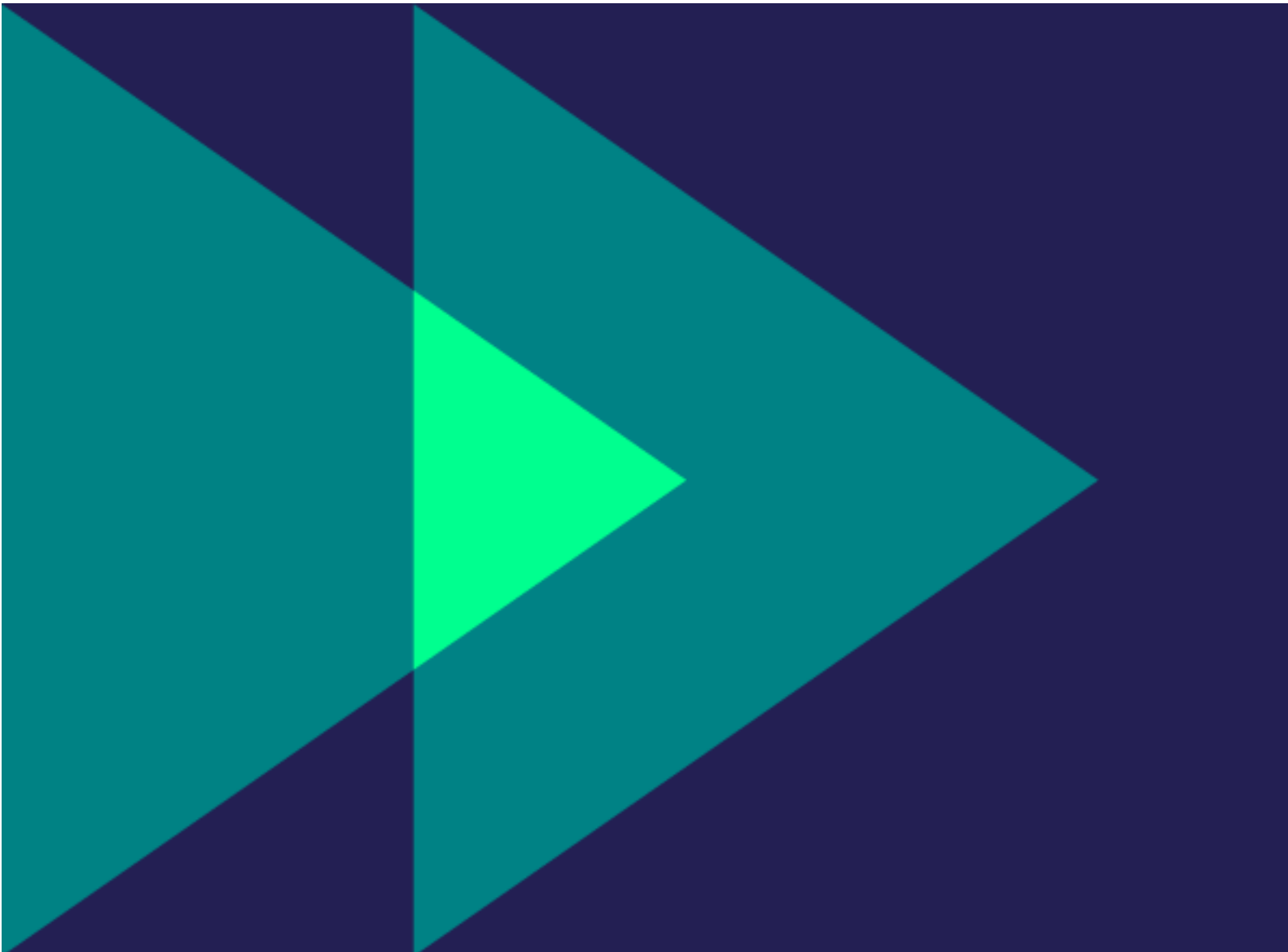
VALIDATION REPORT

Munasafn RVK Tool Library
2023 RM0005

IMPACT FORECAST



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Details of the validation process

	Validation request	First review	Feedback call	Hand-in revisions	Final review	Wrap-up call
Date	27/02/23 14h17	04/03/23 12h00	10/03/23 14h30	28/03/23 12h48	31/03/23 11h00	31/03/23 16h00
Result	Invalid, Unclear, Significant			Plausible, Positive within limits and Significant		

Colofon

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Introduction and definitions

This Validation report documents the Validation of a Climate Impact Forecast:

Validation is a review process performed by an impartial impact expert to determine if a CIF is Valid, Positive and Significant.

