Power in People

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SOMO

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HUMAN RIGHTS IN WIND TURBINE SUPPLY CHAINS

Towards a truly sustainable energy transition

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1 | INTRODUCTION

In order to achieve the goals on renewable energy set during the 2015 United Nations Climate Change Conference in Paris, the Netherlands and other countries around the world will need to rely heavily on renewable energy technologies such as wind turbines, solar cells and batteries for energy storage.

The Dutch government aims to reduce carbon emissions by 95 per cent by 2050.[1] To this end, ministers have set renewable energy production targets and have planned for the construction of wind farms at sea as part of the country's energy mix. However, the increased reliance on wind energy in the Netherlands and around the world will create stronger demand for the minerals needed to produce wind turbines. These can reach over 100 metres in length from the turbine to the ground,[2] with the rotor blades attached to the turbine adding up to 80 metres of additional height.[3] Altogether, wind turbines can weigh over 140,000 kilograms, using an array of different materials and minerals.[4] The World Bank has estimated that the wind energy industry's demand for minerals will grow by approximately 250 per cent by 2050 in order to scale up to meet the 2°C degree temperature rise threshold agreed in Paris.[5]

While the Dutch state is taking urgent action to increase wind capacity, it is becoming increasingly important that it pays attention to the supply chain of wind energy used in wind turbines, which often causes adverse human rights impacts for communities near the mines, and can cause damage to the local environment.

This briefing paper provides an overview of which minerals are used in wind turbines, which human rights and environmental impacts are associated with the production of those minerals, and what should be done to reduce those adverse impacts. Although the increased demand for wind power is a global phenomenon, this paper focusses on the Netherlands as an important case study in this global context.

It is important to note that ActionAid and SOMO are not questioning the need for a transition towards a system of sustainable energy provision, nor the vital role that wind energy has to play in that transition. On the contrary, this paper is designed to encourage and support the deployment of wind energy technologies in a truly sustainable manner. An urgent shift away from fossil fuels to renewable sources of energy is essential to stop climate change. However, we believe that it is crucial that the social and environmental risks of mineral production needed for the transition are considered in order to make this energy transition truly sustainable.

Many of the world's largest mining countries are known to produce minerals required for wind turbines in a way that is highly damaging to the environment and local communities. The mining that takes place for the minerals destined for renewable energy production causes a multitude of human rights risks and impacts, which will be discussed in this paper. Companies that use the minerals to manufacture wind turbines are directly linked to those risks through business

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1 These goals were set in Paris, and were also included in the Dutch energy agreement for sustainable growth.
Sociaal Economische Raad, Energieakkoord voor duurzame groei, September 2013, <http://www.energieakkoordser.nl/energieakkoord.aspx> (retrieved on 8 August 2017).

2 MHI Vestas, The world's most powerful available wind turbine gets major power boost, 6 June 2017, <http://www.mhivestasoffshore.com/worlds-most-powerful-available-wind-turbine-gets-major-power-boost/> (retrieved on 27 September 2017).

3 Siemens website, Wind turbine technology, no date, <https://www.siemens.com/global/en/home/markets/wind/turbines-and-services/technology/blades.html> (retrieved on 2 January 2018).

4 Acciona website, AW132/3000, no date, <http://www.acciona-windpower.com/products-and-services/aw3000/aw1323000/> (retrieved on 27 September 2017).
Turbines Info, Size of Wind Turbines, 7 March 2017, <http://www.turbinesinfo.com/size-of-wind-turbines/> retrieved on 27 September 2017.

5 This 250 per cent increase appears to be based on 2013 production data for the minerals aluminium, chromium, copper, iron, lead, manganese, molybdenum, neodymium, nickel and zinc. Wind energy sector demand for all these metals is expected to rise by about 250 per cent. Other metals needed to produce wind energy were not included in the analysis.
World Bank Group, The Growing Role of Minerals and Metals for a Low Carbon Future, June 2017, <http://documents.worldbank.org/curated/en/207371500386458722/pdf/117581-WP-P159838-PUBLIC-ClimateSmartMiningJuly.pdf>, page 12 (retrieved on 8 August 2017).

relationships in their supply chain. According to leading international normative frameworks for responsible business conduct and human rights, such as the UN Guiding Principles on Business and Human Rights (UNGPs)[6] and the Organisation for Economic Co-operation and Development (OECD) Guidelines for Multinational Enterprises,[7] wind turbine manufacturers have a clear responsibility to address these risks of adverse human rights and environmental impacts in the supply chain.

The fact that the Netherlands and the world is set to see a wind energy boom provides a unique and urgent opportunity for governments and companies to ensure that tackling climate change, sustainable development and protecting human rights go hand in hand. As a leading supporter of normative standards such as the UNGPs and the OECD Guidelines, the Dutch government should take an active role in ensuring that Dutch companies respect these standards and avoid contributing to adverse social and environmental impacts in the supply chain while trying to reduce carbon emissions.

About this research: aim, research questions and methodology

This briefing paper was commissioned by ActionAid Netherlands and written by the Centre for Research on Multinational Corporations (SOMO). The paper is primarily intended to inform the Dutch government and companies in the wind energy sector about the social and environmental risks in the renewable energy supply chains. The paper aims to influence and improve Dutch policy to ensure fair and sustainable mineral supply chains globally and to broaden the scope of the energy transition agenda.

The paper sheds light on the risks that are brought about by the projected increase in demand for minerals, such as iron ore and chromium, needed for the production of new wind turbines. An overview will be provided of how the mining of these minerals affects people and the environment in international supply chains. The paper also describes what is expected of companies supplying the Netherlands with wind turbines in terms of their supply chain responsibility and respecting human rights. The paper then reviews efforts by these companies to undertake due diligence to identify, prevent and mitigate risks of adverse impacts in their metals and minerals supply chain.

According to the OECD Guidelines and UNGPs, all companies in the wind turbine supply chain have a responsibility to conduct human rights due diligence. However, to limit the scope of this paper, the focus here will be on the producers of wind turbines, specifically those that are supplying the Dutch market. The focus will also be on offshore wind energy projects and the turbine producers involved. Although these offshore wind energy projects currently account for only 23 per cent of Dutch wind energy production, the individual projects are generally of a larger scale, making them more suitable for research. Although offshore and onshore wind turbines differ in size and composition, both types consist of largely the same materials. The paper then reviews the role of the Dutch government in ensuring respect for human rights and the environment in the permitting process and provides suggestions as to how the government can ensure that the Dutch energy transition is truly sustainable. Finally, recommendations are provide to the companies that manufacture wind turbines to help them better comply with the expectations of responsible business conduct contained in the OECD Guidelines and UNGPs.

The normative framework used to evaluate the policies of the Dutch wind energy sector and the governmental support programme is the set of norms for responsible business conduct laid out in the OECD Guidelines[8] and the state duty to protect as described in the UNGPs.[9] The Dutch government is committed to implementing both standards and publicly promotes them.

6 UN Office of the High Commissioner for Human Rights, Guiding Principles on Business and Human Rights, 2011, <http://www.ohchr.org/Documents/Publications/GuidingPrinciplesBusinessHR_EN.pdf> (retrieved on 18 September 2017).

7 OECD, OECD Guidelines for Multinational Enterprises, 2011, <http://www.oecd.org/daf/inv/mne/48004323.pdf> (retrieved on 8 August 2017).

8 Idem.

9 UN Office of the High Commissioner for Human Rights, Guiding Principles on Business and Human Rights, 2011, <http://www.ohchr.org/Documents/Publications/GuidingPrinciplesBusinessHR_EN.pdf> (retrieved on 18 September 2017).

The paper seeks to answer the following research questions:

- How will growth in the demand for wind energy affect the demand for minerals used in the production of wind turbines in the coming decades?
- Which social and environmental risks are associated with the supply chain of wind turbines used in the Netherlands?
- To what extent are the Dutch government and wind turbine manufacturing companies operating in the Netherlands responsible for addressing the risks of adverse social and environmental impacts in the supply chain of wind turbines?
- What actions have the Dutch government and wind turbine manufacturers taken to these risks in the supply chain?

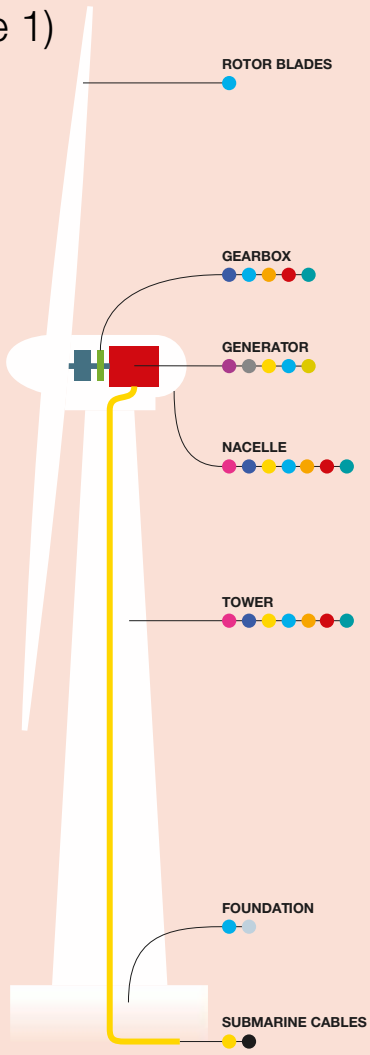
In order to answer these questions, a variety of research methods and sources were employed to gather and analyse information about the production and trade of minerals associated with wind turbines, as well as about the social and environmental impacts of mining these minerals. Sources include media reports, mineral maps and government reports. The analysis is also based on questionnaires that were sent to seven wind turbine manufacturers.[10] MHI Vestas Offshore Wind (hereinafter "MHI Vestas") and Siemens Gamesa, which account for the lion's share of the Dutch market, provided a response to the questionnaire. Subsequently, a draft version of the report was sent to all seven of the wind turbine producers, and they were given the opportunity to make comments and corrections to the draft. Only MHI Vestas responded to this request for review. In addition to the selected wind turbine manufacturers, the Dutch Wind Energy Association (NWEA), which represents a wide range of turbine manufacturers and other companies active in the Dutch wind sector, also received and commented on a draft version of the paper. The comments and suggestions from MHI Vestas, Siemens Gamesa and the NWEA have been incorporated into the current version. The Dutch Ministry of Economic Affairs and Climate (EZK) was also provided with a draft of the paper prior to publication.

10 These are MHI Vestas Offshore, Siemens Gamesa, Lagerwey, Goldwind, Nordex, Enercon and General Electric.

2 | GROWING DEMAND FOR RAW MATERIALS

The following minerals are used in the production of wind turbines found in offshore wind farms: aluminum, boron, chromium, lead, limestone (for concrete),[11] manganese, iron, nickel, cobalt, copper, molybdenum, rare earth (praseodymium, neodymium, terbium and dysprosium)[12] and zinc.[13] Figure 1 displays where these metals are used in a wind turbine.

Raw materials used in wind turbines (Figure 1)



- Aluminium
- Boron
- Chromium
- Cobalt
- Copper
- Iron
- Lead
- Manganese
- Molybdenum
- Nickel
- Rare Earths*
- Concrete

* dysprosium, neodymium, praseodymium, terbium

Sources: European Commission Materials Information System (MIS) Wind Energy, April 2016 and European Commission Raw Materials Scoreboard 2016.

The source does not specify the wind turbine type on which the above information is based.

11 US Geological Survey, Mineral Commodity Summary: Lime, January 2017, <https://minerals.usgs.gov/minerals/pubs/commodity/lime/mcs-2017-lime.pdf> (retrieved on 8 August 2017).
MPA the Concrete Centre website, Offshore wind: Concrete gravity foundations, no date, <http://www.concretecentre.com/Sectors/Wind-Energy/Offshore-Wind-Gravity-Foundation-Solutions.aspx> (retrieved on 8 August 2017).

12 European Commission, Raw Materials Scorecard, 2016, <https://publications.europa.eu/en/publication-detail/-/publication/1ee65e21-9ac4-11e6-868c-01aa75ed71a1> (retrieved on 8 August 2017).
World Bank Group, The Growing Role of Minerals and Metals for a Low Carbon Future, June 2017, <http://documents.worldbank.org/curated/en/207371500386458722/pdf/117581-WP-P159838-PUBLIC-ClimateSmartMiningJuly.pdf>, page 64 (retrieved on 8 August 2017).

13 World Bank Group, The Growing Role of Minerals and Metals for a Low Carbon Future, June 2017, <http://documents.worldbank.org/curated/en/207371500386458722/pdf/117581-WP-P159838-PUBLIC-ClimateSmartMiningJuly.pdf>, page 64 (retrieved on 8 August 2017).

