Sustainable Finance Platform

SDG 7 Impact Measurement Overview

By the Sustainable Finance Platform

The Sustainable Finance Platform

This report is a reflection of the deliberations of the SDG Impact Assessment Working Group set up under the auspices of the Sustainable Finance Platform. The working group consists of financial and non-financial companies and is sponsored by PGGM.

The Sustainable Finance Platform is a cooperative venture of De Nederlandsche Bank (chair), the Dutch Banking Association, the Dutch Association of Insurers, the Federation of the Dutch Pension Funds, the Dutch Fund and Asset Management Association, Invest-NL, the Netherlands Authority for the Financial Markets, the Ministry of Finance, the Ministry of Economic Affairs and Climate, and the Sustainable Finance Lab. Platform members meet twice a year to forge cross-sectoral links, to find ways to prevent or overcome obstacles to sustainable funding and to encourage sustainability by working together on specific topics.

The Sustainable Finance Platform fully supports this paper. However, the practices and advice described herein are in no way binding for the individual financial institutions comprising the industry organizations which are members of the Platform, nor are they committed to take any specific follow-up actions. Furthermore, this paper outlines private sector initiatives and as such does not contain any supervisory requirements.

Content

1 Introduction

This Impact Measurement Overview on Sustainable Development Goal (SDG) 7 – Affordable and Clean Energy – is part of a series of papers that describe the methodologies, data sources and market practices that are currently available for each SDG. The paper follows up on the publication SDG impact indicators – A guide for investors and companies (2017) by the SDG Impact Assessment Working Group ('Working Group') of the Sustainable Finance Platform. Its aim is to provide the investor community with a summary of available methodologies, data sources and examples of impact measurement for SDG 7. The SDG 7 Impact Measurement Overview can be found on the website of the DNB Sustainable Finance Platform for use by the wider investor community, as a **dynamic document** that will be improved upon and refined with progressing insights, experiences and data quality.

SDG 7 aims to "ensure access to affordable, reliable, sustainable and modern energy for all".[1] Achieving this is an essential step in the fight against climate change, as the use of energy represents the largest source of greenhouse gas (GHG) emissions from human activities[2] , as well as a priority in the global development agenda, since, in 2018, 789 million people still lacked access to electricity, critical for performing basic daily tasks.[3] Yet, at present, the world is not on track to achieve SDG 7 by 2030, and it is estimated that doing so would require annual investments of around $680 billion to renewable energy.[4]

Positive impact indicators and the logic model

The positive impact indicators originally suggested by the Working Group for SDG 7 in the aforementioned Guide for Investors were:

- Renewable energy produced (Target 7.2)
- Avoided greenhouse gas emissions (Goal 7)5
- Number of people with access to affordable, reliable and modern energy services (Target 7.1)

These and other indicators can be mapped to the logic model below:

• Equity and/or credit	• Companies developing, producing and distributing products and	• Capacity installed (MW)[7]	• Renewable energy produced (MWh)[8]	• Number of people provided with access to affordable, reliable

[1] The 2030 Agenda for Sustainable Development; https://sdgs.un.org/2030agenda
[2] European Environmental Agency, "Energy and Climate Change", August 29, 2017; https://www.eea.europa.eu/signals/signals-2017/articles/energy-and-climate-change
[3] IEA, IRENA, UNSD, World Bank, WHO. 2020. Tracking SDG 7: The Energy Progress Report. World Bank, Washington DC. © World Bank. https://trackingsdg7.esmap.org/data/files/download-documents/tracking_sdg_7_2020-full_report_-_web_0.pdf
[4] Ibid.
[5] Note that avoidance of emissions stemming from relative technological improvements may not correspond to an absolute reduction of emissions. This is further elaborated on in the 'Challenges and future developments' section.
[7] https://datacatalog.worldbank.org/total-installed-capacity-mw
[8] See https://iris.thegiin.org/metric/5.1/pi5842/

	services, in the areas of:[6] ○ Renewable energy ○ Alternative fuels ○ Energy efficiency			and modern energy services[9] • Avoided greenhouse gas emissions (MT CO_2eq)[10]

The focus of this SDG 7 Impact Measurement Overview on positive impact measurement does not preclude the need to identify and measure **adverse impacts**. After all, solely accounting for positive impact, and disregarding potential adverse impacts, may facilitate 'SDG washing'. Moreover, companies that contribute positively to SDG 7 (e.g. by providing renewable energy services) may nonetheless have adverse impacts on other, interlinked SDGs (e.g. through adverse environmental impact), or even on SDG 7 itself (e.g. through excessive pricing, which may hinder access to energy).