The Validation process usually takes two weeks and includes a first review, a first feedback call between the team and validator, time for revisions if needed, a final review and a final results call. For a detailed description see www.impact-forecast.com/cif-validations

The review comprises a structured check using our CIF Validation tool, a sensitivity analysis and the writing of an Impact story. CIF trainers with LCA expertise are trained to perform this process in a uniform and objective way.

CIF Validations are made on the request of the project team, and possibly commissioned by an impact organisation. The results are used by teams and organisations to compare and communicate the climate impact of projects.

A Climate Impact Forecast or CIF is an LCA based calculation of the GHG reduction or climate adaptation potential of a project. Using our CIF tool, the project team found the net climate impact of the key differences between business as usual and their innovative solution.

The Impact data in this report, and in CIF in general, is calculated with information from the project team and from the CIF tool. Technical details, amounts and assumptions in the calculation are provided by the project team. Impact factors (LCI data), impact equivalents and the calculation itself are provided by the CIF tool.

The CIF tool is used by teams to improve their impact and support design and business decisions with impact data.

CIF results are the project's potential or actual avoided emissions in tCO_2eq.

Every CIF Validation result consists of three independent outcomes:

Valid

A CIF is valid if it is representative of the project, using appropriate data and well justified assumptions. Therefore, the CIF and its results are representative of the potential for the project to mitigate, enable or adapt to climate change.

Detailed requirements for validity are specified on www.impact-forecast.com/cif-validations. A CIF can be Valid, Plausible, Improbable and Invalid.

Positive

A CIF is positive when it shows that the project has a lower climate impact than business as usual, or improved climate resilience in the case of adaptation. A positive mitigation or enabler CIF shows the avoided GHG emissions in $-tCO_2eq$.

This outcome depends on a sensitivity assessment. CIF results can be Positive, Positive within limits, Unclear, Sensitive and Negative.

Significant

A CIF is significant when the project has a climate impact (positive or negative) greater than 5 tonnes of CO_2eq per year. This is roughly the global average annual CO_2 emissions per person, and the mass of a male African Elephant.

The threshold for significant impact can be set to a higher amount for a particular organisation or occasion. The result can be Significant or Marginal.

Impact story

An impact story is a summary of how a project makes a positive climate impact. It is written by the validating impact expert and contains the key impact data from the Climate Impact Forecast.

NEW SHARING HARDWARE SYSTEM BOOSTS CIRCULARITY OF USEFUL ITEMS AND REDUCTION OF E-WASTE

Munasafn RVK Tool Library enables community members in the age group of 18-45, who are environmentally conscious and of lower income to share & borrow tools and other household electronics by having access to our self check-out library system (similar to post office collect boxes) in a communal location, where they can access those items easily. The projected impact is in the order of -1000 tonnes CO2eq, estimating 2520 fully changed users in one year.

How does Munasafn RVK Tool Library make a positive climate impact? Compared to which baseline?

Munasafn RVK Tool Library promotes and encourages community members to share and borrow tools and other household electronics - which contradicts the habit of buying and owning any of these items.This is done by providing them with a self-checkout item library that is convenient placed in communal areas, for example in Libraries and Universities.

By fostering the habit of borrowing and sharing, it is also reducing the potential number of importations. In addition, there is also the potential reduction in waste treatment considering that some tools, once unused, would be thrown away and put through waste management.

The difference in impact per year is calculated assuming that 7000 community members in the age group of 18-45, who are environmentally conscious and of lower income are reached, of whom 45% are expected to change on average 80% of their current habit of buying and owning shareable items.

How much impact, and what does it depend on?

