Export credit support in the Netherlands: fossil phase out and job impacts

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Key findings

Based on the publicly available data and following the Both ENDS energy type categorisation, between 2015 and 2020 ADSB provided insurance policies for energy-related projects at a total value of 7.7 billion EUR. Between 2015 and 2020, 124 fossil fuel related ADSB insurance policies were issued (i.e. projects related to coal, oil and gas), representing more than 83 percent of that total value.

ADSB support for energy-related export projects is concentrated within a small number of industries and companies. The manufacturing and construction sectors are the principal beneficiaries of ADSB support in the Netherlands, in particular civil engineering and specialised construction activities, other transport equipment, chemical and chemical products, and machinery and other equipment. Out of 50 exporting companies benefiting from the issuance of ADSB insurance policies, 4 companies account for more than half the total value of insurance policies issued between 2015 and 2020.

ADSB energy-related insurance policies supported in total fewer jobs outside of the Netherlands than domestically. It is estimated that through the issuance of insurance policies supporting export projects, the ADSB supported between 200 and 700 job years outside the Netherlands overall between 2015 and 2020. While the quality, location and duration of such jobs are important aspects to be considered, an analysis of these aspects is not within the scope of this study.

Each one million of support offered in the form of ADSB insurance policies supported on average 3.9 jobs in solar PV and wind energy value chains and 4.1 jobs in fossil fuel value chains on average. Jobs supported in renewables oscillate between a maximum of 6.8 and a minimum of 2.7, while in fossil fuels between 4.3 and 3.7 jobs. The highest variation in jobs supported in renewables is primarily due to differences in the energy type composition – wind or solar. Among the energy types studied, solar has the greatest potential to support jobs.

Scenario analysis suggests that more jobs overall could be supported in the future if ADSB were to shift a 100% of its energy-related support to solar PV and wind energy. Shifting fossil fuel support into renewables is projected to allow ADSB to support 2,300 more jobs in 2025, compared to a Business-as-Usual scenario in which the current support proportions are maintained across FF and RES. The distribution of these jobs between the Netherlands and the rest of the world will depend on the specific types of the projects and the domestic content of the ADSB-supported transactions in the future.

Investment in value chains related to renewables generally requires more labour input per EUR invested than in fossil fuel industries due to higher labour requirements. For every EUR 1 million invested in solar (construction and manufacturing), close to three times more jobs are supported compared to gas-fired power, based on job multipliers suggested by the International Energy Agency (IEA). ADSB support for products related to the renewables sector is likely to be more effective in supporting both domestic and foreign jobs, than ADSB support for fossil fuels due to job intensity of renewables.

Accounting for short term transition costs, in particular regarding labour market mismatches and distributional impacts are key in ensuring a smooth transition away from fossil fuels. Just Transition Policies aimed at addressing the distributional and employment impacts of transitioning away from fossil fuel support, such as reskilling and retraining, are necessary to ensure sustainable development.

Continued support to the fossil fuel-related industry and continued investment in fossil fuels can have adverse long-term effects for the Dutch economy. In light of an increasing number of countries pledging to reach net zero mid-century, continued investment in fossil fuels is likely to lead to the creation

of substantial stranded assets. In the short term, investments in fossil fuels can be seen as a means of protecting existing jobs. However, as global demand shifts, it presents opportunities for other firms outside of the Netherlands to develop expertise in emerging industries and technologies, meaning that Dutch firms are then at a competitive disadvantage when later trying to shift to focus on meeting the increasing demand for these services**.**

Key findings of this report are in line with recent literature on ECA activity produced by the CBS[1], Vivid Economics[2], Perspectives Climate Research[3], and Both ENDS[4]. In line with the Dutch ECA's mandate to promote job creation and support economic activity in high uncertainty environments, the findings of this report support the idea that there can be significant benefits if the Dutch government aligns export finance with climate targets adopted in the Paris Agreement and phases out fossil fuel support.

[1] See. Public export credit insurance in the Netherlands (cbs.nl)
[2] See. UK Export Finance and domestic jobs - Vivid Economics
[3] See. ECA_Dutch_Case_Study.pdf (perspectives.cc)
[4] See. The_fossil_elephant_in_the_room_web.pdf (bothends.org)

1 Introduction

The objective of this study is to provide a quantitative assessment of domestic and foreign jobs supported with insurance policies for energy-related projects issued by the Dutch Export Credit Agency (ECA), Atradius Dutch State Business (ADSB), using available data. The data regarding ADSB support is derived from the ADSB website[5] and the categorisation of projects by energy type was provided by Both ENDS.[6] The dataset includes information on the value of the insurance policy (maximum liability), the exporter, the country where the project takes place, and a description of the transaction and a mapping of insurance policies into energy types (oil, gas, oil and gas, wind, solar, biofuel and nuclear) carried out by Both ENDS. The dataset was extended by Cambridge Econometrics (CE) with information on the industry of the exporter and the foreign content[7] (likely upper and lower bound) of the export contract covered by the insurance policy. This data suggests that between 2015 and 2020, fossil fuel-related projects account for more than 83 percent of the total energy-related insurance policy value.

Box 1: ADSB and the role of Export Credit Agencies (ECAs)

ECAs are public companies or private companies in the service of national governments. They support national export businesses operating in high uncertainty markets through export credits and investment insurances. ECA support is typically offered to large and risky projects that would not have been otherwise. In this sense, it is assumed that ECA support can crowd in investment and have a high degree of additionality.

In 2020, there were more than 113 national ECAs, offering export support in the form of medium to long term loans, guarantees and insurances that amounted close to USD 215 billion. Based on Oil Change International energy mapping methodology, in 2019 ECAs were the largest PFIs supporting fossil fuel investments worldwide.[8]

In recent years, ECA activities have received criticisms in relation to compliance and competition issues, transparency, and the adverse impact that their fossil fuel-related activities have on alignment with national environmental targets such as the Paris agreement.

The Dutch ECA has been active since 1932, functioning as a pure cover ECA. It covers political and commercial risks only through insurances. ADSB currently has about 200 insurance commitments annually – provided before the signing of the deals with the aim to facilitate project funding. Half of these commitments become insurance policies, subject to the rate at which ADSB insurance holders win the competition for the project assignment.

Sources: Aligning Export Credit Agencies with the Paris Agreement (perspectives.cc); Report to the U.S. Congress on Global Export Credit Competition (exim.gov); Public export credit insurance in the Netherlands (cbs.nl).

The methodology relies on a combination of input-output modelling and available information on job intensities by energy type. For the modelling of jobs supported by the ADSB, this study treats ADSB support at the level of the production of the good/service described by the export contract that is covered by the insurance policy**.** Input-output tables for the Netherlands are used to provide a quantitative assessment of the upstream and downstream supply chain impacts of the credit support domestically.[9] Job impacts in the rest of the world are estimated with the help of employment multipliers by energy type suggested by the IEA (International Energy Agency). For the purpose of the job estimates, projects related to coal, oil and gas are grouped under the category of fossil fuel-related projects. Projects related to solar and wind energy

[5] See. https://atradiusdutchstatebusiness.nl/nl/artikel/afgegeven-polissen.html
[6] See. Based on the methodology which can be found here: https://www.bothends.org/en/Whats-new/Publicaties/The-fossil-elephant-in-the-room/
[7] Defined as part of the contract that is fulfilled through economic activities that take place outside the Netherlands.
[8] See. Shift the Subsidies: Financing Dirty Energy – Oil Change Int'l (priceofoil.org)
[9] The quantification approach and level of analysis followed by this report mirrors that followed by the 2017 CBS report on Public export credit insurance in the Netherlands (cbs.nl).

are grouped as renewable energy projects. Projects related to nuclear, hydropower and biofuels are not taken into consideration - each of the three energy types accounts for less than one percent of the total energy-related insurance value issued during the period considered. Thus, the analysis uses a subset of the total insurance policies issued by ADSB between 2015 and 2020 that is defined by energy type.

The report also assesses the future potential of the Dutch Export Credit Agency (ECA), Atradius Dutch State Business (ADSB) in supporting jobs through fossil fuel-related projects by comparing this with the potential for supporting jobs exclusively through projects associated with clean renewable energy (solar and wind). As more countries take concrete steps to decarbonise their economies, supported by the inclusion of Net-zero targets in law across most of the European Union and in policy documents for the US, this report discusses the potential role of ECAs in supporting the Paris alignment of the government whilst also supporting jobs domestically and abroad.[10] Information from the IEA Net Zero by 2050 outlook[11] is used to create future projections of the impact of ADSB support (magnitude kept constant and equal to the six-year average) on jobs. These projections suggest that investing in renewables can support a greater number of jobs than investing in the fossil fuel sector.

The estimated magnitude of jobs supported by the ADSB (inside and outside the Netherlands) can be considered as an upper limit. This report recognises that assessing the additionality of an ECA to contracts remains challenging and exceeds the scope of this report. The estimates produced are based on the assumption that each insured transaction would not have been realised if not for the support of the ECA (100% additionality). It is possible that some transactions would have happened even without the support of ADSB or would have happened through the support of some other national ECA. It is also possible that the effect of ADSB funding is larger than the maximum liability covered, if it enables economies of scale due to high degree of concentration in a small number of industries and exporters.

The findings presented in this report relate to ADSB energy-related support only, but key takeaways can be of relevance to other countries with active ECAs. Similar to the ADSB, many other countries' ECAs provide significant sums of support to industries that contribute to fossil fuel value chains. The G20 governments together provided at least USD 40.1 billion a year in export finance for fossil fuel projects, compared to just USD 3.5 billion for clean energy between 2018 and 2020.[12] Like the Netherlands most of these countries manufacturing sector can readily contribute to renewable value chains due to its focus on multi-purpose goods.[13]

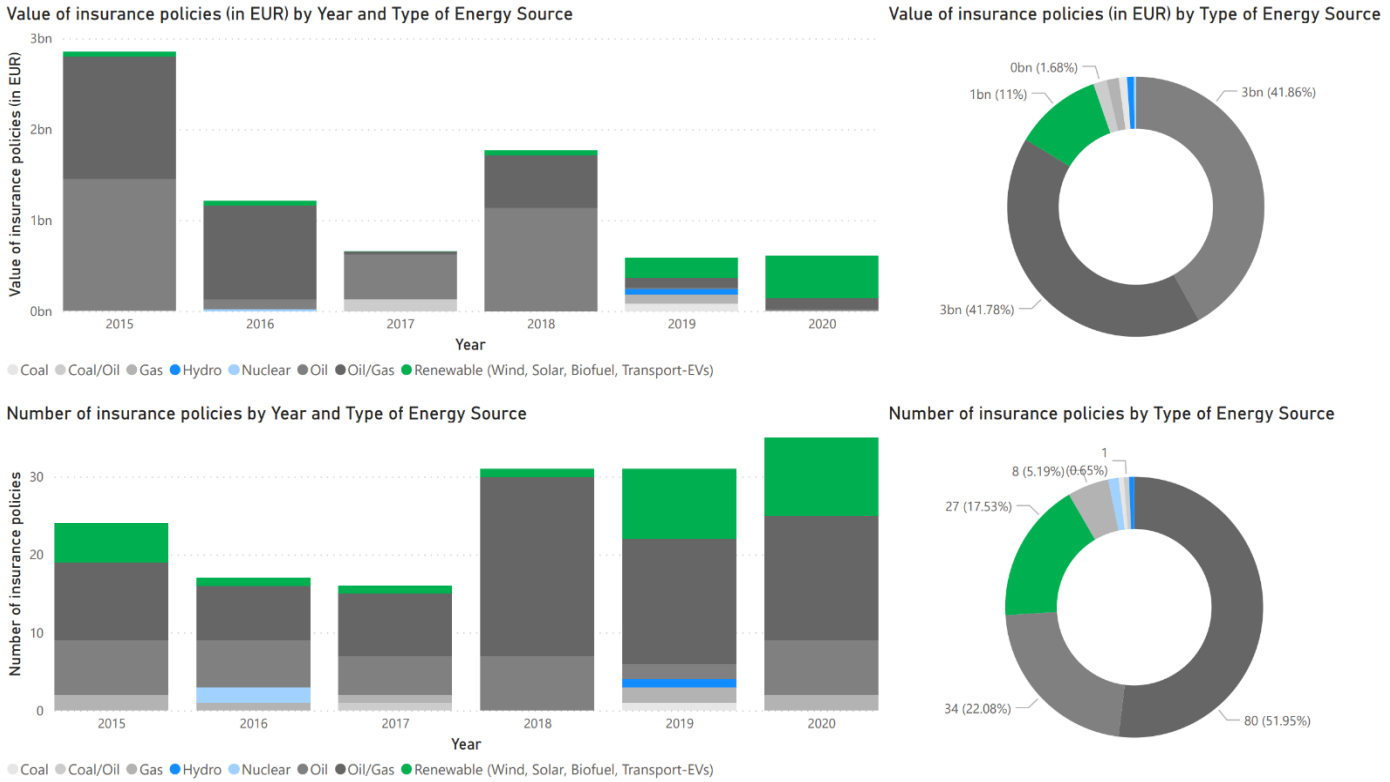
The remainder of this report is set out in five chapters. Chapter 2 presents an overview of the ADSB publicly available dataset with Both ENDS energy type categorisation. Chapter 3 discusses the estimated jobs supported by ADSB between 2015 and 2020, in the Netherlands and abroad. Chapter 4 presents a more granular assessment of jobs supported abroad by producing three case studies, covering different types of projects in terms of energy type, geography and share of foreign content of the export contract covered by the insurance policy. Chapter 5 presents two different outlooks for jobs support by the ADSB, one in which fossil fuels continue to receive the same level support as they did in the period 2015-2020, and one in which all support is shifted towards renewables. Finally, the annex of this report offers more detail of the methodology and data used, together with some auxiliary data tables.

[10] See. Net-zero Target Status | Net-Zero Targets | Climate Watch (climatewatchdata.org)
[11] See. Net Zero by 2050 – Analysis - IEA
[12] See. http://priceofoil.org/2021/10/28/new-report-g20-governments-have-bankrolled-more-than-188-billion-in-fossil-fuels-since-2018/
[13] See. UK Export Finance and domestic jobs (vivideconomics.com)

2 Support to energy-related projects (2015-2020)

Between 2015 and 2020, more than 83 percent of the total value of insurance policies related to energy projects and issued by the ADSB were in support of fossil fuel projects, based on the ADSB publicly available dataset with Both ENDS energy type categorisation. This translates to 124 fossil fuel-related insurance policies (i.e. projects related to coal, oil and gas) and 27 insurance policies related to other (i.e. projects related to solar, wind, hydro, nuclear, EV transport and biofuels), issued between 2015 and 2020. In terms of the number of insurance policies related to energy projects and issued by ADSB, this corresponds to 74 of insurance policies being in support of export projects linked to fossil fuels.