In this context, it is important to note that, whilst renewable energy companies clearly play a key role in reducing carbon emissions and enabling the transition to a net-zero carbon economy, issues may arise in in relation to respect for human rights through their supply chains. For example, a recent report[11] shows that out of the 16 largest publicly traded wind and solar energy companies in the world, none are currently fully meeting their responsibility to respect human rights, as defined by the UN Guiding Principles.

[6] Taxonomies can be used to identify appropriate companies, based on their activities.
[9] See https://iris.thegiin.org/metric/5.1/pi4060/
[10] See https://iris.thegiin.org/metric/5.1/pi5376/
[11] See Renewable_Energy_Benchmark_Key_Findings_Report.pdf (business-humanrights.org)

2 Methodologies and initiatives

Several SDG 7-specific methodologies and initiatives are available for evaluating the impact of companies and investments on 'Affordable and Clean Energy'. Some relevant methodologies and initiatives are included in the table below and mapped to the logic model.

• EU Taxonomy • APG-PGGM Taxonomy • CBI Sector Criteria	• PCAF Global Accounting & Reporting Standard for the Financial Industry • GHG Protocol for Project Accounting • IFI Framework for a Harmonized Approach to Greenhouse Gas Accounting • EU Methodology for Calculation of GHG emission avoidance • The Avoided Emissions Framework • WRI Estimating and Reporting the Comparative Emissions Impacts of Products • GIIN Clean Energy Access Investments • UBS/PGGM/Harvard impact model • WHEB Impact Measurement Methodology • Net Purpose • Y Analytics

Among the initiatives and methodologies that approximate impact measurement by classifying companies' activities and revenues, we identify the taxonomy developed by APG and PGGM, the EU Taxonomy and various Sector Criteria by the Climate Bonds Initiative (CBI).

The **taxonomy developed by APG and PGGM** offers guidance on which companies contribute to the advancement of SDG 7, by mapping their revenues to pre-defined SDG 7 solutions. The **EU Taxonomy**[12] maps economic activities that meaningfully contribute to climate change mitigation and adaption, including activities in the sub-sector 'Electricity, Gas Steam and Air Conditioning Supply'. **CBI Sector Criteria**, including for the Bioenergy, Hydropower, Geothermal Energy, Marine Renewable Energy, Solar Energy and Wind Energy sectors, "set climate change benchmarks for that sector that are used to screen assets and capital projects" based on "their contribution to climate change mitigation, and/or to adaptation or resilience to climate change."[13]

Among the methodologies and initiatives that approximate impact measurement by evaluating or quantifying outputs and/or outcomes, or, by contextualizing those outcomes, measure impact, we identify several frameworks.

First, we identify various frameworks available for GHG accounting of emissions avoided. These include, amongst others, the **GHG Protocol for Project Accounting**, **The Global GHG Accounting & Reporting Standard for the Financial Industry by PCAF** (emissions avoided are only measured in the project finance asset class), the

[12] For the 'Technical Annex', see https://ec.europa.eu/info/sites/info/files/business_economy_euro/banking_and_finance/documents/200309-sustainable-finance-teg-final-report-taxonomy-annexes_en.pdf
[13] See https://www.climatebonds.net/standard/sector-criteria

IFI Framework for a Harmonized Approach to Greenhouse Gas Accounting, the **EU Methodology for Calculation of GHG Emission Avoidance**, the **Avoided Emissions Framework** by Mission Innovation, and a working paper on **Estimating and Reporting the Comparative Emissions of Products**. In general, avoided emissions are defined as the reduction in emissions stemming from companies' activities and related outputs[14] compared to the emissions that would have occurred in their absence. All of the frameworks listed above provide methodologies for calculating this reduction, albeit over different timespans.[15] Moreover, differences can be found across frameworks with respect to the emission factors[16] used for calculating baseline emissions.

Methodologies more specifically focused on quantifying outcomes and impact of renewable energy investments include a framework for impact evaluation by GIIN concerning Clean Energy Access Investments, and the impact modelling methodology prepared by the Harvard School of Public Health for UBS and PGGM.

The impact evaluation framework by GIIN concerning **Clean Energy Access Investments** offers guidance with respect to the type of investments that are being made in the area of clean energy access (e.g. grid-based energy systems, waste-to-energy services, solar home systems), as well as *how* to measure the impact of such investments against relevant metrics (e.g. Client individuals provided with new access, GHG emissions reductions, jobs created).

The **UBS/PGGM/Harvard impact model[17]** aims to assess the positive contributions to health and sustainability of publicly traded energy generation, energy efficiency, recycling, transportation, telecommunications and other sustainable companies by quantifying, for example, deaths prevented, hospitalization days prevented, tons of CO_2eq prevented, GWh of clean energy generated. Indeed, beyond measuring energy access, the model attempts to incorporate health-related benefits stemming from emissions reduction.

