

Triodos Bank

renewable energy

deep dive

methodology

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Triodos Bank Renewable Energy Deep Dive 2024 Methodology

1 Introduction

Background and objective

Triodos Bank's mission is to make money work for positive social, environmental and cultural change. To that end we believe profit doesn't need to be at the expense of the world's most pressing environmental problems. That's why we only finance sustainable organisations and enterprises transitioning to sustainable approaches, from organic food and farming businesses, to pioneering renewable energy enterprises, recycling companies and nature conservation projects.

Triodos Bank wants to finance the urgent need for a transition to a sustainable economy of the future, helping to create the conditions for people to live a better quality of life. As a bank in a new, more sustainable economy, this means helping to develop a society that lives within its environmental means; beneath a safe environmental ceiling and above a fair social floor. For us, that doesn't just mean avoiding financing companies that harm the environment or have a negative impact on people's lives. It means only and exclusively financing projects, people and business that have a positive impact on people or the planet.

In order to ensure that we are having the desired impact and in order for us to credibly report on our impact, we aim to measure and report on the impact we have on our stakeholders. To do this we have leveraged the Impact-Weighted Accounts Framework (IWAF) and True Price¹ methodology to start to quantify, measure, value and report our impact. These are frameworks that enable an organisation to quantify their impact and allow for transparent reporting and the integration of impact into decision-making.

Measuring and valuing our impact allows us to credibly report on the value we create for society.

In 2023 we have taken our first steps towards quantified and valued impact measurement and reporting by including the Renewable Energy Deep Dive in our Annual Report. One of the biggest challenges of the 21st century is our overall energy consumption and dependence on fossil fuels. Triodos Bank has always been an advocate for a fossil fuel-free economy and contributes to the energy transition through financing and advocacy. In this deep dive we have measured the impact of our financing of wind and solar electricity generating projects.

The energy transition does not come without significant risks, as new technologies carry an environmental footprint as well as potential social impact in the value chain. In the new situation environmental and social impacts are to be minimised. A credible assessment of a just transition ideally includes a view on both the environmental and social externalities. Our impact assessment includes a quantitative analysis of the environmental impacts of wind and solar energy- addressing both the impact in an absolute sense and the impact avoided when compared to other energy sources. The value chains of renewable energy, carry significant risk of social impacts, through potential human rights violations. In order to contribute to transparent and unbiased reporting, we have also quantified this potential social impact risk.

Approach

In order to measure and value our impact we have leveraged existing standards such as the IWAF (Impact-Weighted Accounts Framework) and the valuation approach described by True Price. The IWAF is an initiative of the Impact Economy Foundation developed by from Harvard Business School, Singapore Management University, Erasmus School of Management and Impact Institute.

The process of measuring and valuing our impact with the Renewable energy deep dive has followed many of the steps laid out in the IWAF. In particular:

¹ <https://www.truepricefoundation.org/>

Scope

In this step the boundaries of the assessment are defined. This includes identifying impacts to be measured and the value chain steps that are considered. For instance, in this step it would be agreed effects such as contribution to climate change and air pollution are important to consider. More information on the scoping choices made during the Renewable Energy pilot can be found in the Scope section.

Measure impact

Impact is measured by establishing calculation models, aligned with the scope, and populating these models with a combination of bank and secondary data in order to calculate non-valued impact. For instance, Triodos Bank data on kilowatt hours (kWhs) of renewable electricity produced through their financing is combined with impact data in order to estimate tons of CO₂ emitted from the production of that electricity. More information on the data sources used can be found in the Data Sources chapter.

Value impact

All impacts are converted into a common monetary unit by combining the non-valued impact with a monetisation factor. For instance, the tons of CO₂ is converted to Euros by using an abatement cost. This ensures that all impacts can be compared and combined. Monetisation factors are taken from the True Price methodology. Monetisation factors aim to reflect the normative desirability of an impact. For impacts which entail a breach of rights (such as the negative impacts expressed in the Renewable energy deep dive) the monetisation factor estimates of the cost to remediate the impact.

