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Subject: **State Aid SA.53525 (2020/N) – The Netherlands**
SDE++ scheme for greenhouse gas reduction projects including renewable energy

Excellency,

1. PROCEDURE

(1) By electronic notification of 23 July 2020, the Netherlands notified, pursuant to Article 108(3) of the Treaty on the Functioning of the European Union (TFEU), the above-mentioned measure. The Commission requested more information on 11 and 29 September 2020, 19 and 22 October 2020 and 13 November 2020. The Netherlands provided responses and further information on 21, 25 and 29 September 2020, 1 October 2020, and 12, 13, 19, 20 and 23 November 2020, and 2 December 2020.

(2) By letter dated 29 September 2020, the Netherlands agreed exceptionally to waive its rights deriving from Article 342 TFEU in conjunction with Article 3 of Regulation 1/1958[1] and to have the present decision adopted and notified in English.

2. DETAILED DESCRIPTION OF THE SCHEME:

2.1. Background and objectives

(3) The 'SDE+' (Stimulering Duurzame Energieproductie) is an existing aid scheme in the Netherlands which supports investment in renewable electricity, gas and

[1] Regulation No 1 determining the languages to be used by the European Economic Community (OJ 17, 6.10.1958, p. 385).

Zijne Excellentie de Heer Stef Blok
Minister van Buitenlandse Zaken
Rijnstraat 8
NL – 2515 XP Den Haag

heat production. This scheme has evolved over time and been approved by the Commission in 2003, 2007, 2012, 2015, 2016, 2017 and 2019[2]. The scheme is due to end on 31 December 2020.

(4) The Netherlands has adopted a national target of a 49% reduction of greenhouse gas (GHG) emissions by 2030, compared to 1990 levels.

(5) To achieve this target, the Netherlands has notified a new version of the SDE+, the SDE++, which would operate from 2020 until 2025[3] and support not only renewable energy production but also other measures to reduce GHG emissions, for example green hydrogen production and carbon capture and storage.

2.2. National legal basis

(6) The national legal basis is the Royal decree 'Besluit stimulering duurzame energieproductie en Klimaattransitie' (SDEK) under the framework law for subsidies (Kaderwet EZK- en LNV-subsidies).

2.3. Beneficiaries

2.3.1. Renewable energy technologies

(7) The SDE++ will include energy based on the following renewable sources, which were also supported in the SDE+: onshore wind, solar, geothermal, osmosis, hydro, biomass, sewage gas and biogas. The production of renewable energy generally reduces GHG emissions when this production displaces energy production based on fossil fuels.

(8) The SDE++ will also include energy based on the following renewable sources which were not supported in the SDE+:

(a) Extension of solar thermal technologies – where for example superfluous heat produced by solar thermal installations in the summer can be stored for use in the winter. Heat can for example be stored in aquifers and then released by using electric heat pumps to raise the temperature to the appropriate level for an application;
(b) Aquathermal energy – where thermal energy is extracted from surface or waste water in the summer and then stored in a thermal energy storage system (TES) for delivery via an electric heat pump to consumers in the winter;
(c) Extension of geothermal energy to applications that require an electric heat pump to raise the temperature to the appropriate level; and

[2] In March 2003, the Commission authorised schemes N707/02 and N708/02 (the Milieukwaliteit van de Elektriciteits Productie or MEP scheme). On 21 December 2007, the Commission authorised scheme N 478/07 (the initial SDE scheme). On 7 September 2012, the Commission authorised amendments to the SDE expanding the types of generation eligible to participate (creating the SDE+ scheme). The Commission authorised small amendments to the SDE+ scheme regarding to support to biomass co-firing, and support to biogas, on 25 August 2016 and 10 May 2017 respectively, and in its decision in case SA.55761 of 20 December 2019 authorised the extension of the scheme for one year until 31 December 2020.

[3] With extension possible depending on the scheme's evaluation.

(d) Compost heating – where the heat given off by the exothermic process of converting organic matter into humus is captured and used, for example to heat greenhouses next to a mushroom farm.

(9) GHG emissions reduction is possible because these methods avoid burning gas to produce heat or electricity. However, the emissions reduction from methods (a), (b) and (c) above depends on the carbon intensity of the electricity used to operate the heat pumps.

(10) Co-firing biomass in coal-fired power plants was eligible under the SDE+ but is currently not eligible for support under the SDE++. Offshore wind was supported under the SDE+ but will not be eligible for support under the SDE++ because it is now considered by the Netherlands to be cost-effective without subsidy.

(11) The Netherlands has confirmed that:

(a) All of the renewable energy technologies supported under the SDE++ will fall within the definition of 'renewable energy sources in the Guidelines on State aid for environmental protection and energy 2014-2020 (EEAG)[4].

(b) All eligible biofuels will comply with the definition of 'sustainable biofuels' in the EEAG. They will also meet the criteria in Directive 2018/2001 (the Renewables Directive) and be limited to feedstocks listed in Annex IX part A of the Renewables Directive. Feedstocks listed in Annex IX part B of the Renewables Directive will not be eligible for support.

(c) Where the renewable energy methods described in this section involve heat pumps, these will comply with the energy efficiency standards and criteria in the Renewables Directive Article 7.4 and Annex 7[5].

(d) All of the district heating and cooling activities supported under the SDE++ will fall within the definition of energy efficient district heating and cooling in the EEAG.

2.3.2. Waste heat solutions

(12) The SDE++ will include the following technologies that reduce GHG emissions and are based on waste heat:

(a) Heat pumps – the use of large-scale heat pumps (those with a nominal thermal capacity of at least 500 kWth) for use in upgrading residual heat from industrial processes so that it can be reused in the same or other local industrial processes (steam production, steam compression and hot water production). Heat pumps use energy to upgrade low-temperature source heat to heat with a higher temperature. Large-scale heat pumps in industry use process heat, which would otherwise have to be cooled down or discharged, as heat sources. Reusing this heat avoids the use of energy and

[4] OJ C 200 28.6.2014, p.1

[5] OJ L 328, 21.12.2018, p. 82–209

CO_2 emissions as gas would have had to be used to produce the required heat using a boiler or CHP. This could be relevant for various heat-intensive processes such as distillation, vaporisation, spray drying, washing, and process water heating in various sectors including chemicals, food, beverages and paper;

The efficiency (amount of output heat for input energy consumed) of the heat pump is expressed as Coefficient of Performance (COP). Technologies must be close to the scenarios investigated by the Dutch Environmental Assessment Agency (Planbureau voor de Leefomgeving, PBL)[6] for the reference installations. In 2020 there will therefore be a requirement in terms of minimal COP of 2.3 and a nominal thermal capacity of at least 500 kWth. Heat pumps should produce heat for industrial applications while cooling is excluded. Both closed and open system heat pumps are eligible.

(b) Industrial waste heat – the delivery of residual waste heat to one or a few customers, or to many customers through a district heating network. The SDE++ would support the costs of the outward connection of residual heat as a heat source up to and including a heat transfer station at a distribution network, or directly to greenhouse horticulture, commercial buildings or other business processes. The undertaking with the heat source would normally submit the bid for support and make the investment. The costs that are incurred in exploiting heat from a heat transfer station to a small-scale consumer and any associated distribution network fall outside the scope of the SDE++. This category covers situations in which the residual heat is transferred via a heat exchanger but can also include situations in which the heat is upgraded to a higher temperature through a heat pump. Technologies must be close to the scenarios investigated by PBL for the reference installations. For 2020, the minimum output capacity is 5 MWth and the heat may be transported by pipeline. The category residual heat without a heat pump requires a minimum ratio of the length of the route and the thermal output capacity after heat exchange. The category residual heat with a heat pump requires a COP of 3.0 or higher.

Table 1: SDE++ Industrial Waste Heat Scenarios

Residual heat in combination with heat pump		**Residual heat without a heat pump**	
1. Decoupling to heat transfer station	2. Decoupling directly to greenhouse horticulture or commercial buildings	3. Decoupling to heat transfer station	4. Decoupling directly to greenhouse horticulture or commercial buildings

Source: The Netherlands

[6] PBL is a part of the Dutch Government but acts independently. Its independence is safeguarded by the Aanwijzingen voor de Planbureaus, Staatscourant (government gazette) 3200, 21 February 2012.

2.3.3. Carbon capture and storage (CCS)

(13) The SDE++ will also include CCS as eligible projects. CCS reduces GHG emissions by storing the emissions for the long term. The avoided emissions depend on the volume of captured and subsequently stored emissions as well as the emissions potentially linked to the energy used to capture, transport and store the carbon.