Table 1 shows the amounts of various minerals and metals needed to create a turbine, measuring this in the kg per material to create one MW of turbine production capacity. These figures are subject to change over time given the continuous innovation and increase in efficiency within the wind energy sector. Nevertheless, the numbers provide a base from which to calculate the mineral and metal costs for the increased production of wind energy. The large amounts of specific materials needed to produce wind energy, as in the case of steel, shows that the demand for specific metals is likely to grow significantly with the push towards greater wind capacity.[14]

Table 1 Amounts of minerals and metals used in wind turbines

Metal	Wind turbine manufacturing estimates kg/MW
Aluminium	Unknown
Boron	0.8 - 7.0
Chromium	789 - 902
Cobalt	Unknown
Copper	1,140 - 3,000
Dysprosium	2.8 - 25.0
Iron (in magnet)	52 - 455
Iron (cast)	20,000 - 23,900
Lead	Unknown
Manganese	32.5 - 80.5
Molybdenum	116 - 136
Neodymium	0 - 186
Nickel	557 - 663
Praseodymium	4 - 35
Steel	103,000 - 115,000
Terbium	0.8 - 7.0
Zinc	5,150 - 5,750

Current offshore wind turbines in the Netherlands produce up to 4 MW (based on www.windstats.nl). It is expected that newer wind turbines will go up to 10 MW in the coming decade.
Source: World Bank report, The Growing Role of Minerals and Metals for a Low Carbon Future, June 2017.

Current offshore wind turbines in the Netherlands have a capacity of 4MW, but improvements in efficiency are expected to increase to increase this to 10MW by 2030.
Based on: World Bank 2017[15]

As mentioned in the introduction, the World Bank recently reported how increased mineral demand by the renewable energy sector is expected to increase global demand for a wide range of minerals by 2050.[16] The report provides an estimate of increased mineral demand for all major renewable energy technologies[17] put together, as a percentage of 2013 production figures. Altogether, renewable energy production is estimated to lead to an increase in the need for aluminium (2%), chromium (<1%), cobalt (2%), copper (3%), iron (2%), lead (5%), manganese (<1%) and nickel (3%). In terms of percentages, this impact on mineral demand does not seem very large, which is because these minerals are already used in an array of different industries. However, in the case of iron, for example, a 2 per cent growth in demand will require additional annual pig iron production of 23.4 million metric tonnes.[18] The anticipated increases in demand for copper (3%) and lead (5%) will require increased production of 537,000 tonnes[19] and 270,000 tonnes[20] respectively.

Location of mining sites

The sites where mining takes place for the minerals used in the production of wind turbines are geographically widespread. Highly industrialised countries, such as Australia and Canada, represent the main producers of some minerals, such as aluminium, iron and nickel. However, a large proportion of global production of the minerals used in wind turbines is mined in low and middle-income countries such as China, Brazil, Russia, India, Chile, Turkey, South Africa, Indonesia, the Philippines, the Democratic Republic of Congo (DRC), Gabon, Guinea, Malaysia, Peru and Mexico.

14 Idem.

15 World Bank Group, The Growing Role of Minerals and Metals for a Low Carbon Future, June 2017, <http://documents.worldbank.org/curated/en/207371500386458722/pdf/117581-WP-P159838-PUBLIC-ClimateSmartMiningJuly.pdf>, page 12 (retrieved on 8 August 2017).

16 Ibid.

17 These are wind energy production, photovoltaic solar energy production and energy storage (batteries).

18 US Geological Survey, Mineral Commodity Summary: Iron and Steel, January 2014, <https://minerals.usgs.gov/minerals/pubs/commodity/iron_&_steel/mcs-2014-feste.pdf> (retrieved on 8 August 2017).

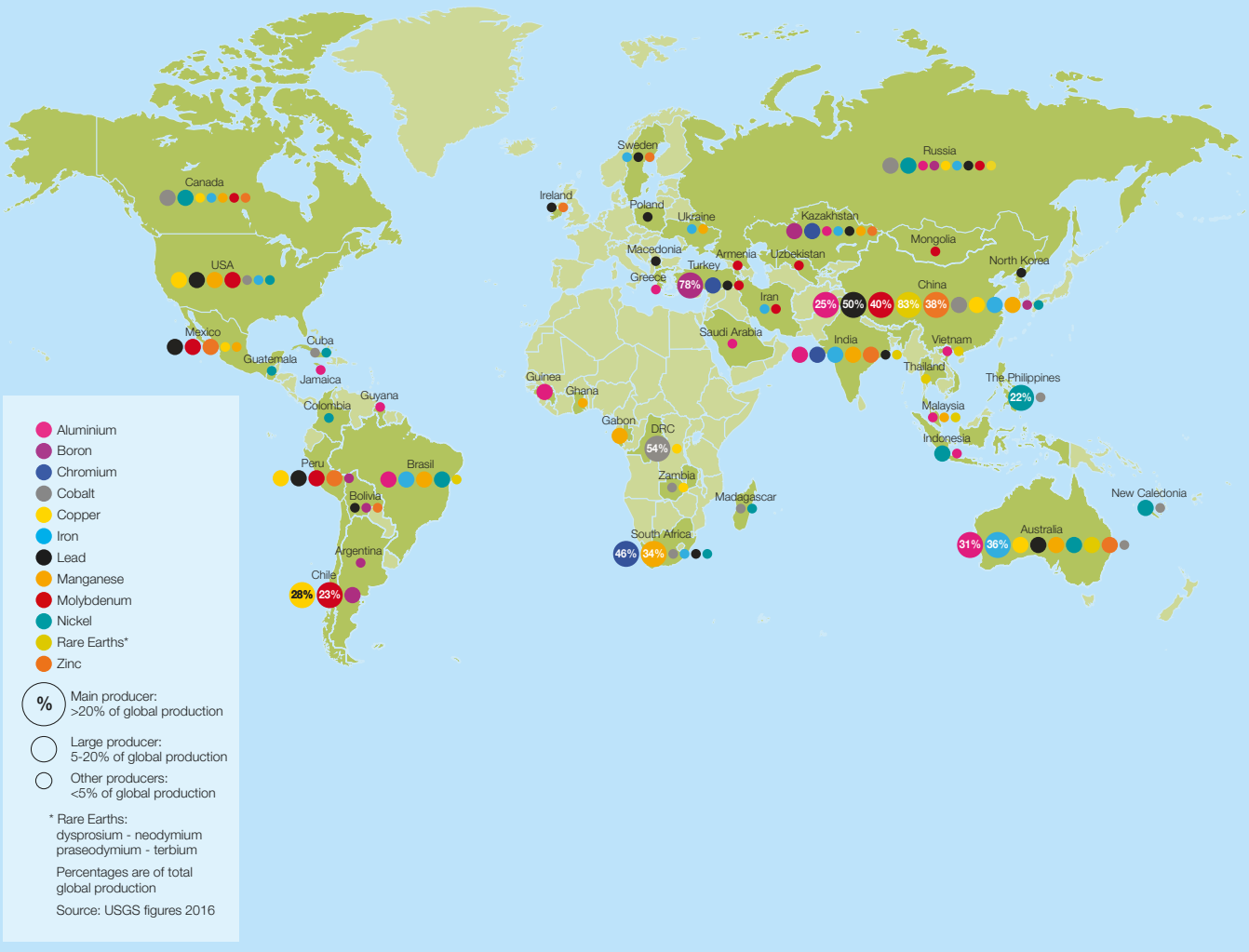
19 US Geological Survey, Mineral Commodity Summary: Copper, February 2014, <https://minerals.usgs.gov/minerals/pubs/commodity/copper/mcs-2014-coppe.pdf> (retrieved on 8 August 2017).

20 US Geological Survey, Mineral Commodity Summary: Lead, February 2014, <https://minerals.usgs.gov/minerals/pubs/commodity/lead/mcs-2014-lead.pdf> (retrieved on 8 August 2017).

Governments have the primary duty to protect human rights on their soil.[21] However, standards of environmental protection and upholding human rights in policies, legal frameworks and institutional arrangements in some of these countries are often weak and enforcement is missing or limited. Corporations have a responsibility to respect human rights and the environment that is independent of the host country's ability or willingness to protect human rights. As will be discussed in more detail in Chapter 5, this applies to companies' own operations, as well as human rights and environmental risks in the supply chain.

Figure 2 shows the leading producers of the aforementioned raw materials. Some mineral deposits are highly concentrated, with at times just one country controlling both production and export of a certain metal (such as China's rare earth minerals; Turkey's boron; and South Africa's chromium and manganese). However, in most cases mineral deposits can be found in several countries. It should be noted that, due to market dynamics, fluctuating prices and political (in)stability, the primary country of origin of some of these minerals can change quickly and unexpectedly.

Producers of minerals and metals used in wind turbines (Figure 2)



21 UN Office of the High Commissioner for Human Rights, Guiding Principles on Business and Human Rights, 2011, <http://www.ohchr.org/Documents/Publications/GuidingPrinciplesBusinessHR_EN.pdf> (retrieved on 18 September 2017).

Iron as main mineral

As Table 1 shows, iron (and steel, which is an alloy of iron) accounts for by far the largest amount of minerals used in wind turbines. According to MHI Vestas, their turbines consist of 84-89 per cent iron and steel. It seems likely that wind turbines produced by other companies will contain a similarly sizeable proportion of iron and steel. The total mass of MHI Vestas's wind turbines varies from 230 to 600 tonnes, depending on the hub height.[22] Other minerals they mention are aluminium (1%), copper (0.4% to 1%) and minerals contained in electronics (1%). These electronics could contain various other minerals, possibly including tin and tungsten.[23]

Box 1: Rare earth demand depends on the turbine type

The magnetic field used in turbines' generators is provided by either electromagnets, which need electricity applied to their copper windings (usually used in so-called geared turbines), or by permanent magnets (direct-drive turbines).[24] Direct-drive turbines use rare earth elements (praseodymium, neodymium, terbium and dysprosium), while geared turbines do not.

Currently, geared turbines make up the bulk of the installed base,[25] but by 2020 half of worldwide generators used offshore are expected to be using direct-drive turbines.[26] Direct-drive wind turbines are generally more reliable than geared models, yet they do use a more complicated and expensive low-speed generator. This type has generally been used in places where higher wind speeds would put more stress on the gearboxes (at sea) and it would be more difficult to access the turbine to perform maintenance.[27] Whether direct-drive turbines will gain prominence during this century as the dominant type of wind technology may have a large impact on rare earth (neodymium) demand,[28] although different sources provide conflicting predictions.[29]

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22 Vestas website, Powering sustainability, no date, <https://www.vestas.com/en/about/sustainability#!available-reports> (retrieved on 8 August 2017).

23 Vestas website, Powering sustainability, no date, <https://www.vestas.com/en/about/sustainability#!available-reports> (retrieved on 8 August 2017).

24 In the review of the report, Vestas pointed out that geared turbines can technically also make use of permanent magnets, although the majority of geared turbines use electromagnets.

25 World Bank Group, The Growing Role of Minerals and Metals for a Low Carbon Future, June 2017, <http://documents.worldbank.org/curated/en/207371500386458722/pdf/117581-WP-P159838-PUBLIC-ClimateSmartMiningJuly.pdf>, page 8 (retrieved on 8 August 2017).

26 The Crowne Estate, Marine Estate Research Report, 2011, <https://www.thecrownestate.co.uk/media/5694/use_of_rare_earth_metals_in_offshore_windfarms.pdf> (retrieved on 8 August 2017).
TNO, Materialen in de Nederlandse economie: Een kwetsbaarheidsanalyse, 1 December 2015, <https://repository.tudelft.nl/view/tno/uuid:4e88e2fb-d7fa-403d-a135-d42201c0de8a/> (retrieved on 8 August 2017).

27 World Bank Group, The Growing Role of Minerals and Metals for a Low Carbon Future, June 2017, <http://documents.worldbank.org/curated/en/207371500386458722/pdf/117581-WP-P159838-PUBLIC-ClimateSmartMiningJuly.pdf>, page 8 (retrieved on 8 August 2017).

28 World Bank Group, The Growing Role of Minerals and Metals for a Low Carbon Future, June 2017, <http://documents.worldbank.org/curated/en/207371500386458722/pdf/117581-WP-P159838-PUBLIC-ClimateSmartMiningJuly.pdf>, page 11 (retrieved on 8 August 2017).