Attribute and aggregate impact

Finally impacts are attributed in line with the attribution approach as described in the Triodos Bank Greenhouse Gas Accounting methodology.

2 Definitions

IWAF

Impact-weighted accounts framework¹ is a structured method with guiding principles allowing organisations to develop their own Impact-Weighted Accounts in order to steer on impact.

Value chain

The value chain of an organisation is the combined upstream, downstream and own operations activities used to produce all products and services to which the organisation contributes. Upstream operations are the activities of suppliers, including purchased energy. Own operations are all the activities over which the business has direct control. Downstream operations are the activities relating to further processing, purchase, use or disposal of any products or services produced by the organisation.

Loans

Loans are defined as all loans and advances to customers within Triodos Bank.

Investments

Investments are defined as all types of financial products managed by Triodos Investment Management, Triodos Regenerative Money Centre and Triodos Foundations. This includes equity, loans and bonds, but excludes liquidities and other assets held in the funds.

ThImpact

Our impact can be understood as the difference we make in the world by having an effect on the things valued in society².

Absolute Impact

Absolute impact is the impact generated by Triodos Bank (and our lending clients and investments) compared to a no-alternative scenario. For example, the absolute impact of wind energy includes outcomes such as the CO₂ released during the production of the steel blades. Environmental impact is negative in an absolute sense for most economic activities.

Reference scenario

The reference scenario is the counterfactual scenario in which alternative activities are expected to occur without the activities of Triodos Bank's clients and investments.

For example, in the renewable energy deep dive, it is assumed that without the financed kWhs of electricity produced by Triodos Bank's clients and investments, that this demand for electricity would be met by other common electricity sources. The local electricity grid mix is used as the basis for this alternative.

¹ <https://impac economyfoundation.org/publications>

² Impact Institute (2022). Impact measurement and valuation for banks. The Integrated Profit & Loss methodology to measure, value and aggregate impact of banks: what, why and how. This definition comes from the Impact-Weighted Accounts Framework's more technical interpretation "A difference in an outcome that affects the welfare of an organisation's stakeholder with respect to a reference scenario during a given timeframe."

Avoided Impact

Avoided impact measures the difference between the absolute impact and the impact that would have been created in the alternative, reference scenario.

Impact valuation (monetisation)

Impact valuation is an assessment of the normative desirability of an impact from the perspective of a stakeholder in a common quantitative unit that reflects that impact's value to that stakeholder. The common unit is often monetary.

Remediation costs

Remediation costs are the quantitative estimates of the costs that should be incurred to remediate the harm that is caused by unsustainable impacts. Remediation costs include restoration costs, compensation costs, prevention of re-occurrence costs and retribution costs³.

³ Definition from the Conceptual Framework for Impact Weighted Accounts (IEF, 2022). All monetisation factors and remediation costs used within the renewable energy deep dive are taken from Monetisation Factors for True Pricing (True Price Foundation, 2023).

3 Guiding principles

Impact measurement is performed in alignment with several guiding principles. These are adapted from the Impact Weighted Accounts Framework¹.

Materiality based

Impact is considered material if it satisfies one of the following criteria (double materiality): (i) the impact materially affects the future earning potential of the company; (ii) the impact materially affects the welfare of one of more (external) stakeholder groups. This principle aims to ensure that the most significant impacts (in terms of size, importance to stakeholder groups and contribution to the overall impact of the bank) are included.

Multi-dimensional

We aim to assess multiple impacts across different capitals and stakeholders. The goal is to adequately reflect different forms of value creation for different stakeholders. In the renewable energy deep dive we have focused on understanding our environmental and potential social impact.

Value chain responsibility

We aim to understand and measure the impact of our value chains, this includes the impact of our clients and investments and their value chains.

Comparability

We aim to report in a commensurable unit, for example a monetary unit. Valuation can help to convert all impacts to the same unit in order to reflect their value to stakeholders. The method used to value impact should be both robust and transparent.

Balanced reporting

Impact reporting should portray a balanced view of the impact created which means that both positive and negative impacts are incorporated. In addition, negative impacts that reflect an infringement of rights are not netted out against positive impacts. This ensures that the violation of one stakeholders rights are not justified by an increase in the well-being of another.