(14) CCS can be used in the industrial sector by capturing CO_2 from industrial processes, compressing it, transporting it and storing it underground. CCS can also be applied in electricity generation, however, only industrial applications will be included in the scope of the SDE++. Besides CCS, it is possible to make use of the captured CO_2 in, for example, greenhouses, urea, melamine and soft drink production. This is referred to as Carbon Capture and Use (CCU). However, this technique is not yet included in the SDE++.

(15) Capture of CO_2 from industrial processes can be pre-combustion or post-combustion. With pre-combustion techniques, the CO_2 is removed in the production process, while post-combustion techniques remove CO_2 from flue or residual gases.

(16) The Netherlands has indicated that the following processes are the most likely to make use of CCS, as they can yield the highest CO_2 reduction potential: ethylene oxide production, hydrogen production (so as to then qualify as 'blue' hydrogen), steel production, ammonia production, waste incineration plants, CO_2 capture at oil refineries (cracker, CHP and process heating). The Netherlands distinguishes CCS projects between new capture of CO_2 at existing facilities and new capture at new facilities. The second scenario will typically display lower costs as the capturing can directly be taken into account in the design of the entire facility while capturing at an existing facility will require more adaptation costs.

(17) In addition to new CO_2 capture locations, the Netherlands has explained that there are also locations where CO2 is already being captured and is being delivered to horticulturists and the soft drinks industry. Given that this demand depends in part on seasonal influences, some of the captured CO_2 is vented. This CO_2 could also be delivered to the CO_2 transport and storage network. Such a solution would require investment in additional compression (CO_2 is not compressed at the same pressure for CCU and CCS) and a connection to the CO_2 transport network. This type of project (additional CO_2 storage at existing capture facilities) is included in the SDE++. The technology specific base amount is consequently lower to reflect the fact that no capturing equipment is needed but only an additional compressor and connection to the CCS transport network.

(18) Only the CCS costs as such are eligible for support under the SDE++ and taken into account to establish the technology specific base amount. Costs linked to the industrial production process (eg. steam methane reform process) are excluded. The technology specific base amount includes both investment costs (where applicable capturing, compression, connection to the transport network) and operating costs (energy for capturing and/or compressing, fee to the operator of the transport and storage). Applicants also need to demonstrate that the CCS chain is complete and that they would be connected to a CO_2 storage facility.

2.3.4. Technologies based on electricity that reduce GHG emissions:

(19) The SDE++ will also include projects where fossil fuel inputs are replaced by electricity (electrification).

(a) Electric boilers – the use of large-scale electric boilers in the industrial sector to produce hot water or steam for industrial processes.

This technology can be used in industrial processes as an alternative to boilers or combined heat and power (CHP). Supported projects can comprise the electric boiler (including control panel), the electricity infrastructure (cables, transformers) inside and outside of the fence, and the connection to the steam or heating network (pipelines). Producing heat can reduce GHG emissions when the supported heat production avoids gas being burned to produce heat. However, as the production of electricity itself can generate emissions, the net avoided emissions of electrification solutions depend on the one hand on the avoided emissions of the fossil fuel that is replaced and on the other hand on the carbon intensity of the electricity used, and also how much energy is consumed by the supported process ('internal use of energy'). Technologies must be close to the scenarios investigated by PBL for the reference installations. For 2020 electric boilers must have a nominal thermal capacity of at least 5 MWth, with the produced heat used in a system with a temperature of at least 100 degrees Celsius, to ensure a certain degree of energy efficiency. The SDE++ will be open to applications outside the industrial sector as well.

(b) Production of hydrogen based on electrolysis (using electricity to produce hydrogen).

(20) As for hydrogen production projects , the hydrogen eligible under the scheme has to be produced from electrolysis. Producing hydrogen from electrolysis can reduce GHG emissions when the hydrogen displaces hydrogen that would otherwise have been produced in a steam methane reformer which in the Netherlands typically uses natural gas and produces GHG emissions (one ton of hydrogen produced from steam methane reforming typically generates 9 tons of CO_2[7]). The avoided emissions also depend on the carbon intensity of the electricity used to power the electrolyser and produce the hydrogen.

(21) With regard to hydrogen projects as well as other electrification projects, the Netherlands indicated that it is important that the used electricity is produced by renewable/low carbon sources, in order to have a net CO_2 reduction effect compared to grey hydrogen production. The Netherlands has confirmed that, once work to develop the EU regulatory framework for green and low carbon hydrogen under the Renewables Directive or other sources of legislation is done the SDE++ will be amended if necessary to comply with the EU framework.

2.3.5. Specific eligibility rules for electrification technologies

(22) As explained in Section 2.3.4, for technologies reliant on electricity as an input the carbon intensity of the electricity has a significant impact on whether the

[7] IEAGHG, 2017.

technologies reduce emissions. For example, if hydrogen production based on electrolysis is subsidised, then in hours when the electricity used by the electrolyser comes from renewable sources, the activity will lead to significant emissions reductions. However, in hours when the electricity used comes from fossil fuel sources then the activity could increase rather than reduce emissions in those hours.

(23) With regard to hydrogen projects as well as other electrification projects, the Netherlands indicated that it is important that the used electricity is produced by renewable/low carbon sources, in order to have a net CO_2 reduction effect compared to *grey* hydrogen production. For this reason:

a) First, the technology-specific base amount for electric boilers and hydrogen based on electrolysis assumes an electricity price corresponding to the average electricity price in the 2000 hours during which electricity prices would be the lowest in each year between 2020 and 2034 (0.036 €/kWh_e)[8], which is expected to correspond to the electricity price at times when the electricity would be low carbon.

b) Second, the Netherlands will limit the support that can be granted to 'flexible' technologies (as defined in Section 2.4) based on electrification to a maximum number of hours per year corresponding to the hours in which renewable electricity sources are expected to be the marginal option (and therefore hours in which the electricity supply in the Netherlands is expected to be low carbon) over the subsidy lifetime. To ensure that the SDE++ never provides a subsidy in any particular year for activity that increases rather than reduces emissions, the amount of full load hours for which a subsidy can be paid in each year will be limited to ensure that the calculated (up-front) net GHG emissions reduction of an average project in each year for a project's lifetime is at least 0. The number of hours will be chosen based on in depth analysis by PBL of the projected evolution of the electricity generation mix in the Netherlands. The expectation is that as more low carbon generation is installed and more fossil-fuel based generation is retired, the number of hours for which subsidies will be available will be increased.

(24) Table 2 shows the hours for which subsidies will be available for electric boilers and electrolysers for the 2020 allocation round for the years in which 2000 full load hours would lead to a net GHG emissions increase. These hours are different for electric boilers and electrolysers, since they are based on the GHG emissions intensity of the input and the avoided emissions caused by the output of these techniques.

Table 2: Maximum full load hours for electric boilers and electrolysers – 2020 allocation round

Year	Full load hours electric boilers	Full load hours electrolysers

[8] These figures have been calculated for the 2020 subsidy round. They will be recalculated by PBL every year following the same methodology.

2021	1490	0
2022	1670	0
2023	1790	1490
2024	1860	1590
2025		1820

Source: The Netherlands

(25) The subsidies available for each year of a support contract will be determined and published in advance of the opening of an SDE++ allocation round and fixed for the duration of contracts awarded in that allocation round regardless of the eventual real evolution of the electricity mix in the Netherlands.

(26) Before each subsidy allocation round PBL will calculate how many hours renewable electricity sources are expected to be the marginal option in the middle year of the subsidy period related to the forthcoming allocation round, and if a lower maximum is needed in the preceding years to avoid a net GHG emissions increase in any contract years. The figures in Table 2 will therefore be updated for subsequent allocation rounds after 2020.

(27) Some hydrogen production technologies involve a certain level of continuous demand for electricity (a 'must run' demand) in order to keep the facility operational. To avoid that this must run demand creates demand for electricity that is not low carbon, applicants for hydrogen production based on electrolysis will have to demonstrate in their application for subsidy that this installation can run as a flexible option, as part of the feasibility study, to ensure GHG reductions. Projects are then eligible for subsidy if they demonstrate and confirm that the average electricity demand outside hours eligible for subsidy (i.e. low carbon hours) will stay below 1% of the maximum electricity demand of the installation.

2.3.6. Other eligibility rules

(28) Subsidies will continue to be available only to new installations and for projects where the facility to generate new additional renewable heat or gas, or additional CCS equipment, is being added to existing installations, except for biomass which can qualify for an 'extended lifetime' subsidy. The extended lifetime subsidy applies when operating costs including fuel and maintenance costs mean continued operation of biomass plants is expected to be unprofitable based on the latest projections of costs and revenues.

