Loudspring Impact Results 2018

LITERATURE REVIEW

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Loudspring

This impact report literature review for Loudspring was compiled by David Helsing with the assistance of Matt De La Housaye from Global Green.

Any questions or clarifications about the methodology used by Loudspring can be directed to David Helsing. If you like what you read and would like to begin the impact reporting journey yourself, then feel free to contact David Helsing about working on your own company impact report.

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Introduction

Over the past two years, Loudspring has published impact results from a select group of companies in the Loudspring portfolio. When we decided to embark on the journey of measuring impact and communicating these results to our stakeholders, we made a decision that each year we would ensure that our models were stress-tested and improved upon, and our ability to communicate impact improved upon as well. This year we continue this journey.

As part of our 2018 impact assessment we decided to produce this deep-dive into the methodology behind the impact measurements (including a brief literature review in the annex below) in advance of releasing our impact results for 2018 and provide even more insight into our process. This will also create a backlog of the sources used in our impact assessment of our portfolio companies, so that others can learn and take inspiration from our approach and impact reporting can grow.

We believe that doing good for the planet is also good for doing business. By using the products and services of our companies, we do not only help others improve our environment and realign their values; we help them cut costs and create other ways of increasing revenue.

Known Unknowns

We take our progress seriously and are always seeking to do better.

Measuring impact is a long journey. Many organizations, research institutions and talented individuals are working hard to improve the methods and approaches to measuring impact, but there are currently no hard and fast answers to what the best way is to go about it; there is no generally-agreed framework for measuring impact, especially when it comes to what kind of impacts your products and services have on society. Like previous impact reports, the impact assessment for 2018 will mainly estimate how much water and greenhouse gas (GHG) emissions were saved or 'avoided' through the operations of our portfolio companies. This estimation relies heavily on publicly available data and research concerning water use and GHG emissions, apart from the sales and operations data that the portfolio companies themselves provide. We try to use official numbers by governments as much as possible in order to reduce the risk of bias that might be introduced when individual companies or business organizations produce numbers themselves.

The definition of 'avoided emissions' that we apply in our reporting is similar to that which is proposed by the Mission Innovation (MI) Framework (which itself is derived from the Greenhouse Gas Protocol). The MI Framework defines 'avoided emissions' as: "reductions in emissions caused indirectly by a product. This is where a product provides the same or similar function as existing products in the marketplace, but with significantly less GHG emissions". Given that Loudspring invests in and grows companies that provide services and products that replace other services and products with a higher environmental burden, the concept of 'avoided emissions' fits perfectly with the impact we are trying to achieve at Loudspring and is in fact basically what we have been measuring these last three years.

So, for us, the business as usual case from which we avoid emissions is that of the Loudspring portfolio not existing. By comparing these two scenarios (the emissions from traditional solutions vs. those of Loudspring's companies), we produce an estimate of how much emissions we helped avoid emitting.

At Loudspring, we take our progress seriously and are always seeking to do better. Progress when it comes to measuring impact is putting yourself under a better microscope and looking at the impacts of your business and operations with clear and sober eyes. Improving impact measurement is also about widening your view and accounting for impacts previously unrecognized and doing this in a transparent manner.

What is new in our soon to be released results for 2018 is that we have expanded our impact assessment to include how our companies are contributing towards the UN Sustainable Development Goals, as well as doing an initial mapping of the biodiversity impacts of our portfolio companies. These two new aspects were included for good reasons:

1. The UN Sustainable Development Goals have become the main platform for where different sectors communicate about sustainability (which is a very good thing for the planet and a conversation we want to be a part of); and

2. Biodiversity is an area of concern for us as a company that we feel is not getting the attention it deserves in the mainstream – We decided that we wanted to help elevate biodiversity concerns.

In the following sections, we shed some light onto how we go about estimating emissions reductions from the operation of our portfolio companies. We identify what we see as the 'business as usual'-case as defined by the MI Framework, and how emissions are avoided due to our portfolio.

Climate Change and Loudspring – Greenhouse Gas (GHG) emissions from our companies and operations

Climate change is often described as the major challenge of our time and is seen as an extremely difficult issue to tackle. Its effects are spread throughout the world (and do not remain where emissions originate); greenhouse gases traverse freely in the atmosphere and are not directly poisonous to humans; and the epic time scale involved makes it difficult to discern the causal links between emissions and effects. Nevertheless, having been on the environmental agenda since the 1970s, climate change is now the main environmental issue on the international agenda, with the COP 21 2015 agreement on limiting GHG emissions as the centerpiece. Other important agreements include the Sustainable Development Goals, also introduced in 2015, which cover a wider range of issues, including climate change.

Individual Portfolio Companies and GHG Emissions

Eagle Filters

Eagle Filters provide air filtration technology for natural gas power plants and generates monetary savings through: decreased maintenance time, increased efficiency (less fuel needed), and higher total capacity (about 3% improvement for each category). Up until 2017, we have calculated estimates based on: installed capacity (MW) multiplied by average load rate in number of hours run per year (which gives us how much electricity is produced in MWh), and multiply this by the fuel efficiency increase assumed by Eagle's air filtration technology. So far, we have only looked at the second category for impact on GHG emissions, because the estimated average load of a power plant is 60%, which indicates that most plants do not run at full capacity, and thus the first category is not highly relevant. If indeed more fuel could be burnt due to decreased maintenance needs, this would lead to more GHG emissions, so this year we intend to look more at the specifics of the power plants in Eagle Filters' portfolio. For the second category, since the efficiency decreases over time for a plant without the filter installed and the max efficiency increase with Eagle Filters is 3%, we assumed the average savings effect to be 1% in 2017's calculations.

For the third category, we currently do not know how much of the time is spent running at full capacity, when it would matter, so it is currently disregarded too (it would produce a negative impact, in terms of burning more fuel).