Figure 1: ADSB support for energy-related projects between 2015 and 2020



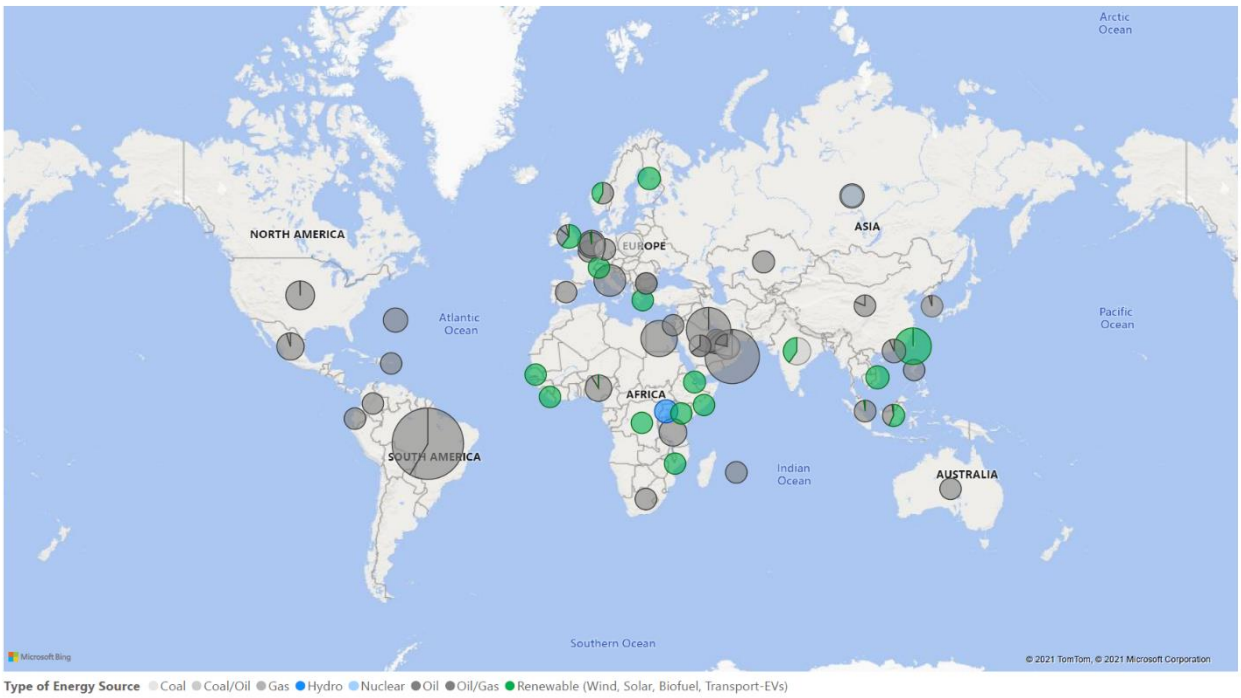
Source: Both ENDS

The Both ENDS energy type categorisation builds on publicly available information related to each insurance policy. Publicly available reports do not provide detailed information on the methodology ADSB uses for the classification of insurance policies by energy type. The Both ENDS energy type classification is based on publicly available information relating to the debtor entity, the exporting company, the description of the transaction provided by ADSB, the country where the risk is located and the year the insurance policy was issued. Further desk research was conducted by Both ENDS where it was unclear whether an insured transaction supported the fossil fuel sector. In *The Fossil Elephant in the Room*, Both ENDS discusses that the energy type mapping of multi-purpose projects was particularly challenging.[14] Activities such as the construction of dredging or transport ships result to a good that can contribute to many projects during its lifespan, which can be related to fossil fuels or renewables. Due to the lack of detailed publicly available life cycle analysis on the expected use of these goods, Both ENDS classifies insurance policies related to multi-purpose goods based on the first project the good was used.

[14] See. LR_Annex_research_methods_fossil_fuel_elephant.pdf (bothends.org)

Close to one quarter of the total insurance value related to energy projects and issued by ADSB between 2015 and 2020 supports projects took place in Brazil, based on reported information on the country where the risk is located. This is followed by Oman (15.3%), Kuwait (10.8%) and Taiwan (7.1%). Nigeria is the most frequent importer of energy-related projects receiving ADSB support, accounting for 15.5 percent of the total number of energy-related insurance policies issued during the same period. This is followed by China and Saudi Arabia, each accounting for close to 5 percent.

Figure 2: Distribution of ADSB energy-related support by risk location, 6-year aggregation (2015 - 2020)



Source: Both ENDS

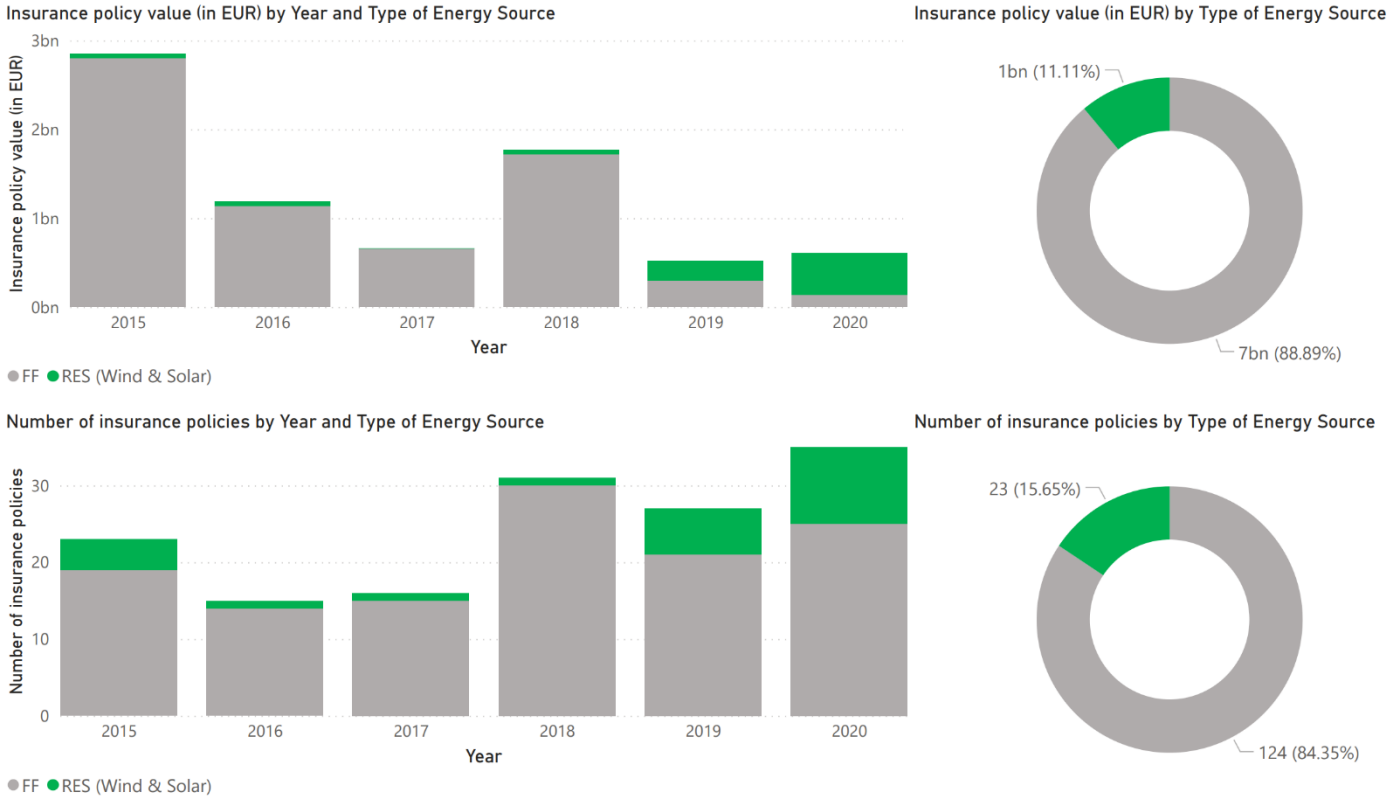
The jobs analysis presented in Chapter 3, 4 and 5 of this report focuses on projects related to four energy types, using a subset of the total energy-related projects supported by ADSB. Projects related to coal, oil and gas are grouped under the category of fossil fuel-related projects, hereafter in graphs called FF. Renewables include only solar and wind energy. Excluded energy type projects that have benefited from ADSB support at least once include nuclear, hydropower and biofuels - each of the three energy types accounts for less than one percent of the total energy-related insurance value issued during the period.[15]

Box 2: Energy type of export credit insurances and multi-purpose goods/services

The lack of a transparent and widely recognised approach to match insured export contracts to energy types impairs on the reporting capacity of ADSB with respect to the alignment of its activities with the Paris agreement. This becomes particularly important for multi-purpose goods, i.e. goods that can contribute to multiple value chains during their life cycle. For instance, a dredger may be delivered for the extension of a harbour. The extended harbour may be used for fossil fuels today but it has the potential to accommodate the construction and maintenance of offshore renewable installations in the region. For multi-purpose goods/services the Both ENDS data uses information on the first project the product of the insured export contract contributes.[16]

[15] The population of projects used by this report excludes Nuclear, Biofuel and Hydro projects. Between 2015 and 2020 there are two ADSB insurance policies issued related to nuclear energy, two related to biogas and only one related to hydro.
[16] See. LR_Annex_research_methods_fossil_fuel_elephant.pdf (bothends.org)

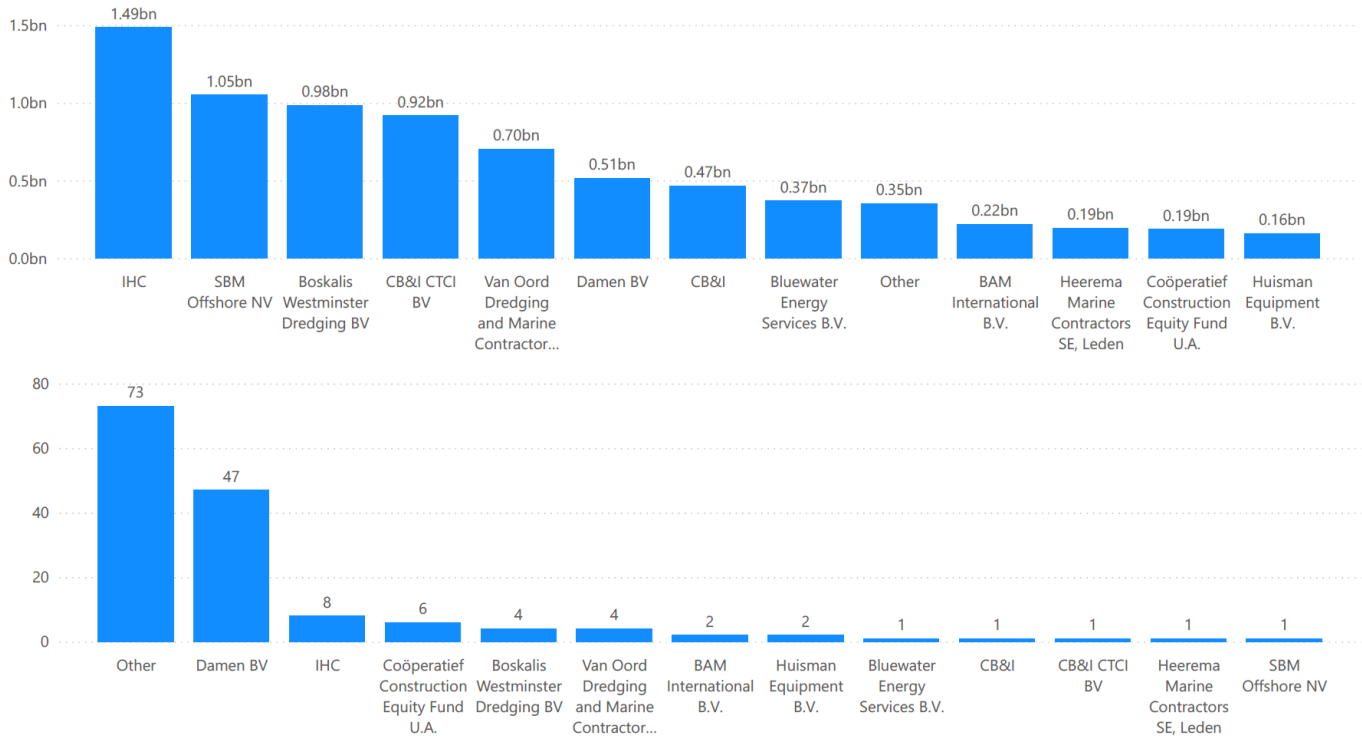
Figure 3: Split of ADSB support in projects related to renewables (RES) and fossil fuel (FF) value chains between 2015 and 2020



Within the final subset of projects used for the jobs assessment calculation – oil, coal, gas, wind and solar (i.e. excluding nuclear, biofuel and hydro projects), fossil fuel-related projects accounted for more than 88 percent of the total energy-related insurance policy value. This translates to 124 fossil fuel-related insurance policies and 23 insurance policies related to solar PV and wind, issued between 2015 and 2020. The support value for fossil fuels compared to the total yearly support has also fluctuated significantly over the period, and there is a clear trend of decreasing fossil fuel-related share within total support values. Thus, while overall yearly support has decreased towards the end of the period (with considerably lower support observed in the years 2019 and 2020 than in the preceding years), its composition has shifted towards more renewables.

ADSB support for fossil fuel-related projects is concentrated within a small number of industries and companies. Out of 50 exporting companies benefiting from the issuance of ADSB insurance policies, 4 companies account for more than half the total value of insurance policies issued between 2015 and 2020. The distribution of exporters becomes more skewed when presented by the number of insurance policies, with a single shipbuilding company accounting for close to one third of fossil fuel-related and renewable-related insurance policies. This highlights that large firms are major beneficiaries of the current system.