Consistency

We aim to be consistent in compiling and disclosing the measurement of impacts with respect to the units, scale, assumptions, choices, estimates and calculation approach and follow best practice of calculation methods where that has already been established. This allows the users of the report to compare the report over time.

Best available approach

We aim to make an ongoing effort to seek and aim for the best approach in assessing the scope of the impact statements, measuring and valuing impact, and improving the reliability of impact statements. Such efforts can target “incremental improvement” that occurs over time, or “breakthrough improvement” that occurs all at once.

¹ (IEF, 2022). These principles are also adopted and described in guidance provided by Banking for Impact (2022).

Neutrality

We aim to prevent bias in any material direction, in particular bias favouring Triodos Bank. The impact assessment aims to provide impartial and factual information.

Conservative

Where a neutral approach is not feasible, we use a conservative approach that aims to prevent bias towards ourself. In other words, when two otherwise equally good choices are available, the approach that has the least favourable impact must be chosen.

Verifiable

We aim to compile impact measurements in a verifiable manner, such that a third-party assurance provider can verify the (i) calculations, (ii) input data and (iii) main assumptions.

Transparency

We work to demonstrate transparency about how the impact measurements were compiled by disclosing sufficiently the sources of data, uncertainty, assumptions, limitations and omissions.

4 Scope of the Renewable Energy Deep Dive

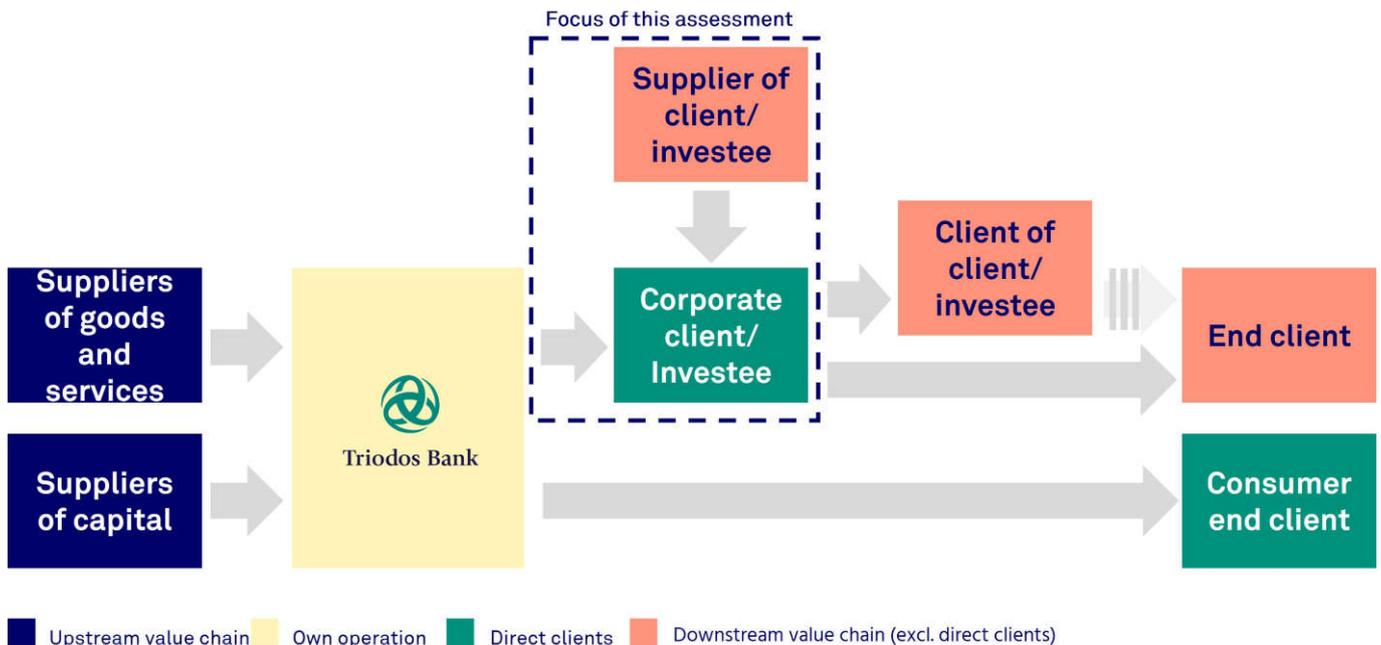
Scope of the current assessment

Time scope: The assessment is done once a year based on the 31 December 2023 snapshot of the portfolio. The impact represents the impact generated over 2023 based on the amount of electricity generated in the year.