Calculation formulas

1) Estimated avoided electricity use (kWh) * average CO_2 emissions from combusting natural gas (g CO_2/kWh)

Enersize

Enersize produces carbon emissions savings through improving the efficiency of compressed air systems – notorious energy users. To estimate the savings they produce we receive an estimated savings effect and the annual electricity consumption in facilities where Enersize's service is employed. For 2016, the three big projects that Enersize had were used for the calculations (China and Finland). For 2017, it was estimated that an additional 600 MWh were saved in China, otherwise the calculations remained the same.

Calculation formulas

2) Estimated avoided electricity use (kWh) * Average emissions factor per country (g CO_2/kWh)

Nuuka Solutions

Nuuka improves (amongst other things) energy efficiency in offices and other premises where their solution is implemented. They measure different parameters, such as CO_2 concentration, heat patterns and human movement patterns, and optimise the indoor climate while minimizing energy use. We're calculating electricity use reductions based on the estimated savings by Nuuka and multiply this by a CO_2/kWh factor depending on the generation mix in the country. Nuuka estimates how much their offering is saving based on a baseline (i.e. how much energy would have been used if Nuuka's solution was not in place and compare actual numbers to this. 90% of their projects were based in Finland in 2017, with projects outside of Finland still being in early phases. Therefore, in 2017 projects outside of Finland were disregarded in the calculations but will be included in 2018.

Calculation formulas

3) Estimated avoided electricity use (kWh) * Average emissions factor per country (g CO_2/kWh)

ResQ Club

Producing food emits different GHGs: methane (CH4) through endemic fermentation in cattle; nitrous oxide (N2O) from fertilizing; and CO_2 from changed land use, food processing and transport. ResQ Club provides meals that otherwise would have been wasted, which reduces what people would otherwise eat. Reduced food waste theoretically reduces the need for the same amount of food, which in the long run reduces the need for land that is needed for food production.

If you eat at home vs. eating out, the food is usually prepared and cooked, so the CO_2 effects of this were disregarded (there is probably a slight saving if you cook in a restaurant), but a discount for the added cooking in the home was added to the savings (the assumption is that the meals that are rescued are already cooked, and therefore the energy use that would occur at home to cook a meal can be averted).

For 2017, rough estimates of what kind of meal by type (beef, pork, chicken, fish, vegetarian) were rescued were provided by ResQ Club. One meal was supposed to be an average of 320g, of which 100g would be the meat, and the rest various vegetables, tubers, etc. From here, data on GHG emissions from

producing different types of food was used to estimate how many GHG emissions would be saved by reducing food production. For 2018, the possibility of assessing more detailed data will be evaluated.

In the previous year, emissions factors produced by non-governmental agencies were used. For this year, an attempt to gather official emissions factors is being done, and more studies are considered. However, it should be mentioned that the International Panel on Climate Change (IPCC) and the European Environmental Agency (EEA) mention that the GHG intensity in food production heavily depends on the breed and the raising methods, so the margin of error should be considered high.

Calculation formulas

4) Estimated average total emissions per type of food product (g CO_2e/kg per food product category) * Estimated avoided consumption per food product category (kg per food product category)

Sofi Filtration

Sofi Filtration efficiently recycles water in industrial processes. Their unique method of purification allows the water to be reused many times in industries before discharge to the environment. This can save water compared to traditional ways of treatment. However, as this service has not been rolled out extensively yet, the impact of this was disregarded in 2016 and 2017. We intend to investigate this aspect this year.

Swap.com

Swap.com is the largest online consignment platform in the US, specializing mostly in secondhand clothing. Swap.com lets users of their platform sell items of high quality for reuse, reducing the need for new production of items (primarily clothes), which has a huge potential for reducing GHG emissions. However, this leads to the need to understand how many GHG's are emitted in order to produce certain items of clothing on average (it is not feasible to estimate for every single type of clothing or toy). Swap.com mainly sells clothing items, but also toys, video games, DVDs, and other things. These items are made from different materials, in different factories, which makes it impossible to put exact numbers on emissions for production, and it is not always clear what they replace exactly. For example, if you buy a used DVD, do you replace another DVD? The streaming of a film? Or is it just an added item for the consumer? We can't know. For clothing it is equally complex: clothing items differ in composition and type of materials, total weight, how it was produced, etc., and it is not clear if one used item entirely replaces the need to buy a new clothing item. Therefore, it becomes necessary to assume average estimates.

For clothes, many different life cycle assessments (LCAs) have been made to estimate the emissions from certain clothing items under certain circumstances (how it has been produced, how far it has been shipped, how it is washed and how many times, how it is disposed of, and so on). Several studies are assessed to generate an average number for how much CO_2 is emitted for an average kg of cotton (other materials are disregarded, as Swap.com does not have data on kg of clothing per yarn type). When we make our estimates, we exclude the use phase, as it is merely extended for the item, and not removed. It should be noted that the reports assessed are exclusively based on the European context (telling that the interest for this topic is largest in this region), whereas Swap.com is based in the US. But, since fashion is such a global business, the impact of production and distribution should be about the same for both the US and the EU.