Figure 4: Distribution of exporters by size and frequency of ADSB support, 6-year aggregation (2015-2020)

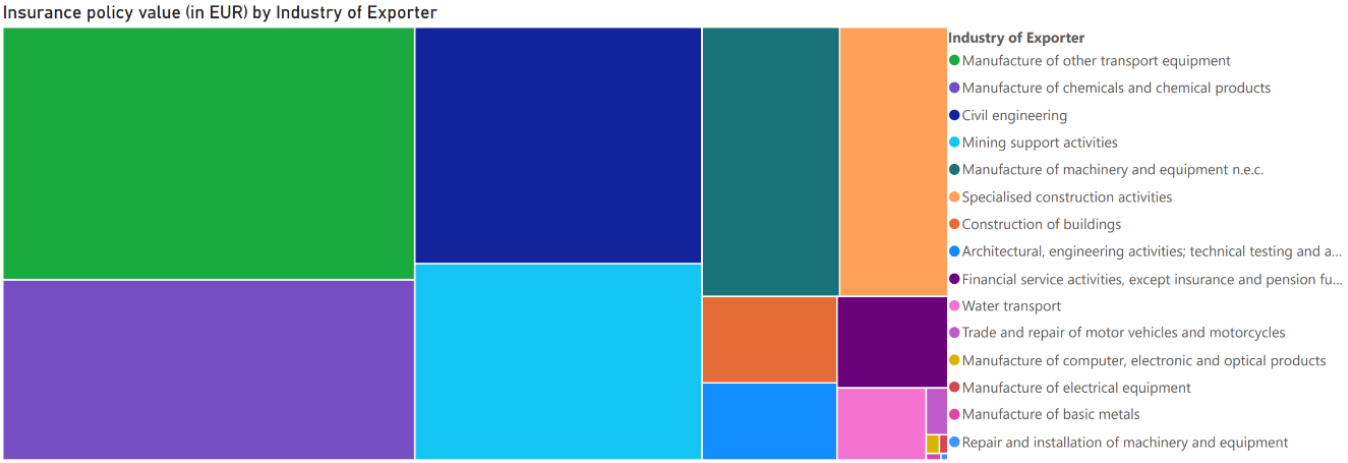


The exact split, between the country of the exporter and the importing country, of economic activities supported by ADSB insurance policies remains unclear. To obtain an estimate of the Dutch and foreign content of the value generated through each insurance policy, the authors reviewed available literature discussing the geographic split of economic activity for the production of similar goods and services and held expert interviews with experienced professionals in the field. According to its mandate, the ADSB will only support projects with a Dutch content that is at least 20 percent of total project value. Expert consultations suggest that a lower bound of Dutch component of 50 to 60 percent is more likely. To account for the lack of widely accepted information on the split, this analysis adopts a sensitivity approach, thereby presenting an upper and lower bound of Dutch component for each insurance policy considered. The only other study performing a similar analysis of the ADSB support uses microdata on self-reported information relating to the foreign content of the export contracts, which were not made publicly available.[17] However, given the complexity of deriving an accurate estimate of the local and foreign content of export contracts using self-reported information may also lead to a rough approximation of the split in support between the Dutch and the foreign economy. For the domestic content, exporters are often part of international value chains. Pinpointing the contribution of the exporter to the total value is not a trivial task. For the foreign content, companies often employ temporary labour from third countries in addition to local population, thus the increase in salaries may have a very limited influence on aggregate demand within the destination country.

[17] See. Public export credit insurance in the Netherlands (cbs.nl)

The manufacturing and construction sectors are the principal beneficiaries of ADSB support in the Netherlands, based on the industrial mapping performed for this analysis. The mapping of ADSB support into NACE industrial codes involves some degree of uncertainty as the ADSB publicly available dataset does not provide information on the industry that each insurance policy supports. The mapping of the insurance policies into NACE codes was done based on publicly available information on the exporting company and the description of the transaction. When more than one industry were mentioned, a second industry was included and taken under consideration for the purpose of the input-output analysis used to derive the jobs impact of ADSB support. The figure above presents information on the relative size of support in terms of insurance policy value each of the principal (as opposed to secondary) industries received. Based on the mapped industries and the transaction descriptions, a high number of energy-related insurance policies are in support of either multi-purpose goods or goods and services for which demand is not necessarily generated through a fossil fuel value chain.

Figure 5: Industries benefiting through ADSB support in the Netherlands, 6-year aggregation (2015 - 2020)



3 Jobs supported

Job estimates are produced by applying two widely used methods for the quantification of jobs impact, input-output tables and employment multipliers, based on the ADSB publicly available data enriched with energy mapping by Both ENDS, and industrial and foreign content mapping by CE. The use of two different methods to estimate the historical jobs impact of ADSB strengthens the robustness of the results. The rest of this section presents job estimates through the lenses of sensitivity analysis and Box 3.1 discusses methodological and data limitations faced by this study. The use of sensitivity analysis helps address the uncertainty involved with developing precise estimates for the jobs impact of ECA activities, given current data availability. The upper and lower bound job estimates are picked out of four alternative estimates resulting from two different figures for the foreign content of export contracts and the use of two methods in parallel (Input-output and Employment multiplier estimate).

Box 3: Quantitative assessment tools

Input-output

In the context of historical analysis, the use of input-output analysis allows us to understand what the effect is of the empirically observed supply chains to the job creation in certain economic sectors (in this case, job creation results from the ADSB support provided to exporter companies in selected sectors es of the economy). The ADSB support, provided in a specific year, is considered to have contributed to final demand in a specific economic sector, and thereby induced economic activity across the whole economy. The magnitude of the impact on other sectors depends on the local industry structure and the strengths of linkages across economic sectors, which are determined by the year-specific national input-output table[18]. This approach accounts for direct and indirect job creation (induced jobs are not included). The approach was used to assess yearly impacts of the ADSB support in the Dutch economy as well as in the selected case study countries.

Employment multipliers

Employment multipliers estimate how many jobs are created or maintained per million of EUR investment in certain specific energy technologies. For this analysis, we took existing employment multipliers from the publicly available (i.e. 2020 Sustainable Recovery report of the IEA)[19], which include direct and indirect job creation (induced jobs are not included). The IEA database was compiled based on existing literature, industry engagement, surveys of government statistical accounts and macroeconomic modelling. The use of employment multipliers makes it possible to isolate employment created by an investment from other macroeconomic factors that could otherwise impact the levels of job creation.

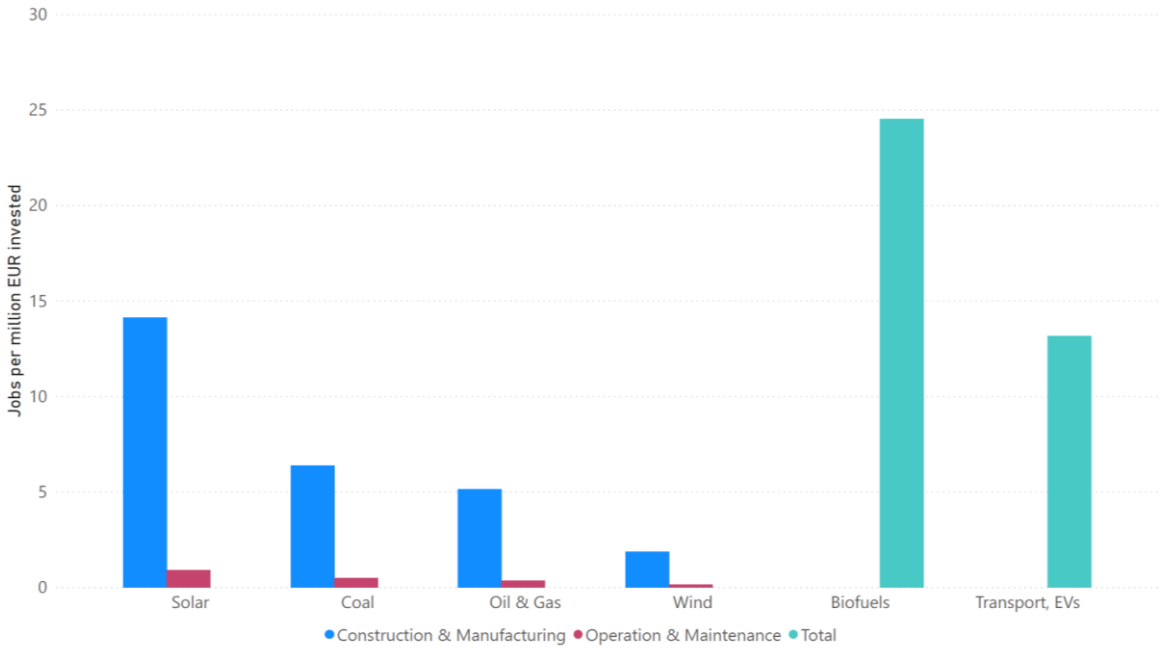
The reported value of the insurance policy (maximum liability) in the ADSB publicly available data is split into foreign and domestic content of the export contract. This is performed for each transaction reported, in line with the methodology described in Chapter 2 based on which more capital-intensive projects are assumed to generate more value for the Dutch economy than for the foreign country. The rest of this report refers to jobs supported in the Netherlands as “domestic employment” and jobs supported outside the Netherlands as “foreign employment”.

[18] Input-output tables for the Netherlands are available here: https://www.cbs.nl/en-gb/custom/2020/29/supply-and-use-input-output-and-sector-accounts. Input-output tables for the selected case study countries were accessed at the public sites of the national statistical offices of Kuwait, Taiwan and Nigeria.

[19] See. https://www.iea.org/reports/sustainable-recovery

For the Dutch economy, the industrial mapping is used to introduce the Dutch share of the total insurance value (assuming 100% additionality across all projects) as a portion of the final demand by sector in the input-output table for each year. Since there is no publicly available information reported on the duration of each project supported through an ADSB insurance policies, the full increase in demand is realised in the year of transaction rather than being split across a number of years subject to export project characteristics. Employment figures at industry level are used to produce job estimates through the input-output tables. In parallel, the Dutch share of the insurance value is introduced to employment multipliers based on the data of the International Energy Agency (IEA)[20] to produce a second estimate of ADSB jobs impact. While there is a wide range of empirical literature providing estimates on geography- or sector-specific job multipliers, IEA data was used due to its methodological consistency across technologies and its coverage of all the energy technologies that were required for the analysis.

Figure 6: IEA Employment Multipliers



Source: IEA World Energy Outlook 2020

The foreign share of the insurance value is used together with the IEA's employment multipliers to produce the estimate of ADSB jobs impact abroad, i.e. outside the Netherlands. Using input-output tables to model the job impacts abroad would require multiregional input-output tables and analysis for all importing countries. Instead, the employment multiplier method is used to estimate foreign jobs and Chapter 4 offers more detailed insights as to the upstream and downstream jobs impact of ADSB support in the importing countries using three case studies, where input-output methodology and multiplier analysis could be used together.

Box 4: Methodological limitations

Variation in the domestic/foreign content of the export contract can impair the attribution of supported jobs between the Netherlands and abroad. ADSB requires that at least 20 percent of an export contract value is generated in the Netherlands. In the absence of publicly available data regarding domestically generated value added, this report adopts a sensitivity analysis. Based on available literature and expert views, a maximum and a minimum value of domestic contract content was set.

The breakdown of value added and job estimates by energy type is dependent on the methodology used to

[20] See. https://iea.blob.core.windows.net/assets/c3de5e13-26e8-4e52-8a67-b97aba17f0a2/Sustainable_Recovery.pdf

categorise transactions by energy type. This is the result of a lack of a widely recognised and transparent approach to mapping insured export contracts into different energy types. The categorisation used for this study is likely to overrepresent the fossil fuel content due to assumptions relating to multiple use of supported goods/services across their life cycle. Box 2.1 discusses this in more detail.

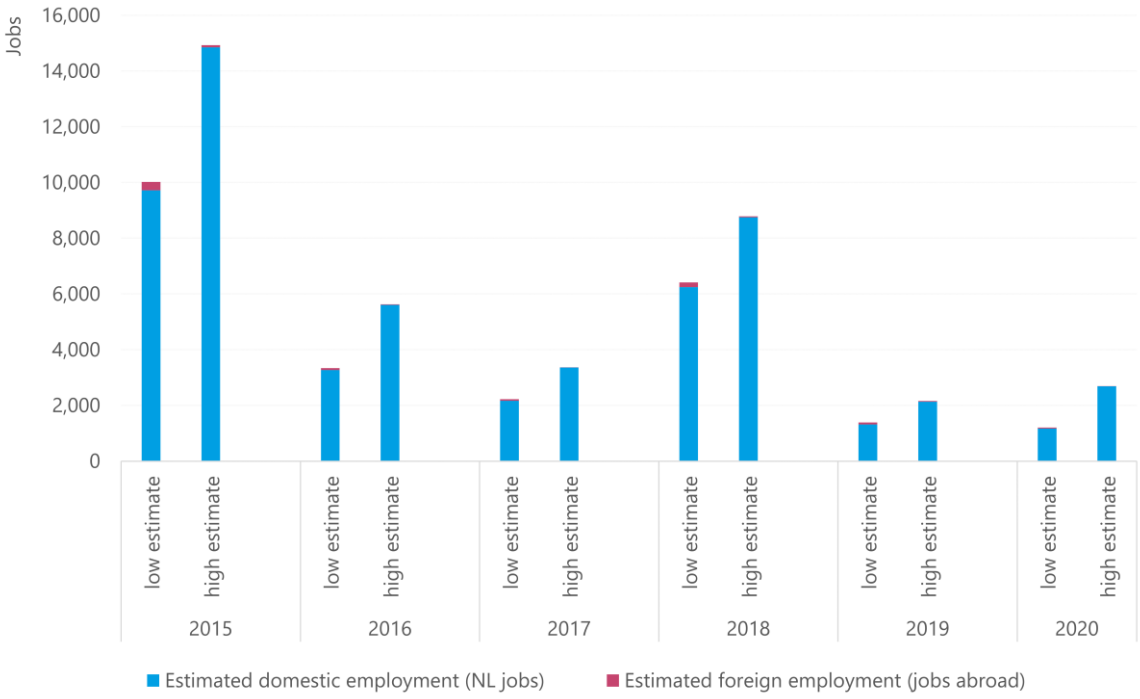
Input-output tables reflect the structure of the economy at a given point in time and assumes firm homogeneity within each industry. Input-output analysis, together with gravity models, is widely used for the quantification of ECA's impacts on the economy, yet the use of it may underestimate structural changes within economies over time, as well as changes in supply chain links with other economies. Internationally active firms on average outperform domestic competitors (closer to the average firm performance captured by input-output analysis). This is likely to lead to estimated jobs supported being less than the actual number of jobs supported within a country (here, the Netherlands). However, internationally active firms are also more likely to rely more heavily on inputs from abroad. This is likely to lead to the estimated jobs supported being more than the actual number of jobs supported within a country (here, the Netherlands). The relative strength of these two effects will determine the direction of the likely bias of the estimate in respect to the actual number of jobs supported.

The use of employment multipliers that are based on earlier empirical studies or industry observations is low-cost, robust and allows for methodological consistency across the various energy types. However, this method is not able to capture dynamic effects at due to its static nature it does not account for the job gains / losses and the changing skills needs over the longer run resulting from the re-structuring of sectors in the energy transition. In other words, in a forward-looking analysis the use of multipliers (evidenced by historical observations) may not capture the changing productivity and workforce availability each sector will face, which may yield different job multipliers in the future.

It is beyond the scope of the analysis to assess whether the insured activities would or would not have materialised without ADSB support. Beneficiaries may focus on high-risk markets only due to the existence of ADSB; alternatively scenarios could include the same firms exporting to less risky destinations or projects being realised without the support of the Dutch ECA. It may also be that the Dutch ECA, due to the degree of concentration in a very small number of industries (with high fixed costs) has fostered economies of scale. Assuming that halting support leads to a contraction in demand, the change may impair value added per unit produced, assuming fixed costs remain unchanged.