(29) The SDE++ will initially only be open to projects physically located in the Netherlands. However, the Netherlands will leave scope in the national law for extending the scheme to other Member States if it chooses to do so in future.

(30) Energy efficiency projects that are legally required are not eligible for support under the SDE++, for example energy efficiency improvements with a payback time of 5 years or less which are required under the Dutch Environmental Management Activities Decree (Activiteitenbesluit Milieubeheer). In general including for activities outside the scope of this and other laws, PBL will also not include technologies / approaches for inclusion in the SDE++ when PBL's economic analysis indicates that they are profitable enough without support to payback the required investment within 5 years.

(31) Undertakings in difficulty or subject to an outstanding recovery order following a previous Commission decision declaring aid illegal and incompatible with the internal market are ineligible for the scheme. Undertakings, which were not in

difficulty on 31 December 2019 but became undertakings in difficulty in the period from 1 January 2020 to 30 June 2021, will also be ineligible to participate in the scheme.

2.4. Allocation process

2.4.1. Emissions factors to allow direct comparison of technologies

(32) The SDE++ aims to put all types of potential beneficiary into competition and select for funding those projects that deliver the highest GHG emissions reduction per EUR of State aid.

(33) To enable a direct comparison of projects, an emissions factor is determined for each technology by PBL[9]. This factor provides a measure of the GHG reduction potential of the technology concerned in the medium term.

(34) For renewable energy, the emissions factor is determined by estimating the avoided emissions due to substituting production by fossil fuel power generation in the following way:

(a) For renewable electricity, producers are assumed to substitute the projected average marginal plant for electricity production in 2030[10] in The Netherlands.

(b) For renewable gas, producers are assumed to substitute natural gas.

(c) For renewable heat, producers are assumed to substitute heat generated in a natural gas-fired boiler. The substituted installation will be different if necessary to reflect the application (eg. the temperature of the heat required) so that it represents the most likely alternative installation.

(35) For hydrogen production, producers are assumed to substitute the use of natural gas for making hydrogen.

(36) For heat pumps, electric boilers and industrial heat solutions, beneficiaries are assumed to substitute the use of natural gas-fired boilers.

(37) For technologies based on a significant amount of electricity, such as heat pumps, electric boilers, hydrogen production and CCS, the emission factors, and the rules governing the amount of production eligible for support, also take into account the emissions of the produced and the internal use of energy. Two different approaches are used, based on the time and quantity of electricity consumption:

(a) 'Basic load', where electricity is consumed continuously. In that case, the 2020 SDE++ scheme determines the emissions linked to the electricity consumption based on the projected average marginal electricity generation plant in 2030, as a proxy for the emission factor over the

[9] Note, this is similar to the existing SDE+ scheme which, to enable a direct comparison of electricity, heat and gas projects, relied on conversion factors to convert heat and gas, often measured in GJ and m^3 respectively, into kWh.

[10] For the 2020 allocation round. For the 2021 allocation round, the reference year will be 2031, etc.

duration that the plant will be eligible for subsidy. The time horizon will be moved by one year on an annual basis (thus 2030 serves as reference for bidding rounds to be organised in 2020; 2031 will serve as reference for bidding rounds to be organised in 2021, etc).

(b) 'Flexible', where electricity is expected to be consumed only in low price hours where renewable electricity is setting prices and therefore providing the electricity supply. For these technologies, the 2020 SDE++ scheme will determine the emissions linked to the electricity consumption based on the expectation that in 2030 there will be 2000 hours where the marginal plant for electricity production in the Netherlands is 100% renewable. The SDE++ subsidy for flexible technologies will only be paid for a limited number of hours per year (see Section 2.3.5).

(38) 2030 is used as a point of reference for the 2020 allocation round because the contracts in the SDE++ are 12-15 years and this will represent roughly the mid-point of an SDE++ support contract (accounting for the time lag between the award of a subsidy and the benefitting facility entering operation).

Table 3: Emissions Factors for 2020

Energy component	Emission factor	Explanation
Electricity consumed, flexible	0 g CO_2/kWh	Electricity consumed is expected to be 100% renewable.
Electricity consumed, basic load	187 g CO_2/kWh*	Projected average emission factor for the average marginal option in 2030
Electricity produced	187 g CO_2/kWh	Projected average emission factor for the average marginal option in 2030
Heat consumed and supplied	226 g CO_2/kWh	Replaces gas-fired boiler use
Biogas produced	183 g CO_2/kWh	Replaces natural gas use
Hydrogen produced	229 g CO2/kWh	Replaces natural gas use
Biomass used	0 g CO_2/kWh	The use of manure will take the avoidance of methane emissions from manure into account.

Source: The Netherlands

(39) Detailed methodologies for calculating the emissions factors will be published for consultation each year, and updated annually.

2.4.2. Competitive process

(40) Each year, a budget for the scheme is set. The budget calculation takes into account the expected supply of projects (including the pipeline of projects with planning consent), as well as possible limitations on competition if the 'ceilings' (see Section 2.4.3) are met, so that the budget can be set at a level that ensures the budget is a binding constraint in a competitive allocation process.

(41) The allocation process progresses in sequential phases, with a different level of support (called a **phase base amount**) acting as an offer cap in each phase – ie. participants can offer at or below the phase base amount. The phase base amounts will be expressed in terms of EUR/tCO_2equivalent. The lowest level of support is offered in phase one. Once phase one closes, if there is still budget available then phase two is opened, where the offer cap is increased to a higher base amount.

Once the budget is exhausted the scheme will close for that year and applications submitted on a later day will be declined. On the day that the budget limit is reached, the applications with the lowest subsidy intensity (EUR/tCO_2equivalent) are granted subsidy first. The subsidy intensity is calculated as the base amount minus the long term product price.

(42) The phase base amounts are determined in a way that aims to stimulate competition among beneficiaries. Specifically, by setting the phase base amounts just below the technology specific base amounts of categories that are close together should stimulate beneficiaries to submit bids below their technology specific base amounts.The total available budget, planned phases and timing, phase base amounts and technology-specific base amounts will be published on a public website in advance of the scheme opening for applications each year.

2.4.3. Technology-specific base amounts

(43) Although all technologies are able to offer their projects for the scheme in any phase, for each technology a specific price level (called the **technology specific base amount**) also applies and acts as an offer cap for that technology. The technology specific base amounts will be expressed in EUR/tCO_2equivalent by applying emission factors to the technology specific base amounts[11].

(44) PBL will calculate the technology specific base amounts for each category of beneficiary. PBL will publicly consult on the proposed technology specific base amounts. The technology specific base amounts aim to take into account the main relevant costs for each category of beneficiary, for example the investment and running costs of the project. Technology-specific base amounts will also take into account benefits from aid measures applicable to all beneficiaries within a category, for example tax relief measures. The calculation will also take into account a normal rate of return.

(45) The Netherlands has explained that most of the technologies included in the SDE++ will be used to replace equipment based on fossil fuel (the counterfactual). Costs like insurance, personnel, overhead that both the environmental-friendly technology and the counterfactual equipment have in common are not taken into account in the technology specific base amount. However, additional costs linked for instance to the connection to the electricity grid to supply the electric boiler or electrolyzer with electricity will be included in the technology specific base amount, as well as the purchase of electricity.

(46) Market revenues and cost savings are taken into account in the correction amount (see section 2.5 below)

(47) For 2020, PBL's initial analysis assumes projects are financed with 30% equity and 70% debt (20%/80% for solar and wind because these are established technologies and lenders are comfortable with higher gearing), and that the return required on equity is between 9% and 15% depending on how well established the benefitting technology and how risky investors are expected to consider the technology. The return on debt is expected to be set at around 2% based on the

[11] Base amounts will also be specified in EUR/kWh where relevant.

current Euribor rate, a commercial interest margin and an interest swap to convert the interest margin into a 10-year interest rate. This would imply an overall assumed weighted average cost of capital (WACC) / target internal rate of return (IRR) of 2.7%-5.6% nominal / 1.2%-4.0% real, post-tax[12].

(48) PBL will publish updated technology specific base amounts each year after consulting publicly on the main assumptions, technology specific details and cost calculations.