29 On the one hand, a 2013 report by the International Energy Agency (IEA) estimates that less than 1 per cent of the world's neodymium production is used in the wind energy sector, and the organisation expects that this proportion of total production used by the wind energy sector will stay constant in the coming years, in part due to the increased use of rare earth in a myriad of products, ranging from LCD screens to rechargeable batteries. On the other hand, 2012 research carried out at the Massachusetts Institute of Technology indicates that neodymium demand is likely to increase by as much as 700 per cent over the next 25 years, in large part due to the growth of the wind energy sector. The World Bank estimates that neodymium demand for wind energy production alone will cause a global demand increase of 18 per cent over 2013 production levels. It is not entirely clear what is the cause of this discrepancy in the growth expectations for rare earth between these different organisations.
International Energy Agency, Technology Roadmap: Wind Energy, 2013, <http://www.iea.org/publications/freepublications/publication/Wind_2013_Roadmap.pdf>, page 27 (retrieved on 8 August 2017).
MIT News, Clean energy could lead to scarce materials, 9 April 2012 <http://news.mit.edu/2012/rare-earth-alternative-energy-0409> (retrieved on 8 August 2017).
World Bank Group, The Growing Role of Minerals and Metals for a Low Carbon Future, June 2017, <http://documents.worldbank.org/curated/en/207371500386458722/pdf/117581-WP-P159838-PUBLIC-ClimateSmartMiningJuly.pdf>, page 23 (retrieved on 8 August 2017).

3 | SOCIAL AND ENVIRONMENTAL RISKS AND IMPACTS IN THE WIND ENERGY SUPPLY CHAIN

Mines and other extractive operations often have significant adverse impacts on neighbouring communities and the environment. Among other things, extractive industries are frequently linked to armed conflict, corruption, human rights violations such as forced displacement, child labour, land grabbing, destruction of ecosystems, depletion or pollution of water supplies, and air and soil pollution. These are issues that are related to the mining industry in general, not just to the segment that supplies the wind energy sector. However, by using its leverage throughout the upcoming energy transition, the wind energy sector will have the opportunity to make a positive impact on the mining industry, by making sure it does not support such damaging mining practices.

There have been many social and environmental risks and impacts documented when it comes to the minerals used in wind turbines. For example, the Environmental Justice Atlas reports hundreds of conflicts between local communities and mining companies associated specifically with the extraction of aluminium, copper, cement, iron and rare earth metals.[30] These impacts are found in all of the main producing countries mentioned above, as well as in many other smaller producing countries. For the sake of brevity, SOMO has attempted to cluster the adverse impacts associated with the extraction of wind turbine minerals and to provide some concrete examples of each.

Threatening livelihoods of local communities and indigenous people

The mining of minerals has an impact on land and water use, resources that communities in many countries are heavily dependent on for their livelihoods. This particularly affects women. Mine operators may block access to water sources that communities depend on for their everyday needs. Mining operations have caused desertification and drought, which can fuel food insecurity (due to crop damage). Relocation of local communities often takes place without the communities' Free Prior and Informed Consent (FPIC), without adequate compensation and without being given new land with rich soil, basic infrastructure and access to drinking water. Women are often not included in decision-making processes about land and resources.

Indigenous communities are often most vulnerable to the impacts caused by mining activities, particularly in terms of displacement from traditional lands and the loss of traditional knowledge, practices and cultures. In Mongolia, for example, iron ore mining threatens to prevent nomadic herders from accessing the grounds they need.[31] Impacts can also be caused by companies' disengagement: through forced displacements, iron ore mining company African Minerals in Sierra Leone first made local communities dependent on the jobs it provided, only to then go bankrupt and leave local communities even more impoverished than they had been before its arrival (see Box 2 for more information).[32]

Health and safety issues for workers and local communities

Pollution of water, air and soil, water depletion and the destruction of the environment by mining

30 The Environmental Justice Atlas does not appear to report conflicts related to the extraction of all minerals or materials, and as such the five listed here are the materials reported on by the Atlas that are also used in the production of wind turbines. To consult the Environmental Justice Atlas, go to <https://ejatlas.org/commodity>.

31 SOMO, Impacts of the global iron ore sector, December 2014, <https://www.somo.nl/impacts-of-the-global-iron-ore-sector/> (retrieved on 8 August 2017).

32 SOMO, African Minerals in Sierra Leone, 1 April 2015, <https://www.somo.nl/african-minerals-in-sierra-leone/> (retrieved on 8 August 2017). Human Rights Watch, Sierra Leone: Mining Boom Brings Rights Abuses, 19 February 2014 <https://www.hrw.org/news/2014/02/19/sierra-leone-mining-boom-brings-rights-abuses> (retrieved on 8 August 2017).

companies has adverse impacts on communities that depend on these natural resources for their livelihoods. When contaminated wastewater from mining operations leaks into rivers and lakes, this causes water to become unfit for human consumption and use by local communities. Waste overflows, mud slides and dam bursts (at times destroying whole villages) have occurred.

A recent example of this was the 2015 Samarco disaster in Brazil, when a tailings dam at the Samarco iron mine burst, killing 19 people and displacing 6,000 more,[33] while polluting the nearby river Doce for hundreds of miles.[34] Mining also exposes workers and communities to air pollution, and potentially to dangerous levels of radiation. Accidents regularly take place in and around mines. Where safety standards are insufficient or are not upheld by mining companies, these accidents can have deadly consequences for mine workers.[35]

Environmental issues

The environmental impacts of mining include soil erosion, the formation of sinkholes, loss of biodiversity and contamination of soil, groundwater and surface water by chemicals from mining processes. As previously pointed out, contamination and chemical discharges can also have adverse health effects on local populations. Mining may also cause the destruction and disturbance of ecosystems, deforestation and loss of vegetation cover. In farming areas, mining often disturbs grazing and croplands. Copper, manganese and zinc are toxic, which increases pollution risks.[36] These minerals can leak into local groundwater and pose a danger to communities and animals through bioaccumulation in the plants or animals they eat. A prime example of large-scale soil erosion and mine dumps is BHP Billiton's Ok Tedi open-pit copper and gold mine in Papua New Guinea. This discharges 200,000 tonnes of waste into the local environment every day, polluting water supplies, soil and adversely affecting the lives of 30,000 people. [37]

Corruption and tax avoidance

Mining companies often provide an important potential source of tax revenue in the developing countries where they operate. However, corruption among government officials often inhibits this potential revenue stream.[38] Many governments across the world have provided mining companies with tax incentives, thereby lowering their tax revenue. Where companies have been subject to their host country's regular tax regime, mining companies have also been known to avoid paying taxes, using international tax avoidance structures to do so. Media reports of companies avoiding taxes in the mining sector – including Glencore and Vedanta in Zambia,[39] Paladin Resources in Malawi[40] and Rio Tinto in Mongolia[41] – are frequent.

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33 The Telegraph, One year on, Brazil battles to rebuild after the Samarco mining disaster, 15 October 2016, <http://www.telegraph.co.uk/business/2016/10/15/one-year-on-brazil-battles-to-rebuild-after-the-samarco-mining-d/> (retrieved on 8 August 2017).

34 The Guardian, Samarco dam collapse: one year on from Brazil's worst environmental disaster, 15 October 2016, <https://www.theguardian.com/sustainable-business/2016/oct/15/samarco-dam-collapse-brazil-worst-environmental-disaster-bhp-billiton-vale-mining> (retrieved on 8 August 2017).

35 Mines and Communities, South Africa Update, 28 November 2006, <http://www.minesandcommunities.org/article.php?a=117> (retrieved on 8 August 2017).

36 Reis, L.S.L.S., Pardo, P.E., Camargos, A.S., Oba, E., Mineral element and heavy metal poisoning in animals, 15 December 2010, <https://repositorio.unesp.br/bitstream/handle/11449/137100/ISSN1119-3999-2010-01-12-560-579.pdf?sequence=1> (retrieved on 8 August 2017).

37 Chu, B.S.P., the BHP and Ok Tedi case, 1984-2000: issues, outcomes and implications for corporate social reporting, 2001, <https://www.unisa.edu.au/Global/business/centres/cags/docs/apcea/APCEA_2001_7(1)_Chu.pdf> (retrieved on 8 August 2017).
WWF website, Ok Tedi, Papua New Guinea: Belching out copper, gold and waste, no date, <http://wwf.panda.org/what_we_do/where_we_work/new_guinea_forests/problems_forests_new_guinea/mining_new_guinea/ok_tedi_forest_new_guinea/> (retrieved on 8 August 2017).

38 The Bribe Payers Index (2011), an index that charts the perception of corruption associated with 19 business sectors globally, reported that the mining sector was the fifth worst sector in terms of how much bribery takes place.
Transparency International, Bribe Payers Index Report 2011, 2011, <https://www.transparency.org/bpi2011/results>.

39 War on Want, <http://www.waronwant.org/sites/default/files/WarOnWant_ZambiaTaxReport_web.pdf> (retrieved on 8 August 2017).

40 ActionAid, The poorest country in the world lost US$43 million in six years to combination of tax avoidance and tax breaks by a single mining company, 18 June 2015, <http://www.actionaid.org/zambia/news/poorest-country-world-lost-us43-million-six-years-combination-tax-avoidance-and-tax-brea> (retrieved on 8 August 2017).

41 Reuters, Special report: In tax case, Mongolia is the mouse that roared, 16 July 2013, <http://www.reuters.com/article/us-dutch-mongolia-tax-idUSBRE96F0B620130716> (retrieved on 8 August 2017).

A 2016 report commissioned by the Dutch government[42] explores possible policy initiatives the Dutch government could undertake to tackle tax avoidance by international mining groups that draw on subsidiaries within the Netherlands. The report highlights the risk of the Netherlands being used as a conduit country for financial flows, allowing companies to use the Netherlands' many Double Taxation Agreements to avoid paying taxes in developing countries. Given the increasing demand for and production of specific minerals destined for wind turbines, it will likewise become increasingly important that the companies extracting them pay their fair share in taxes in the countries where they are mined.

Violence and (armed) conflict

Mining activities can fuel violence and (armed) conflict in many ways. Sometimes it finances armed groups and security forces. Sometimes local groups who oppose mining activities are violently suppressed by the government. Many minerals used in wind turbines – aluminium, copper, cement minerals, iron, lead, manganese, molybdenum and nickel – are associated with fuelling conflict in multiple countries.[43] Violence also often occurs between the police or military and illegal miners trespassing on the mine sites. This may lead to the local police opening fire on illegal miners and passers-by. In some areas artisanal and small-scale mining takes place alongside large-scale formal mining, which can give rise to conflicts.

Other risks associated with the wind energy supply chain

The issues described above are all related to the mining of minerals used in the production of wind energy, which is the focus of this report. However, several other risks are associated with the production of wind turbines elsewhere in the supply chain. For example, production of wind turbine components takes place in China, among other places, where human and labour rights of workers are often not protected. Although wind energy itself is relatively environmentally friendly, CO2 emissions take place during the production of the wind turbines, and the transportation of minerals and component parts is mostly fossil fuel powered.

Mining-related social and environmental risks are not the only risks encountered along the wind energy supply chain. Committing to sustainable sourcing of minerals for the production of wind energy would be a big step in the right direction, but would not address all supply chain risks related to wind energy production.

42 Profundo, Tax avoidance by mining companies in developing countries, 23 December 2016, <https://www.rijksoverheid.nl/documenten/rapporten/2016/12/23/tax-avoidance-and-mining-report> (retrieved on 8 August 2017).

43 SOMO, There is more than 3TG, 1 February 2015, <https://www.somo.nl/there-is-more-than-3tg/>, page 6 (retrieved on 8 August 2017).

Children in Kankoyo, Zambia are playing in front of Glencore's Mopani underground copper mine. The community in Kankoyo suffers badly from the air and environmental polution caused by the mining operations.

© Kadir van Lohuizen/NOOR for ActionAid

Box 2: Concrete examples of adverse impacts caused by the mining of minerals used in wind turbines

Neodymium: China – Large-scale water and air pollution

The sourcing of one of the most important minerals for generators – the neodymium in the permanent magnet – takes place in China. China produces 90 per cent of the world's rare earth neodymium. However, in the city of Baotou (North China), a humanitarian disaster is taking place.