Over the period 2015-2020, ADSB supported on average more than 5,000 jobs a year through the insurance policies for Dutch exports related to fossil fuels and renewables activities (Netherlands and abroad) considered for the analysis. Energy-related ADSB insurance policies issued in 2015 appear to have supported the highest number of jobs overall, around 14,900 jobs (highest estimate of that year). The lowest level of support in terms of the number of jobs supported through ADSB insurance policies for fossil fuels, solar and wind was in 2020, when the ADSB supported around 1,200 jobs (lowest estimate of that year). Note though that, in the absence of data on the duration of the projects, the basis for the estimates are the transactions agreed in a given year. Therefore the estimates vary considerably between years, in line with the transaction values for those years.

Figure 7: ADSB-supported energy-related jobs in the Netherlands (NL - domestic employment) and abroad (foreign employment), 2015-2020



Jobs supported abroad (foreign employment) between 2015 and 2020 through energy-related (fossil fuel or renewables-related) ADSB insurance policies are consistently lower than the number of jobs supported in the Netherlands. Overall, the ADSB supported between 200 and 700 job years outside the Netherlands between 2015 and 2020. This is due to a number of factors. First, we cannot observe the true share of foreign activities in the total value of export activities supported through ADSB support. Based on available literature and expert interviews, this content is likely to vary between 10 and 45 percent of the total insured value, subject to the specific importing country, the type of activities covered by the insurance (capital vs labour intensity) and the specific exporting company receiving ADSB support. Second, available literature and stakeholder interviews suggest that activities in the importing country are commonly related to operation and maintenance. Based on the IEA employment multipliers used in this study, this type of activity supports fewer jobs compared to construction and manufacturing activities that are more likely to take place in the country of origin of the exporter, in this case the Netherlands.

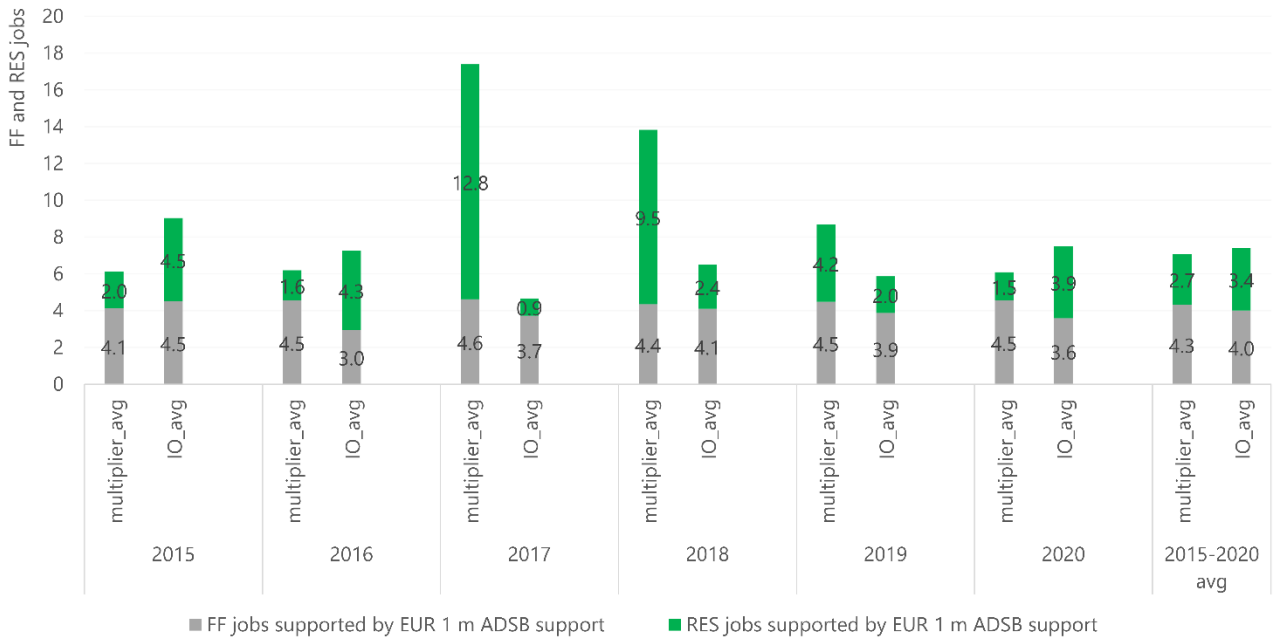
Figure 8: ADSB-supported energy-related jobs abroad (foreign employment), 2015-2020

Over the 2015-2020 period, the Dutch ECA, ADSB, supported a yearly average of around 4,800 jobs through support provided to fossil-related activities and around 500 jobs through support provided related to renewables. Jobs supported through support for fossil fuel value chains in 2015 and 2018 – more than 10,000 and 8,000 jobs respectively – far exceed the highest number of jobs supported in renewables as well as the overall support offered to renewables across all six years. In the latter years, the balance has shifted somewhat because the support for fossil fuels projects has decreased and the support for renewables-related projects has increased relative to preceding years.

Figure 9: ADSB-supported fossil fuel (FF) and renewables-related (RES) jobs, 2015-2020

On average, four jobs were supported for each one million euros of ADSB support offered between 2015 and 2020. Each one million of support offered in the form of ADSB insurance policies supported an average 3.9 jobs in renewables value chains and an average 4.1 jobs in fossil fuel value chains on average. Jobs supported in renewables oscillate between a maximum of 6.8 and a minimum of 2.7, while in fossil fuels between 4.3 and 3.7 jobs. The highest variation in jobs supported in renewables is primarily due to differences in the energy type composition – wind or solar. Solar is significantly more labour intensive than wind power. In addition, the IEA employment multipliers used in this study present conservative estimates for wind power employment capacities.

Figure 10: Fossil fuel (FF) and Renewables (RES) jobs supported by EUR 1 million of ADSB support



4 Case studies

A lack of available documentation presents a challenge in accurately approximating the split of the total economic activity undertaken due to the support of an ADSB insurance policy between the Netherlands and abroad. The objective of the case studies is to zoom into the foreign content of three distinct cases of ADSB support, and providing a granular quantitative assessment of the impact of ADSB support across the supply chain of importing countries.

This chapter develops in three sections, each dedicated to a specific case study that presents how an implied increase in final demand in the industrial sector allocated to the insurance policy stimulates economic activity across the economy, given the local industry structure. Each case study uses the estimated value of the Dutch and foreign (non-Dutch) component of the ADSB insurance policy to produce an upper and lower estimate of jobs supported through a given insurance policy. Two out of the three case studies present an estimate of the jobs supported through the realisation of the project, which ADSB support is linked to, thereby producing job figures based on the assumption that ADSB funding was not only necessary for the realisation of the activities covered by an insurance policy but for that of the entire project to which the insured activities contribute. The third case study focuses on a multi-purpose good, accounting for the highest number of insurance policies offered compared to other types of goods. The three instances of ADSB support were chosen based on the following four characteristics: project size, energy outlook, geography and data availability.

The first case study looks into the support provided by ADSB to Van Oord Dredging and Marine Contractors BV for the New Refinery Project of Kuwait National Petroleum Company in Al-Zour. The Kuwait project is one of the largest fossil fuel-related projects supported by ADSB, engaging local labour. Moreover, the type of work conducted – Dredging and land reclamation – can offer insights to ADSB involvement in Egypt and Oman as well as future projects. Dredging and land reclamation is an activity that, while mapped as a fossil fuel-related project here, it can be used for activities related to renewables. Thus, it is likely that more projects of this type will take place in the coming years.

The second case study discusses the ADSB support to Boskalis Westminster Dredging BV, linked to activities in the Changfang and Xidao Wind Farms in Taiwan. The Changfang and Xidao project is one of the largest renewable-related projects supported by ADSB, engaging local labour in Taiwan. Moreover, the type of work conducted – transportation and installation of wind jackets for turbines – is an activity that is likely to be supported in the future, given the prominence that wind power has in future outlook scenarios that incorporate a strong shift towards renewable sources of energy as economies transition towards Net Zero Emissions[21].

The third case study presents information on ADSB credit support for the provision of different types of marine vessels to Nigerian operators by Damen BV. Delivery and/or construction of marine vessels is one of the most frequently supported activities by the ADSB. It engages little local labour and it is considered as a multi-purpose activity, in terms of energy type. While all instances presented here are categorised as fossil fuel-related, the third case study focuses on Nigeria, and aims to highlight the complexity of energy type categorisation and provide information relating to the upstream and downstream effects of the country's growing water transport activities

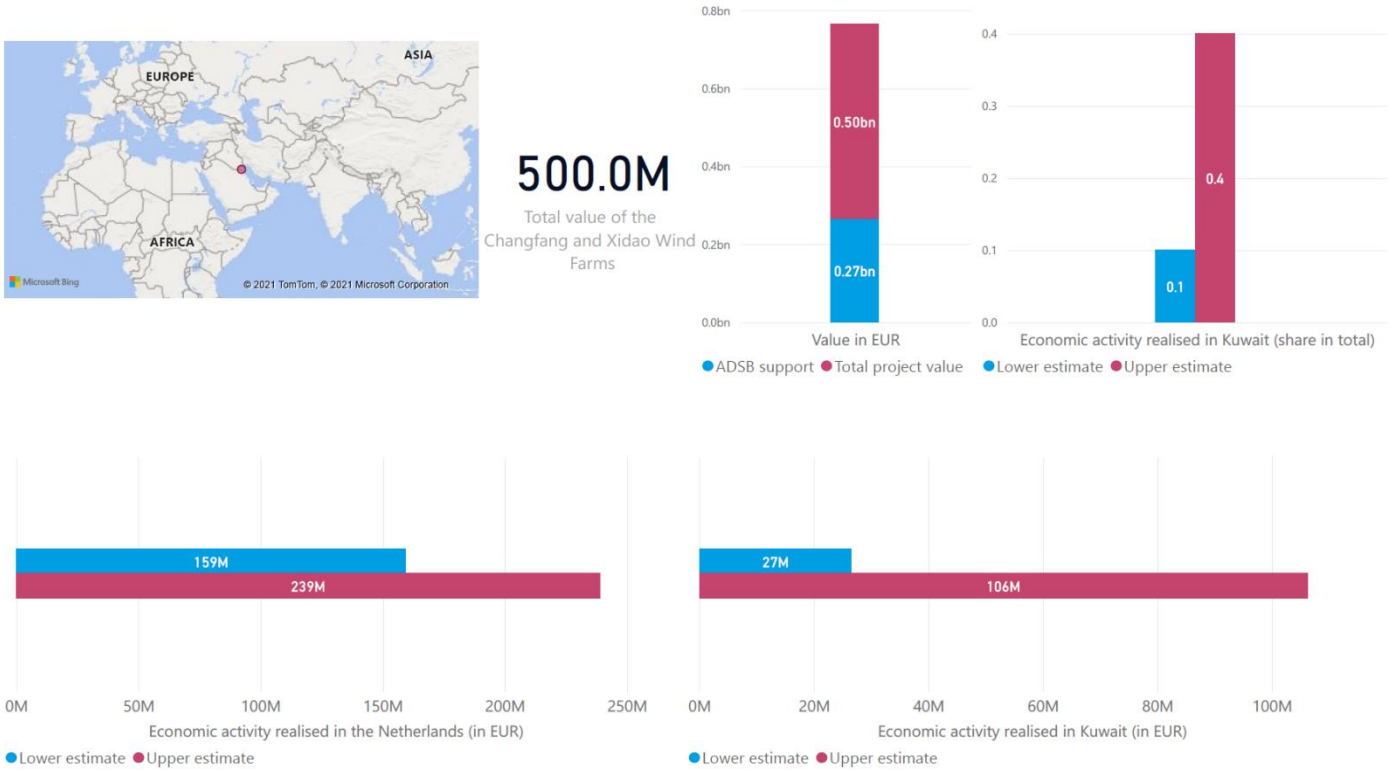
Accurately mapping the industries within which activities were directly supported in the importing country was the greatest challenge that this section phased. ADSB does not report information on the type of activities conducted in destination countries through the support offered by its insurance policies, instead we used available literature to produce a split by industry of the total of the foreign content of each ADSB insurance used for the case studies. Each case study provides information relating to the transaction and the economic sectors it directly affects in the destination country. This is followed by a quantitative

[21] See. Net Zero by 2050 – Analysis - IEA

assessment of jobs impact of the credit support in destination countries through input-output modelling and through the multiplier approach. For this, national input-output tables (for Kuwait, Taiwan and Nigeria) and data on local employment were used to estimate the jobs impact. In each case, jobs supported by the 'domestic' content part of the same ADSB transaction (that is, the part that supports jobs in the Netherlands) is also estimated, both through the multiplier approach and through input-output modelling for the Netherlands.

4.1 Case 1: Dredging and land reclamation for the Al-Zour refinery, Kuwait

Figure 11: Summary figures of the Kuwait case study



The Al-Zour refinery was set to be the largest refinery in the Middle East, designed to process mainly heavy crudes and produce 340,000 barrels per day of high-quality petroleum products. As such, it was expected to create numerous new job opportunities for national employment.[22] During the construction peak time, it employed more than 60,000 construction workers.[23]

In 2015 and 2016, ADSB issued two insurances policies for dredging activities in Kuwait linked to the Al-Zour refinery. The 2015 insurance policy is meant for services linked to the dredging and land reclamation for the construction of a "Solids Pier" and a "Small Harbor" in Kuwait, for the New Refinery Project of Kuwait National Petroleum Company (K.S.C.C.) located near Al-Zour, Kuwait. The 2016 insurance policy was also linked to dredging and land reclamation for the Al-Zour. Often, an export transaction is covered by two separate insurance policies. The first insures the production cost, reimbursing the company for the production cost in the event the buyer pulls out during production. The second insures the risk of non-payment following delivery. It was unclear whether this is the case here. If so, it would be more appropriate to focus on the 2015 transaction. The decision to use only on the 2015 transaction was due to input-output table availability.