By allowing community members to share and borrow items that would otherwise be purchased, owned and used by single individuals, this system will maximise the use of items and benefit multiple people throughout its lifetime. This translates into a reduction of materials that would be necessary for the product of the tools that are available in the self-checkout system. It is assumed that each item is on average borrowed 2.7 times per year and the input data represents the 16 most borrowed items a user will access while using the service: carpet cleaner, 2 battery drills, jigsaw saw, ice cream machine, projector, pressure washer, angle grinder, hammer drill, iron, camping gear -tent/2 sleeping bags/2 floor mats, camping cooler, gardening tool kit, basic tool kit, hand tools, kids party kit and heat gun. These materials are mainly made out of polymers and metals such as lithium and steel and their reduction shows to have the biggest impact. This means that, per changed user, there is an impact of -404.8 kg CO2eq. This is equivalent to an impact of - 1000 tonnes CO2eq a year.

Other impact drivers are related to transportation and waste treatment. Firstly , transportation is expected to be avoided (both by air and water) by the final user from the imported goods in the self checkout system which is shared instead of bought - this becomes even more meaningful in the case of

Iceland that imports most of these goods. This is based on data collected by the Icelandic National Import database. Secondly, there is a decrease in the treatment of tools and items that would normally be put to waste management once thrown away, which is stopped by our system which expands the life of items due to our maintenance and repair structure.

Finally, the company itself needs to provide the hardware of the self-checkout system. Thus, the overhead impact is related to the construction and implementation of modular containers that are scalable and adaptable, built from locally sourced materials and upcycled screens, wiring, and more. For their construction, the materials required are plywood, electric cables, computer screens / desktop, screws made of stainless steel and 223g per PCBs. It is also assumed that there will be 20 self-checkout units, each with 16 items to be borrowed.

Validity

The forecast is plausible, positive within limits and significant. It is considered plausible because there was only (and at most) one input that raised a question to the validator, and it is not a key input, or not too far off, otherwise it is not a priority to resolve the concern. In this model, it was considered that there is a reduction of the transportation of goods (via water and air), with the quantities inserted being based on data collected from the Icelandic National Import database. However, although the quantities are realistic, it is not possible to clearly evaluate their validity because the rationale behind those quantities is not clearly described.

It is considered positive within limits because the impact depends on the adoption rates, as well as the amount of units installed.

Finally, it is considered Significant because it has the potential impact greater than 5 tons per year, which compensates for more than one average person

A note about ...

The validator has no doubt about the positive impact that Munasafn RVK Tool Library has in the shift of behaviour as well as in its environmental social impact. It has a direct link to one of the principles of circular economy, which is to make materials and products to circulate. This means keeping materials in use, either as a product or, when that can no longer be used, as components or raw materials. This way, nothing becomes waste and the intrinsic value.

Climate Impact Forecast and Validation results

Munasafn RVK Tool Library enables community members in the age group of 18-45, who are environmentally conscious and of lower income to share & borrow tools and other household electronics by having access to our self check-out library system (similar to post office collect boxes) in a communal location, where community members can access those items easily, for example libraries or universities. The difference in impact of Munasafn RVK Tool Library per year is calculated assuming that 7000 community members in the age group of 18-45, who are environmentally conscious and of lower income are reached, of whom 45% are expected to change on average 80% of their current habit of buying and owning shareable items. That is equivalent to 2520 fully changed users.

per reached user	This is a not applicable in our project.
per changed user	The materials listed below are related to the average tools and items components inside the standard self checkout system set up in which the final user has access to in replacement of buying. This data has been collected and analysed by our team when choosing items for the self checkout system. This material data represent the 16 most borrowed items a user will access while using our product (carpet cleaner, battery drill x 2, jigsaw saw, ice cream machine, projector, pressure washer, angle grinder, hammer drill, iron, camping gear -tent/2 sleeping bags/2 floor mats, camping cooler, gardening tool kit, basic tool kid -hand tools, kids party kit, heat gun). Based on our pilot projects, each user borrows each item on average 2.7 times per year. The transported relayed in this is related to the transport avoided by the final user from the imported goods in the self checkout system which is shared instead of bought. This is based on data collected by the Icelandic National Import database. The waste treatment relayed below is related to the decrease of need of treatment of tools and items that would normally be put to waste management once thrown away, which is stopped by our system which expand the life of items due to our maintenance and repair structure.
our overhead	This data is collected from the materials used (More from new materials, Less from second hand materials - e-waste) to produce the self checkout hardware system - Ply wood, electric cables, computer screens / desk top, screws (stainless steel) and PCBs (113 g per PCB x 16 per unit x 20 location units)