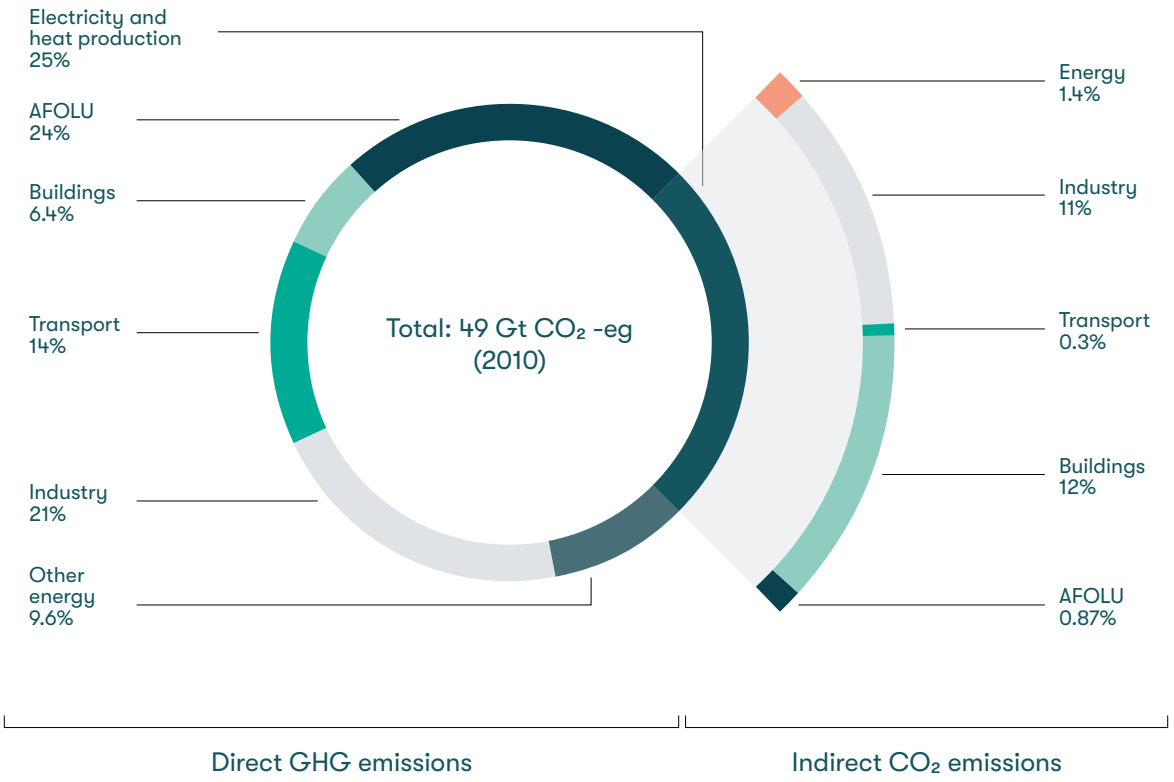
Apart from clothing, two LCAs are assessed for two other items sold by Swap.com: toys (a teddy bear containing some electronics) and a DVD containing movies.

Calculation formulas

5) Estimated average emissions from production per type of product (g CO_2e/kg per product category) * Estimated avoided consumption per product category (kg per product category) * Expected replacement rate

GHG emissions common across the Loudspring portfolio companies

To make a fair assessment of the impact our portfolio has, we must include the negative impacts due to the operations of our companies. Just because their products make a positive impact on our society, we cannot ignore that even they use energy and transportation, which leads to emissions.



Source: IPCC Fifth Assessment Report, 2014

Transportation: Cars

Using cars to transport humans and goods is extremely important to the global economy and the private lives of citizens. But as most cars are still propelled by combustion engines (using mainly diesel and gasoline as fuel) they put a heavy burden on our environment. Transport is said to be responsible for 14% of global GHG emissions, which means it is critical that we address it. Out of these 14% of global emissions, 72% comes from road transport alone.

Options to tackle GHG emissions from transportation include: switching to electric vehicles or other vehicles using carbon neutral fuels, or reducing the miles travelled, either by shifting transportation methods, or reducing the need for transport in the first place.

The simplest way to estimate carbon emissions from cars is to look at how much fuel you spent and then just multiply that amount with a factor for how much CO_2 is produced per liter of fuel combusted (which is provided by the International Energy Agency). The next best thing is an estimate (or data) of the range driven per fuel type, which could then be reverted to an estimate of how many liters were used. A third option would be an estimate of the range driven, multiplied by the average emissions factor for new cars sold in each country. In the second option, estimates of CO_2 emissions per km for each car type are provided by car manufacturers, while in the third option, figures provided by sector organizations or governments are used.

Calculation formulas

6) Amount of fuel used (L [or kWh] per fuel type) * Average emissions factor per fuel (g CO_2/L)

7) Distance driven per fuel type and car model (km) * Average emissions factor per car model (g CO_2/km)

8) Distance driven (km) * Average emissions of new car sales in the country (g CO_2/km)

(Note: when an electric vehicle is used, the emissions factor is the same as the emissions factor of electricity production in that country, unless a specific contract is used in which the emissions factor is different, ranging down to 0g CO_2/kWh in the case of green electricity.)

Transportation: Air Travel

Air travel is commonly thought of as the most rapidly increasing source of GHG emissions in our private lives and is the main culprit of private emissions among individual citizens in the wealthier countries such as Sweden and Finland, where many of our companies are active. Many organizations rely on air travel for business purposes and the transport of goods that are required to quickly reach customers or business partners. Like cars, GHG's are emitted when planes combust fuel for propulsion.

When calculating emissions for air travel, it is important to consider per capita emissions. Per capita emissions mean that when an airplane travels, the emissions from the flight are divided among the number of people on the plane: everyone has an equal responsibility for the emissions from the plane you are on.

There are differences in the emissions from air travel depending on the efficiency of the plane, the load rate (how much weight is added), the distance (take-off is more intense than cruising), and flight altitude. In order to get an exact estimate of emissions from flying, apart from obtaining this data, the number of passengers on each flight becomes necessary to know by how many heads you need to divide the estimate. As it is difficult or would require undue effort to obtain all this information about each flight, a carbon emissions calculator provided by the International Civil Aviation Organization (ICAO) is used to generate estimates for flight travel emissions. The portfolio companies supply information of how many times they have travelled (and between which airports throughout the year), and we use this information to produce an estimate of flight emissions.