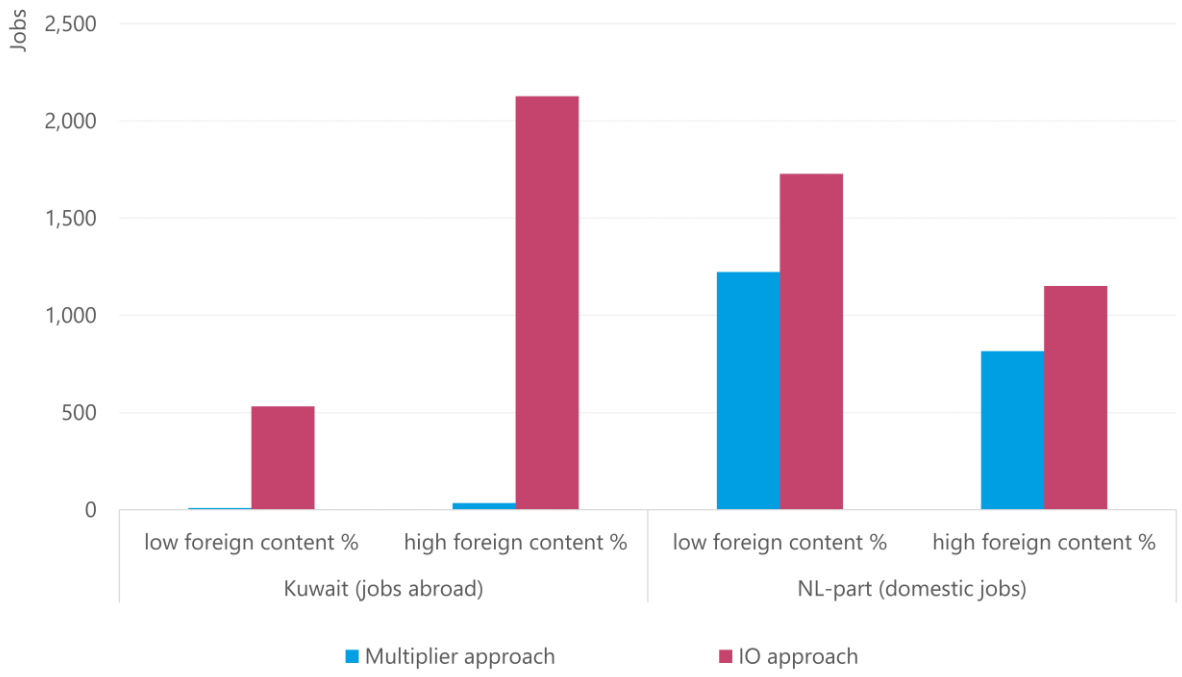
[22] See. Environment Public Authority - Kuwait > Achievements > 12 (epa.org.kw)
[23] See. 202139152441.pdf (kipic.com.kw)

The dredging and land reclamation project in the salt plain of Al-Zour was a 500 million EUR project linked to the Al-Zour refinery project. The land reclamation took place as part of the first phase of the investment programme. Therefore, in our analysis, we assume 'total project value' that the ADSB transaction contributed to was of 500 million euros.

Assessment of jobs supported by the ADSB support and by the total project value

ADSB support covered little more than half of the total project value, EUR 265 million out of EUR 500 million, supporting between 500 and 2,100 jobs in Kuwait. The dredging and land reclamation project supported in Kuwait close to 2/3 of the jobs supported in the Netherlands – between 1,200 and 1,700 jobs in the Netherlands, and 500 and 2,100 jobs in Kuwait, based solely on the industrial structure of the respective country described by available input-output tables for the year of the transaction. Compared with the more generic multiplier approach to estimate job impacts outside of the Netherlands, the input-output calculations applied in the case studies allow for a more bespoke (and higher) estimates of the jobs supported in these importing countries. Input-output tables are country-specific, and therefore also better reflect indirect effects as well as differences in labour intensities across sectors and importing countries.

Figure 12: Jobs supported by the export support in the economy of Kuwait (foreign content) and in the Netherlands (domestic content), # of jobs supported



The construction of the harbour, to which the dredging and land reclamation activities supported by the ADSB insurance policy were linked, supported between 2,500 (Employment multiplier approach) and 10,000 jobs (input-output approach) if the total project value is considered (rather than total liability value of ADSB support) in Kuwait. Taking under consideration the upstream and downstream impacts of the creation of a harbour in the country produces a significantly higher job estimate than focusing solely on job creation dynamics as described by employment multipliers linked to fossil fuel activities.

Construction (in particular, civil engineering) and Manufacturing are the main sectors observed to benefit through the increase in final demand due to the ADSB insurance. Based on Kuwait's industrial structure, as described by the input-output tables, other industries benefiting indirectly include Administrative and support service activities, as well as Professional, scientific and technical activities. The

same industries were affected both by the creation of the harbour, and the dredging and land reclamation activities.

Figure 13: Jobs supported by the export support in the economy of Kuwait overall, for the ADSB-supported part only and for total project value, # of jobs supported

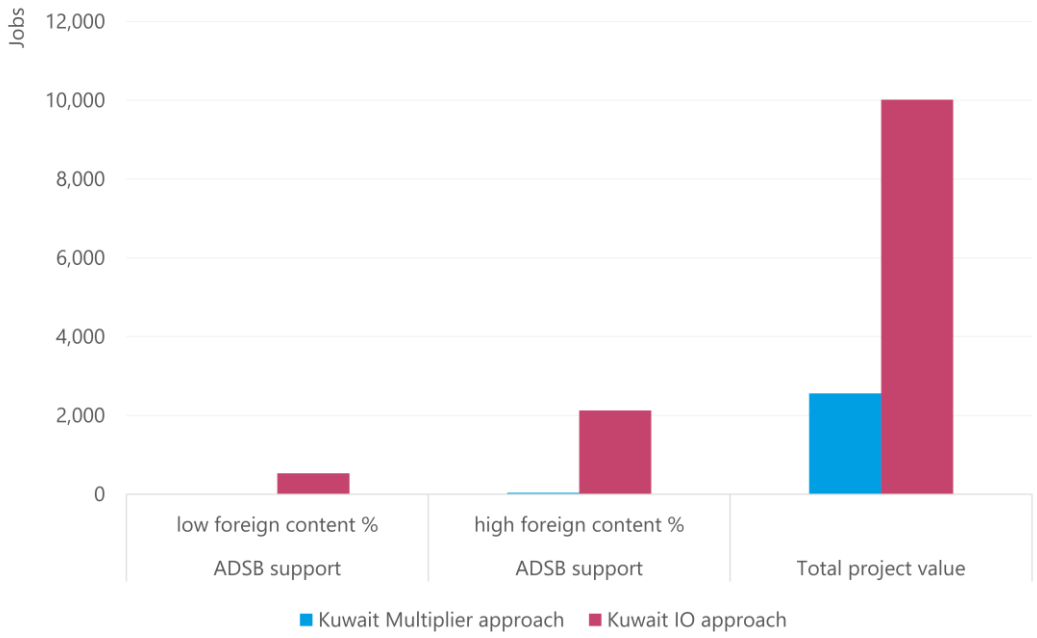
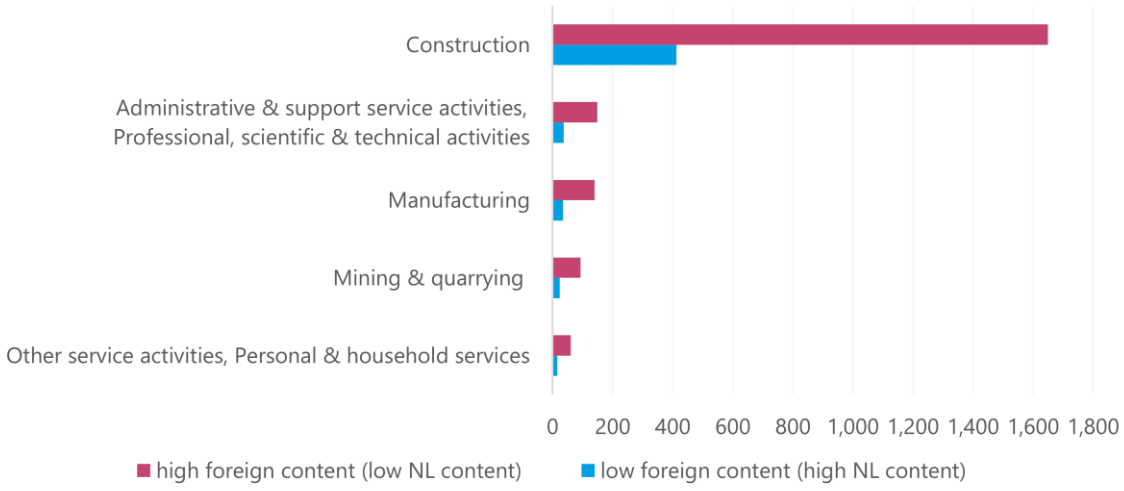


Figure 14: Jobs supported in the economic sectors that benefitted most from the export support in the economy of Kuwait, # of jobs supported



4.2 Case 2: Transport and installation of foundations and jackets for wind turbines, Taiwan

Figure 15: Summary figures of the Taiwan case study

The Changfang and Xidao wind farms will include 62 units of V174-9.5MW turbines with a combined capacity of 598MW each. The financing of the project (approx. USD 3bn reported) takes place through a mixture of equity and senior loans from a group of 25 international and local banks, financial institutions and six export ECAs. Available project documentations suggests that the project is expected to create 5,300 jobs and will provide clean energy to more than 600,000 households in Taiwan.[24] Expected date of completion is set in the first quarter of 2024.[25]

In 2020, ADSB supported with a single insurance policy transport and installation activities linked to the Changfang and Xidao wind farms. The policy referred to the transport and installation of 62 foundations and jackets for wind turbines, accounting for the total number of foundations and jackets transported and installed in the Changfang wind farm.

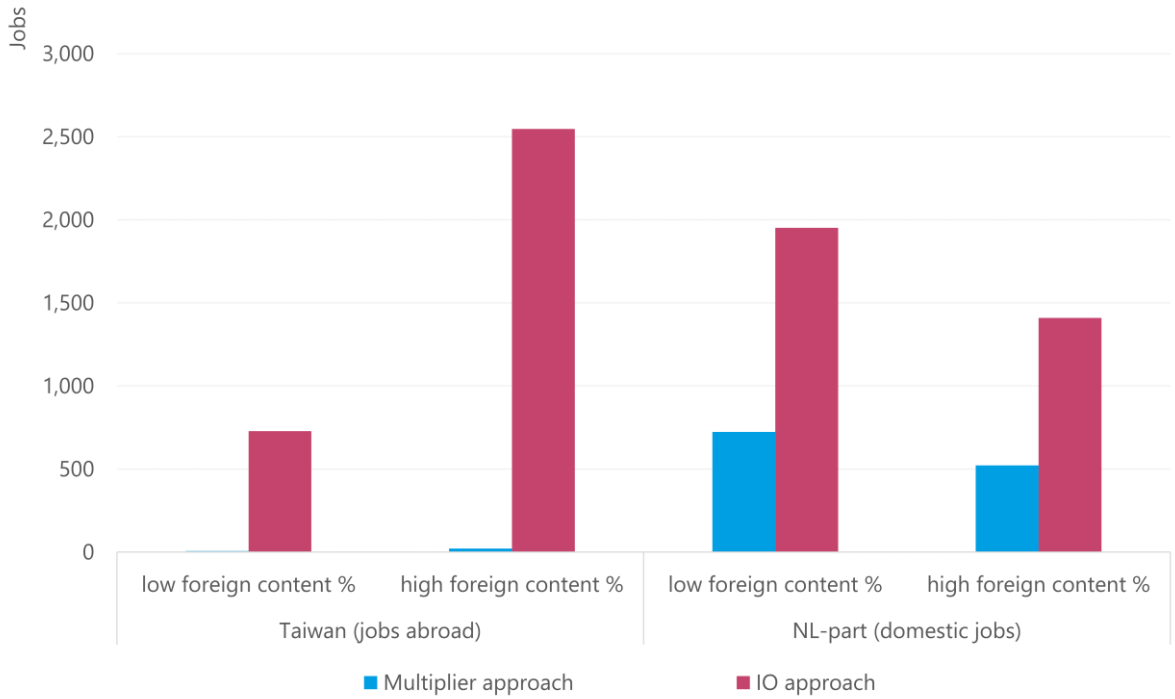
Assessment of jobs supported by the ADSB support and by the total project value

The insurance policy covering activities related to the transport and installation of the foundations and jackets for the wind turbines in Changfang covers only small fraction of the value of the Changfang and Xidao wind farms – EUR 431 million out of EUR 2.6 billion. The transport and installation activities supported in Taiwan may have supported a greater number of jobs than in the Netherlands. Subject to the size of resident population employed for the transportation and installation activities, between ½ and 1 ¼ as many jobs were supported in Taiwan compared to the Netherlands. These figures translate to between 1,400 and 2,000 jobs in the Netherlands, and 700 and 2,500 jobs in

[24] See. CIP reaches financial close on 589 MW offshore wind project, Changfang and Xidao, off the coast of Changhua County, Taiwan - Copenhagen Infrastructure Partners (cipartners.dk)
[25] See. Changfang and Xidao Wind Farm Project, Taiwan (power-technology.com)

Taiwan, based solely on the industrial structure of the respective country described by available input-output tables for the year of the transaction.

Figure 16: Jobs supported by the export support in the economy of Taiwan (foreign content) and in the Netherlands (domestic content), # of jobs supported



The construction of the two windfarms, to which the transportation and reclamation activities contributed, supported between 4,800 (Employment multiplier approach) and 44,000 jobs (input-output approach) if the total project value is considered (rather than total liability value of the insurance provided). Taking under consideration the upstream and downstream impacts of the creation of the windfarms produces a significantly higher job estimate than focusing solely on job creation dynamics as described by employment multipliers linked to wind power activities. Compared with the multiplier approach, the input-output calculations applied in the case studies allow for a more bespoke (and higher) estimates of the jobs supported in these importing countries. Input-output tables are country-specific, and therefore also better reflect indirect effects as well as differences in labour intensities across sectors and importing countries.

Construction, Transportation, and Storage and Manufacturing are the main sectors observed to benefit through the increase in final demand due to the ADSB insurance policy. The input-output tables suggest that while the insurance was provided to an economic actor that is active in the Construction sector (more specifically, in Specialised construction activities) and in Transportation and Storage (more specifically, in Water transport), there are further industries that are strongly affected by the export support (and thus, that are benefitting the most in terms of the number of jobs supported indirectly throughout the economy): Manufacturing and Support service activities. The same industries are affected both by the creation transportation and installation activities, as well as the construction of the two windfarms.