2.4.4. Ceilings

(49) Although the scheme generally aims to allow the market to determine the most cost effective way to reduce GHG emissions reductions, the Netherlands is considering three ceilings for limiting the total potential support to certain categories of beneficiary:

(a) A budget ceiling of EUR 550 million (disbursements in 2030) for GHG emissions reductions by the manufacturing industry (excluding renewable energy production technologies);

(b) A ceiling of 7.2 Mton for CCS, as part of the national climate objective of achieving a 14.3 Mton reduction for industry by 2030, and a ceiling of 3 Mton for CCS as part of the climate objective of 20.2 Mton reduction for the electricity sector. CCS projects that realise negative emissions (eg. Bio-energy with carbon capture and storage, BECCS) would not count towards the ceiling; and

(c) A ceiling of 35 TWh of subsidized electricity production, in which the expected increase of electricity demand by electrification is taken into account.

(50) These ceilings may be removed at any time. If used, they will be monitored and evaluated as part of the evaluation plan, which will check in particular whether the ceilings have delivered cost-effective GHG emissions reductions and ensured competition between technologies.

2.5. Form of aid and level of support

(51) The notified scheme aims to subsidise the unprofitable component, without which the beneficiary would not have an incentive to realise the GHG emissions reduction.

(52) The **subsidy amount** is the difference between the price offered by a successful beneficiary in the competitive process (and which at the maximum will correspond to the cost for the production of energy (or capture and storage of CO_2) that PBL has established for each technology and serves to determine the technology specific base amount*)* and the **correction amount,** which represents the revenues or avoided costs of the project, for example revenues from the sale of heat, electricity or gas produced, revenues from avoided emissions (eg. avoided

[12] PBL's analysis for 2020 is available here: https://www.pbl.nl/publicaties/eindadvies-basisbedragen-sde-2020

EU Emissions Trading System (ETS) costs for projects covered by the ETS) and avoided costs for the purchase or production of heat.

(53) There are different correction amounts depending on the beneficiary type:

(a) For beneficiaries that produce electricity, the correction amount is the electricity price. This is calculated each year as the average market price, based on exchange-traded day ahead prices. The correction amount is also adjusted to take into account imbalance settlement costs[13], revenues from the sale of guarantees of origin and ancillary services revenues (when applicable).

(b) For beneficiaries that produce gas, the correction amount is the natural gas price. This is the exchange-traded year ahead price.

(c) For beneficiaries that produce heat for supply to a third party, there is no general market price so the correction amount aims to emulate the price that would have had to be paid for heat if the SDE++ subsidised heat was not available, e.g. the exchange-traded year ahead price of natural gas.

(d) For beneficiaries that produce hydrogen, the correction amount is a calculated hydrogen price, based on the price for hydrogen that is produced from natural gas in a steam methane reformer (SMR) based on the exchange-traded year ahead price of natural gas.

(e) For beneficiaries in the ETS traded sector, the correction amount also takes into account the average ETS price, based on the EEX-EUA on the European Energy Exchange.

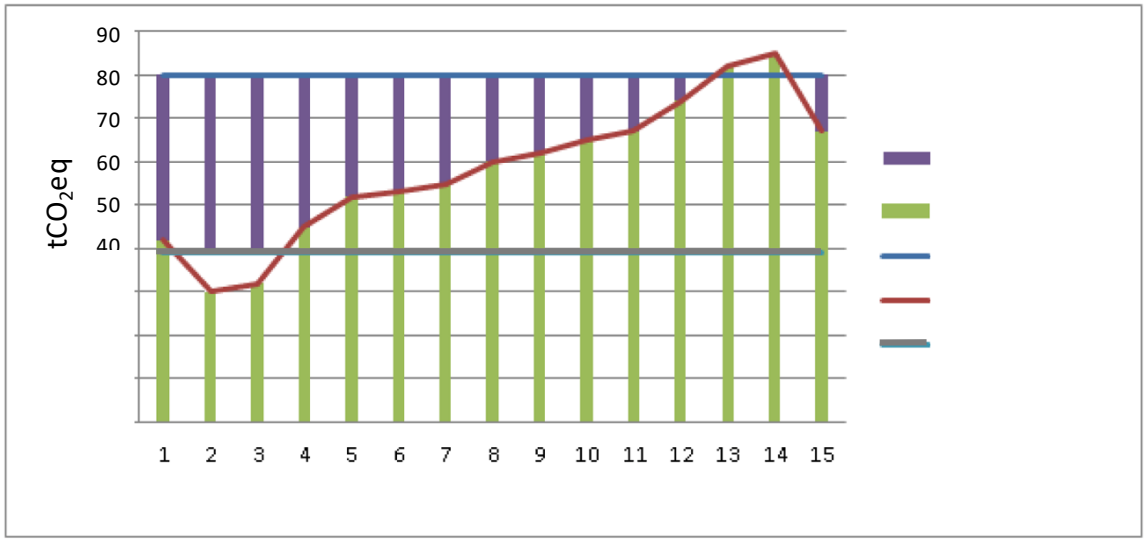
(f) For all types of beneficiary including beneficiaries producing heat or electricity for self-consumption, the correction amount is adjusted to take account of avoided costs, e.g. avoided costs of gas that would otherwise have been used for heat.

(54) The subsidy amount is therefore a variable premium as shown in Figure 1. The correction amount is the relevant market reference price per measurable unit produced (e.g. kWh or reduced tCO_2equivalent).

(55) There is also a **floor price**, which limits the revenues that beneficiaries can receive and thereby provides a cap on the maximum possible expenditure under the scheme. This is because, if the correction amount ever falls below the floor price, beneficiaries will be paid the difference between the floor price and the price offered in the competitive process.

Figure 1: Form of aid and level of support in the SDE++

[13] A fixed cost per kWh is assumed (for 2020, 0.004 €$_{2019}$/kWh).



Source: The Netherlands

Table 4: Parameters used by Dutch authorities in the calculation of SDE++ subsidies

	Renewable electricity	**Renewable gas**	**Renewable heat/heat and electricity**	**CO2 reduction (including hydrogen production)**	
Base amount	Cost price renewable electricity	Cost price renewable gas	Cost price renewable heat/heat and electricity	Cost price carbon neutral production of: hydrogen, heat or use of residue heat	Cost price CCS
Correction amount	Electricity price (market)	Gas price (market)	Energy price (market)	Market price product	Market price product
	Value Guarantees of Origin (GO)				
			Greenhouse gas price (ETS price)		
	Other corrections due to policy measures[14]				
Floor price	2/3 long term electricity price	2/3 long term gas price	2/3 long term energy price	2/3 long term market price	2/3 long term ETS price
			2/3 long term ETS price		

Source: The Netherlands

(56) 80% of the estimated subsidy amount is paid monthly in advance to each beneficiary. The estimated subsidy amount is calculated based on an estimated correction amount, and an estimated number of running hours for the benefitting technology. Estimations are made by PBL.

(57) The final subsidy amount is adjusted annually depending on the actual correction amount, which depends on real annual ETS, product (hydrogen) and energy prices. If the ETS, product and energy prices are higher than expected, the

[14] For 2020 no such corrections are proposed, but in future the correction account could be modified to take account of e.g. new energy efficiency standards – to avoid subsidies for activities for which there is already an incentive.

correction amount will be higher and therefore the subsidy amount lower. If ETS, product and energy prices are lower than expected, the subsidy amount will be higher and the correction amount lower. The subsidy amount paid to each beneficiary is also adjusted *ex post* each year based on the actual metered output of the beneficiary (ie. electricity, heat or gas produced, or amount of GHG stored), to ensure as far as possible that only actual GHG emissions reduced by the beneficiary are subsidised. There is a maximum annual number of load hours for which each category of beneficiary can receive a subsidy.

(58) For project categories in which the Netherlands does not have significant experience and where there is a higher risk of a diversity of different costs within a category (for the 2020 allocation round for CCS, electric boilers and industrial waste heat), the Rijksdienst voor Ondernemend Nederland (RVO – Netherlands Enterprise Agency) will also check one year after project implementation (and whenever there are indications to do so) whether the real costs of the project align with the expectations in the project's business case. If the beneficiary's costs are lower than anticipated, the subsidy amount will be reduced to avoid overcompensation.