In order to extract neodymium, it is mixed with uranium and thorium. These radioactive elements, along with a slew of other toxic chemicals, get dumped into the local environment after use.[44] In fact, for every tonne of neodymium produced, it has been reported that between 340,000 and 420,000 cubic feet of poisonous gases are produced along with 2,600 cubic feet of acidic water and one tonne of radioactive waste.[45] A pool of more than 120 km^2 full of toxic mud and waste has appeared. As a result, groundwater in the area is radioactive, the air contains high concentrations of toxic substances, and plants, animals and people have become ill and died. In the meantime, poisonous water from the lake is slowly mixing with water of one of China's main waterways, the Yellow River.[46]

Cobalt: DRC – Child labour

More than half of the world's total supply of cobalt comes from DRC.[47] According to the government's own estimates, 20 per cent of the cobalt currently exported from the DRC comes from artisanal miners in the southern part of the country. There are approximately 110,000 to 150,000 artisanal miners in this region, working alongside much larger industrial operations. Among these artisanal miners are children as young as seven who scavenge for rocks containing cobalt in the discarded by-products of industrial mines, and who wash and sort the ore before it is sold.[48] Children reportedly work between 10-12 hours a day in and around these cobalt mines, often carrying sacks of mineral ore weighing between 20-40 kg.[49]

44 De Groene Rekenkamer, Windenergie in Nederland: De dodelijke keerzijde van windenergie, November 2013, <http://www.groenerekenkamer.nl/1795/windenergie-nederland-de-dodelijke-keerzijde-van-windenergie/> (retrieved on 8 August 2017).

45 Unrepresented Nations & Peoples Organization, Inner Mongolia: Mining of Rare Earth Elements Threatens Local Environment, 13 April 2015, <http://unpo.org/article/18120> (retrieved on 8 August 2017).

46 De Groene Rekenkamer, Windenergie in Nederland: De dodelijke keerzijde van windenergie, November 2013, <http://www.groenerekenkamer.nl/1795/windenergie-nederland-de-dodelijke-keerzijde-van-windenergie/> (retrieved on 8 August 2017).

47 US Geological Survey, Mineral Commodity Summary: Cobalt, January 2017, <https://minerals.usgs.gov/minerals/pubs/commodity/cobalt/mcs-2017-cobal.pdf> (retrieved on 8 August 2017).

48 Amnesty International, "This is what we die for", 2016, <https://www.amnesty.org/en/documents/afr62/3183/2016/en/> (retrieved on 8 August 2017).
US Department of Labor, List of Goods Produced by Child Labor or Forced Labor, Required by the Trafficking Victims Protection Reauthorization Act of 2005, September 2016, <https://www.dol.gov/sites/default/files/documents/ilab/reports/child-labor/findings/TVPRA_Report2016.pdf> (retrieved on 8 August 2017).

49 Amnesty International, "This is what we die for", 2016, <https://www.amnesty.org/en/documents/afr62/3183/2016/en/> (retrieved on 8 August 2017); US Department of Labor, List of Goods Produced by Child Labor or Forced Labor, Required by the Trafficking Victims Protection Reauthorization Act of 2005, September 2016, <https://www.dol.gov/sites/default/files/documents/ilab/reports/child-labor/findings/TVPRA_Report2016.pdf> (retrieved on 8 August 2017).

Copper: Zambia – Impact on women

Zambia is known to have large copper reserves of the highest grade in the world, and continues to be an important copper supplier globally. Large-scale copper extraction in Zambia is focused in two north-western provinces. People living in poverty have generally not benefitted from mining in Zambia; women and children face specific challenges and are arguably the most adversely impacted by the copper mining industry. A 2015 study by ActionAid found that these impacts range from only having access to the lowest paid work, if any, to severe health issues caused by pollution. In addition, there are several gaps in the legal framework leaving women's rights unprotected. Forced displacement as well as air and water pollution caused by copper mining were reportedly found to affect women more than other community members. This led to serious psychological, social, economic, health and physical stress. Furthermore, gender-based violence, an increase in alcohol abuse and prostitution were found to be common social impacts in communities around large-scale mining industries.[50]

Sierra Leone: Iron – Community and labour rights violations

Until 2015, the company African Minerals was Sierra Leone's largest producer of iron ore. The company forced local communities to resettle in order to make way for its mine. Where they had previously been able to subsist on their own farming, community members now found themselves on arid land incapable of growing crops. They were provided with insufficient compensation for the loss of their land.[51] When workers at the company's Tonkolili iron mine protested against their poor working conditions and violations of their freedom of association, they were attacked by police, who fired their guns as well as tear gas canisters at them. African Minerals went bankrupt in 2015, and its Tonkolili mine has stopped production, leaving local workers and communities that depended on the mine for their livelihood in dire straits.[52]

Liberia: Iron ore – Corruption

In 2016, a Global Witness exposé revealed that UK mining company Sable Mining had paid large amounts of "consulting fees" to senior Liberian government officials in the hope that they would allow the company to acquire the concessionary rights to exploit the country's largest iron ore deposit, the Wologizi concession. The company did not receive rights to the concession, but did report that it received lucrative rights to transport iron ore from one of its mines in neighbouring Guinea to the Liberian coast using an existing railroad track. Leaked documents also showed that Sable Mining made a $25,000 payment to a member of the ruling party earmarked to bring about the resignation of the party's then secretary general, Henry Fahnbulleh. Mr. Fahnbulleh resigned several months after the payment was made.[53]

50 ActionAid, Impacts of Mining Extractive Industries on Women in Zambia, 2015, <http://www.actionaid.org/sites/files/actionaid/press_releases/impact_of_the_mining_industry_on_women_in_zambia_-_small.pdf> (retrieved on 8 August 2017).

51 Human Rights Watch, Sierra Leone: Mining Boom Brings Rights Abuses, 19 February 2014, <https://www.hrw.org/news/2014/02/19/sierra-leone-mining-boom-brings-rights-abuses> (retrieved on 8 August 2017).

52 SOMO, African Minerals in Sierra Leone, 1 April 2015, <https://www.somo.nl/african-minerals-in-sierra-leone/> (retrieved on 8 August 2017).

53 Global Witness, Global Witness Exposes Bribes to Top Liberian Officials by UK Mining Company and Varney Sherman, 11 May 2016, <https://www.globalwitness.org/en/press-releases/global-witness-exposes-bribes-top-liberian-officials-uk-mining-company-and-varney-sherman/> (retrieved on 8 August 2017).

4. | GOVERNMENT RESPONSIBILITY IN A SUSTAINABLE TRANSITION

The Dutch government aims to promote renewable energy and has set a target of 14 per cent of all energy to be generated from renewable sources by 2020, rising to 16 per cent by 2023.[54] The Dutch portion of the North Sea is well suited for offshore wind development due to its favourable wind conditions, relatively shallow waters and good harbour facilities. The government is seeking to reach a production capacity of 4,450 MW through offshore wind by 2023, which should provide five million Dutch households with energy.[55]

Licenses for a growing number and size of Dutch offshore wind farms

The Ministries of Economic Affairs and Infrastructure & Environment announced the creation of five new offshore wind farms from 2015-2019.[56] Each tender will lead to the construction of a wind farm with a capacity of about 700 MW. Two of these tenders have not been awarded yet, while the third tender will likely be awarded in the first quarter of 2018,[57] as shown in Figure 3.

Apart from these very large projects, the largest offshore wind farm in the Netherlands in terms of capacity is the **Gemini** project, which has a total of 150 wind turbines and 600 MW total capacity. The farm was completed in May 2017 and delivers wind energy for 785,000 households. The **Gemini** wind farm is located to the north of the Dutch Wadden Islands.[58]

The development of large-scale wind energy projects at sea will continue beyond 2023, as the government is working on a roadmap for the period 2023-2030 and a long-term perspective for 2030-2050.[59] The Dutch government has set a target for the creation of an additional seven wind farms with a minimum total capacity of 1,000 MW each.[60] Figure 4 shows the current situation and the expected growth of wind energy in the Netherlands. The government is reportedly committed to upholding its leading role in the rollout of large-scale offshore wind farms.[61]

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54 Ministerie van Infrastructuur en Milieu and Ministerie van Economische Zaken, Rijksstructuurvisie Windernergie op Zee, December 2014, <https://www.rijksoverheid.nl/documenten/beleidsnota-s/2014/09/26/rijksstructuurvisie-windenergie-op-zee>, page 7 <retrieved on 8 August 2017>.

55 Rijksoverheid website, Windenergie op zee, no date, <https://www.rijksoverheid.nl/onderwerpen/duurzame-energie/windenergie-op-zee> (retrieved on 8 August 2017).

56 Ministerie van Infrastructuur en Milieu and Ministerie van Economische Zaken, Rijksstructuurvisie Windernergie op Zee, December 2014, <https://www.rijksoverheid.nl/documenten/beleidsnota-s/2014/09/26/rijksstructuurvisie-windenergie-op-zee>, page 13 (retrieved on 8 August 2017).

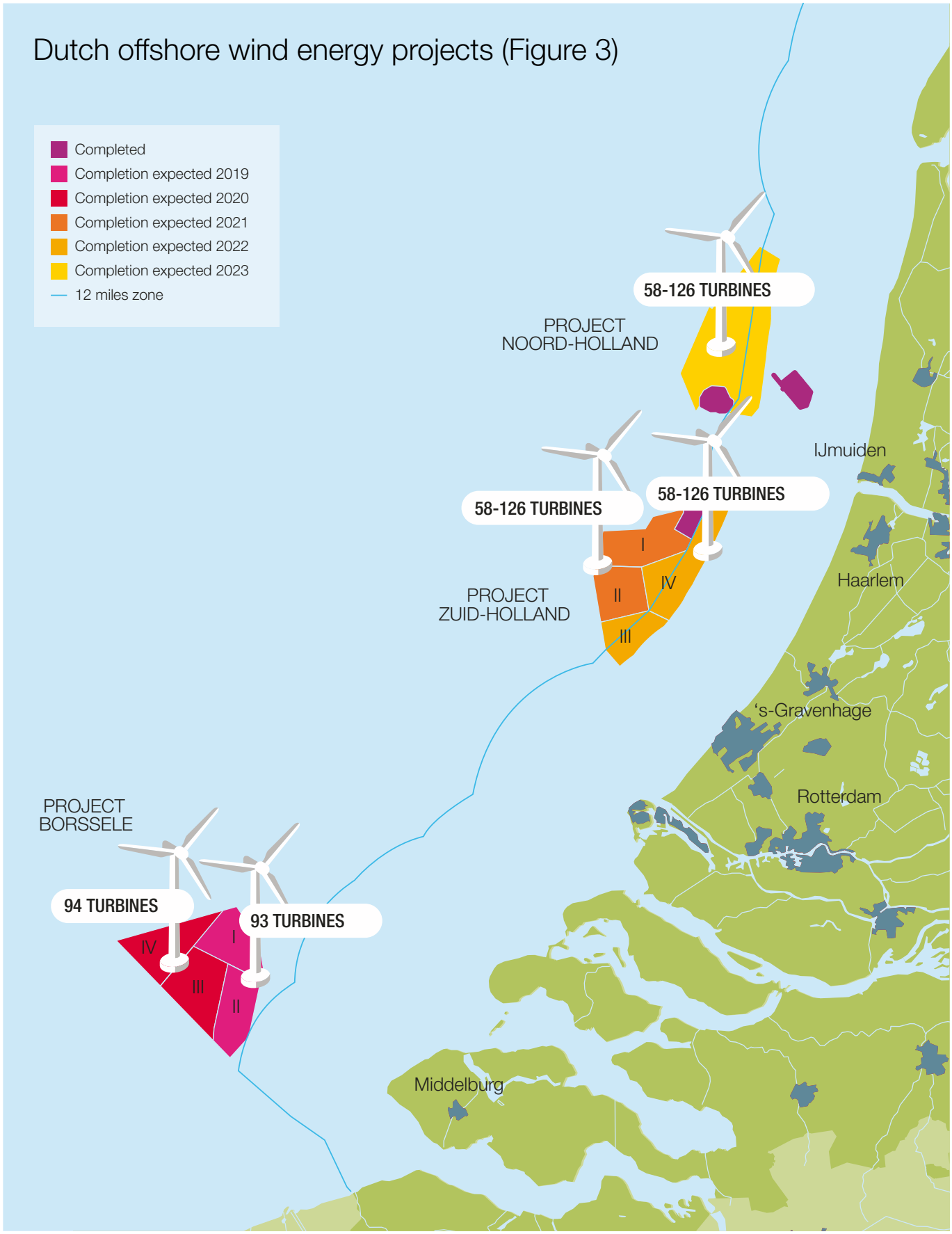
57 Rijksdienst voor Ondernemend Nederland website, Windgebied Hollandse Kust - zuid - kavels I en II, no date, <https://www.rvo.nl/subsidies-regelingen/stimulering-duurzame-energieproductie/categorie%C3%ABn/sde-windenergie-op-zee/windgebied-hollandse-kust-i-en-ii> (retrieved on 2 January 2018).