Activities scope: The assessment is done on wind- and solar electricity generating projects that Triodos Bank or Triodos Investment Management has invested in. Other renewable energy investments such as hydropower and battery storage are currently not in scope.

Capital scope: Impact can be measured across various capitals representing different dimensions across which value can be created or destroyed. The assessment focused on impacts relating to Natural Capital and Social Capital.

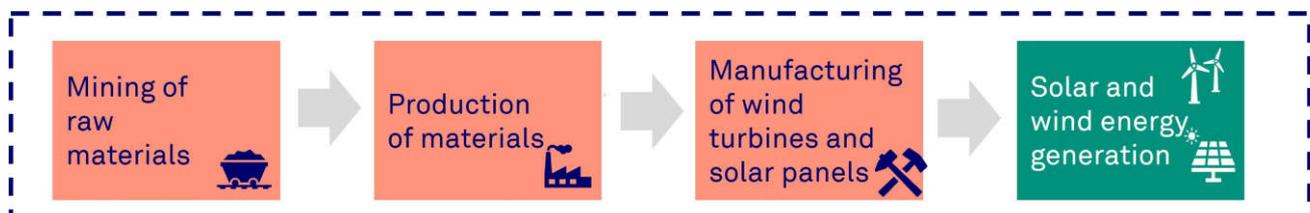
Value chain scope: Like all other organisations, Triodos Bank creates value together with its value chains. Triodos Bank's value chain can be depicted in the figure below.



This assessment has focused on the impact created by our business lending clients and investees, as well as their upstream (supplier) value chains.

The renewable energy deep dive

Corporate clients/ investee value chain scope:



The *environmental impact model* considers the complete upstream value chain, meaning from the mining of raw materials up to and including the installation, as well as the use of the wind turbine or solar panel. The downstream value chain, consisting of deconstruction, disposal and recycling is not in scope.

For the *social impact assessment* only the upstream value chain is in scope because this is where the majority of the negative social impact is potentially realised. The transportation, use phase, and waste stream are out of scope. The social impact assessment focuses on the impact created by four key materials: copper, aluminium, steel, and silicon. It addresses the impact of the mining and manufacturing steps for each material. In addition, the production step to assemble wind turbines and solar panels is in scope.

Impact scope

Environmental impact	Definition
Air pollution	Impacts caused by emissions to air other than climate change, including acidification, photochemical oxidant formation, particulate matter formation, nitrogen deposition from emissions to air, ozone layer depletion, terrestrial and aquatic ecotoxicity and human toxicity from toxic emissions to air.
Contribution to climate change	Contribution to climate change from emissions of greenhouse gases (carbon dioxide, methane, nitrous oxide and others).
Water pollution	Emissions to water contributing to ecotoxicity and human toxicity, as well as eutrophication of marine- and freshwater.
Water use	Concerns the use of blue water in such a way that the water is evaporated, incorporated into products, transferred to other watersheds or disposed into the sea, in areas where water is scarce (Falkenmark & Rockström, 2004).
Land use	The decreased availability of land for purposes other than the current one, through land occupancy. Land occupation by agriculture displaces habitats and ecosystems and therefore leads to biodiversity loss and loss of ecosystem services (Alkemade et al., 2009; de Groot et al., 2012; Milà i Canals et al., 2007).
Material use	The consequence of the primary extraction of scarce, non-renewable resources besides fossil fuels, such as minerals. These bear external societal costs because the stock of these materials is reduced for present and future generations.