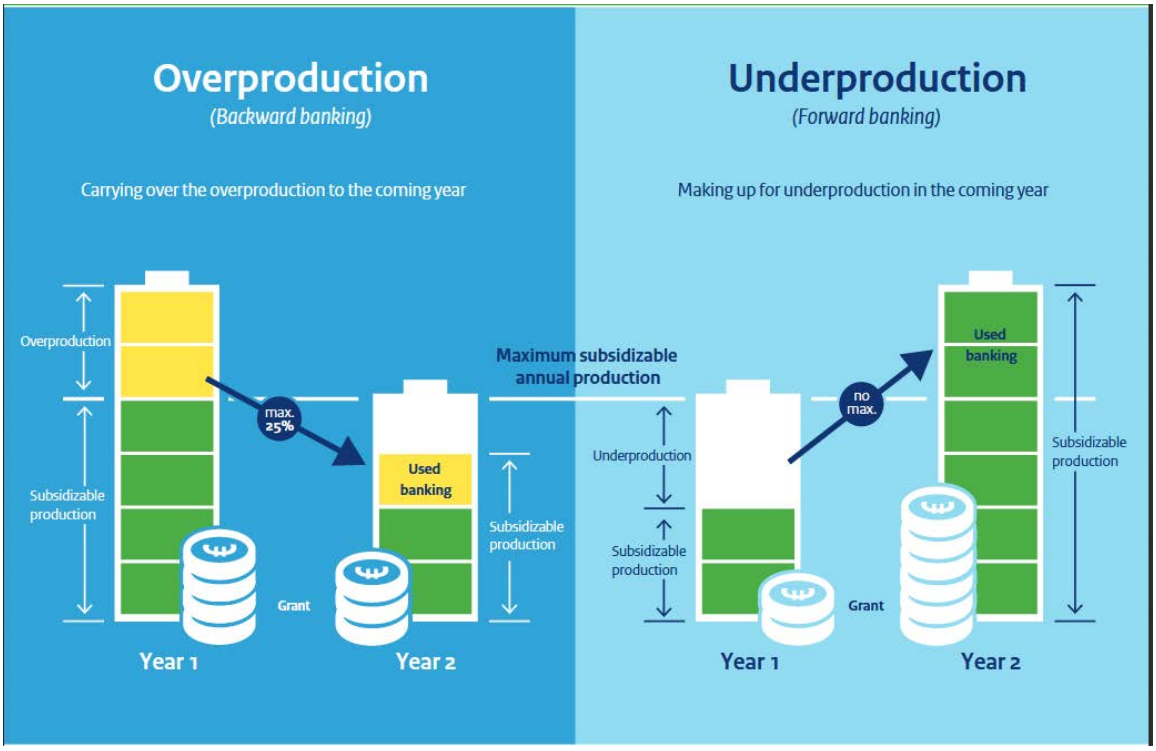
(59) The price offered by a successful beneficiary in the competitive process, the floor price and the maximum annual number of running hours eligible for subsidy are fixed for the duration of each beneficiary's SDE++ contract. The price offered by the beneficiary and the floor price are not indexed.

(60) The reference prices for PBL's annual adjustments to the correction amount are averages for the year. The correction amount is therefore not necessarily identical to the electricity price which the generators actually received for the electricity, gas or heat they sold in the market (or the avoided cost of purchasing ETS allowances). This ensures that the beneficiaries have incentives to participate in their respective markets in the normal way by seeking to obtain the best price for their output.

(61) Beneficiaries can make use of 'forward banking' to transfer unused subsidies (as a result of lower production than the maximum annual number of load hours eligible for subsidy) to future years. This allows the granting of subsidies in future years for production above the maximum annual number of load hours eligible for subsidy, or potentially the receipt of subsidies after the initial SDE++ contract duration has expired (up to maximum one year). It will also be possible to use 'backward banking' to transfer unsubsidised production (as a result of higher production than the maximum annual number of load hours eligible for subsidy) to future years. A maximum of 25% of the maximum annual production eligible for subsidy can be transferred each year. The unsubsidised production will then be eligible for subsidy in future years if production is less than the maximum annual number of load hours eligible for subsidy.

(62) Beneficiaries using electrification techniques with limited annual running hours (see Section 2.3.5) will not be eligible to make use of 'backward banking' and will only be able to make use of 'forward banking' to the extent that they stay within the limit on annual hours eligible for subsidy in Table 2 and after these years only operate in hours when electricity is expected to be low carbon. This is to ensure the annual limits on running hours cannot be circumvented.

Figure 2 – 'Banking' in the SDE++



Source: The Netherlands

(63) Beneficiaries operating in the electricity market are subject to standard balancing responsibilities as defined in the EEAG.

(64) No subsidy will be paid for hours in which the APX day ahead price is negative, whenever negative prices persist for at least 6 consecutive hours. The Netherlands will keep this under review and may reduce the 6 hour 'grace period' to a shorter duration (or remove it entirely) in future allocation years under the scheme.

(65) The maximum subsidy payable under the SDE++ will be 300 EUR/tCO_2equivalent.

2.6. Pre-qualification, obligations and collateral

(66) As part of their application for support, potential beneficiaries must submit evidence of having been granted (or that they can expect to be granted) the necessary permits to proceed with their project, and permission from any 3rd party landowners where such permission is necessary for the project to proceed[15]. For applications with a capacity equal to or greater than 0.5MW, a feasibility study must also be provided. Incomplete applications will be rejected. RVO will also check the technical and economic feasibility of projects and reject any projects deemed unfeasible.

(67) Beneficiaries successful in the allocation process have to implement their project within a certain deadline (between 1.5 and 5 years depending on the type of

[15] For categories of beneficiary (e.g. CCS) where permits for all required infrastructure may not be possible to obtain until a late stage of the project, the rules also allow potential beneficiaries to provide a bank guarantee of 2% of the total subsidy amount as an alternative to demonstrating that all required permits have been granted as part of the application.

project). They must also order the parts necessary for the construction of the project within 18 months (30 months for CCS) of the aid granting decision and send evidence of having made this order to the national authorities. The subsidy can be withdrawn if the applicable deadline/s are missed.

(68) For larger projects that are granted more than EUR 400 million, beneficiaries must issue a bank guarantee of 2% of the total subsidy amount, which is gradually forfeited if the project's deadlines are not met.

2.7. Duration of the support

(69) Successful beneficiaries will be granted contracts with a duration of between 12 and 15 years, with the 15 year contracts available for the more capital intensive technologies eligible for support under the scheme.

(70) The scheme is planned to be in place for 5 years (until 31 December 2025).

2.8. Cumulation

(71) Where there is a risk that particular beneficiaries in the SDE++ receive aid from another source such as subsidies for innovation, the RVO will carry out an 'overstimulation test' to ensure that the SDE++ subsidy amount is reduced to correct for this. RVO will request data of the beneficiaries on the total investment costs, received grants, tax benefits and all other types of aid, and based on this will calculate whether there is any over compensation. If there is, the total subsidy granted to the specific beneficiary will be reduced. Note this would not include aid already accounted for when the applicable technology specific base amount was set (cf. Section 2.4.2).

2.9. Budget and financing

(72) The annual budget for new contracts concluded under the main SDE++ will be established in advance of each allocation round. The Netherlands estimates a budget of up to EUR 3.2 billion for annual expenditure under the SDE++ scheme in 2030. This budget aims to cover all disbursements, however, including the ones already committed under existing SDE+ (and predecessor scheme) contracts. The *additional* annual budget in 2030 under SDE++ is expected to be approx. EUR 1 billion[16], and annual expenditure under existing contracts is currently approx. EUR 2.2 billion. Based on current expectations, the Netherlands expects to grant support worth around EUR 6 bn in the allocation rounds in each of the 5 years of the SDE++ covered by this decision.

(73) The SDE++ will be financed from the general State budget. In order to ensure that a sufficient budget is available within the general State budget, the Netherlands applies an additional tax called the Opslag duurzame energie- en klimaattransitie ('surcharge for renewable energy'), which is paid by all energy consumers and is based on the national energy tax (Energiebelasting). The cost of support under the SDE++ is estimated in advance, and the level of the top up set for the duration of each parliamentary term on this basis. The top up is not adjusted later to account for actual expenditure under the SDE++, and is not set annually. If the budget is

[16] Kamerbrief of 26 April 2019, p.2, Table 2.

insufficient, the shortfall does not lead to an automatic adjustment but is financed from the national budget.

2.10. Evaluation and review

(74) The Netherlands has notified the SDE++ scheme for a period of five years (until 31 December 2025). The ex post evaluation will take place in 2023, with a final report due in the first half of 2024. This will allow the results of the bidding rounds of 2020, 2021 and 2022 to be evaluated.

(75) The SDE+, the predecessor scheme of the SDE++, has been the subject of ex post evaluation in the past. In 2016, the Netherlands published an ex-post evaluation of the SDE+ over the period 2011-2015, performed by CE Delft/SEO.[17] The next ex post evaluation of the SDE+ is scheduled to take place in 2021.

