durchschnittlichen_emissionen_einzelnr_verkehrsmittel_im_personenverkehr_bezugsjahr_2018_tabelle.pdf [Accessed on: 28/03/2021 - Wayback machine].

For additional services, Impact Forecast has a roster of over 20 LCA experts all over the world, across 14 countries. Each expert has their own sustainable superpowers and are trained to assist teams across a diversity of sectors.

Our specialists and software solutions help innovators, startups and ecopreneurs measure and improve their climate impact. We make impact data and expertise available to anyone with easy online tools and accessible workshops, leveraged by impact expert coaching and validation on-demand.

Do you want to learn more about Impact Forecast and additional impact services? Then don't hesitate to get in touch. Do you want to learn more about our product? Then schedule a call with our specialists right away!

CONTACT

Impact Forecast
Rotterdam, The Netherlands
bram@impactforecast.org