58 NWEA website, Windparken op zee in Nederland, no date, <http://www.nwea.nl/windenergie/windenergie-op-zee/892-windparken-op-zee-in-nederland> (retrieved on 8 August 2017).

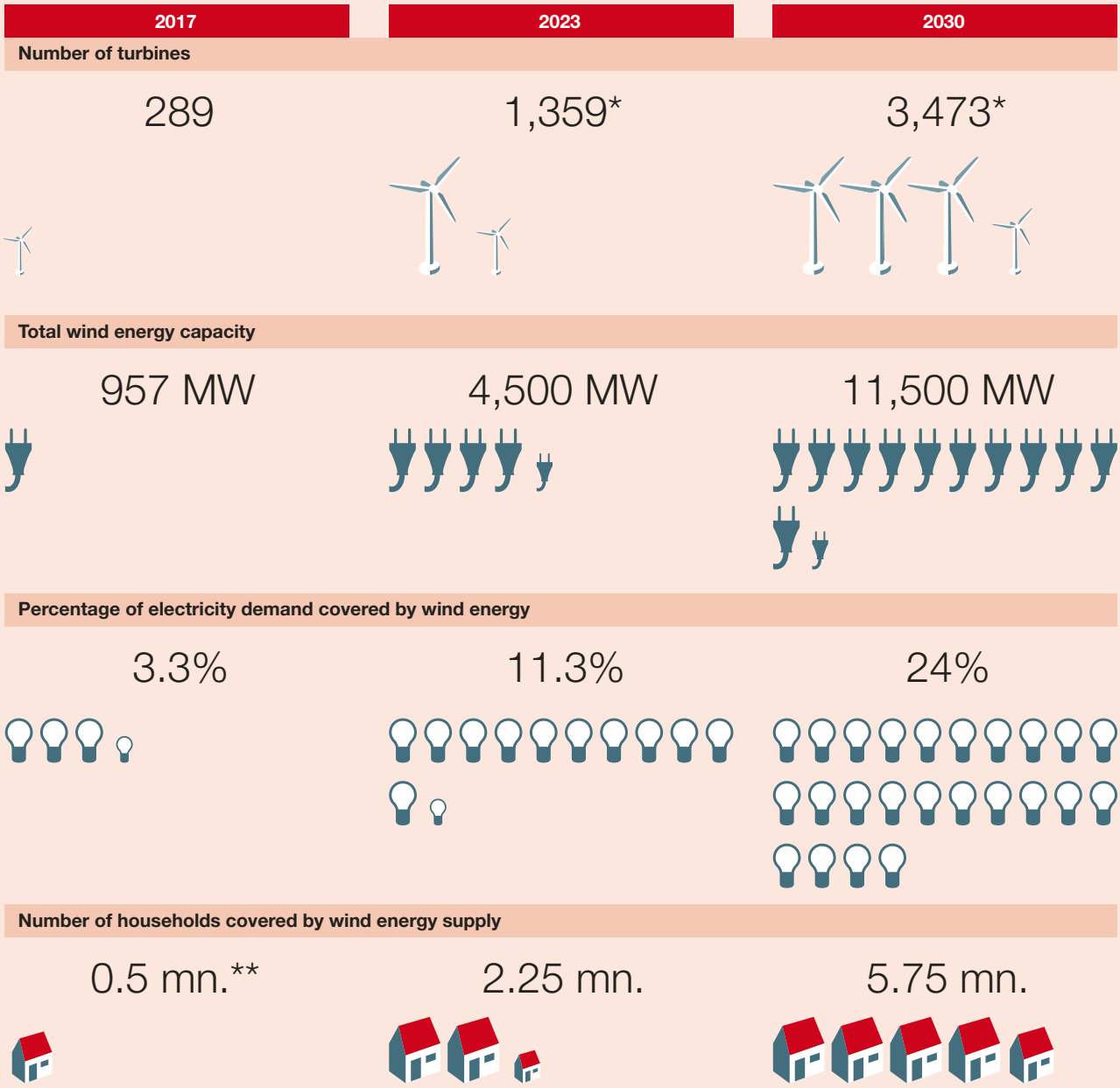
59 Presentatie EZ vervolgroutekaart wind op zee stakeholderbijeenkomst 6 April 2017

60 Rijksoverheid, Eerste subsidieloze Nederlandse windpark in zicht, 28 June 2017, <https://www.rijksoverheid.nl/actueel/nieuws/2017/06/28/eerste-subsidieloze-nederlandse-windpark-in-zicht> (retrieved on 8 August 2017).

61 Ministerie van Economische Zaker, Energieagenda: Naar een C02-arme energievoorziening, December 2016, <https://www.rijksoverheid.nl/documenten/rapporten/2016/12/07/ea>, page 41 (retrieved on 15 August 2017).


Dutch offshore wind energy projects (Figure 3)
Completed
Completion expected 2019
Completion expected 2020
Completion expected 2021
Completion expected 2022
Completion expected 2023
12 miles zone
58-126 TURBINES
PROJECT
NOORD-HOLLAND
IJmuiden
58-126 TURBINES
58-126 TURBINES
I
II
III
IV
PROJECT
ZUID-HOLLAND
Haarlem
's-Gravenhage
Rotterdam
PROJECT
BORSSELE
94 TURBINES
93 TURBINES
I
II
III
IV
Middelburg

Expected growth of Dutch offshore wind energy (Figure 4)



* Total number of households is currently 7.7 mn.
** Estimate of the future amounts of wind turbines have not taken potential efficiency gains into account.Therefore, these figures are likely to turn out lower.

The 2023 and 2030 numbers are estimates based on the planned offshore wind energy growth planned by the Dutch government.
Source: WINDSTATS.NL for current numbers, Dutch government official websites for future plans, Netbeheer Nederland's report Energie in Cijfers for an estimate of future energy consumption, calculations by SOMO.

Protecting human rights in subsidy and permit authorisation: potential policy incoherence

In 2015, the Dutch government implemented a subsidy scheme for offshore wind power, as part of the so-called Encouraging Sustainable Energy Production (SDE+) scheme, which is run by the Netherlands Enterprise Agency (RVO). In order to make wind farms commercially viable, companies interested in setting up wind farms were offered a subsidy.

Previously, the company that provided the offer that relied least on subsidy received the permits

and subsidy to build and run wind farms. Over the past several grant periods, subsidies for these wind licences have been decreasing much more quickly than anticipated,[62] and the Minister of Economic Affairs recently announced that the upcoming tenders for **Zuid-Holland I** and **II** will initially be opened without subsidies.[63] For the upcoming tenders for offshore wind farms, however, bids will be evaluated based on criteria established in the 2015 Offshore Wind Energy Act. The deciding factor will no longer be the lowest price, but rather the quality of the bidding party, the quality of the design and the quantity of electricity that will be produced. Over the coming period, six criteria will be developed in a new Ministerial Order for Offshore Wind Energy. If the subsidy-free procedure fails to yield an acceptable bid, a tender that includes subsidies will be opened. These bids will then be ranked based on the bid price, as with previous tenders.[64]

In granting permits for the wind farms needed to meet increased offshore wind energy targets, the Dutch government has looked into certain environmental impacts, and has also evaluated other potential impacts on fisheries, shipping navigation, soil, water and recreation. The Dutch government has also examined the impact new offshore wind farms might have on oil and gas extraction, and concluded that any such farms should not block extractive activities.[65] The **Borssele III and IV** tenders required applicants to describe how the project would benefit the local economy in terms of job creation. The **Zuid-Holland I and II** description refers to ensuring economic, social and environmental benefits for both local communities and the Netherlands as a whole.

However, neither the Offshore Wind Energy Act and SDE+ subsidy scheme[66] nor the tender documents themselves include an evaluation of whether the applicants conducted due diligence to identify and address (risks of) adverse human rights and environmental impacts in the wind turbine supply chain. This seems to point to policy incoherence in the Dutch government. By adhering to the OECD Guidelines, the Dutch government has made a binding commitment to "recommend to multinational enterprises operating in or from [Dutch] territory the observance of the Guidelines" (emphasis added).[67] This means that the Dutch government should be encouraging even non-Dutch companies such as MHI Vestas and Siemens Gamesa to conduct due diligence in accordance with the OECD Guidelines when those companies are active in the Netherlands. The UNGPs are even clearer about the responsibility of the Dutch government for ensuring respect for human rights when it enters the "state-business nexus" by contracting with companies through the permitting process. The UNGPs note that, "States should exercise adequate oversight in order to meet their international human rights obligations when they contract with business enterprises to provide services that may impact upon the enjoyment of human rights".[68] The Dutch government's current permitting process neither encourages companies to conduct due diligence nor exercises oversight in this regard over the companies to which it grants permits and thus appears to be inconsistent with the government's international commitments to implement the OECD Guidelines and UNGPs. At the very least it is a missed opportunity to promote and encourage compliance with the OECD Guidelines and UNGPs.

62 In 2014, the government set itself a target to lower the cost of offshore wind power by 40 per cent by 2024. This goal was achieved in 2016 already. Ministerie van Economische Zaker, Energieagenda: Naar een C02-arme energievoorziening, December 2016, <https://www.rijksoverheid.nl/documenten/rapporten/2016/12/07/ea> (retrieved on 15 August 2017).

63 Rijksoverheid, Eerste subsidieloze Nederlandse windpark in zicht, 28 June 0217, <https://www.rijksoverheid.nl/actueel/nieuws/2017/06/28/eerste-subsidieloze-nederlandse-windpark-in-zicht> (retrieved on 8 August 2017).

64 Rijksdienst voor Ondernemend Nederland, Hollandse Kust (Zuid) Wind Farm Zone, no date, <http://english.rvo.nl/hollandse-kust-zuid-wind-farm-zone> (retrieved on 15 August 2017).

65 Ministerie van Infrastructuur en Milieu and Ministerie van Economische Zaken, Rijksstructuurvisie Windernergie op Zee Aanvulling gebied Hollandse Kust, December 2016, <https://www.rijksoverheid.nl/documenten/rapporten/2016/12/08/bijlage-1-rijksstructuurvisie> (retrieved on 15 August 2017).

66 SDE+ itself only contains sustainability criteria for solid biomass, something that is not applicable for wind turbines. Rijksdienst voor Ondernemend Nederland website, Sustainability criteria for solid biomass, no date, <http://english.rvo.nl/subsidies-programmes/sde/sustainability-criteria> (retrieved on 15 August 2017).

67 OECD, Declaration on International Investment and Multinational Enterprises, 25 May 2011, <http://www.oecd.org/daf/inv/mne/48004323.pdf> (retrieved on 15 August 2017).

68 UN Office of the High Commissioner for Human Rights, Guiding Principles on Business and Human Rights, 2011, GP 5, p.8, <http://www.ohchr.org/Documents/Publications/GuidingPrinciplesBusinessHR_EN.pdf> (retrieved on 18 September 2017).

Though the permitting process is not the same as the processes related to public procurement, it is interesting to review how the Dutch government applies social and environmental criteria in procurement. Public procurement rules require higher standards of transparency and more stringent sustainability criteria. Applying so-called **international social criteria** becomes an obligation once a concession exceeds the specific European value threshold of €5.2 million.[69] The Dutch government has adopted these social criteria and imposed them on itself.[70] Box 3 explains how these **international social criteria** are normally applied. By applying these criteria, the Dutch government can exert a great deal of influence on the market and require corporate actors to identify and address social and environmental risks and impacts, including those in the supply chain.[71]

Box 3: Public procurement and international social criteria

It is mandatory for national public institutions to include **international social criteria** (ISC) if government contracts have a total value greater than or equal to European public procurement thresholds (€5.2 million for concessions).[72] The ISC focus on promoting international labour standards and human rights, including combating forced labour, slavery, child labour and unfair discrimination. Public tenders are required to include these social conditions in the tender documentation as special terms and conditions that determine performance, but they can also be included in the award criteria.[73]

Guidance on how to do this and on how to evaluate candidates or manage the performance of the contract is available online.

The tool highlights the energy sector as having high environmental and social risks. The guidance refers to a national sector risk analysis that mentions the issues of rare earth (neodymium) mining in China, which causes very serious environmental pollution and major health risks for the local population (see Box 2 for concrete examples of adverse impacts caused by the mining of minerals used in wind turbines).[74] It is not entirely clear whether the use of these criteria has led to companies making concrete improvements in dealing with human rights risks in their supply chain, but it seems likely that the impact of using these criteria depends on how strictly they are enforced and monitored by the government authority responsible for the tender, as well as whether the company that won the tender is willing and able to analyse its entire supply chain, all the way to the source of the materials it uses.