(76) The 2016 evaluation report concluded that the proportion of 'free-riders' (applicants/projects for which the need for aid appeared unclear), should be considered low, indicatively in the order of 5-15%.[18]

(77) In order to determine the extent to which the production supported by the SDE+ provided a real incentive effect, the following two approaches were followed:

(a) *Comparison with rejected applications (control group).* This comparison was based on a survey among applicants whose application was rejected because the budget was oversubscribed. Out of the sample of rejected applicants, 15% applicants proceeded with their project nonetheless, whereas 85% did not proceed.[19] Apart from the relatively small sample size on which these statistics were based, the evaluators raised the question of whether the group of rejected applications could be considered a proper control group. The evaluators held the view that the applicants whose application was rejected (because the budget was oversubscribed) should still be considered the "best available" control group.

(b) *Comparison of financial returns (ex-ante IRR) with and without SDE+*. As with the notified SDE++ scheme, aid applicants to SDE+ needed to submit a feasibility plan for their project, including a cash flow analysis. The evaluators analysed 236 of such feasibility plans and concluded that 16.7% of the projects showed a positive ex-ante project IRR even without aid, which was on average 2% and not high enough to realise the projects.

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[17] CE Delft/ SEO (2016), Evaluatie van de SDE+ regeling, https://www.ce.nl/publicaties/1888/evaluatie-van-de-sde-plus-regeling.

[18] In total, 8076 SDE+ aid applications were made in the period 2011-2015. In that period, most of the SDE+ supported projects related to RES electricity, only a minority to renewable heat or gas production.

[19] Total survey size: 1677 applicants. Response rate: 28%. Out of 467 aid applicants, 68 saw their application rejected. Ten of those (15%) proceeded with their project regardless, 58 did not.

As a result, the evaluators concluded that the proportion of "free riders" in the SDE+ scheme was likely to be limited.[20]

(78) The ex post evaluation report further estimated that, because of the bidding process, relative cost savings of 11% had been achieved compared to the situation in which all these applicants would have received the standard (technology specific) base price.[21]

(79) The report also highlighted that additional cost savings had likely been achieved given that the broad tender scheme allowed more of the efficient technologies to benefit from the available budget (at the expense of less efficient technologies), but concluded that these extra benefits could not be quantified.

(80) For the purpose of the future ex post evaluation of the SDE++, the Netherlands has notified an evaluation plan in line with the requirements of the EEAG, points 242-245.

(81) The evaluation plan notified by the Netherlands includes 19 evaluation questions and corresponding indicators. These evaluation questions and indicators cover three broad aspects:

(a) an evaluation of the effectiveness of the SDE++ scheme, notably in terms of projects granted and executed and the amount of expected CO_2 reductions, in total and per technology;

(b) an evaluation of the efficiency of the SDE++ scheme, notably in terms of EUR/tCO_2 reduced, in total and per technology, the level of competition in the auctions, the role of certain design elements; and

(c) an evaluation of the internal coherence of SDE++ (e.g. whether there are any counterproductive design elements), as well as its external coherence with other climate policies in the Netherlands (more qualitative).

(82) To study the effectiveness of the scheme, the Netherlands has proposed a counterfactual (quasi-experimental) approach, aimed at identifying what would have happened in the absence of SDE++. In this context, the Netherlands emphasizes a cross-sectional method, comparing projects receiving a SDE++ subsidy with a control group comprising projects not receiving a subsidy (either because their application was rejected or because they did not submit an application in the first place).

(83) The approach requires corrections to take into account possible non-observable and observable differences between the beneficiaries and the control group. The potential influence of a 'selection effect' is corrected by a pipeline sampling strategy and the statistical matching of the control group by means of propensity

[20] For a project to go ahead, the evaluators observed that the ex-ante IRR should not be just positive, but should exceed the relevant cost of capital (WACC), deemed to be in the range of 4-8%, depending on the type of project.

[21] In the period 2011-2015, over half of the bids were submitted in the so-called 'free category', i.e. with a price below the administratively determined technology specific base price (cost ceiling for that technology).

score matching (PSM)[22]. Specific attention will be given to the motives of the control group not (yet) to submit an application. It is possible that the characteristics and motives of the parties that do not (yet) submit an application differ from those of the applicants to such an extent that they are not suitable for participation in the control group.

(84) The Netherlands has also proposed to explore a regression discontinuity design (RDD), whereby the causal effect of the SDE++ is measured by the difference in outcomes between applicants whose bids were just good enough to be granted a SDE++ subsidy and applicants whose bids were marginally insufficient to secure a subsidy.

(85) Finally, an assessment will be made of the proportion of project applications for which the internal rate of return (IRR) meets the expected rate of return (hurdle rate) even without subsidy.

(86) Similarly, the proportion of successful project applications for which the internal rate of return (IRR) exceeds the expected rate of return (hurdle rate) will shed light on the extent to which the bidding rounds were competitive or, instead, have led to potential overcompensation.

(87) To measure the impact of the budget ceilings and the 'first come first served' principle on the scheme's efficiency, a supply curve of all applications will be constructed. On this basis, it will be investigated to what extent the use of the budget ceilings has led to additional costs compared to a situation in which such ceilings would not have been used. The research team will also be requested to further investigate the statistical relationship between bid prices and underlying cost and revenue factors using auction econometrics.

(88) The evaluation will also cover the following elements on which the design of the scheme is based:

(a) Reviewing whether electrification technologies have indeed only run during periods of low carbon electricity generation;

(b) Reviewing whether the assumption that beneficiaries using electric boilers would keep an existing gas boiler and only use the electric one in certain hours (namely when electricity is low carbon), proved correct.; and

(c) Reviewing whether pre-qualification and collateral requirements have been sufficient incentive to ensure projects are realised.

(89) The following information sources are identified to implement the evaluation:

[22] Each year, RVO carries out a 'Project Monitor', in order to be able to estimate how many project applications are prepared by the market for the year ahead. A selection for the control group can be made from the list of organizations that have indicated in the project monitors that they are preparing a project application in a given year. The questions in the survey offer the opportunity not only to answer the evaluation questions, but also to perform the statistical match between the beneficiaries and the control group. Socio-economic characteristics are checked which can partly influence the difference in the measurement of impacts. Using these results, appropriate weights can be applied to the respondents in the control group so that they are statistically comparable to the beneficiaries.

(a) Data collection and analysis: consisting of literature research, analysis of the bidding data, RVO's project monitor database, and additional interviews with beneficiaries and other stakeholders. The feasibility plans, which companies need to submit together with the aid application for their projects, will provide the relevant data for the profitability (IRR) analysis.[23]

(b) Survey: large-scale survey to be submitted to all companies that have ever submitted an SDE++ subsidy application to RVO and companies that have indicated to RVO's Project Monitor that they intend to submit an application. This survey will be designed to identify motivations and obstacles in the development of projects, the use of the auction system and the completion of approved projects and to link this to intentions. In addition, the survey examines a possible follow-up to investment proposals that have been rejected within the SDE++. Using the survey, the Netherlands propose to estimate the percentage of companies that realize their project without subsidy. The plan envisages asking SDE++ applicants to commit themselves to participating in such a survey in the event they are asked to (regardless of whether they receive a decision or not).

(c) Focus groups: further deepening of the results from the data analysis and survey by means of discussions with financial institutions, policy makers, implementing bodies, trade associations and project developers about the experiences with the SDE++ scheme and the way in which the scheme responds to investment and financing proposals.

(90) The Netherlands has confirmed that the required data will be made available to the evaluators and that the relevant Dutch authorities will be legally allowed to collect it.

(91) An independent evaluator will carry out the evaluation. The independent expert has not yet been selected. A request for quotation will be sent out to several consultancies that are deemed able to carry out the evaluation based on their portfolio and expertise. In principle, the contract will be awarded to the tenderer whose tender has been designated as the 'most economically advantageous tender' on the basis of the best price-quality ratio.[24]

(92) The evaluation report will be published on a public website.

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[23] The website of the RVO provides a standardized template (Excel sheet) which needs to be submitted, in order to structure the feasibility plans and calculate the most important revenue and cost parameters. See https://www.rvo.nl/subsidie-en-financieringswijzer/sde/aanvragen-sde/stappenplan-aanvragen-sde/bijlagen/haalbaarheidsstudie.

[24] The award criteria consist of the following components: 1) research approach; 2) project approach; 3) quality of the team to be deployed; and 4) price, applying different weighting factors to each component. The research approach has the heaviest weighting factor (approximately 50% of the total points), followed by the quality of the team to be deployed (approximately 30%).