Validation	By: Rafael Martins, Started: Fri Mar 31 2023 10:29:48 GMT+0100 (Western European Summer Time), Completed: Fri Mar 31 2023 11:24:31 GMT+0100 (Western European Summer Time)
Strong points	(+) Very well described scope, as well as providing a good amount of information in the overhead as well as per reached user impacts (+) all in all, a strong model for a complex scenario with great detail in describing the value that the company provides
Weak points	(-) The calculations of transportation need more support. It is mentioned that they are based on a database, however, there is no explanation on the rational behind it. This can be solved with more detail to question like (where are the transportation being done from?, what is being transported by container and airplane? What are the weights being considered?); A link to said reference can as well be useful in this case. However, it does not raise much of a concern considering that it is not the biggest impact "saver".
Sensitivity	The impact is positive within limits, considering that it depends on user engagement & adoption rate. For instance, changing the probably and average degree of user engagement to 10% and keeping remaining data as it is leads to a negative impact. Idem, if I increase the installation of units to 2000 (and corresponding material needs), then I will also have a negative impact.

per reached user	kgCO₂eq.	quantity reached	kgCO₂eq. per 7000 reached users
		0	

per changed user	kgCO₂eq.	quantity changed	kgCO₂eq. per 2520 fully changed users
Container ship (min weight/volume ratio 0,41 ton/	0.00478 per tkm	665872 kgkm	-8013
Air traffic intercontinental (min weight/volume ra	0.5826 per tkm	66783 kgkm	-98039
Electric cord, 6A (1320W), 3x0.75 mm2, domesti	0.1476 per m	5 m	-1860
Stainless Steel (secondary), average	1.965 per kg	23 kg	-113902
Lithium-ion LiFePO4 battery (118 Wh per kg)	94.11 per kg	1.25 kg	-296455
Electric motor, less than 500 W, estimate	2.65 per kg	4.5 kg	-30052
AlMgSi0.5 (6060)	12.95 per kg	12 kg	-391460
ABS (Acrylonitrile butadiene styrene) chemical	3.377 per kg	14.05 kg	-119570
Steel, recycling credit closed loop (56% virgin pa	-0.1738 per kg	1.5 kg	657
plastic waste, collection&sorting	0.09309 per kg	2.5 kg	-586.5
Scrap separation Mn, Fe, Cu, Ni and Zn	0.01371 per kg	5.6 kg	-193.4
landfill (inert waste, not biodegradable)	0 per kg	3.65 kg	0

[The rest of the results are in the following page]

Munasafn RVK Tool Library's total impact per year

eco-costs of human health euro	-11981
eco-costs of eco-toxicity euro	-42388
eco-costs of resource depletion euro	-59135
eco-costs of carbon footprint euro	-125475

	Carbon footprint $CO_2eq.$
Impact per changed user	-404.8 kg
Impact of Munasafn RVK Tool Library in total	-1Kt

Equivalent to

961261 trees

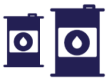
4349 Average humans

2615

times driving a car around the world

21341

passengers flying London-New York



41075

barrels of oil burnt

8888

EU households annual electricity

4230

elephants mass (5t) of CO_2

3815

hot air balloons ($2800\ m^3$) of CO_2

Validation quality mark can be checked on: www.impact-forecast.com

validated in March 2023
validation id:

RM0005

Verifyable at
www.impact-forecast.com

MUNASAFN RVK TOOL LIBRARY

Has the potential to enable a climate impact reduction of

-1 $KtCO_2eq$ / year

Validity of forecast
Plausible

Impact compared to baseline
Positive within limits

Magnitude of impact
Significant

More information

We help companies to know, show and grow their climate impact. More information about the validation process you can find on our website: www.impact-forecast.com