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69 EU law sets minimum harmonised rules for tenders whose monetary value exceeds a certain amount and that are presumed to be of cross-border interest. The European rules ensure that the award of contracts of higher value for the provision of public goods and services must be fair, equitable, transparent and non-discriminatory. For tenders of lower value, national rules apply that are nevertheless subject to general principles of EU law. European Commission website, Thresholds, no date, <https://ec.europa.eu/growth/single-market/public-procurement/rules-implementation/thresholds_en> (retrieved on 15 August 2017).

70 Pianoo website, Social conditions in global supply chains, no date, <https://www.pianoo.nl/public-procurement-in-the-netherlands/sustainable-public-procurement-spp/spp-themes/social-conditions-in-global-supply-chains> (retrieved on 15 August 2017).

71 Apart from wind permits, government bodies can also buy a wind farm or wind turbines for their own use or to profit their general budget by selling the electricity themselves. This should be done according to Dutch public procurement law. However, due to cost considerations, it is apparently more common that a partnership with a consultancy or other private players is established. Such service contracts should be selected through a (European) tender procedure, with a maximum value threshold of €200,000.

72 Pianoo website, Productgroep: Elektriciteit, no date, <https://www.pianoo.nl/document/10577/productgroep-elektriciteit> (retrieved on 15 August 2017).

73 Pianoo website, Social conditions in global supply chains, no date, <https://www.pianoo.nl/public-procurement-in-the-netherlands/sustainable-public-procurement-spp/spp-themes/social-conditions-in-global-supply-chains> (retrieved on 15 August 2017).

74 KPMG, MVO Sector Risico Analyse, September 2014, <https://www.rijksoverheid.nl/documenten/rapporten/2014/09/01/mvo-sector-risico-analyse>, page 87 (retrieved on 15 August 2017).

5.| CORPORATE SUPPLY CHAIN RESPONSIBILITY IN A SUSTAINABLE ENERGY TRANSITION

As indicated, companies that produce wind turbines using the aforementioned minerals are at risk of contributing to a broad range of human rights abuses and environmental damage via their global mineral supply chains. However, according to international normative standards for responsible business conduct, such as the OECD Guidelines and the UNGPs, companies all along the value chain – including downstream (end-user) companies such as wind turbine manufacturers – should respect human rights and conduct human rights due diligence to prevent, mitigate and remediate any adverse impacts. Although significant differences are likely to exist between the supply chains of different turbine producers, depending on the type of turbine and the resulting types of materials used, all wind turbine types contain at least several materials for which human rights risks have been identified along the supply chain (see Figure 1 and Chapter 3). It is important, therefore, that all wind turbine producers should commit to conducting human rights due diligence.

Even if a company sources only a small amount of a certain metal from a problematic mine to produce wind turbines thousands of miles away, the company must take responsibility for avoiding adverse human rights impacts. Furthermore, it should use its leverage over business partners closer to the actual impact to improve conditions on the ground. Box 4 gives more information on the international normative framework for responsible business conduct.

The construction of a wind farm involves a wide range of companies providing different products and services – energy companies, turbine manufacturers, construction companies, installers, engineers, banks, pension funds, consulting companies and law firms.[75] Each of these companies has an individual responsibility to conduct risk-based due diligence, including an environmental and social impact assessment, during the process of applying for the permit and executing the installation of the wind farms. They must also be transparent about the origin of their materials and account for the steps that they have taken to identify and avoid adverse impacts in their own operations and along their supply chains.[76]

Box 4: The international normative framework for responsible business conduct

The OECD Guidelines and the UNGPs are the most comprehensive sets of government-backed recommendations on responsible business conduct that exist today. They contain far-reaching endorsements addressed by governments to multinational enterprises operating in or from adhering countries. The Netherlands adheres to the guidelines, which provide businesses with principles and standards for responsible business conduct in areas relevant to the energy sector such as employment and industrial relations, human rights, environment, information disclosure, combating bribery, consumer interests, science and technology, competition and taxation. Companies are expected to undertake a process called 'due diligence' to identify, prevent, mitigate and remediate adverse impacts on human rights and the environment, and accounting for how risks are identified and addressed. Due diligence is a risk management process wherein companies assess actual and potential human rights impacts, integrate and act on their findings, track responses and communicate about how impacts are

75 NRC, Iedereen wil mee de zee op, 3 October 2015, https://www.nrc.nl/nieuws/2015/10/03/iedereen-wil-mee-de-zee-op-1540217-a1156045, retrieved on 15 August 2017.

76 SOMO, Dredging in the Dark, 1 March 2016, https://www.somo.nl/dredging-in-the-dark/, retrieved on 15 August 2017.

addressed.[77] Importantly, companies are not only expected to identify, prevent and mitigate impacts that they themselves cause, or to which they contribute, but they are also expected to mitigate any impacts caused by other businesses or governments that are linked to their products or services. Companies should establish a system of controls and transparency over the mineral supply chain and a company-level grievance mechanism as an early-warning risk-awareness system. They should publicly report on their supply chain due diligence policies and practices.

The OECD has developed an international framework to help companies meet their due diligence reporting requirements: **OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas.**[78] It provides a roadmap to help companies (both **downstream** – like wind turbine manufacturers and energy companies; and **upstream** – like mining companies and smelters) to avoid contributing to conflict through their mineral purchasing practices. Although the guidance acknowledges that due diligence efforts should differ on a case-by-case basis, it does outline five steps a company should take when carrying out due diligence. These five steps are: establishing strong company management systems; identifying and assessing risk in the supply chain; designing and implementing a strategy to respond to identified risks; carrying out independent third-party audits of supply chain due diligence; and reporting on supply chain due diligence.[79] The guidance itself applies to companies in the supply chain of all minerals, and it also includes a supplement on the "conflict minerals" tin, tungsten, tantalum and gold, outlining the recommended steps companies should take to identify and respond to risks in these particular supply chains.[80]

Companies active in the Dutch offshore wind energy market

The most important companies involved in the current large-scale offshore wind energy sector in the Netherlands are:

- Wind turbine producers Siemens Gamesa Renewable Energy[81] and MHI Vestas Offshore Wind[82] are the leading offshore wind turbine suppliers in the Netherlands. These two companies supply subsidised Dutch offshore wind projects with hundreds of turbines. MHI Vestas supplies 93 turbines for **Borssele III and IV.**[83] and Siemens Gamesa supplies 150 wind turbines in the Gemini farm and 94 for **Borssele I and II**. Each commands about one-third of the Dutch market. Enercon, Lagerwey, General Electric and Nordex are also active on the Dutch market.[84]
- Dredging company Van Oord seems to have the best position on the construction of offshore wind farms, having built the **Gemini** farm and **Borssele II and IV**. However, competition from other dredging and construction companies like Boskalis and DEME is to be expected. Sif Group and Smulders build foundations for offshore wind turbines; they have supplied dozens of projects in northern Europe, including the Netherlands.[85]

77 UN Guiding Principles Reporting Framework, UN Guiding Principles Reporting Framework with implementation guidance, 2015, https://www.ungpreporting.org/wp-content/uploads/UNGPReportingFramework_withguidance2017.pdf, page 110, retrieved on 15 August 2017.

78 OECD, OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas, 2016, <http://www.oecd.org/daf/inv/mne/OECD-Due-Diligence-Guidance-Minerals-Edition3.pdf> (retrieved on 15 August 2017).

79 OECD, OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas, 2016, <http://www.oecd.org/daf/inv/mne/OECD-Due-Diligence-Guidance-Minerals-Edition3.pdf>, page 17 (retrieved on 15 August 2017).

80 OECD, OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas, 2016, <http://www.oecd.org/daf/inv/mne/OECD-Due-Diligence-Guidance-Minerals-Edition3.pdf>, page 4 (retrieved on 15 August 2017).

81 On April 3, 2017, Germany-based Siemens Wind Power and Spain-based Gamesa merged to create Siemens Gamesa Renewable Energy.

82 MHI Vestas Offshore Wind is a joint venture between Demark-based Vestas and Japan-based Mitsubishi (Vestas itself only produces and sells onshore wind turbines).

83 MHI Vestas Offshore Wind website, MHI Vestas appointed preferred supplier for Borssele 3 & 4, 13 December 2016, <http://www.mhivestasoffshore.com/borssele-3-and-4/> (retrieved on 18 September 2017).

84 See WINDSTATS.NL for a ranking of leading wind turbine suppliers in the Netherlands and Bloomberg New Energy Finance for worldwide ranking.

85 Smulders website, Offshore Wind, no date, <http://www.smulders-projects.com/en/offshore-wind> (retrieved on 15 August 2017). SIF Group website, Projecten, no date, <https://sif-group.com/nl/wind/projecten#list> (retrieved on 15 August 2017).

- Energy companies in the Netherlands, such as Eneco, Ørsted (until recently known as Dong Energy), Essent/Innogy, Vattenfall and Shell also appear keen to expand their shares in wind energy.[86] Ørsted is currently operating 17 offshore wind farms across the UK, Germany and Denmark.[87] The company won **Borssele I and II**. A consortium made up of Eneco, Mitsubishi, Van Oord and Shell won Borssele **III and IV**.[88] Other organisations that have reportedly shown interest in investing in the Dutch wind energy sector include Statoil and EnBW.[89]
- Apart from obtaining the wind permit, contractors also get access to the electricity network of TenneT.[90] This is the national high-voltage grid operator, which is 100 per cent owned by the Dutch government. TenneT is responsible for wind farms' grid connection and for upgrading the grid infrastructure needed for the new offshore wind farms.[91]

86 Hilbert Kok, branch specialist offshore wind energy, Nederlandse WindEnergie Associatie (NWEA), email 14 December 2017.

87 Dong Energy, DONG Energy signs agreement with Siemens Gamesa for wind turbines for the Borssele 1 and 2 offshore wind farm, 6 July 2017, <http://www.dongenergy.com/en/media/newsroom/news/articles/agreement-with-siemens-gamesa-for-wind-turbines-for-the-borssele-1-and-2-offshore-wind-farm> (retrieved on 15 August 2017).

88 Rijksdienst voor Ondernemend Nederland website, Subsidie en vergunningronde Borssele, kavels III en IV, no date, <https://www.rvo.nl/subsidies-regelingen/stimulering-duurzame-energieproductie/categorie%C3%ABn/sde-windenergie-op-zee/windgebied-borssele-iii-en-iv> (retrieved on 2 January 2018).

89 Flux Energie, "Buitenlandse kandidaten vergroten kans op subsidieloos windpark" https://www.fluxenergie.nl/59641-2/ (retrieved on 2 January 2018).

90 Rijksdienst voor Ondernemend Nederland website, SDE+ Offshore Wind Energy, no date, <http://english.rvo.nl/subsidies-programmes/sde/sde-offshore-wind-energy> (retrieved on 15 August 2017).

91 Global Wind Energy Council, Global Wind Report 2016, 5 May 2017, <http://gwec.net/publications/global-wind-report-2/> (retrieved on 15 August 2017).

Febby Bwalya carrying her baby on her back is walking towards her little garden overlooking the copper mine in Tsopane, Zambia. Copper mining operations have a big impact on the community. Explosions in the mine are causing houses to crack and a number of houses have already collapsed.

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Box 5: Key characteristics of the wind turbine supply chain

Large proportions of nine out of the twelve above-mentioned materials used in the production of wind turbines are initially exported to China after they are mined. Based on the most recent trade data (from 2015), China is by far the main importer of manganese (55%), chromium (65%), nickel (54%), copper (39%), aluminium (56%), cobalt (58%), boron (25%), iron (61%) and lead (33%).[92] Unlike most of the other countries listed in Figure 2, China does not appear to export the ores it produces (e.g. aluminium, copper, lead, manganese, molybdenum and rare earth) directly as it seems to process them before export.