3. ASSESSMENT OF THE SCHEME:

3.1. Presence of state aid

(93) Article 107 (1) TFEU states that 'any aid granted by a Member State or through State resources in any form whatsoever which distorts or threatens to distort competition by favouring certain undertakings or the production of certain goods, shall, in so far as it affects trade between Member States, be incompatible with the common market'.

(94) The support for renewable energy generators under the SDE++ is financed from the general State budget (see Section 2.9). The scheme will therefore be financed through State resources. The SDE++ is established in national law and the Dutch government determines important parameters of the scheme including the eligible technologies and the scheme budget. The SDE++ is therefore imputable to the State. Beneficiaries will receive an advantage in the form of direct grants (variable premiums) for reducing GHG emissions. It will be paid based on their energy production during a certain number of years of operation. Such support is not available under market conditions. The support is not available to any operator in the different markets concerned that would undertake the same type of investment. Also, the notified measure favours certain types of investments which reduce GHG emissions and are more common in specific sectors, in particular in energy-intensive industries, in the agricultural sector and in the energy sector. The support is therefore selective.

(95) Some beneficiaries are involved in generating electricity and gas, which is widely traded within the European Economic Area (EEA). Several of the technologies concerned target industries in which there is trade between Member States (for instance industrial sectors including chemicals, food, beverages and paper, see Section 2.3). The notified scheme is therefore likely to distort the competition on the electricity and gas markets and affect trade across the EEA. As the the scheme also targets investments undertaken by the user of the energy (in particular industrial users and agricultural sector), the notified scheme is also likely to distort competition on the markets on which the users of the energy are active and affect trade across the EEA. Therefore the notified measure constitutes State aid in the meaning of Article 107 TFEU.

3.2. Legality of the aid

(96) The proposed SDE++ has been notified to the Commission for assessment before any aid under the scheme is granted. Thus, the Netherlands has complied with the stand-still obligation set out in Article 108(3) TFEU.

3.3. Compatibility of the aid

3.3.1. Applicable rules

(97) The Commission has assessed the compatibility of the notified aid scheme on the basis of Article 107(3)(c) TFEU. The notified scheme aims at promoting economic activities in a manner that reduces GHG emissions and increases the level of environmental protection, as described in Section 2.3. The supported activities fall within the scope of the Guidelines on State aid for environmental protection and energy 2014-2020 (EEAG) as corrected by the corrigendum

adopted by the Commission[25]. More specifically they fall under the following categories of aid covered by the EEAG: for energy from renewable sources, aid for resource efficiency and aid for CO_2 capture, transport and storage (CCS) and aid for increasing environmental protection beyond or in the absence of Union standards, aid (see point 18 (e), (g), (h) and (a) of the EEAG).

(98) The Commission has therefore assessed the notified measure as follows:

a) Support for renewable energy sources under the general compatibility provisions in EEAG Section 3.2 and the specific compatibility criteria for operating aid granted for electricity from renewable energy sources in EEAG Sections 3.3.1 and 3.3.2.1

b) Support for the recovery of waste heat using heat pumps and industrial waste heat under the general compatibility provisions in EEAG Section 3.2 and the specific compatibility criteria for resource efficiency (section 3.5 of the EEAG) given that all these technical solutions are based on the recovery and re-use of (industrial) waste heat and allow for the saving of primary energy sources.

c) Support for CCS on the basis of the general compatibility provisions in EEAG Section 3.2 and the specific compatibility criteria for CCS (section 3.6 of the EEAG).

d) Support for electrification solutions (electric boilers and hydrogen from electrolysis) on the basis of the general compatibility provisions in EEAG Section 3.2. As this support is limited to the use of the boiler or the production of hydrogen at times when electricity is produced from renewable energy sources and is thus low carbon, it corresponds to support for increasing environmental protection beyond or in the absence of Union standards (point 25(c) of the EEAG).

3.3.2. Contribution to the development of an economic activity

(99) Article 107(3)(c) TFEU provides that the Commission may declare compatible '*aid to facilitate the development of certain economic activities or of certain economic areas, where such aid does not adversely affect trading conditions to an extent contrary to the common interest'*. Therefore, compatible aid under that provision of the Treaty must contribute to the development of certain economic activity.[26]

(100) The Netherlands has explained that the notified scheme supports the development of economic activity in several sectors including electricity, heat and gas production, use of waste heat, development of carbon capture and storage, and the electrification of heating and hydrogen production in various sectors. The Commission welcomes the fact that these activities are supported in a manner that reduces GHG emissions and thus contributes to environmental protection.

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[25] OJ C 290, 10.8.2016, p.11

[26] C-594/18 P *Austria v Commission* EU:C:2020:742, paras 20 and 24.

(101) The Commission therefore considers that the notified scheme will contribute to the development of certain economic activities as required by Article 107(3)(c) TFEU.

3.3.3. Need for State aid

(102) EEAG point 34 explains that State aid should be targeted towards situations where aid can bring about a material improvement that the market alone cannot deliver. EEAG point 35 explains that Member States should identify the market failures hampering an increased level of environmental protection.

(103) The Netherlands has identified the following market failures:

(a) The negative externalities arising from GHG emissions are not reflected in the cost of emitting GHGs. Consumers therefore do not take the full costs into account when consuming goods and services that generate GHG emissions. This market failure is partially but not fully addressed by the EU Emissions Trading System (EU ETS).

(b) A coordination failure occurs for new GHG reducing technologies, which require a necessary critical mass before investors take the risks involved in investing in these technologies.

(104) The Netherlands has also explained that the scheme will only support projects that deliver a measureable GHG emissions reduction, based on technologies that are unprofitable without aid. The Commission notes indeed that, for all technologies eligible for the SDE++, the Netherlands has empowered PBL – an independent expert body – to undertake a detailed analysis of the cost of making GHG emissions over the lifetime of investments, taking into account avoided costs and any revenues from selling on the market and to identify GHG reducing technologies that are unprofitable without aid in view of identify eligibility for support under the SDE++ (see Section 2.4.2). Technologies with a payback period of 5 years or less are not eligible for support (see Section 2.4.2). More specifically, the Netherlands have demonstrated the unprofitability of the technological solutions referred to in Section 2.3, including for the waste heat solutions, the electric boilers and the hydrogen from electrolysis. The Dutch authorities have in particular demonstrated that the number of hours during which the electricity costs are lower than the gas price, i.e. generally when renewable energy plants are the marginal plant, is too low to recoup the investment costs of the boiler or the electrolyser. Without additional support no investments in electric boilers and electrolysers will take place to displace gas-fired boilers or hydrogen production from fossil fuels.

(105) EEAG point 37 explains that the Commission will consider that aid is needed if the aid effectively targets a (residual) market failure. In relation to renewable energy technologies and CCS, EEAG point 115 and 162 recognises that the EU ETS may not fully internalise the costs of GHG emissions. The Commission considers that this residual market failure applies equally to other measures aimed primarily at reducing GHG emissions.

(106) For example, as regards waste heat solutions, the Netherlands has explained that for residual waste heat, the EU ETS does not provide enough market incentive at the moment for industrial players to invest in residual waste heat. Using residual

waste heat is more expensive than using a combined heat and power station (CHP). In its preliminary study, PBL has calculated that the production costs of residual waste heat range from 0.033 to 0.044 €/kWh_{th} whereas the long-term market price for heat is 0.024 €/kWh_{th}. This means there is an unprofitable component of more than 0.009 €/kWh_{th} (account taken of the ETS). In addition, industrial waste heat faces an additional coordination failure in that the emitter of the waste heat is not the same entity as the one consuming the heat. Interest diverge and the recovery of the waste heat also generally require the intervention of a third party and a heat network.

(107) Regarding electric boilers, the Netherlands has explained that despite the EU ETS, industrial electric boilers are more expensive than gas-fired boilers. This is mostly due to the relatively low market price for gas, compared to the electricity price. In its preliminary study, PBL has calculated that the production costs of electric boilers are about 0.044 €/kWh_{th} whereas the market price for heat is 0.019 €/kWh_{th}. This means there is an unprofitable component of more than 0.025 €/kWh_{th}. Most of the industrial players that use gas-fired boilers and that could technically make use of electric boilers fall under the carbon leakage list. Their installations are therefore granted free allocation of emission allowances at 100% of their relevant benchmark level. It also means that these players will become less competitive if they would invest in an electric boiler and pay a higher cost for their heat production than their competitors, with a high risk of carbon leakage. According to PBL's preliminary study, electric boilers have an unprofitable component of at least 111 €/tCO_2.