Energy Use: Electricity

Almost everything we do today, from using our computers and phones, to running a machine in a factory or (soon, hopefully) driving a car, is dependent on the use of electricity. Suffice it to say, the gears of the world would not turn without a steady and reliable supply of electricity.

Producing electricity requires the transformation of an energy source into electrical power. Wind and hydropower use the kinetic energy in the wind and running water to turn a generator; biomass, coal, oil and (bio)gas combustion release the chemical energy stored in the bonds of the material and turn it into heat (which produces steam, that in turn rotates a generator); solar panels transform energy

from the sun into electricity; nuclear power creates steam to turn a generator using the energy that is released when atoms are split.

All types of electricity generation have different carbon footprints depending on the efficiency of operation and which fuel is used (even solar and wind are not carbon neutral, as the components needed to produce electricity require raw materials and must be transported and built). Depending on the electricity generation mix (i.e. the mix of fuels used to generate electricity in a specific country or region), the amount of GHG emissions per kWh is different in different areas. Therefore, to calculate carbon emissions from electricity use, we multiply how much electricity our companies used by the carbon intensity of that grid. However, companies can also enter green electricity contracts, in which case we would multiply it by the specific emissions factors in the contracts.

While actual meter readings from the companies would be the preferred approach, currently the Loudspring portfolio companies provide estimates of how much electricity they have used during the year.

Similarly, using methods specific to each company, we produce estimates of how much electricity is saved through the products and services of our companies. This estimate is then multiplied with the relevant factors to produce an estimate of the positive impact, i.e. how many GHG emissions are avoided.

Calculation formulas

9) Amount of electricity used (kWh) [meter readings *or* estimates] * Average emissions factor per country (g CO_2/kWh)

Energy Use: Heat

Providing heat is one of the most common uses of energy, either for warming ourselves, homes or offices, or in the production of goods. Heat is produced in a multitude of ways, of which some are: burning fossil fuels or biofuels and using the heat directly or sending it as steam or hot water; as a by-product from electricity generation; as a by-product from various industrial processes or waste treatment; or taken from the ground or hot water near volcanic activity (where this is feasible). Depending on how this is done GHG emissions factors can vary. Due to the local nature of this energy form, it is easier to get specific and separate estimates for every locality. But since it requires a lot of work to determine exactly which heat source is used and in which quantity (and the carbon intensity of it), national averages are used in the impact calculations of the Loudspring portfolio. Note that electricity can be used to produce heat, and in that case the GHG emissions are counted under electricity use.

Calculation formulas

10) Amount of heat used (kWh or BTU or MJ) [meter readings *or* estimates] * Average emissions factor per country (g CO_2/kWh or BTU or MJ)

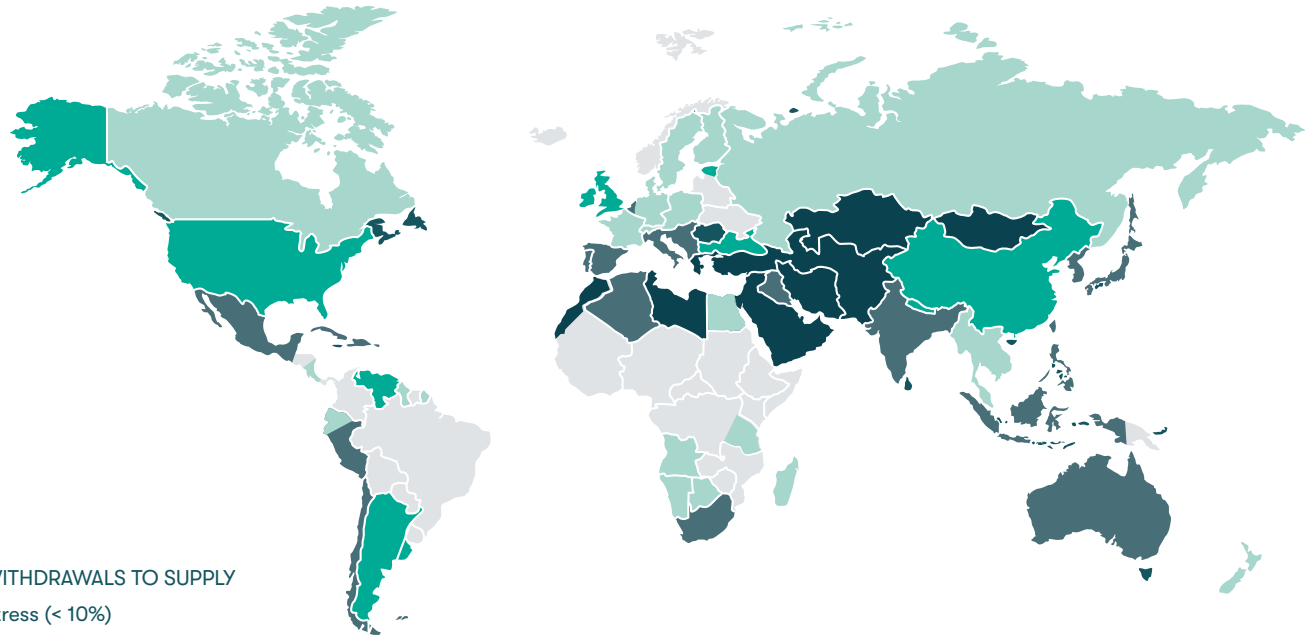
Water Consumption and Loudspring – impact on water resources from our companies and operations

The second large impact category that we look at in the Loudspring portfolio is that of water usage. Many places in the world face high levels of water stress and this is projected to intensify as the impacts of climate change make themselves felt. To put things into context, below is a map of water stress levels in the world in 2013.

Water is not only used for human consumption, but also for the production of food, goods and power, for hygiene and cleaning, and many other things (agriculture uses plenty of water). Therefore, if the intensity of water use can be brought down, it can be seen as a good insurance policy against future water stress.