Social impact	Description
Child labour	Child labour is work that deprives children of their childhood, their potential and their dignity, and is harmful to physical and mental development and/or interferes with their schooling.
Forced labour	Forced labour concerns all physical and psychological damage from work or service that is claimed under threat of punishment and for which the person concerned is not autonomously participating.
Gender discrimination	Gender discrimination concerns the effect of discriminating, nullifying or impairing equality of opportunity or treatment based on gender and/or sex. Gender discrimination in this assessment focuses on the impact on the gender pay gap effect.
Underpayment in the value chain	Underpayment occurs when the actual wages of employees over standard working hours, including financial wages and some forms of in-kind compensation, lie below the legal minimum wage or a decent living wage.
Negative effects of employee health & safety	Negative effects on workers' health and safety at work, specifically the extent to which working in the value chain negatively affects the safety and overall health status of the workers.

Other potentially relevant impacts, such as soil pollution and impacts related to freedom of association for workers in the value chain, are left out of scope due limited data availability.

5 Methodological approach

Understanding the value chain

As described in the scope section, the assessment focused on the impact created by Triodos Bank's wind and solar clients and investees and their upstream value chains. Due to data availability, the modeling approach used for environmental and social impact differs.

Environmental impact

Life Cycle Assessment data (LCA) is used to assess the impact of the own operations and upstream value chain. LCA data provides insight into, for example, the environmental impact of the generation of a kWh of solar electricity production and includes the upstream value chain steps. LCA data was used to understand the absolute impact of wind and solar electricity generation as well as to understand the impact generated by other electricity sources used in the reference scenario.

Social impact

Social impact was only estimated for the upstream value chains of wind and solar. A slightly different approach was taken due to the lack of data providing quantitative insight into the human rights violations across the value chain.

The production of wind turbines and solar panels consists of a variety of different materials, each with different mining and manufacturing value chains. Four metals/ metalloids were selected for the analysis: aluminum, copper, steel and silicon (relevant only for solar panels) based on their materiality in terms of the abundance of the material in wind turbines and solar panels or their association with human rights violations. For each material, the analysis addressed the mining and manufacturing steps of the value chain. For each material and value chain step, two countries were identified that contribute significantly to the mining or manufacturing of the material. These two countries represent one developed and one developing economy. For instance, China and Australia are identified as two large steel mining economies and were included in the analysis.

Secondary data sources were used to assess the prevalence of each social impact in each country, where possible this was supplemented by sector specific information. For example, the prevalence of forced labour conditions in the working population in China. Prevalence data is then combined with an estimate of the number of workers within the wind and solar value chains to get an estimate of the potential negative social impact.

Avoided impact and the reference scenario

Environmental impact

Triodos Bank facilitates the activity of electricity generation by solar panels and wind turbines. Therefore, we have analysed the impact of the activity of electricity generation, as described in the Value Chain Scope. These impacts are negative in an absolute sense as the production of solar panels and wind turbines have a negative effect on the environment.

However, wind and solar energy provide an alternative to other more polluting energy sources and, as such, contribute to the limitation of environmental impact. The impact assessment also addresses Avoided Impact.

To calculate Avoided Impact, the absolute impact of wind and solar energy is compared to the impact that would have occurred in the reference scenario

The reference scenario used in this assessment is the local energy grid mix. The assumption is that if the kWhs of wind or solar energy were not being provided by the companies financed by Triodos Bank that this demand would be met by a blend of the alternative energy sources available in the market. The energy mix is a way to proxy this blend.

Social Impact

We calculate the social impact risks from an absolute impact perspective, with a no-alternative scenario. In a no-alternative activity scenario, only the impacts of the activity are measured.

For both environmental and social impacts, the most material parts of the value chain are taken into account, as described in Understanding the value chain.

Valuation approach

The valuation approach is based on the idea that products and markets should respect basic rights. The right to remediation is stated in article 6 of the Universal declaration of Human Rights. In order to keep a consistent reporting method, the remediation is expressed in a monetary unit. The monetary unit is expressed in euro-equivalents and shows the remediation costs of impacts. By using one monetary unit, different impacts, even from different capitals, can be compared.