Moreover, some investors have developed proprietary methodologies for measuring the impact of their investments, including in climate solutions. An example of such an investor is WHEB, whose **Impact Measurement Methodology** relies on a combination of scoring, ESG screening and quantification of outcomes.

Impact may also be measured in absolute terms – see initiatives like **Net Purpose**, which provide information about absolute impact (e.g. MWh generated, MWh energy saved, MT CO_2e avoided, population provided with clean energy access). In some instances, it is useful to assign a monetized value to that absolute impact. There are a few initiatives that attempt to do this, including **Y Analytics**.

[14] E.g. renewable energy or energy efficiency projects, or, more broadly, products and services.
[15] E.g. PCAF's portfolio GHG accounting considers annual emissions, while most other frameworks are suitable for calculating emissions avoided over a project's or product's lifespan, or over several years more generally.
[16] Emission factor is the mass of GHG emitted per unit of activity (e.g. Gg per ton of coal mined); UNFCCC Resource Guide For Preparing the National Communications of Non-Annex I Parties - Module 3
[17] Reference documents are available upon request.

3 Data sources

In the table below, we include the most relevant available data sources to support the above-mentioned methodologies and map them to the logic model.

• Company reports • FactSet Revere • Open Power System Platform • World Resource Institute Global Power Plant Database • IPP Journal Energy Projects Database	• IFI Harmonized Grid Emission Factors • Greenhouse Gas Protocol Emission Factors • CDP's Full GHG Emissions Dataset	• Peer-reviewed scientific publications • Emission Database for Global Atmospheric Research (EDGAR) • ClimateWatch • The Energy Progress Report • World Energy Council's Energy Trilemma Index • IEA Data and Statistics • IRENA Data & Statistics

Information about companies' revenues and activities can be retrieved directly from **company reports**[18] or from more general data sources, such as FactSet. Additionally, information about energy projects (e.g. power plants) may be retrieved from third party sources, including the **Open Power System Platform**, a platform collecting European power system data, **the World Resource Institute Global Power Plant Database**, a comprehensive, open source database of power plants around the world, and the **IPP Journal Energy Projects Database**, a repository of information about active energy projects worldwide.

Available data sources to facilitate calculation of GHG emissions avoided include the **IFI Harmonized Grid Emission Factors**, a publicly available database of emission factors for grid-connected renewable energy and energy efficiency projects, and the **Greenhouse Gas Protocol Emission Factors**, a database of electricity emission factors for the US and China. Moreover, the **CDP's Full GHG Emissions Dataset** provides self-reported and estimated Scope 1, 2 and 3 emissions data for over 5,000 companies.

Lastly, information about country- and worldwide energy access, consumption and related emissions, useful for contextualizing companies' outputs and outcomes and moving toward impact measurement, is available from a number of sources. These include **peer-reviewed publications**[19] and several publicly available databases, such as the **Emission Database for Global Atmospheric Research (EDGAR)** and **ClimateWatch**, which provide independent estimates of the global anthropogenic emissions (including energy emissions) and emission trends; the **Energy Project Report**, a global dashboard to register progress on energy access, energy efficiency, renewable energy and international cooperation to advance SDG 7; the **World Energy Council's Energy Trilemma Index**, which measures national energy system performances across three dimensions, namely energy security, energy equity and environmental sustainability; the **IEA Data and Statistics**, a large repository

[18] Company reports may also be used to retrieve output, outcome and even impact data.
[19] Peer-reviewed scientific publications may additionally provide information about carbon reductions associated with specific climate solutions (product/technology).

of energy-related data and statistics; and the **IRENA Data and Statistics**, a repository of detailed statistics on renewable energy capacity, power generation and renewable energy balances.

4.1 Company examples

Several companies are already reporting on their activities, outputs, outcomes and even impacts relative to SDG 7.[20] Below, we briefly discuss the example of Ørsted[21] and list other relevant company examples (see second table below).

• **Equity and/or credit** = x% of equity	• Ørsted develops, builds and operates offshore wind farms in Europe, North America and East Asia	• **Capacity installed (MW)** = 7,572 MW	• **Renewable energy produced (MWh)** = 15,248,000 MWh	• **People powered based on installed capacity** = 15 million people[22] • **Avoided greenhouse gas emissions (MT CO_2e)** = 8.1 million tonnes CO_2e

Ørsted is a multinational energy company based in Denmark. They are world leaders in offshore wind power, but their business also encompasses onshore wind power, as well as bioenergy. Through the installation and operation of offshore wind farms in the UK, Germany, Denmark, the Netherlands, the US and Taiwan, they supply green power to more than 15 million people around the world.