Figure 17: Jobs supported by the export support in the economy of Taiwan overall, for the ADSB-supported part only and for total project value, # of jobs supported

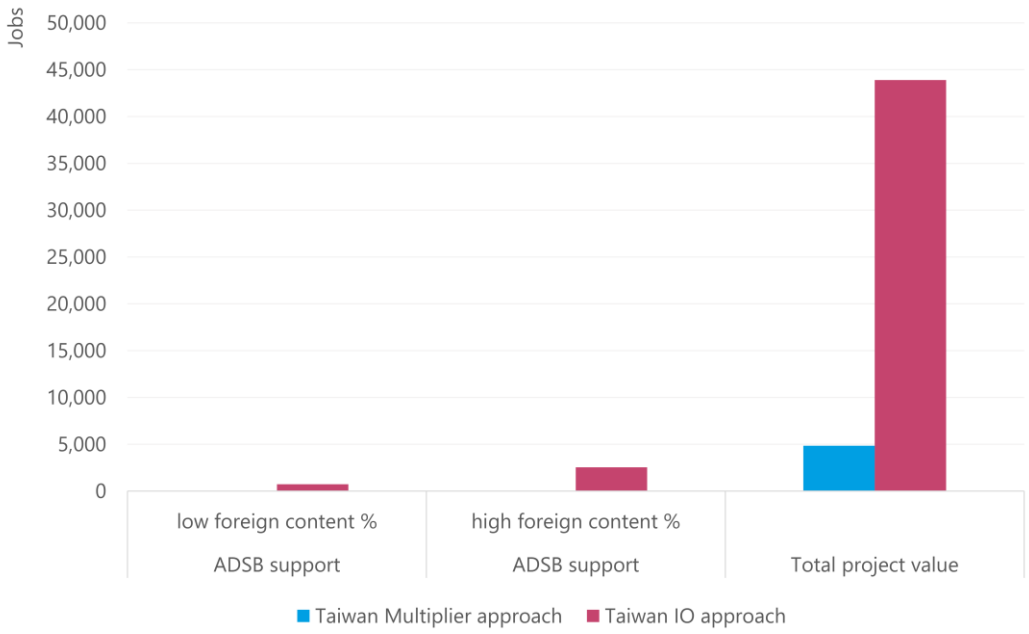
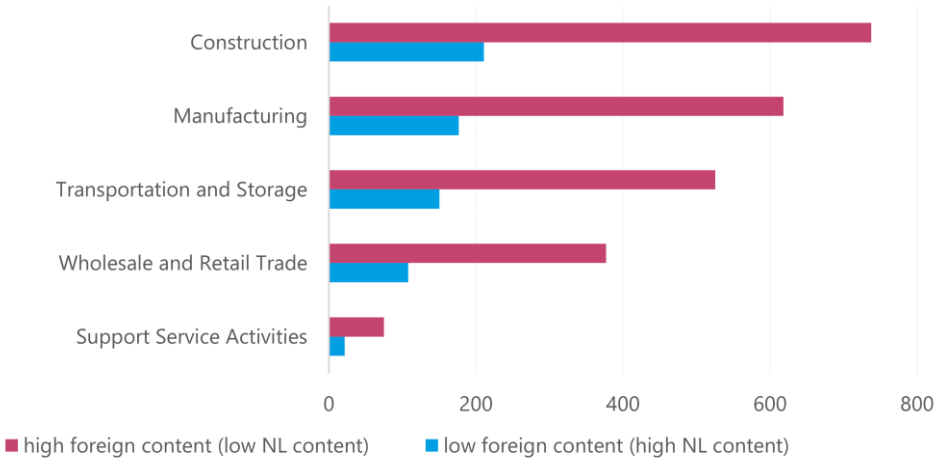
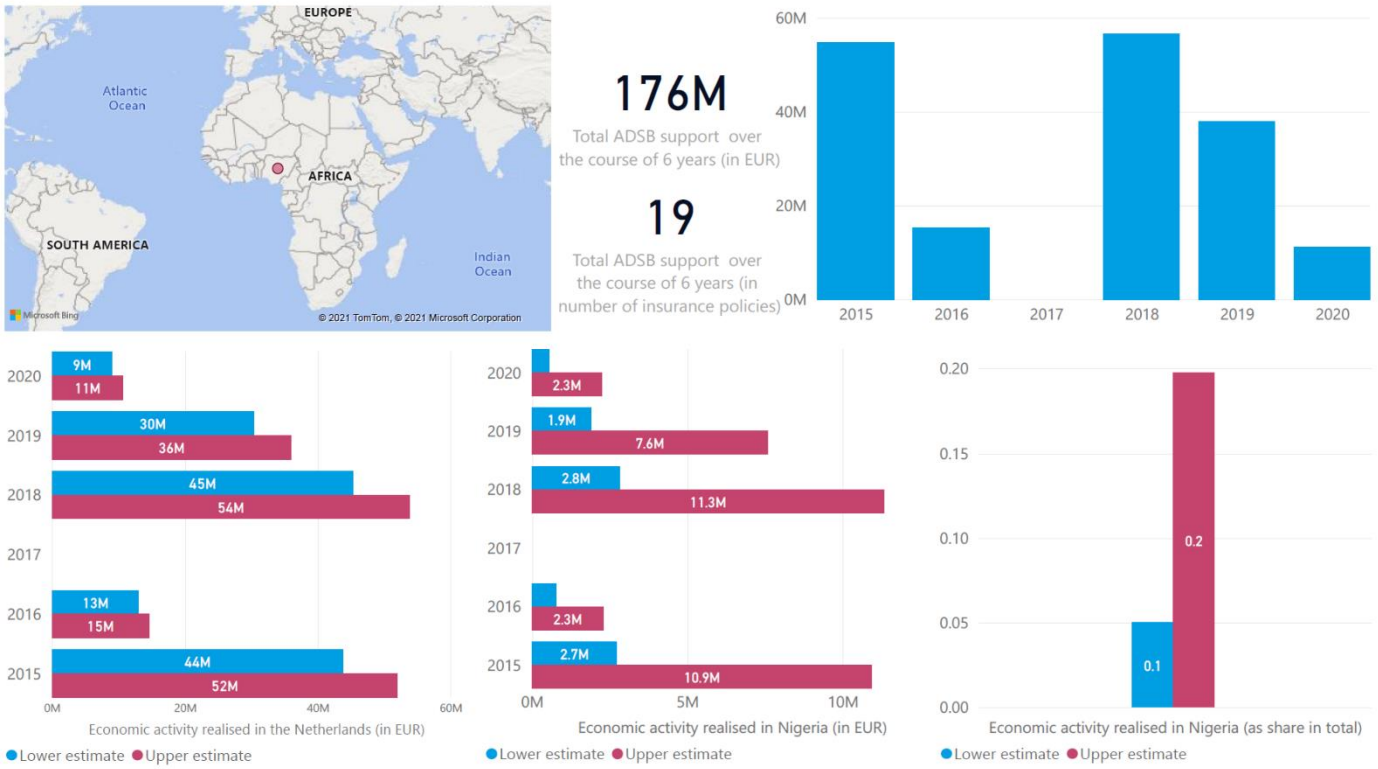


Figure 18: Jobs supported in the economic sectors that benefitted most from the export support in the economy of Taiwan, # of jobs supported



4.3 Case 3: Manufacturing and delivery of marine vessels, Nigeria

Figure 19: Summary figures of the Nigeria case study



Between 2015 and 2020, ADSB issued 19 insurance policies for the construction and delivery (and operation) of marine vessels to Nigeria. Marine vessels can be used for offshore activities that relate either to the value chain of fossil fuels or renewable energy. All 19 insurance policies presented here are mapped into fossil fuel value chains, since the marine vessels are imported by private Nigerian-owned multidisciplinary companies that offer offshore support services for oil and gas exploration and extraction processes to international oil companies active in the region.

The existence of such vessels is necessary for the extraction of oil and gas. Crew and supply support vessels are needed for logistical services necessary for oil and gas exploration and extraction as well as the construction or repair of drilling rigs. Patrol vessels aid extraction activities through the provision of security against piracy.

Nigeria has in place a required local content within Marine, Operations and Logistics services that ranges from 100% (in terms of person-hours/expenditures) for moving services to 30% (in terms of expenditure) for marine logistics.

Table 1: Required Local Content within Marine, Operations and Logistics Services in Nigeria

Marine, Operations and Logistics Services	Nigerian Content	Measurement Unit
Telecommunication Services	90%	Manhours
Supply of crew men for domestic coastal services	80%	Number of employees
Diving/RO'v/Submersible Operations	70%	Manhours
Hook-up and Commissioning including Marine Installation services	75%	Manhours

Dredging service	55%	Manhours
Gravel and Rock Dumping Service	65%	Manhours
Floating storage Units	45%	Manhours
Subsea Pipeline Protection Services	55%	Manhours
Installation of Subsea Package	60%	Manhours
Mooring System Services	50%	Manhours
Ship Chandler Services	90%	Manhours/Expenditures
Moving services	100%	Manhours/Expenditures
Supply vessels	45%	Manhours/Expenditures
Stand-by Vessels	55%	Expenditures
Domestic Clearing of Cargos	30%	Spend
Marine Insurance	40%	
Marine Consulting	40%	Spend
Marine Logistic	30%	Expenditures
Security Service at Location/Platform	80%	Expenditures

Source: NCACT.pdf (ncdmb.gov.ng)

Despite little conclusive evidence as to the magnitude of the contribution of the local content to employment[26] being available, it is presumed that delivery and operation of the marine vessels can be expected to support employment in Nigeria.[27]

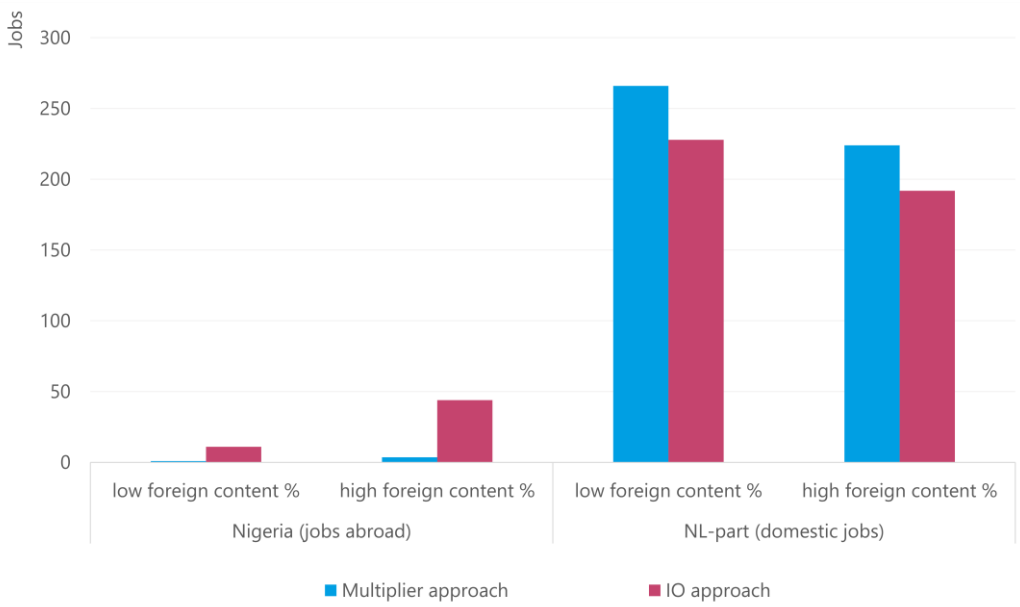
Assessment of jobs supported by the ADSB support and by the total project value

Nigeria has imported marine vessels covered through ADSB insurance policies in 19 instances. The here-assessed ADSB insurance policies' total value is EUR 54 million, relating to the delivery and operation of one supply vessel and four fast crew suppliers during 2015. This supported between 10 and 50 jobs in the country, subject to share of resident population used for delivery and operation, based on the country's industrial structure as described by the year's input-output table. Less than 10 jobs were supported, when a more conservative account of job support is produced through the employment multipliers.

[26] See. The role of local content policy in local value creation in Nigeria's oil industry: A structural equation modeling (SEM) approach - ScienceDirect

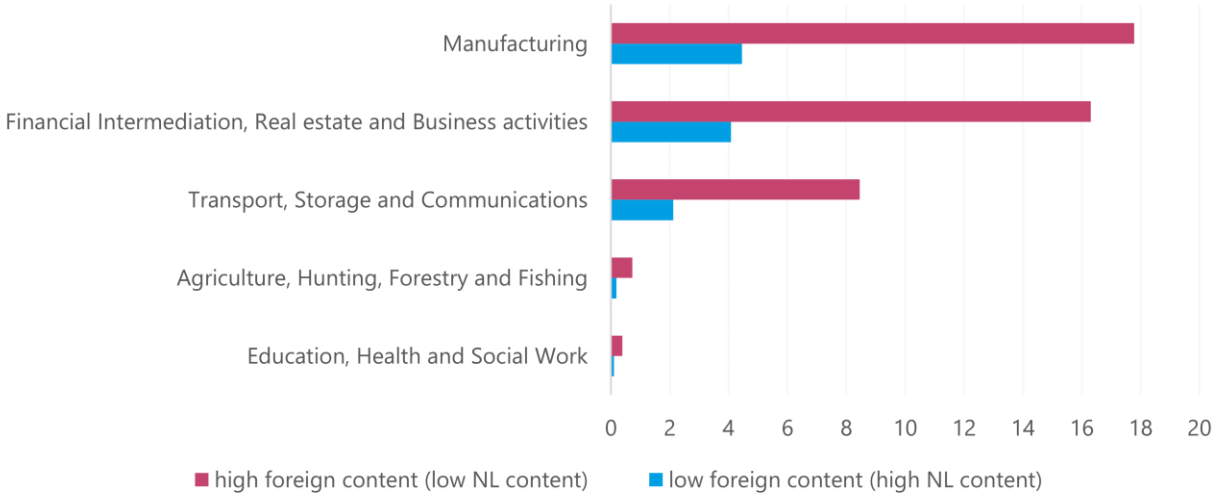
[27] See. Thesis_T-Harkema_12296295.pdf (leavefossilfuelsunderground.org)

Figure 20: Jobs supported by the export support in the economy of Nigeria (foreign content) and in the Netherlands (domestic content), # of jobs supported



Manufacturing (specifically, Manufacture of other transport equipment), Transport, Storage and Communications (specifically, Water transport) and Financial Intermediation, Real estate and Business activities are the main industries observed to benefit through the increase in final demand due to the ADSB insurance. Based on Nigeria's industrial structure, as described by the input-output tables, other industries benefiting indirectly include Financial Intermediation and Business activities, and Agriculture.

Figure 21: Jobs supported in the economic sectors that benefitted most from the export support in the economy of Nigeria, # of jobs supported



5 Future potential jobs

Technological change and climate policy are poised to accelerate the energy transition globally, leading to growth in demand for renewable energy and associated products and services. In the IEA's Net Zero Emissions Scenario, it is projected that final consumption of electricity will jump by 25% between 2020 and 2030. Direct use of renewables in buildings and industry together with low-emission fuels account for most of energy consumed. The demand for fossil fuels on the other hand is projected to decline sharply. The IEA[28] suggests that 2021 needs to mark the end to investments in new fossil fuel supply to maintain a 50% chance to keep global warming limited to 1.5 degrees. The UNEP Production Gap Report[29] states that coal, oil and gas production need to decline by, respectively, 11%, 4% and 3%, a year between 2020 and 2030. This presents both challenges and opportunities for Dutch exports, and thus for export credit support.