WATER STRESS BY COUNTRY

This map shows the average exposure of water users in each country to baseline water stress, the ratio of total withdrawals to total renewable supply in a given area. A higher percentage means more water users are competing for limited water supplies.



RATIO OF WITHDRAWALS TO SUPPLY

- Low stress (< 10%)
- Low to medium stress (10–20%)
- Medium to high stress (20–40%)
- High stress (40–80%)
- Extremely high stress (> 80%)

Source: WRI Aqueduct, Gassert et al., 2013

Water consumption common across the portfolio companies

There is a major source of water consumption that most of our portfolio companies contribute towards reducing: by reducing the need for electricity, we reduce the amount of cooling water needed for power plants, and we reduce the need for water use in fuel extraction. Power plants using steam or gas to rotate a generator will have to be cooled down in order to avoid overheating, usually using tremendous amounts of water. Water is also used during the production of fuel, when you prepare coal for combustion in the mining process. On the flip side, some generation sources, like wind and solar power, do not consume water during operation. The methodology here involves using industry averages for coolant water needed per kWh per generation type, thus calculating a water footprint per kWh of the state grids that are relevant.

One of the difficulties with this approach is that we currently lack information on what type of cooling is used in the countries we are assessing. Every power plant will have a different water cooling profile, as the temperature in the water around it and the engineering tweaks and size of the power plant will be different. Therefore, averages will necessarily be used, while the numbers in specific cases vary wildly, which should be considered a limitation.

Calculation formulas

11) Amount of electricity used (kWh) [meter readings *or* estimates] * Average water use per fuel type (L water/kWh per fuel type) * Ratio of each fuel generation type in every country (%)

Eagle Filters

As Eagle Filters reduces the need for natural gas, they reduce the need for that production, which in turn reduces water consumption. In previous years, we have not considered whether or not Eagle Filters' technology requires less water to be used by plant managers due to the reduced need for online washing of the compressors. We will investigate this saving potential in the 2018 impact results.

Enersize

We have not identified any other water reduction impact from Enersize than that of reduced electricity production.

Nuuka

We have not identified any other water reduction impact from Nuuka than that of reduced electricity production.

ResQ Club

The production of food requires much water, differing depending on which type of food is produced. Water is needed to grow plants as food for humans, but also for the animals we breed. Water is also needed in the processing and cleaning of food products. It is said that one liter of milk requires 1020 liters of water to produce, so the ramifications are huge. Reducing food waste, and in the long run food production has the potential for reducing water consumption greatly.

Calculation formulas

12) Estimated totale average water use per type of food product (L water/kg per food product category) * Estimated avoided consumption per food product category (kg per food product category)

Sofi Filtration

Sofi Filtration cleans water. Where their solution is introduced in places where there was none before, water is saved. Also, their industrial water cleaning process reduces the need for water intake by industry.

Swap.com

The production of the goods that Swap.com sells through its platform requires not only energy, but also water to produce and ship. By reducing the need for new production, water is saved. For water, only cotton is assessed, as water footprint estimations for DVDs and toys are not readily available, but here too the ramifications are potentially huge. It is said that producing one kilogram of cotton requires about 10 000 liters of water in total.

