TenneT
Taking power further

True Value – case study DolWin2

About the document

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Introduction

In our 2016 and 2017 Integrated Annual Report, we have included previous case studies to monetise our impact. With this, we aim to gain more insight into a broader perspective of the impact of our projects, beyond the financial bottom-line. Because our previous case studies has looked into two onshore projects, we decided to choose one of our offshore projects (DolWin2) for our 2018 Integrated Annual Report. This project is related to an offshore convertor in the North Sea, which enables the transportation of electricity generated by offshore wind parks to the onshore grid.

Methodology

The first step in monetising the impacts of DolWin2, was defining the scope of our case study. This has been determining on multiple dimensions:

1) Determining the boundaries of the DolWin2 project

   To determine the boundary of this project, we have decided to include both the on- and offshore converter, next to the cables.

2) Determining which phases of the life cycle to include

   With respect to the phases of the lifecycle of DolWin2, we included the entire value chain from material extraction to operation to end of life. To us, taking the entire life cycle of this project into account provides the most relevant insights on the impact of DolWin2. To take future impacts into account, we have made use of estimations and extrapolated data.

3) Determining the material impacts to monetise

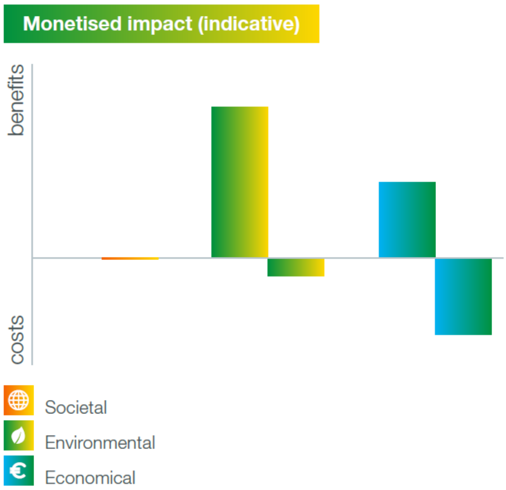
   In terms of impacts, we started with determining significant impacts. Next, we have taking the feasibility to monetise these impacts into account, given the limitations of our case study (e.g. data availability). Due to these limitations, it was not possible to include all effects we consider material. An example of this is Biodiversity.

Where possible we made use of measured data. However, in some instances, we had to make use of assumptions and estimations for certain impact areas.

Results

Environmental

Potential avoided emissions are our main positive environmental impact. To determine this impact, we have taken the electricity fed into the German grid as a basis multiplied this with the average CO_2 intensity of conventional electricity sources to determine the potential avoided emissions. To estimate how the grid mix will develop, we have made use of a study of Prognos AG, where a prognoses has been made. Regarding our negative impacts, material usage and material depletion, transport- and operational emissions as well as grid losses have been taken into account. Conversion factors used, were taken from previous studies performed by Ecofys, as well as from TU Delft.



Societal

For the social dimension, safety incidents were taken into account. Safety incidents were monetised using information from the Health and Safety regulator HSE in the UK. Other impact factors have been considered, however these were not feasible given the limitations of this project. We have looked into the negative impacts related to injuries and what impact they have on society. For the operation phase we used assumptions about future incidents, based on extrapolation of historical data.

Economical

Regarding the economical dimension, negative impacts are related to costs society bears with respect to the initial investment and operational costs during the entire operation phase. To determine the positive impacts, we have taken TenneT's expenditures regarding this offshore project as a basis for our assumption, as these flow back to society (such as paid wages, taxes and costs for materials and services).

Outcome

The result of our research show that our most significant impact is environmental, as depicted in the graph on this page. The main driver behind this positive impact are the potential avoided emissions that can be realised by connecting wind parks to the main grid, thus feeding more and more renewable energy sources into the grid. Negative environmental impacts, have mainly been realised in the initial phases of this project, next to grid losses that occur during the operation phase. Next to this, our economic impacts are significant, however less significant than the monetised environmental impacts of DolWin2.

Uncertainties

The final result are not an absolute truth. There are several uncertainties:

- We focused on most material effects, thereby excluding minor impacts
- Monetising non-financial data is relatively new, conversion factors are not fixed
- Some data is based on assumptions
- Impact is reported for the whole lifecycle of DolWin2, existing data has been used to forecast impact

Conversion factors

Below we have included conversion factors applied in this case study

Impact area	**Conversion factor**	**Value**	**Unit**	**Source**
General				
Discount rate	Net present value (NPV)	2.2	%	TenneT internal documentation
Society				
Safety incidents	Monetised costs related to injuries per injury type	880 – 1,617,000	GBP	Health and Safety Executive Cost model 2016/2017 (www.hse.gov.uk)
Environment				
Material depletion	Costs for material depletion (depending on type of material)	0.06 – 9.18	EUR / tonnes kg	http://www.ecocostsvalue.com/
Material extraction	Carbon conversion factor (depending on type of material)	1.22 - 400	Kg CO_2 / kg	Internal Ecofys study 2015
Carbon emissions	German average grid mix	489	g CO_2 / KWh	https://www.umweltbundesamt.de/sites/default/files/medien/1410/publikationen/2018-05-04_climate-change_11-2018_strommix-2018_0.pdf
Carbon emissions	Monetisation factor carbon emissions	100	Euro/tonnes	https://www.natuurenmilieu.nl/wp-content/uploads/2016/06/NM-Energievisie-juni-2016.pdf

Questions

If you have any questions or would like to receive more information, send an email to CSR@tennet.eu.