There are multiple types of remediation¹:

Restoration cost: The cost to restore health, wealth, circumstances, capabilities or environmental stocks and its quality to a comparable situation than before the impacts had occurred.

Compensation cost: The cost to compensate affected people for economic and/or non-economic damage caused by the social or environmental impact.

Prevention cost of re-occurrence: The cost that would prevent the re-occurrence of the impact. This should be included on top of restoration or compensation.

Retribution cost: The cost to pay for legal fines or sanctions, if they apply to the violation. This reflects additional costs when high societal values are violated, and are added on top of the actual costs of compensating or restoring the damage.

Allocating impact to Triodos Bank

Triodos Bank understands that the responsibility of impact is shared over the value chain. In an impact assessment the impact of the whole value chain is assessed. In line with the GHG Protocol and PCAF, Triodos Bank will account for its impact based on its proportional ownership share. Attribution factors to attribute the impact of our client (and their upstream value chains) to our share are defined per customer or project, or based on conservative averages per sector and country. This means that we calculate the impact as it relates to the proportion of our finance in a project or on a customer's balance sheet. For example, if we are responsible for half of a project's finance, we report half of the impact generated or avoided by that project. This attribution approach is consistent with the PCAF methodology.

¹ For a more detailed description of remediation, see True Price (<https://www.truepricefoundation.org/wp-content/uploads/2023/03/2021-05-11-Valuation-framework-for-true-price-agri-food-final-version.pdf>).

6 Main assumptions

To calculate the impact of solar and wind energy, certain assumptions are made. The main assumptions are listed below, separately for environmental and social model.

Topic	Assumption	Limitation	Rationale
Triodos Bank absolute impact	The companies Triodos Bank finances do not differ fundamentally from the average solar and wind electricity companies and their value chains. Therefore data on generic solar and wind value chains can be used to estimate the impact.	Individual efforts of specific companies to source materials differently or to recycle materials will not currently be captured in the analysis.	Data was not available to understand the unique value chains of each company. Using secondary databases is considered best-available data.
Triodos Bank absolute impact	All of Triodos Bank's solar lending and investments are made in large-scale solar.	Impact estimates may differ if the portfolio is found to include a large share of smaller scale solar projects.	The majority of solar financing and investing was identified to be in large scale solar. However this information was not available throughout the whole portfolio.
Triodos Bank absolute environmental impact	An LCA assessment of wind and solar energy in the Netherlands is assumed to be representative for all European countries in the analysis (Netherlands, Belgium, Great Britain, Germany, Spain, France, Italy, Ireland, and Ukraine) and is used throughout.	Impact estimates differ slightly across countries. When changing geographies, certain parameters are adjusted such as impact of transportation or natural conditions (such as wind or sun hours per year).	Country-specific LCAs were not available for all countries. For countries which did have specific LCAs available, the difference compared with the Netherlands LCA was minimal.
Triodos Bank absolute environmental impact	A Rest-of-world LCA assessment of wind and solar energy is assumed to be representative for all developing economies (Nigeria, Kenya, Vietnam, India, Pakistan, and Honduras) and is used throughout.	Impact estimates differ slightly across countries. When changing geographies, certain parameters are adjusted such as impact of transportation or natural conditions (such as wind or sun hours per year).	For emerging markets there are no country-specific LCAs and therefore Rest-of-World data is considered to be best-available.
Triodos Bank absolute environmental impact	Triodos Bank lends to or invests in the average solar and wind value chains. Therefore, the LCAs used are representative of Triodos Bank's activities.	There is insufficient evidence that Triodos Bank's lending and investing activities are not part of the average value-chain.	All LCAs consider that a large share of production occurs within China. As China uses lots of coal in its manufacturing the impact of solar and wind for specific impacts (mainly air pollutants) is higher than what would typically be expected.
Triodos Bank absolute social impact	Two countries are used to estimate the social impact being created within each value chain step analyzed in the social model. This assumes that other countries where production occurs do not have social impacts materially worse or better than those chosen for analysis.	This is a simplifying assumption. If countries excluded from analysis have significantly worse social impact then the results could be underestimated.	To gather data on every country involved in the production of solar and wind energy would be challenging. For this reason two countries are selected – one developed economy and one developing economy. This is done to try to get a balanced view of the potential social impact, as the social impact profiles often differ significantly between developed and developing markets. However we acknowledge that there is wide variation within these categories. This approach is considered the best available for a baseline estimate of the impact.
Triodos Bank absolute social impact	The forced labour rates within a country are assumed to be approximately consistent between all sectors within the given country.	This is a simplifying assumption and likely leads to the underestimation of forced labour in some sectors.	Data availability on these issues is low. Country-level data is considered best available data.
Triodos Bank absolute social impact	Child labour rates for high income countries are used to estimate the amount of child labour in Germany, Norway, US, Canada and Japan. Child labour rates in Southern America countries are used to estimate child labour rates in Chile, despite the fact that it is also a high income country.	Small inconsistency (but more accuracy) in estimation of child labour prevalence.	The datapoints of multiple child labour indicators were not present in the ILOstat database for multiple high-income countries. The average percentage of child labour in high-income countries helped to gapfill this datapoint. Only Chile is an exception, although it is classified as a high income country, as we found proof of higher than high-income averages of child labour. Therefore we used the Latin America and the Caribbean statistics to estimate the amount of child labour.
Reference scenario	In the reference scenario, the impact of the average electricity grid mix of the country is always used. This assumes that in the financed kWhs of wind or solar were.	In reality, the additional capacity of solar or wind would replace whatever is most expensive according to the merit order curve at that given time. The Impact Avoided is therefore slightly over or underestimated depending on whether the grid mix is more or less polluting than	There is however no data on what the marginal technology is of a country at any given time and likewise data collected by Triodos Bank shows kWhs produced in a year, not exactly when within that year. As we can only gauge electricity generated in a year, we assume the average grid mix is an accurate representation of the fluctuations in the merit order curve.