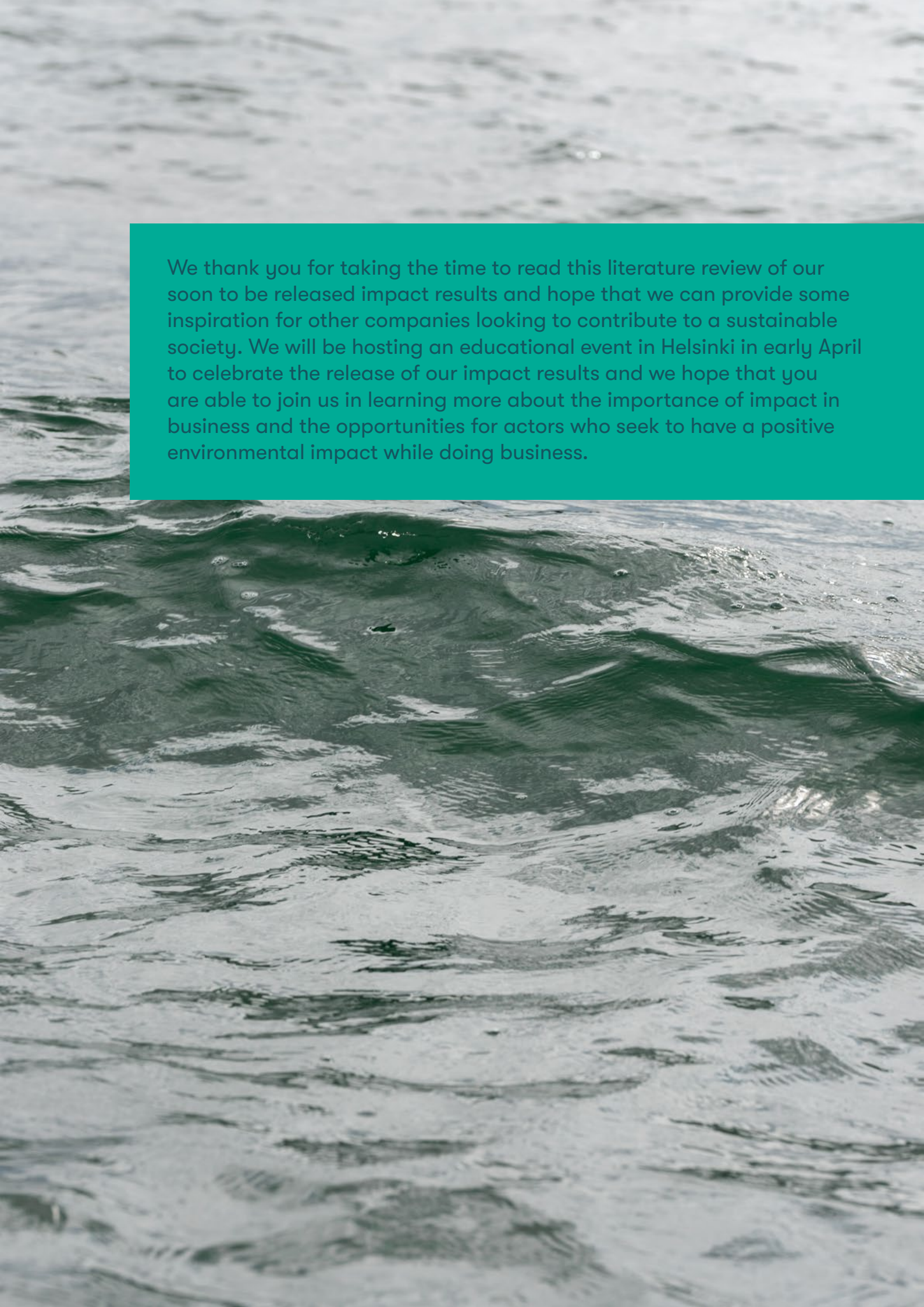
Calculation formulas

13) Estimated average water use (L water/kg of fully fabricated cotton) * Estimated avoided consumption (kg of clothing) * Expected replacement rate

Concluding Remarks

The third year of impact reporting from Loudspring sees us provide more transparency than ever regarding our sources, and also highlights our ongoing commitment to continuous improvement in how we measure our impact. We are a company group that is focused on saving natural resources and communicating our impact is a verification of this mission. The sectors where Loudspring companies operate (energy, real estate, fashion, food and manufacturing) are sectors in a state of transition as climate change continues to pose a threat to our future and demand for sustainable solutions increases in the mainstream of the global economy.

The addition of how our portfolio companies are aligned with the Sustainable Development Goals will hopefully enable a better understanding of our collective performance within a conceptual framework common to all sectors. By including biodiversity considerations, we here at Loudspring wish to highlight and elevate this growing concern. The reality is that addressing climate change is one thing, but there are other grave challenges we must face at the same time. Biodiversity and water stress are such challenges.



We thank you for taking the time to read this literature review of our soon to be released impact results and hope that we can provide some inspiration for other companies looking to contribute to a sustainable society. We will be hosting an educational event in Helsinki in early April to celebrate the release of our impact results and we hope that you are able to join us in learning more about the importance of impact in business and the opportunities for actors who seek to have a positive environmental impact while doing business.

Annex – a brief overview of literature informing the impact calculations

The literature used is separated into those which are used commonly across all companies and those which are used only for a specific company. Below are short descriptions of the documents and websites that are used in the calculations.

GHG emissions common across the Loudspring portfolio companies

Transportation: Cars

"THE AUTOMOBILE INDUSTRY POCKET GUIDE 2018-2019"
For Europe, the European Automobile Manufacturers Association (ACEA) provides a guidebook with data covering a range of topics each year. In this guidebook, an average number is provided for the emissions intensity of the newly sold cars during the year before, per country (this number in turn is supplied by the European Environment Agency). Due to the official recognition of this number, it is deemed to be of high reliability.

"GREENHOUSE GAS EMISSIONS FROM A TYPICAL PASSENGER VEHICLE", 2018, EPA
For the US, the EPA has produced figures for typical passenger vehicles anno 2018, which can be deemed to be of high reliability.

Transportation: Air travel

"ICAO CARBON EMISSIONS CALCULATOR"
(www.icao.int/environmental-protection/CarbonOffset/Pages/default.aspx)
ICAO is an international body overseeing international flight and is responsible for international flight emissions according to the Paris Agreement. Given this endorsement by policy-makers, we deem the reliability of their estimations to be adequate. ICAO plans to use a system called CORSIA (an offsetting and reduction scheme) to reduce emissions over time. The tool itself is very easy to use and we recommend you take a look to try it out for yourself or your business. It should be noted that the calculator uses average passenger load factors for each "route group" and might therefore be under- or overestimating emissions per capita slightly.

Energy use: Electricity

"OVERVIEW OF ELECTRICITY PRODUCTION AND USE IN EUROPE"

(www.eea.europa.eu/data-and-maps/indicators/overview-of-the-electricity-production-2/assessment-4)

For the European countries, the European Environment Agency publishes yearly estimations of the carbon intensity of the member states' electricity grids, based on numbers reported by the national agencies, so they can be deemed credible. The same numbers are used for reporting to the UNFCCC. It should be noted that there is a delay of a couple of years, so in effect, for 2018 we will be using 2016's figures.

"2013-2017 CO2, SO2 AND NOX EMISSION RATES", PJM, 2018

As a special case for Swap.com, the emission rate for a specific area of the US had to be obtained, since the numbers produced by the IEA constitute an average for the entirety of US soil. The reliability is high, as these numbers are produced by the operator itself.

"CO2 EMISSIONS FROM FUEL COMBUSTION 2018", IEA, 2018

The International Energy Agency (IEA) also produces numbers on the CO2 emissions throughout the world from the combustion of different fuels. These numbers vary slightly from the source above. The IEA does not receive data on carbon intensity from electricity generation (g CO2/kWh) from its member countries, but rather produces estimates based on more general data (how many kWh were produced of each fuel, and how much fuel was burnt of each type of fuel). This produces a so-called 'Tier 1 Approach', which means they only count the fuel combusted within the country, excluding the effects of any import/export of electricity, different efficiencies of generation technologies, and only use an average for the caloric value of fuels. Individual countries often use more sophisticated methodologies to get a more accurate estimate, which is why we prefer to use factors reported directly by countries, rather than those produced by the IEA. Therefore, when numbers are not available in the source above, this source is used (for example in the case of China).