In this chapter, we assess the potential of the ADSB to support jobs under two scenarios, assuming that the annual level of policy insurance value equals the average of the past 6 years for renewables and fossil fuels. The first scenario assumes the current (2015-2020 average) share of support provided for fossil fuel-related and for renewables-related projects remains unchanged over the years (that is, a considerably higher portion of total ADSB support goes for fossil fuel-related projects than for renewables). The second scenario assumes that fossil fuel-related support stops completely from 2022 onwards, and all the previously fossil fuel-related support amount is shifted to support renewables-related projects:

- **Business-as-Usual**: Current (2015-2020 average) ADSB support value and its composition for fossil fuels and renewables remains constant over the projection horizon.
- **100% RES scenario**: Current (2015-2020 average) ADSB support for fossil fuels and renewables shifts 100% to renewable value chains.

The objective is to estimate, using a consistent method, how many more / less jobs can be supported in the second scenario, compared to a 'no change' Business-as-Usual scenario. To allow for better comparability, the two scenarios assume the same level of support is provided in each year (i.e. EUR 1.25 billion total insurance policy value). The analysis focuses on the number of jobs that can be *potentially* supported by the ADSB under different assumptions regarding the future composition of the project portfolio. Assumptions regarding the anticipated deployment of various energy sources and associated potential Dutch export growth in products related to energy forms (Coal, Oil and Gas, Renewables – Wind, Solar) are based on:

- Current values of the Netherlands' exports using the United Nations Comtrade Database[30] for selected product categories
- Global energy supply projections from IEA's Net Zero Emissions Scenario[31], which is broadly compatible with a 1.5°C warming scenario.

Dutch export values related to the key energy forms (Coal, Oil and Gas, Renewables – Wind, Solar) evolve in line with energy supply projections from the Net Zero Emissions Scenario in order to give an indication of potential growth of future Dutch export values in these product categories, the historical (2015-2020) average support value and its initial (2021) split is based on the 2015-2020 average. The split of future support across the various energy forms follows a similar split as the calculated split of Dutch export

[28] See. https://iea.blob.core.windows.net/assets/888004cf-1a38-4716-9e0c-3b0e3fdbf609/WorldEnergyOutlook2021.pdf

[29] See. https://www.unep.org/resources/adaptation-gap-report-2021?gclid=Cj0KCQiAys2MBhDOARIsAFf1D1f-vbvaFc67JAUBn3-asT--xhpGP_SCviWxnvhf8uwPuk04M5hj4OkaAjA2EALw_wcB

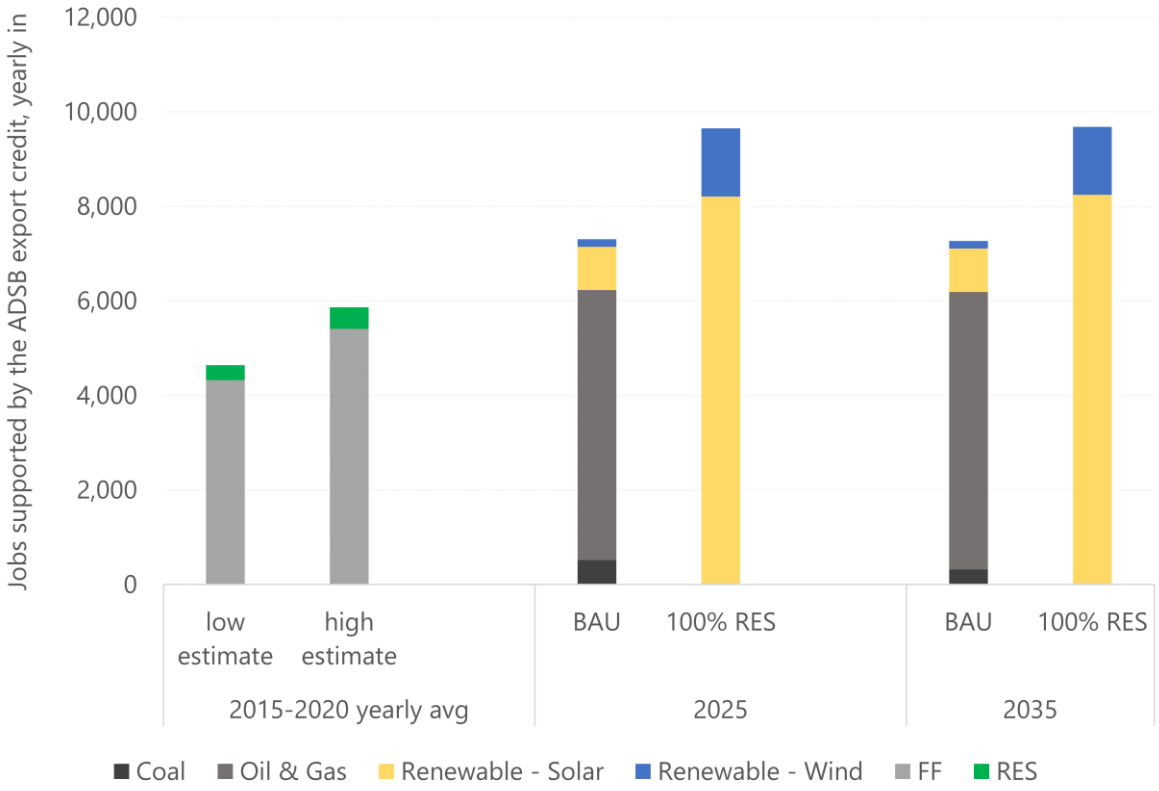
[30] See. https://comtrade.un.org/

[31] See. Net-zero Target Status | Net-Zero Targets | Climate Watch (climatewatchdata.org)

potential across energy forms in the projected years. Therefore, the Business-as-Usual scenario already has somewhat higher jobs estimates for both FF and RES than the historical average was for the period 2015-2020.

In the 100% RES scenario, more jobs overall could be supported than in the Business-as-Usual scenario (9,600 RES jobs in the 100% RES scenario, compared to 6,200 FF jobs and 1,100 RES jobs in the Business-as-Usual in 2025). This results primarily from the higher job support potential of investment made in renewables than in fossil fuel-related activities, as described by the IEA employment multipliers. Were the ADSB to insure solar PV and wind energy projects in the future instead of projects related to fossil fuels, the number of jobs supported is likely to be higher. A 100% renewables (RES) scenario produces 9,600 jobs supported in 2025, compared to a Business-as-Usual estimate of around 6,200 in fossil fuels and 1,100 in renewables, with the same level of support.

Figure 22: Future jobs potentially supported by the ADSB, in the Business as Usual (BAU) and in the 100% RES scenario, in 2025 and 2035, by energy type



The key driver behind these results is that investment in value chains related to renewables generally requires more labour input per EUR invested than in fossil fuel industries due to higher labour requirements. Renewable energy infrastructure has higher labour intensity during the construction and manufacturing phase. A significant part of the investment in renewables is channelled to processes such as the development, manufacturing, installation and the management of associated activities. In contrast, fossil fuel sectors channel more expenditure towards operation and maintenance as a result of the existence of variable costs in fuel. This requires comparatively less labour.

Short term transition costs – in particular regarding labour market mismatches and distributional impacts – are key in ensuring a smooth and just transition away from fossil fuels. The analysis presented here quantifies the number of jobs potentially supported by ADSB under various future scenarios, using multiplier analysis. By doing this, short term transition costs – in particular regarding labour market mismatches and distributional impacts – are not accounted for in the quantifications. In this respect,

there is an important role for government in facilitating the just transition through labour market and social policies, such as well-planned and adequately financed long-term retraining and re-skilling programmes.[32]

Box 5: Implications from a Just Transition perspective

There are several aspects to ECA support that strongly relate to the perspective of a just transition. First, there are large receivers of the ADSB support that might face challenges with a complete phase-out of fossil fuel-related support. This also means that jobs currently supported by the ADSB would potentially be at risk. On the other hand, new sectors that previously were unable to access ADSB support in the RES sector might also benefit, leading to a broadened and more diverse pool of beneficiaries. In particular, should the ADSB be able to match its support mechanism to the profile of the recipients (smaller / mid-sized companies, for example) it might enable better access for a larger set of beneficiaries.

At the level of an individual job there is no clear evidence if a 'greener' job will necessarily be a better job. However, at the industry- and at the national level, some high-carbon industries (coal, mining, conventional ICE vehicles manufacturing) are facing decline and do not have long-term prospects, while other industries (such as renewables, the construction of energy efficient buildings or advanced waste management) are expanding and will continue to be offering long-term employment prospects. A successful transition towards a greener economy therefore requires complementary labour market and social policies to ensure that the benefits of the transition are maximised. It is key to ensure that those workers who are displaced as a result of decarbonisation policies are suitably protected and assisted with the transition back to work.

Continued support to the fossil fuel-related industry and continued investment in fossil fuels can have adverse effects for the Dutch economy, subject to expectations for subdued demand for fossil fuels in the future. This is not incorporated by the quantitative analysis, yet other research suggests that continued investment in fossil fuels is likely to lead to the creation of substantial stranded assets (assets become obsolete before the end of the lifetime due to industrial transition)[33]. The valuation of such stranded assets suggests that the long-term costs could outweigh the short-term benefits of fossil fuel investments. Similarly, fossil fuel projects made possible with the ECA support could also pose economic risks for importing countries where these contribute to a fossil fuel lock-in, particularly when this concerns developing countries that lack the investments necessary to diversify their energy mix.

This highlights the potential risks in investing in fossil fuel-based assets as the rest of the world decarbonises. In the short term, these investments are seen as 'protecting' existing fossil fuel industry jobs; however, as global demand shifts, it presents opportunities for other firms outside of the Netherlands to develop expertise in the emerging industries and technologies (e.g. the shipping and installation of offshore wind turbines), meaning that Dutch firms are then at a competitive disadvantage when later trying to shift to focus on meeting the increasing demand for these services. The trade-off could therefore be trading security for jobs in fossil fuel-supporting industries in the short term for the long-term employment prospects in industries supporting renewables and other nascent industries.

[32] See. Measuring the socio-economics of transition: Focus on Jobs (irena.org) and Exploring the trade-offs in different paths to reduce transport and heating emissions in Europe - Cambridge Econometrics (camecon.com)
[33] See. Macroeconomic impact of stranded fossil fuel assets (nature climate change)
Europe Gas Tracker Report 2021

6 Annex

Descriptive statistics of ADSB support and the dataset used

The dataset used for the analysis was collected and made available to us by Both ENDS. The data has been collected from publicly available sources and covers transactions from the period 2015-2020. The dataset classifies transactions by type of energy source, where the following energy sources are identified:

- Fossil fuel-related (FF)
  - Oil & Gas (O&G)
  - Coal
- Renewables-related (RES)
  - Wind
  - Solar
  - Biofuels
  - Transport / EV

The following tables provide a summary of the dataset used for the quantitative assessment of jobs supported presented in this report.

Figure 23: Value of ADSB-supported transactions related to fossil fuels (FF) and renewables (RES), in EUR million

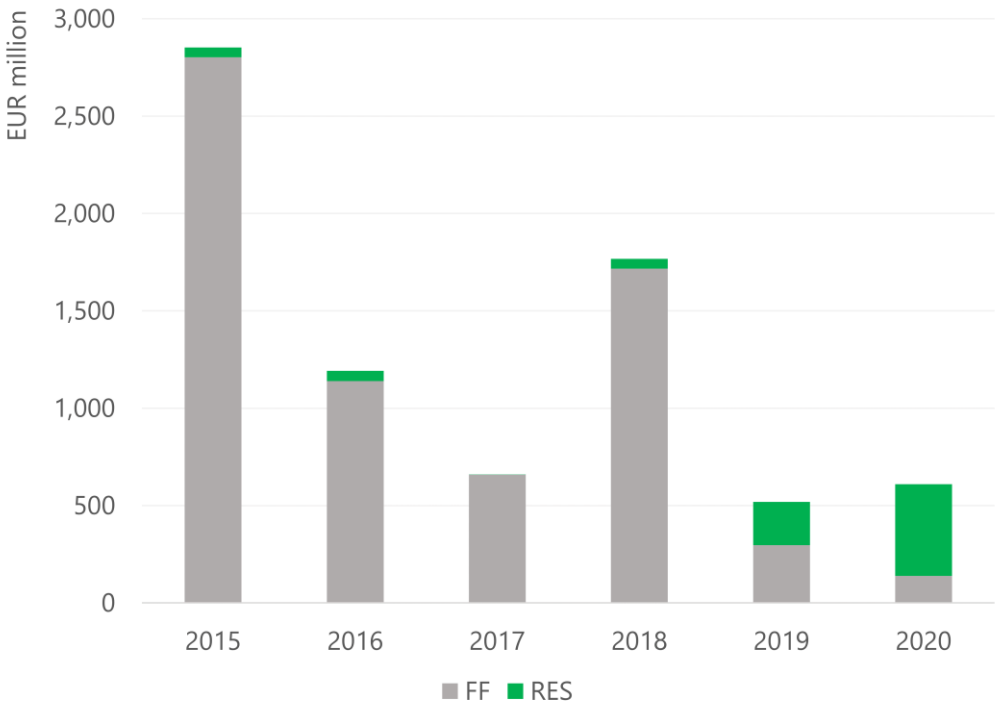


Figure 24: Number of ADSB-supported transactions related to fossil fuels (FF) and renewables (RES)

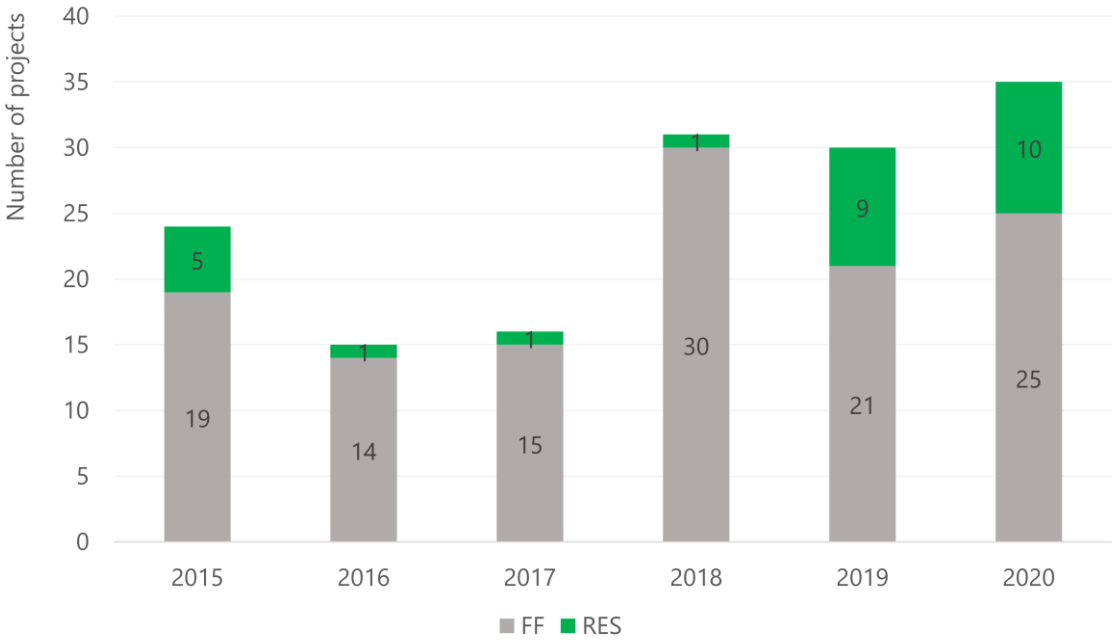


Figure 25: Value of ADSB-supported transactions related to renewables (RES) and distribution across different RES types, in EUR million