7 Glossary

IWAF Impact-weighted account framework

IEA International Energy Agency

EU SFDR European Union Sustainable Finance Disclosure Regulation

NFRD Non Financial Reporting Directive

CDP Carbon Disclosure Project

EU CSRD European Union Corporate Sustainability Reporting Directive

8 Data Sources

The impact assessment uses Primary data (from Triodos Bank or clients or investees), Impact Institute data and other secondary data

Primary

The primary data is delivered by Triodos Bank. The data entails location, type and (attributed) amount of generated electricity, as well as the (attributed) installed capacity.

Impact Institute data

A database with monetisation factors for external costs is used in order to express impact in euro terms. The monetisation factors are based on the True Price principles. A subset is published open source by True Price¹.

External data – other

Additional data is required in order to calculate impact. In the process of sourcing external data, two data hierarchy rules are followed based on scope and validity.

- **Scope.** Sources of research most relevant and undertaken in the same geography, time period and under similar conditions to the situation under measurement are preferred over sources with a less directly applicable scope.
- **Validity.** Validated sources including official national or global statistics and peer-reviewed research are preferred over reports or single studies by research organisations.

A sample of key data sources are provided in the table below.

Key data source	Description
EcoInvent (2020)	Life-cycle Assessment (LCA database). Science-based environmental assessments database, containing footprints of a wide variety of processes.
ILO (2023)	International labour organisation that tracks labour statistics.
Walkfree.org (2023)	Research organisation that tracks prevalence of modern slavery worldwide.
The World Bank (2023)	A collection of inflation factors from across the years and globe.
Eurostat (2023)	European database containing the electricity grid mix data of European countries.
Organisation for economic Co-operation and Development (OECD) (2023)	International organisation and holds data on mean and median societal wage statistics.
International Renewable Energy Agency (Irena) (2017)	Contains data on amount of materials, and amount of labour required to produce renewable energy.

¹ True Price Foundation, 2023: Monetisation Factors for True Pricing Version 3.0.0 (Authors: Galgani et al.). Amsterdam. <https://trueprice.org/monetisation-factors-for-true-pricing/>

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