Note: If a company has a special contract for electricity (for example a green electricity plan) which states a different emissions factor than the national average, this is used instead.

Energy use: Heat

"UTSLÄPP AV VÄXTHUSGASER FRÅN EL – OCH FJÄRRVÄRMEPRODUKTION [GHG EMISSIONS FROM POWER PRODUCTION AND CENTRAL HEATING]", 2018, NATURVÅRDSVERKET

(www.naturvardsverket.se/Sa-mar-miljon/Statistik-A-O/Vaxthusgaser-utslapp-fran-el-och-fjarrvarme/)

The Swedish Nature Protection Agency produces data on electricity and central heating production in Sweden – data which is used to report to the UNFCCC as well. The data describes the total emissions from central heating, the fuel mix, and how many TWh was produced. This data is deemed to be of high quality.

"FINNISH ENERGY: CARBON EMISSIONS FROM DISTRICT HEAT PRODUCTION AT A HISTORIC LOW – 2017 RECORD YEAR ALSO IN RECOVERED HEAT", 2017, FINNISH ENERGI

(energia.fi/en/news_and_publications/publications/finnish_energy_carbon_emissions_from_district_heat_production_at_a_historic_low_2017_record_year_also_in_recovered_heat.html)

Finnish Energy is the lobby organization representing the Finnish power industry, including central heating providers. The statistics office of Finland does not

provide any breakout figures for the carbon emissions from district heating. However, Finnish Energy is a commonly cited source regarding news about power production and is certified by WWF, so the reliability of their data can be said to be high.

Note: In the US (where Swap.com) is located, central heating is not as common as in the Nordic countries, and the emissions from heating heavily depends on the producer. For Swap.com, an assessment will be made based upon the contract by which they are procuring heat.

Eagle Filters

"CO2 EMISSIONS FROM FUEL COMBUSTION 2018", IEA, 2018
As part of the methodology for estimating the CO2 emissions from fuel combustion, the IEA provides standard emissions factors for various fuels. One of those is natural gas, and that number is used in the case of Eagle Filters to estimate how much CO2 emissions are avoided from not burning natural gas, after estimating how much fuel is saved due to their filters. The reliability of this number is thought to be extremely high.

ResQ Club

"KONSUM UND ERNÄHRUNG", 2016, GERMAN DEPARTMENT OF ENVIRONMENT
(www.bmu.de/themen/wirtschaft-produkte-ressourcen-tourismus/produkte-und-konsum/produktbereiche/konsum-und-ernaehrung/)

In 2016, the German Department of Environment produced estimates for how many GHGs are emitted from various popular food items as part of the national program for sustainable consumption.

"HOW IS THE CARBON FOOTPRINT CALCULATED IN THE ILMASTODIEETTI TOOL?", 2017, SALO ET AL
The Finnish Environment Institute is a research institute and government agency under the Ministry of the Environment, located in Helsinki, Finland, and they have produced a carbon footprint calculator that citizens can use and gain insights into how to reduce one's footprint. This tool is called the Ilmastodieetti, and in this document, the various factors used to calculate the citizens impacts are described, including those of alimentary items. The tool itself can be found on the following link: www.syke.fi/en-US/Research__Development/Consumption_and_production/Calculators/Carbon_footprint_calculators

"FÖRDJUPAD ANALYS AV SVENSK KLIMATSTATISTIK 2018", 2018, NATURVÅRDSVERKET
A Swedish publication describing the climate-related emissions of 2018, counted as official statistics. Agriculture-related emissions are also described, with number produced by SLU (the Swedish Agricultural University). The numbers produced by SLU will soon be available for public view.

"EVALUATION OF THE LIVESTOCK SECTOR'S CONTRIBUTION TO THE EU GREENHOUSE GAS EMISSIONS (GGELS) – FINAL REPORT", 2010, LEIP ET AL
While not an official stance of the EC, this EU-funded project performed by the EC Joint Research Centre (EU JRC) evaluated the emissions of livestock in all European countries. While the publication is older than the other ones, it does contain emissions factors comparative for all the European countries, produced with the same methodology.

"SUPPLEMENTARY INFORMATION S1 – DETAILED RESULTS OF THE CAPRI N-LCA AND S2 – QUANTIFICATION OF THE MAIN N BUDGET FLOWS IN THE EU25 AGRICULTURE SECTOR – IMPACTS OF EUROPEAN LIVESTOCK PRODUCTION: NITROGEN, SULPHUR, PHOSPHORUS AND GREENHOUSE GAS EMISSIONS, LAND-USE, WATER EUTROPHICATION AND BIODIVERSITY", 2015, LEIP ET AL
The researchers led my Mr. Leip at the EU JRC made a comprehensive LCA in an attempt to quantify how much agriculture in Europe, by product group, affects the EU. They also looked specifically at how Nitrogen flows between the EU and different parts of the world. In the LCA, they assessed the impact agriculture has on global warming, air quality, soil acidification, terrestrial biodiversity and water quality.

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"THE CARBON FOOTPRINT OF TEXTILES", 2010, NORBERT JUNGMICHEL
Norbert Jungmichel of Systain Consulting, a German CSR consulting firm, produced Life Cycle Analyses (LCAs) for three different types of clothing for the German Ministry for Economic Affairs and Energy. The LCAs cover cultivation of fibers, production, sales and distribution, use, and disposal of the products. A cotton t-shirt, a cotton sweat-jacket with a hood, and an acrylic jacket for kids were assessed. The author admits to large uncertainties, which is natural as several assumptions are made as to how consumers use the clothes, and under what conditions the clothes are made. This is true for all studies of this kind.