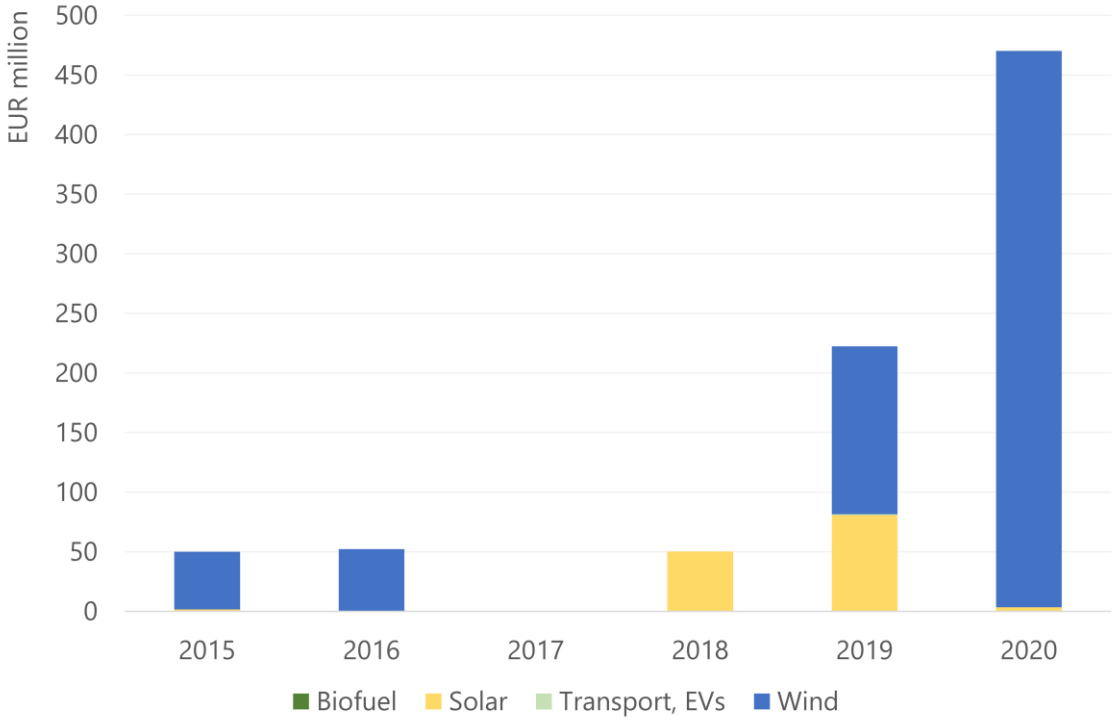


Table 2: Maximum insured value for fossil fuel- and for renewables-related transactions by ADSB over the period 2015-2020, in EUR million

	Maximum insured value (EUR million)	% of yearly total
2015	**2,853**	**100%**
Renewable - Solar	1	0.1%
Renewable - Wind	48	2%
O&G	2,802	98%
2016	**1,192**	**100%**
Renewable - Wind	52	4%
O&G	1,139	96%
2017	**659**	**100%**
Renewable - Solar	0	0.02%
Coal	129	20%
O&G	530	80%
2018	**1,767**	**100%**
Renewable - Solar	50	3%
O&G	1,717	97%
2019	**519**	**100%**
Renewable - Solar	80	15%
Renewable - Wind	141	27%
Coal	79	15%
O&G	217	42%
2020	**609**	**100%**
Renewable - Solar	3	0.6%
Renewable - Wind	467	77%
O&G	139	23%
Total	**7,599**	

Table 3: Maximum insured value for the selected case study transactions, in EUR million

	Maximum insured value (EUR million)
Kuwait (2015)	
O&G	266
Nigeria (2015)	
O&G	55
Taiwan (2020)	
Renewable - Wind	431

Assumptions used for the assessment of jobs supported

Employment impacts, in economic analysis, are commonly calculated using one or a combination of two standard methods:

- Employment multipliers
- Input-output (IO) modelling

In our assessment of employment impacts of the historical and future ADSB support, the job impacts have been calculated using both methods, which also allows for the comparison and sense-checking of the estimates produced.

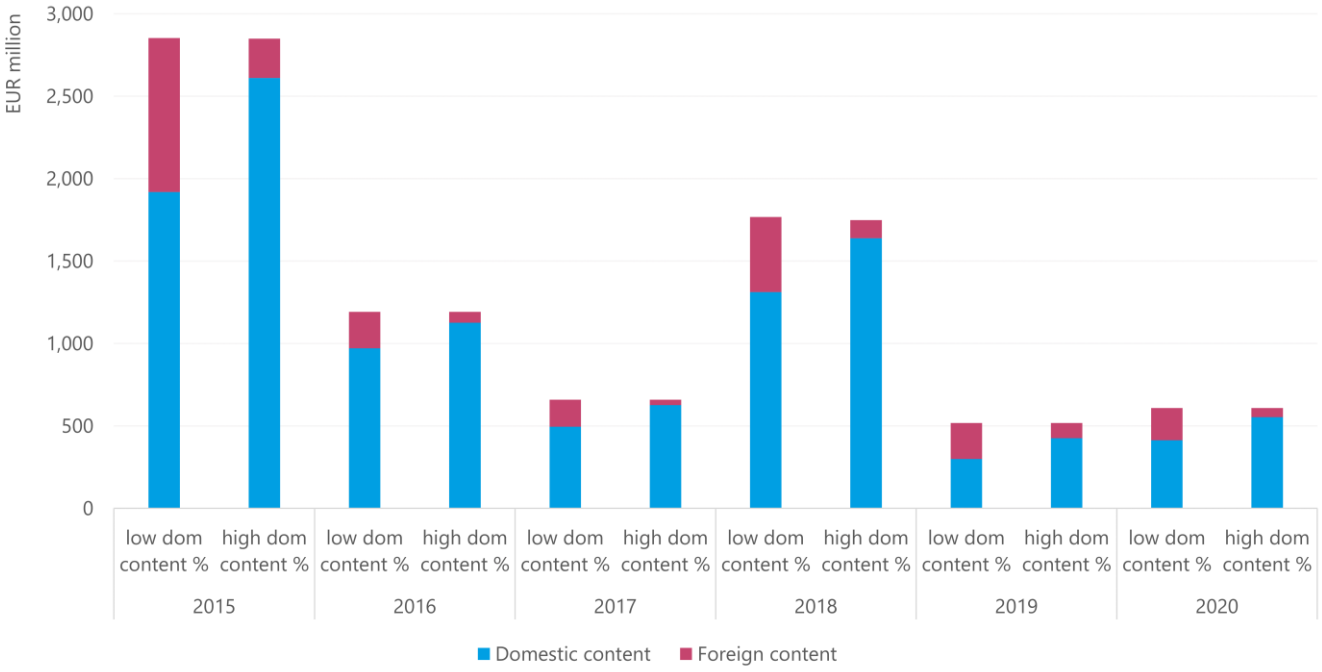
Domestic (NL) and foreign value creation of ADSB transactions

As a first step in the analysis, we identified what part of the support provided by ADSB creates value in the domestic (NL) economy, and what part of it creates value elsewhere (globally). Our approach (both the Multipliers approach and the IO approach) builds on a split of transaction value into domestic and foreign content part, by each individual transaction. We considered the assumed domestic- and foreign content-related part of the support to be a close approximation of the split of economic activity undertaken between the Netherlands and the target country as a result of ADSB support. In other words, the part of the support that is domestic content-related is assumed to support jobs in the local economy, while the part that is foreign content-related is assumed to support jobs in export countries (globally, outside of the Netherlands).

Through publicly available documentation and expert consultations, we have grouped the transactions by their broader types and identified the respective shares of them as domestic- and foreign content-related. In the majority of cases, most of the economic activity is generated by the principal contractor, the “exporter”. In most cases, we expect that the Dutch economy will absorb at least 65% of the maximum liability. In cases that the ADSB support is limited to the construction and delivery of a good (such as a marine vessel), we expect that the Dutch component will be relatively greater. For this case, for instance, we expect that the Dutch economy will benefit of 95% of the maximum liability provided. To address the sensitivity of the job estimates to the domestic content within total transaction value, and to be able to provide a more nuanced estimate of the estimated jobs supported by ADSB support, we provide interval estimates by employing, when appropriate, two scenarios describing the domestic-foreign split: one lower-bound of the domestic share within total support, and one upper-bound of the domestic-share within total support. In most cases, the domestic share falls between 60-90% of total support value.

- „low domestic content %” means relatively lower share of domestic content within total support
- „high domestic content %” means relatively higher share of domestic content within total support

Figure 26: Estimated domestic and foreign content of the ADSB support, with low and high domestic content share assumptions, in EUR million



Job estimates using employment multipliers

Employment multipliers estimate how many jobs are created or maintained per million of USD invested in new infrastructure or spent on certain goods (for the analysis, USD-based multipliers have been converted to EUR). For this analysis, we took employment multipliers from the 2020 Sustainable Recovery report of the International Energy Agency[34]. The table below shows the employment multipliers used for the assessment of job impacts.

Table 4: Employment multipliers used for the job impact calculations (jobs per million EUR invested)

	Construction & Manufacturing	Operation & Maintenance	Total
Unabated coal-fired power	6.4	0.5	
Unabated gas-fired power	5.1	0.3	
Wind	1.9	0.1	
Solar	14.1	0.9	
Urban transport infrastructure			13.2
Biofuels			24.5

Source: International Energy Agency (2020) Sustainable Recovery - World Energy Outlook Special Report.
Note: Unabated gas-fired power used for Oil & Gas type of transactions. Urban transport infrastructure used for Transport / EV type of transactions.

[34] More detailed information on the construction of specific employment multipliers can be found in the technical annex of the report: https://iea.blob.core.windows.net/assets/c3de5e13-26e8-4e52-8a67-b97aba17f0a2/Sustainable_Recovery.pdf

Job estimates using IO modelling

The use of national input-output analysis allows us to understand what the effect of an implied 'shock' is (in this case, ADSB support provided to exporter companies in selected sectors of the economy) on other sectors along supply chains. The ADSB support, provided in a given year, is considered to increase final demand in a given economic sector, and thereby induces economic activity across the whole economy. The magnitude of impacts on other sectors depends on the local industry structure and the strengths of linkages across economic sectors, which are specified by the national input-output table.

In each year, sectors where exporting companies that have been provided ADSB support are assumed to experience an increase in final demand for their products / services (through increasing exports), which, in turn, has positive impacts on other sectors Gross Value Added (GVA) (derived through the IO modelling, on a yearly basis). In each year, the support provided by ADSB is aggregated from the level of transactions considered to capture total support provided to each economic sector. Employment in each economic sector is assumed to change in line with GVA change (resulting from the final demand increase). Using historical data on sectoral employment, it is possible to calculate the employment impacts resulting from the assumed change in final demand (in terms of the number of persons employed).

Methodology and assumptions used for the market outlook

For the market outlook, we identify current Dutch export related to the relevant energy forms (Coal, Oil and Gas, Renewables – Wind, Solar), and used future energy supply growth projections to project future Dutch export values in these product categories. The specific allocation of future support across the various energy forms follows the same split as future Dutch exports are split across energy forms in the projected years. We defined and assessed two scenarios for comparison:

- **Business-as-Usual**: Current (2015-2020 average) ADSB support value and its composition for FF and RES % is constant over the projection horizon.
- **100% RES scenario**: Current (2015-2020 average) ADSB support for FF and RES shifts 100% to RES.

To allow for better comparability, the two scenarios assume the same level of support is provided in each year.

Projected Dutch exports in products related to energy forms (Coal, Oil and Gas, Renewables – Wind, Solar) are based on:

- Current values of the Netherlands' exports using the United Nations Comtrade Database[35] for selected product categories defined by Harmonized System (HS) Codes
- Global energy supply projections from IEA's Net Zero Emissions Scenario

The table below shows the product categories and the respective HS codes that capture trade (exports) related to the selected energy types.

Table 5: Product categories and HS codes used to assess export of the Netherland that is related to various energy types

Energy type	Corresponding HS code (2- or 6-digit)	HS code name (2- or 6-digit)
Coal	2701-2709 (all within categories)	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes
Oil & Gas	27, not included in Coal	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes
Solar	854140	Diodes, transistors and similar semiconductor devices; photosensitive semiconductor devices, including photovoltaic cells, whether or not assembled in modules or made up into panels; light-emitting diodes;

[35] https://comtrade.un.org/data

		mounted piezoelectric crystals
	841919	Instantaneous or storage water heaters, non-electric (excl. instantaneous gas water heaters and boilers or water heaters for central heating)
Wind	730820	Towers and lattice masts, of Iron or Steel
	850231	Generating Sets, Electric, Wind-powered
	841290	Engines; parts, for engines and motors of heading no. 8412 (reaction engines, hydraulic power engines, pneumatic power engines)
	848210	Ball bearings
	848340	Gears and gearing; (not toothed wheels, chain sprockets and other transmission elements presented separately); ball or roller screws; gear boxes and other speed changers, including torque converters
	850164	Electric generators; AC generators, (alternators), of an output exceeding 750kVA
	850431	Electrical transformers; n.e.c. in item no. 8504.2, having a power handling capacity not exceeding 1kVA
	851290	Electrical lighting or signalling equipment (excluding articles of heading 85.39), windscreen wipers, defrosters and demisters, of a kind used for cycles or motor vehicles - Parts
	853620	Electrical apparatus; automatic circuit breakers, for a voltage not exceeding 1000 volts
	841381	Pumps for liquids, whether or not fitted with a measuring device; other pumps
	850300	Electric motors and generators; parts suitable for use solely or principally with the machines of heading no. 8501 or 8502

Sources: Joint Research Centre (2017) EU Energy technology trade. Jacob, A. – Moller, A. K. (2017) Policy landscape of trade in environmental goods and services. CE own assumption.