No publicly available trade data on rare earth was found. However, the wind turbine component that contains rare earths, magnets used in turbine generators, is primarily produced in China.[93]

The production of other components such as blades, towers, nacelles[94] and generators is geographically widespread. Vestas produces its onshore blades in the US, Germany, Denmark, Spain, Italy, China and India. In addition, it also uses sub-contractors located in China and Brazil. It is not entirely clear where MHI Vestas produces its offshore turbine components, but the company is known to have production facilities in the UK, and has at least two nacelle and blade factories in Denmark.[95]

Towers are produced by Vestas in the US and by sub-contractors in China, Canada, Mexico, Brazil, Denmark, Spain, Egypt, Czech Republic, Vietnam and Poland. Nacelle assembly takes place in Denmark, US, Spain, China and India. Vestas only produces geared turbines.[96] The generator production is located in Germany and China.[97]

Siemens produces turbine components in Germany and China,[98] and possibly in other countries. Enercon produces wind turbines in Germany,[99] while Nordex produces turbines in both Germany[100] and China,[101] as well as in Spain through its new subsidiary Acciona.[102] Approximately 20 per cent of Nordex suppliers for wind turbine components have their main offices or production locations outside of Europe. Turkey, China and Brazil are mentioned as important supplier countries.[103]

Final assembly of turbines generally takes place in the destination countries where the turbine is to be installed. Vestas is producing in Denmark, Germany and Spain. Lagerwey only has wind turbine production facilities in the Netherlands.[104]

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92 This information was found in the Observatory of Economic Complexity database, by searching each individual mineral and identifying the main exporter for each. To visit the Observatory of Economic Complexity, go to <http://atlas.media.mit.edu/en/>.

93 The Crowne Estate, Marine Estate Research Report, 2011, <https://www.thecrownestate.co.uk/media/5694/use_of_rare_earth_metals_in_offshore_windfarms.pdf> (retrieved on 8 August 2017).

94 A nacelle is the cover housing that contains all of the generating components in a wind turbine, including the generator, gearbox, drive train and brake assembly.

95 MHI Vestas Offshore Wind, MHI Vestas creates more than 400 new manufacturing jobs in regional Denmark, 6 March 2017, <http://www.mhivestasoffshore.com/more-than-400-new-manufacturing-jobs-in-regional-dk/> (retrieved on 15 August 2017).

96 Vestas provided this information during its review of the report.

97 Vestas website, Vestas locations, no date, <https://www.vestas.com/en/about/find_vestas#!vestas-headquater> (retrieved on 15 August 2017).

98 Wind Power Monthly, Ten of the biggest and the best manufacturers, 30 June 2015, <http://www.windpowermonthly.com/article/1352888/ten-biggest-best-manufacturers> (retrieved on 15 August 2017).

99 ENERCON website, Production of ENERCON, no date, <http://www.enercon.de/en/company/production/> (retrieved on 15 August 2017).

100 ENERCON website, Production of ENERCON, no date, <http://www.enercon.de/en/company/production/> (retrieved on 15 August 2017).

101 Nordex, Nordex China focusing on expansion, 1 November 2017, <http://www.nordex-online.com/en/news-press/news-detail.html?tx_ttnews%5Btt_news%5D=463&tx_ttnews%5BbackPid%5D=1&cHash=05a59ea112> (retrieved on 15 August 2017).
Wind Power Monthly, Nordex to introduce 2.5MW turbine to China, 20 October 2011, <http://www.windpowermonthly.com/article/1099727/nordex-introduce-25mw-turbine-china> (retrieved on 15 August 2017).

102 Wind Power Monthly, Nordex and Acciona complete merger, 4 April 2016, <http://www.windpowermonthly.com/article/1389823/nordex-acciona-complete-merger> (retrieved on 15 August 2017).

103 Nordex, 2016 sustainability report, 2016, <http://www.nordex-online.com/fileadmin/MEDIA/Sonstiges/Nordex-SE_nhb2016_en_170428.pdf> (retrieved on 15 August 2017).

104 Lagerwey, Nieuwe windturbinefabriek Lagerwey officieel geopend, 28 June 2017, <https://www.lagerweywind.nl/blog/2017/06/28/nieuwe-windturbinefabriek-lagerwey-officieel-geopend/> (retrieved on 15 August 2017).

Human rights due diligence by wind turbine manufacturers

As discussed above, all companies in the wind turbine value chain have an individual responsibility to conduct risk-based due diligence to identify, prevent and mitigate any adverse impacts caused by their operations. The scope of this paper focuses on the role and responsibility of one type of actor in the value chain: the wind turbine manufacturers. They are an important link in the wind turbine value chain because there are relatively few players at this level. This means that individual companies are likely to hold a relatively high degree of leverage over the entire chain.

This sub-section reviews the policies and practices of Vestas (as a core joint venture partner in MHI Vestas), Siemens (as the parent of Siemens Gamesa), Enercon, Lagerwey, General Electric, and Nordex as they are the primary companies involved in supplying current large-scale offshore projects in the Netherlands. Vestas, Siemens, General Electric and Nordex mention policies on responsible sourcing of minerals and human rights. However, in the case of Siemens and General Electric this only relates to the so-called **conflict minerals** (i.e. tin, tantalum, tungsten and gold), and to the binding US and EU rules on their use. These are metals that are relatively unimportant in the manufacture of wind turbines. Other minerals that are significant for turbine production are not specifically mentioned in these four companies' policies or annual reports. The companies do not appear to have identified nor addressed risks intheir minerals supply chain in accordance with the recommendations in the OECD Guidelines and UNGPs.

A more in-depth look at the corporate responsibility policies of these four companies is presented in Box 6. The other three companies – Enercon, Lagerwey and Goldwin – do not have a publicly available policy or commitment to respect human rights, nor do they indicate that they conduct due diligence to identify and avoid social and environmental risks in their minerals supply chain.

It should again be noted that, while the Dutch government expects Dutch companies and companies operating on Dutch soil to follow the OECD Guidelines and UNGPs, though it does not require respect for human rights or undertaking due diligence as a condition for authorising permits and subsidies.

Box 6: Corporate policies on respect for human rights and the environment

Siemens has rolled out a process to determine the use, source and origin of **conflict minerals** in its supply chain. The company sometimes works with its direct suppliers to remediate risks and perform additional due diligence so that it can continue to source responsibly.[105] Siemens participates in certification schemes for smelters and refiners and is confident this will increase transparency within the supply chain as a whole.[106] Furthermore, in its review response to this research, the company states that it tracks all materials it uses to the original source location. However, Siemens does not provide a high degree of supply chain transparency; it does not, for example, publish supply chain information beyond its direct suppliers. On direct suppliers, Siemens implemented a risk-based system of self-assessments by suppliers, risk evaluations conducted by the purchasing departments and sustainability audits by external auditors. In 2016, this resulted in 7,036 "improvement measures with suppliers on issues like the prohibition of corruption and bribery, respect for basic human rights of employees, prohibition of child labour, health and safety of employees and environmental protection.[107] In their review response, Siemens write that the company contractually obliges its suppliers to comply with a framework of rules concerning working conditions and respect for the environment in those suppliers' operations as well as their supply chain. However, Siemens does not seem to perform actual human rights due diligence in its supply chain, which would require more proactive research. Instead it seems to place its trust in this contractual obligation its suppliers commit to.

In its 2016 sustainability report, Siemens states it successfully reduced the use of eight critical materials (based on the European Commission's list of critical raw materials).[108] It is unclear exactly which materials were covered by this measure, and whether any of these were minerals used in wind turbines. Siemens uses a code of conduct for its suppliers, which is based on the International Labour Organization (ILO) core conventions and the OECD Guidelines, among others. The supplier code of Gamesa[109] also mentions that suppliers are expected to be "DRC conflict-free". This is defined by Gamesa as a requirement that its suppliers do not source tin, tungsten, tantalum or gold from the DRC or its neighbouring countries.[110] It should be noted, however, that the aim of conflict mineral legislation like the US Dodd-Frank Act is not to have companies boycott conflict-affected or high risk areas like the DRC. In line with the legislation, Gamesa should instead encourage suppliers to source responsibly from DRC or other conflict-affected or high risk areas by for instance buying from mines that have been audited and certified. This is an important nuance, as conflict mineral laws should not affect bona fide mining operations that are essential to people's livelihoods.

105 Siemens, Siemens Statement on Conflict Minerals, no date, <https://w5.siemens.com/cms/supply-chain-management/en/sustainability/conflict-minerals/pages/conflict-minerals.aspx> (retrieved on 15 August 2017).

106 Siemens, Sustainability Information 2016, 2016, <https://www.siemens.com/content/dam/webassetpool/mam/tag-siemens-com/smdb/sustainability/sustainability/documents/13067-siemens-sustainability-information-2016-neu.pdf>, page 22 (retrieved on 15 August 2017).

107 Siemens, Sustainability Information 2016, 2016, <https://www.siemens.com/content/dam/webassetpool/mam/tag-siemens-com/smdb/sustainability/sustainability/documents/13067-siemens-sustainability-information-2016-neu.pdf> (retrieved on 15 August 2017).

108 European Commission website, Critical Raw Materials, no date, <https://ec.europa.eu/growth/sectors/raw-materials/specific-interest/critical_nl> (retrieved on 2 January 2018).

109 Siemens Wind Power and Gamesa merged in April 2017, and now make up SIEMENS Gamesa Renewable Energy.

110 Gamesa, Gamesa Supplier's Code of Conduct, no date, <http://www.gamesacorp.com/recursos/doc/rsc/compromisos/proveedores/codigo-de-conducta-de-proveedores-2015-esp.pdf> (retrieved on 22 August 2017).

Vestas recognises its responsibility to respect human rights as outlined in the UN Guiding Principles. It works with a policy that includes the company's expectations towards its business partners. In case of any complaints by employees, business partners, or any associates on breaches of the policy, these can be submitted to an internal grievance mechanism, the Vestas EthicsLine.[111] Vestas has also prepared a code of conduct for business partners in accordance with the UN Global Compact, the International Bill of Human Rights and the ILO conventions. With regard to due diligence on wind farm projects it is involved in, Vestas states it conducts assessments of projects it supplies turbines to or is otherwise involved in, as well as consulting with affected local communities.[112] All Vestas suppliers, including those supplying metals and minerals, are required to answer a self-assessment on human rights and must sign the code as a condition of contracting with Vestas.

However, the company does not appear to do its own due diligence upstream in its supply chain, instead depending heavily on their suppliers' self-assessment. Vestas has confirmed with SOMO that it has not identified any human rights impacts associated with metals and minerals in its wind turbines as a risk in its supply chain.[113] Considering the multitude of human rights risks associated with wind turbine supply chains, as described above, the absence of any such risk in Vestas's supply chain appears unlikely.

General Electric (GE) has the obligation to report according to the US law on the use of tin, tantalum, tungsten or gold. Apart from supporting an industry-wide due diligence mechanism that aims for conflict-free sourcing (from the DRC) and contributing to a non-governmental organisation (NGO) programme in the DRC to support mining communities and contribute to peace and stabilisation,[114] it does not mention other specific risks in the supply chain or actions in relation to other specific raw materials or metals. In reaction to another piece of legislation, the California Transparency in Supply Chains Act, GE reports on its supply chain monitoring and evaluation programme, in which direct suppliers must agree to comply with certain social and environmental expectations[115] and conducts on-site supplier assessments.[116]

111 Vestas website, Powering sustainability, no date, <https://www.vestas.com/en/about/sustainability#!available-reports> (retrieved on 8 August 2017).

112 Vestas, Sustainability 2016, no date, <https://www.vestas.com/~/media/vestas/about/sustainability/pdfs/vestas%20sustainability%202016.pdf> (retrieved on 12 September 2017).

113 Vestas's reaction to a questionnaire sent in light of this research, 15 August 2017.

114 General Electric website, Conflict Minerals, no date, <www.gesustainability.com/building-things-that-matter/supply-chain/conflict-minerals/> (retrieved on 15 August 2017).

115 These social and environmental expectations include the following: "Treat workers fairly, provide a safe and healthy work environment, protect environmental quality, and comply with prohibitions against forced, prison or indentured labor and against subjecting workers to any form of compulsion, coercion or human trafficking."

116 General Electric, Monitoring & Evaluation, no date, <http://www.gesustainability.com/building-things-that-matter/supply-chain/monitoring-evaluation/> (retrieved on 15 August 2017).

Nordex aligns its activities and decisions with the ethical guidelines and principles that can be found in the UN Global Compact, the OECD Guidelines and the Universal Declaration of Human Rights of the United Nations. Business partners are expected to do the same.[117] In its 2016 sustainability report, it sets the goal of securing compliance along the entire supply chain, and embedding environmental and social standards permanently in its sourcing and supplier management processes by 2018. In 2016, Nordex worked with more than 4,500 suppliers and conducted more than 200 supplier audits that registered no incidents or complaints. The company did not terminate any business relationships owing to human rights violations, corruption, unacceptable working practices or negative impacts on society or the environment. However, the report makes no mention of suppliers further down the supply chain (e.g. mining companies), nor of the origin of raw materials (including **conflict minerals**).[118]

Although some of the policies and actions described above are aimed at addressing human rights risks in these companies' supply chains, none of the companies appears to do actual human rights due diligence. Such due diligence efforts require a more active approach, as previously described in Box 4.