"INTERNATIONAL CARBON FLOWS", 2011, CARBON TRUST
Carbon Trust is a UK-based for-mission company that provides consultation services for governments and organizations that look to lower their impact. This report is part of a series that put different sectors in a global perspective regarding carbon flows. While the report mainly focuses on international flows, it does provide a use case for cotton T-shirts, and what the carbon emissions embedded in this would be. The report mainly points toward the importance of improving the longevity of clothing.

"MAPPING CLOTHING IMPACTS IN EUROPE: THE ENVIRONMENTAL COST", 2017, EUROPEAN CLOTHING ACTION PLAN
While funded by the LIFE project in the EU, this paper is not the official stance or data of the EU. The project is conducted by five partners: the Danish Fashion Institute, the London Waste and Recycling Board, MADE-BY, Rijkswaterstaat, and WRAP. The report mainly looks at high-level impacts (total amount of carbon emitted on a European level), but also provides how many kg of clothing is used in the EU, making it possible to produce factors for clothing in general.

"ENVIRONMENTAL ASSESSMENT OF SWEDISH FASHION CONSUMPTION. FIVE GARMENTS – SUSTAINABLE FUTURES", 2015, ROOS, SANDIN, ZAMANI, PETERS
Funded by Mistra, a foundation for sustainability-related research based in Sweden, this report provides an LCA of five different clothing items: a cotton t-shirt, a pair of jeans, a dress, a jacket, and a hospital uniform. It should be noted that the functional unit is one use, which means that the impacts of production and distribution are distributed across the uses, and the results have to be multiplied by the number of uses assumed in the study, in order to get the lifetime emissions.

"THE LIFE CYCLE OF A JEAN", 2015, LEVI STRAUSS CO
Levi Strauss has conducted LCA analyses of their jeans since 2007, pioneering the effort in the industry for more sustainable clothing. While this LCA is primarily

led by a private company, and therefore could be biased, they do follow the ISO 14040, and the results indicate a higher CO2 factor than the other studies do.

"THE ENERGY AND GREENHOUSE-GAS IMPLICATIONS OF INTERNET VIDEO STREAMING IN THE UNITED STATES", 2014, SHEHABI ET AL
In this study, the GHG emissions streaming movies vs rental DVDs vs consumer-bought DVDs are compared. For the purpose of Loudspring's impact report, the consumer-bought estimations will be consulted to provide an estimate for film items.

"LCA AND ECO-DESIGN IN THE TOY INDUSTRY: CASE STUDY OF A TEDDY BEAR INCORPORATING ELECTRIC AND ELECTRONIC COMPONENTS", 2009, MUNOZ ET AL
Not many studies can be found that evaluate the impact of toys, and the impact difference between toys should be considered great. However, a teddy bear incorporating electronics could be said to cover many of the materials used in many toys (except containing less plastics than most), and is as good a representative as anything else.

Water consumption common across the portfolio companies

"OPERATIONAL WATER CONSUMPTION AND WITHDRAWAL FACTORS FOR ELECTRICITY GENERATING TECHNOLOGIES: A REVIEW OF EXISTING LITERATURE", 2012, MACKNIK ET AL
From the abstract: "This report provides estimates of operational water withdrawal and water consumption factors for electricity generating technologies in the United States. Estimates of water factors were collected from published primary literature and were not modified except for unit conversions." As this study is a literature review, the figures here are reliable: they contain different estimates from different studies, which show the range the numbers can have. However, the study only covers operation, while reduced power use will also reduce how much fuel has to be produced.

"THE CONSUMPTIVE WATER FOOTPRINT OF ELECTRICITY AND HEAT: A GLOBAL ASSESSMENT", 2015, MEKONNEN ET AL
From abstract: "This study assesses the consumptive water footprint (WF) of electricity and heat generation per world region in the three main stages of the production chain, i.e. fuel supply, construction and operation." This study covers the three main parts of power production, which makes it more comprehensive than the study above, and the study uses many different studies as the foundation of its research. However, the data provided in the paper does not give numbers per country.

"WATER REQUIREMENTS FOR EXISTING AND EMERGING THERMOELECTRIC PLANT TECHNOLOGIES", 2009, US DOE (NATIONAL ENERGY TECHNOLOGY LABORATORY)
The report at hand was sponsored by the DOE, but it does not take responsibility for the accuracy of the numbers. The report looks at natural gas, coal, and nuclear power plants, and the data is based of two reports done in 2002 and 2007 by NETL.

ResQ Club

"THE WATER FOOTPRINT OF FOOD", 2008, HOEKSTRA
The report introduces the water footprint for several food items, including the most common types of meat. While the methodology for arriving at these numbers is not clearly written, and studies are not referred to, the report is penned by Hoekstra, a regular writer at the Water Footprint Network who has produced most of the numbers used on water consumption, so they will be used for comparison.

"A GLOBAL ASSESSMENT OF THE WATER FOOTPRINT OF FARM ANIMAL PRODUCTS", 2012, MEKONNEN AND HOEKSTRA
Another publication by the same team at the Water Footprint Network, this document deals with the water footprint of different animal protein products specifically.

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"ENVIRONMENTAL ASSESSMENT OF SWEDISH FASHION CONSUMPTION. FIVE GARMENTS – SUSTAINABLE FUTURES", 2015, ROOS, SANDIN, ZAMANI, PETERS
Mentioned in the GHG section as well, this LCA study also provides water consumption estimates.

"THE GREEN, BLUE AND GREY WATER FOOTPRINT OF CROPS AND DERIVED CROP PRODUCTS", 2011, MEKONNEN AND HOEKSTRA
Mekonnen and Hoekstra writing for the Water Footprint Network are responsible for most studies quoted in the realm of estimating water footprints. Due to the many assumptions made the reliability is not the highest, which they are the first to admit.

Loudspring