Other company examples include:

• 3M • Kingspan	• Enel • Engie • EDF Group • Iberdrola • Siemens Gamesa	• Signify • Vestas

[20] Not all companies make explicit references to the SDG framework in their reports, but nonetheless include information about renewable energy production and provision.
[21] All information presented in the table was retrieved from Ørsted's 2020 Annual Report unless noted otherwise.
[22] This figure is based on the total output of Ørsted-built offshore wind farms as of 2020 and was retrieved from https://orsted.com/en/about-us/about-orsted/our-vision-and-values

4.2 Investor examples

Several investors are already reporting on their (financed) activities, outputs, outcomes and even impacts relative to SDG 7.[23] Below, we briefly discuss the example of Triodos Bank and Investment Management[24] and list other relevant investor examples (see second table below).

• **Equity and/or credit**	• Renewable energy and energy efficiency projects	• **Capacity installed (MW)** = 5,100 MW	• **Renewable electricity produced that can be attributed to Triodos Bank's and Investment Management's finance** = 2,500,000 MWh[25]	• **The equivalent number of households worldwide whose electricity needs Triodos attributed to as a result of its sustainable climate and energy lending and investment funds** = 0.7 million households • **Avoided greenhouse gas emissions (in tonnes of CO_2 equivalent)** = 0.9 million

Triodos Bank N.V. is a sustainable bank that aims to "make money work for positive, social, environmental and cultural change."[26] Their investment strategy is based on a 'positive screening' criterion, meaning that the organizations, companies and people that the bank invests in must be assessed to have a positive environmental and/or social impact. These include numerous energy projects, such as the installation of new renewable energy generation capacity, and energy savings and efficiency measures.[27]

Other investor examples include:

• APG • Van Laschot Kempen	• Banca Etica • WHEB Asset Management • Brookfield Renewable Partners	• Access to Energy Fund • Calvert Impact Capital • Set Ventures Global Equity Impact Fund

[23] Not all investors make explicit references to the SDG framework in their reports, but nonetheless include information about (financed) renewable energy production and provision.
[24] All information presented in the table was retrieved from Triodos Bank's 2020 Integrated Annual Report unless noted otherwise.
[25] See https://www.annual-report-triodos.com/2020/disclosures/appendix-iii-un-sustainable-development-goals
[26] See https://www.triodos.com/about-us
[27] See https://www.triodos.com/impact-themes/renewable-energy

5 Challenges and future developments

SDG 7 impact measurement is developed with respect to the available methodologies and data sources. Several GHG accounting frameworks, complete with databases of emission factors, are available for calculating (avoided) CO_2 emissions both for corporate actors and financial investors. Moreover, data on, for example, capacity installed and energy produced are already routinely reported for energy projects, and the disclosure of carbon emissions (generated, avoided, and eventually stored) is becoming more widely practiced and mandated under national and international regulatory frameworks.

Nonetheless, impact measurement in the context of SDG 7 still faces various (methodological) challenges, including:

- **Affordability and accessibility**: SDG 7 aims to scale up the production and provision of "**affordable** and clean energy."[28] Yet, to this day, it remains challenging to define indicators, supported by existing methodologies and data sources, that adequately capture the affordability dimension of impact. The same holds true for **accessibility**, where lack of (physical) access to clean and affordable energy can function as a barrier to the achievement of SDG 7 by 2030. Nonetheless, with progressing insights and data quality, it might eventually be possible to assess the impact of companies based on whether the energy services they provide are affordable and accessible.
- **Impact on SDG 7 is intrinsically linked to impact on other SDGs**: air quality improvement, reduction in water consumption and reduction in acid precipitations due to lower NO_x and SO_2 emissions are all examples of impacts that may arise from renewable energy generation which concern other SDGs (e.g. 3, 6, 15). For this reason, one of the above-mentioned methodologies (UBS/PGGM/Harvard impact model) proposes to include health impacts and non-CO_2 emission reductions as indicators for SDG 7 impact measurement.
- **Geographic specificity of SDG 7 impact**: the location where the renewable energy is installed has a large influence over the actual carbon emission reduction, as different electricity sources are displaced by additional renewable capacity in different countries and regions. Country-specific emission factors should thus be preferred for calculating the baseline scenario in which the intervention takes place, provided that outcome data is broken down by geographic location. This is particularly relevant for calculating GHG emissions avoided.
- **GHG emissions avoided**: in the context of this indicator, it is also important to note that the avoidance of emissions arises from a relative improvement over the existing technologies, and as such does not represent an absolute reduction in environmental damage. It is thus crucial that, alongside measuring relative improvements, absolute emission levels are continuously monitored, as an absolute reduction in CO_2 levels will be needed to achieve a zero carbon, sustainable economy.[29]

[28] See https://sdgs.un.org/2030agenda (emphasis added)
[29] See, for example https://impact.whebgroup.com/media/2020/06/WHEB-Impact-Measurement-Methodology.pdf


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