In 2014, the Dutch government identified a number of economic sectors important for the Dutch economy that pose a high degree of risk to people and the environment.[119] The government publicly called on these high-risk sectors to formulate and sign sectoral CSR agreements (known as 'convenanten' in Dutch) that specify how abuses in the supply chain should be prevented and eliminated. The government indicated that these CSR agreements should be aimed at improving compliance with the OECD Guidelines particularly regarding due diligence and addressing social and environmental impacts in value chains. The energy sector is one of these high-risk sectors, and the risk study that was done by the government makes specific reference to the risks associated with rare earth sourcing in China.[120] So far, several such sector agreements have been established, but none of these is in the energy sector.[121] That said, the Dutch Association for Sustainable Energy (NVDE) and the NWEA have initiated a process to develop a CSR agreement for the wind energy sector, and potentially for the larger sustainable energy sector.[122] These industry umbrella groups have indicated that they will strive to achieve as broad a level of participation of individual companies in the sector as possible.

117 Nordex, Code of Conduct, no date, <http://www.nordex-online.com/en/company-career/compliance.html> (retrieved on 15 August 2017).

118 In 2016, Triodos Bank engaged with Nordex on the topic of conflict minerals. Nordex committed to assessing the types and volumes of potential conflict minerals used. No (public) reporting on this appears to have taken place yet.
Triodos Bank, Responsible sourcing, no date, <https://www.triodos.com/en/investment-management/socially-responsible-investment/active-engagement/SRI-engagement-report/responsible-minerals-sourcing> (retrieved on 15 August 2017).

119 KPMG, MVO Sector Risico Analyse, September 2014, <https://www.rijksoverheid.nl/documenten/rapporten/2014/09/01/mvo-sector-risico-analyse> (retrieved on 15 August 2017).

120 KPMG, MVO Sector Risico Analyse, September 2014, <https://www.rijksoverheid.nl/documenten/rapporten/2014/09/01/mvo-sector-risico-analyse> (retrieved on 15 August 2017).

121 Rijksoverheid, IMVO-convenanten, no date, <https://www.rijksoverheid.nl/onderwerpen/internationaal-maatschappelijk-verantwoord-ondernemen-imvo/imvo-convenanten> (retrieved on 28 September 2017).

122 KPMG, MVO Sector Risico Analyse, September 2014, <https://www.rijksoverheid.nl/documenten/rapporten/2014/09/01/mvo-sector-risico-analyse> page 87 (retrieved on 15 August 2017).

6. CONCLUSIONS AND RECOMMENDATIONS

To achieve the emission reduction goals set out in the Paris Agreement on climate change, governments worldwide will need to urgently increase their reliance on renewable energy. As a result, the demand for minerals needed in sustainable energy technologies like wind turbines will increase. However, the production of these minerals can bring about adverse human rights impacts and environmental risks, as we have seen illustrated in this report. It is imperative that companies and governments seize the opportunity to ensure that tackling climate change, sustainable development and protecting human rights go hand in hand.

In order to support a sustainable shift to an increase in the production of wind energy, this paper has investigated the minerals needed to produce wind turbines. The demand for these minerals is expected to grow due to an increase in the production of wind energy in the Netherlands and elsewhere. Some of the minerals in question include chromium, iron, manganese, molybdenum and nickel. The increase in demand for these minerals will depend to some degree on technological developments and choices made in the industry.

The countries where minerals are mined are geographically widespread. As described in Chapter 2, many minerals are mined in low and middle-income countries in Asia, Africa and Latin America. Enforcement of social and environmental standards in these countries is often weak. Since protection of human rights and the environment cannot be guaranteed by those countries' governments, this increases the importance of corporate responsibility.

This briefing paper sheds light on the environmental and human rights risks associated with the mining of specific minerals from the countries listed above, for which demand is expected to rise in the future. The mining of the defined minerals has significant adverse impacts on neighbouring communities and on the environment. Adverse impacts linked to the mining of these minerals include armed conflict, corruption, tax evasion, forced displacement, destruction of ecosystems and depletion or pollution of water supplies. Furthermore, the examples described in Box 2 above reveal the heightened vulnerability of children, women and indigenous people to these adverse impacts.

The report analyses the role of the Dutch government and its approach to ensuring the wind energy growth needed for a transition to renewable energy through large offshore wind projects. It reveals that protecting human rights in the wind energy supply chain is a blind spot for the Dutch government, and a source of policy incoherence. By adhering to the OECD Guidelines, the Dutch government has made a binding international commitment to "recommend to multinational enterprises operating in or from [Dutch] territory the observance of the Guidelines" (emphasis added).[123] This means that the Dutch government should be encouraging even non-Dutch companies to conduct due diligence in accordance with the OECD Guidelines when those companies are active in the Netherlands. The UNGPs are even clearer about the responsibility of the Dutch government for ensuring respect for human rights when it enters the "state-business nexus" by contracting with companies through the permitting process. The UNGPs note that, "States should exercise adequate oversight in order to meet their international human rights obligations when they contract with business enterprises to provide services that may impact upon the enjoyment of human rights".[124] However, the Dutch government's current process for granting permits to develop wind farms does not include an evaluation of whether the applicants conducted due diligence to identify and address (risks of) adverse human rights and environmental impacts in the wind turbine supply chain, as is expected by the OECD Guidelines. This appears to be inconsistent

123 OECD, Declaration on International Investment and Multinational Enterprises, 25 May 2011, <http://www.oecd.org/daf/inv/mne/48004323.pdf> (retrieved on 15 August 2017).

124 UN Office of the High Commissioner for Human Rights, Guiding Principles on Business and Human Rights, 2011, GP 5, p.8, <http://www.ohchr.org/Documents/Publications/GuidingPrinciplesBusinessHR_EN.pdf> (retrieved on 18 September 2017).

with the government's international commitments to implement the OECD Guidelines and UNGPs and is at the very least a missed opportunity to promote and encourage compliance with the OECD Guidelines and UNGPs.

In addition to evaluating the actions taken by the Dutch government to address social and environmental risks in wind turbine supply chains, the report also the supply chain responsibility policies and practices of companies active in the Dutch offshore wind energy sector. The sector is dominated by a small number of wind turbine manufacturers, including Vestas, Siemens Gamesa Renewable Energy, and to a lesser extent Enercon, Lagerwey, General Electric and Nordex. These wind turbine producers run the risk of contributing to a broad range of human rights abuses and environmental degradation through their global mineral supply chains. According to international normative standards for responsible business conduct, such as the OECD Guidelines and the UNGPs, companies all along the value chain, including downstream (end-user) companies such as wind turbine manufacturers, should respect human rights and conduct **risk-based due diligence** to prevent, mitigate and remediate any adverse impacts. Even companies that are geographically far removed from the mine where adverse human rights impacts are taking place have a responsibility to use their leverage over business partners that are closer to the actual impact to avoid problems and improve conditions.

However, an analysis of the policies on respect for human rights and the environment of the leading wind turbine manufacturers for the Dutch market shows that human rights due diligence is not being done, and that supply chain transparency continues to be lacking. Although several wind turbine producers have human rights policies in place, and Vestas requires its direct suppliers to carry out a self-assessment of human rights risks, none of the companies appears to conduct due diligence and proper risk assessments of their mineral supply chains. This provides a possible explanation for why Nordex reports it has never terminated a business relationship due to human rights violations, and why Vestas states that no adverse human rights impacts were identified in its supply chain. As a result, SOMO concludes that wind turbine producers operating on the Dutch market have not yet taken appropriate steps to prevent and mitigate risks of adverse impacts, and are therefore living up to the OECD Guidelines and UNGPs in this regard. In order to ensure a truly sustainable and just energy transition takes place in the Netherlands, these companies need to improve their due diligence.

Recommendations to the Dutch government

Because of the urgency of the energy transition, the Netherlands must take action now to improve the way it manages wind energy supply chain risks. In order to do so, the Dutch government should ensure policy coherence between its wind farm licensing process and its binding commitment to implement the OECD Guidelines, which involves ensuring that companies operating on Dutch territory observe the Guidelines. It could do this by requiring all applicants for wind farm permits and subsidies to conduct risk-based due diligence in line with the OECD Guidelines[125] and OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas[126] prior to granting the wind permit. It should verify that the companies have conducted due diligence and that it is of sufficient quality and that the results are publicly available.

Furthermore, the Dutch government could draw on practices for including social and environmental protection criteria in the public procurement process and apply them to the wind farm permitting process. The application of European procurement law would mean **international social criteria**, as described in Box 1,[127] would apply. The government should also make due diligence part of the six criteria that are being developed in a new ministerial order, as described in Chapter 2, and the 2030 roadmap that is currently being formulated.

As part of the due diligence verification, the following criteria should be met by the company applying for the licence and the SDE+ subsidy:

125 OECD, OECD Guidelines for Multinational Enterprises, 2011, <http://www.oecd.org/daf/inv/mne/48004323.pdf> (retrieved on 8 August 2017).

126 OECD, OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas, 2016, <http://www.oecd.org/daf/inv/mne/OECD-Due-Diligence-Guidance-Minerals-Edition3.pdf> (retrieved on 15 August 2017).

127 The **international social criteria** focus on promoting international labour standards and human rights, including combating forced labour, slavery, child labour, and unfair discrimination.

- A social (including human rights) and environmental impact assessment of its suppliers has been carried out in consultation with stakeholders and potentially impacted rights-holders. If suppliers of companies applying for a licence and SDE+ have not carried out such an impact assessment, the applicant company should use its leverage to make sure those same suppliers conduct such an assessment.
- Prevention and mitigation measures, such as an effective grievance mechanism, should be put in place to address any potential or actual adverse social and environmental impacts. Companies applying for licences to install wind turbines on Dutch soil should be expected to use their leverage to influence the entity causing potential adverse impacts to prevent or mitigate that impact. If the companies have insufficient leverage, they should work together to increase their leverage.
- There should be a clearly defined disengagement strategy. Consider how to responsibly disengage from business partners causing adverse impacts if due diligence efforts and the use of leverage do not achieve the desired prevention, mitigation or remediation of adverse impacts.
- Findings of the due diligence process should be communicated internally and externally to all personnel, business contacts, potentially impacted rights-holders and other stakeholders. There should be adequate and timely communication and consultation with the communities directly affected by the environmental, health and safety policies of the enterprise and by their implementation.

As well as making due diligence efforts part of the permit authorisation system, the Dutch government should build on the on-going sectoral CSR agreement ("covenant") process to take the initiative to come to a binding agreement with the entire Dutch energy sector, offshore construction companies and wind turbine manufacturers on identifying, preventing, mitigating and accounting for environmental and human rights risks. In determining these risks and actions, local and Dutch stakeholders should be properly consulted and their concerns should inform decision-making.

Due to the urgent need for the Netherlands to undertake its transition to the use of more renewable energy, it is crucial that the above recommendations are implemented as a matter of urgency. The swift implementation of human rights due diligence in the supply chains of wind turbines will allow for an energy transition without delay, while also ensuring that human rights and the environment are respected in the wind energy supply chain.

Recommendations to companies manufacturing wind turbines

Based on the research findings related to wind turbine manufacturers' currently limited degree of implementation of the OECD Guidelines and UNGPs regarding due diligence in the supply chain, a number of recommendations can be made

- Producers of wind turbines should make a public commitment to respecting human rights and the environment in the supply chain and develop and implement policies that reflect this commitment.
- Producers of wind turbines should conduct risk-based due diligence in line with the OECD Guidelines for Multinational Enterprises and the UN Guiding Principles on Business and Human Rights. This involves establishing a process to identify, prevent, mitigate and remediate adverse impacts on human rights and the environment. This process should be developed through meaningful stakeholder engagement with stakeholders, and should involve public accounting for how risks are identified and addressed.
- Regarding the possibility of developing a CSR agreement regarding the Dutch wind sector, it will be important that wind turbine manufacturers are part of the process and that the agreement address risks in international metal supply chains too. Such a sectoral CSR agreement could be a useful step to increase leverage and coordinate due diligence efforts; however, this does not replace the responsibility of each company to respect human rights and conduct due diligence to identify and prevent risks in international supply chains.

actionaid

P.O. box 10707
1001 ES Amsterdam
The Netherlands
Tel: +31 20 520 6210
IBAN: NL89 TRIO 0338 8888 88

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