(108) Regarding hydrogen, the Netherlands has explained that despite the EU ETS, green hydrogen is more expensive than conventional (fossil-based) hydrogen, due mainly to the high cost of electricity required for electrolysers as compared to the low costs of methane for the alternative fossil-based production. Furthermore hydrogen projects need economies of scale to reduce the unprofitable component of the investment.

(109) Further, for electrification solutions, the Netherlands has shown that the switch to electricity generates reductions of carbon emissions only when the electric boilers and the electrolysis-based hydrogen are activated at times when the electricity is low carbon. They have shown that this is the case in the Netherlands at moments when renewable electricity is the marginal plant. This also means that as long as the electricity is not entirely low carbon, owners of electrification projects will have to maintain two different types of plants and switch from one to the other in function of the carbon intensity of the electricity (and its relative price). Project owners will thus have to invest in equipment with sufficient capacity to cover their needs but which will in the short and probably also medium-term be used only during a low number of hours during the year.

(110) The Commission notes that in the SDE++ the consideration of eligible categories of beneficiary takes into account the incentive provided by the ETS. Only approaches/technologies that are more expensive than the ETS will be eligible to participate in the scheme. Second, for those categories that are eligible, the calculation of technology specific base amounts for each technology/approach in the ETS traded sector will take into account all avoided ETS costs.

(111) The Commission therefore considers that the notified scheme is necessary to support the targeted economic activity in a manner that increases environmental protection.

3.3.4. Appropriate instrument

(112) EEAG point 40 explains that aid measures must be appropriate to address the policy objective concerned, and that an aid measure will not be considered compatible with the internal market if the same positive contribution to the common objective is achievable through other less distortive policies or aid instruments.

(113) Point 116 of the EEAG states that, to allow Member States to achieve their targets in line with the EU 2020 objectives, the Commission presumes the appropriateness of aid for renewable energy sources provided all other conditions of section 3.3.2 of the EEAG are met. According to point 107 of the EEAG, under certain conditions State aid for renewable energy sources can be an appropriate instrument to contribute to the achievement of EU objectives and related national targets.

(114) EEAG point 108 recalls that the EEAG should prepare the ground for achieving Union environmental objectives beyond 2020. The Commission therefore interprets EEAG points 107 and 116 as applying not only to the achievement of the EU's 2020 targets but also to longer term targets such as the 2030 decarbonisation target mentioned in Section 3.3.2.

(115) The appropriateness of both investment and operating aid for CCS is also presumed (EEAG point 163).

(116) EEAG point 42 explains that different measures to remedy the same market failure may counteract each other. This is the case where an efficient, market-based mechanism has been put in place to deal specifically with the problem of externalities. An additional support measure to address the same market failure risks undermining the efficiency of the market-based mechanism.

(117) In this case, the ETS addresses already partiality the issue of externalities. However, as has been shown above under Section 3.3.2 that the SDE++ aims to support projects and technologies for which a residual market failure exists.

(118) EEAG point 45 explains that environmental aid can be awarded in various forms, but that the Member State should ensure that the aid is awarded in the form that generates the least distortions to trade and competition. In that respect, the Member State is required to demonstrate why other potentially less distortive forms of aid such as repayable advances as compared to direct grants are less appropriate. EEAG point 47 explains that for operating aid, which is the type of aid chosen by the Dutch authorities, the Member State must demonstrate that the aid is appropriate to achieve the objective to which the aid is targeted.

(119) The Commission notes first that the Netherlands has demonstrated that the ETS was not sufficient in isolation to trigger the GHG emissions projected to be incentivised by the support scheme. In order however to preserve the incentive effect of the ETS, savings on ETS allowances are deducted from the base amount (see Sections 2.4 and 2.5). The Netherlands has also explained that in view of the unprofitability of the technologies concerned, repayable advances were not

appropriate either. In fact, the Netherlands has designed the aid instrument in relation to the identified market failure. The scheme involves operating aid with the aid limited to the additional costs of achieving GHG emissions reductions and the aid amount fluctuates per unit of energy produced or consumed in function of the difference between the levelised production costs (base amount) and the different market revenues and/or cost savings linked to the production or consumption of one unit of low carbon energy (or to the capture of one unit of carbon). These future revenues and cost (savings) are surrounded by a high degree of uncertainty. The aid form significantly reduces this level of uncertainty for both the beneficiaries and the granting authorities, reducing also the level of support needed to trigger the projects. Finally, the aid is also awarded via a competitive bidding process, which will also incentivise operators to include or all relevant costs and revenues in their bids.

(120) For hydrogen and electric boiler, the choice of operating aid capped at a limited number of hours of operation (see Section 2.3.5), is designed to reduce the level of support, while at the same time, triggering a reduction of GHG, as the subsidy is destined to incentivise operation 'at times of abundant supply of renewable electricity in the grid', in line with the EU Hydrogen Strategy[27], as it is only then that the support measure will generate important net GHG emission reductions. This will make sure that the overall support will have a net CO_2 reduction compared to the production of 'grey' hydrogen or the use of gas boilers.

(121) The Commission therefore considers that the aid in the notified scheme is an appropriate instrument to support the targeted economic activity in a manner that increases environmental protection.

3.3.5. Incentive effect

(122) State aid has an incentive effect if it incentivises the beneficiary to change its behaviour towards the development of certain economic activity pursued by the aid and if the change in behaviour would not occur without the aid[28].Carbon emission reducing technologies are only eligible for the SDE++, when they are unprofitable without aid. As described in Section 2.4.2, this determination is based on a detailed analysis of the cost of making GHG emissions, taking into account avoided costs and any revenues from selling on the market.

(123) EEAG point 50 explains that aid does not present an incentive effect for the beneficiary in all cases where work on the project had already started prior to the aid application by the beneficiary.

(124) The Netherlands has confirmed that, in line with EEAG point 50, no aid will be granted for projects (other than existing biomass projects qualifying for an extended lifetime subsidy related to ongoing operating costs – see Section 2.3.4)

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[27] Page 14: 'The CO_2 emissions of electricity remain relevant for policies stimulating hydrogen production as it should be avoided that electricity production as such is supported indirectly; demand for electricity for hydrogen should be enabled in particular at times of abundant supply of renewable electricity in the grid.'

[28] See in that sense points 49 and 144 of the EEAG, as well as the *Hinkley* judgment in footnote 26 above.

on which work has already started. For existing biomass projects, for which aid may be granted if it meets the requirements in EEAG Section 3.3.2.3, the Commission assumes the requirement of point 50 is met so long as the cost of producing energy from biomass is higher than the energy market price after plant depreciation.

(125) The need for an application form in EEAG point 51 does not apply since the aid will be awarded on the basis of a competitive bidding process (EEAG point 52) and see Section 3.3.6.1.

(126) The Commission therefore considers that for the notified scheme the aid has an incentive effect.

3.3.6. Proportionality

(127) According to point 69 of the EEAG, environmental aid is considered to be proportionate if the aid amount per beneficiary is limited to the minimum needed to achieve the targeted environmental protection objective, which is hereby understood as the intended development of economic activities in an environmentally friendly manner.

3.3.6.1. Competitive bidding process.

(128) According to point 126 of the EEAG if aid is granted in a competitive bidding process open to all generators producing electricity from renewable energy sources on a non-discriminatory basis, the aid is presumed to be proportionate.

(129) For other beneficiary types, the Commission considers that in case of a competitive bidding process, the aid intensity may reach 100% of eligible costs (point 80 of the EEAG).

(130) As the SDE++ will be based on a bidding process, the Commission has verified whether it would qualify as transparent and non-discriminatory competitive bidding process. EEAG point 19 (43) defines a competitive bidding process as 'a non-discriminatory process that provides for the participation of a sufficient number of undertakings and where the aid is granted on the basis of either the initial bid submitted by the bidder or a clearing price. In addition, the budget or volume related to the bidding process is a binding constraint leading to the situation where not all bidders can receive aid.

(131) The design of the SDE++ will allow many different eligible technologies to compete in the same bidding process, and allow less widespread technologies the possibility to outcompete more established technologies where their developers have found solutions for reducing costs. Competition should push participants to participate in the earliest phase that offers sufficient subsidy to make their project viable, since once the budget is exhausted the scheme will close for that year and any pending phases will be cancelled.

(132) The rules for the competitive bidding process in the SDE++ are transparent and published in advance.

(133) The level of subsidy paid to beneficiaries in the SDE++ will be established via a bidding process where successful participants will receive the level of support for which they bid. As explained in Section 2.4.1, on the day that the budget limit is

reached, the applications with the lowest subsidy intensity (EUR/tCO_2equivalent) are granted subsidy first. There is a risk that, should the budget not be exhausted on the first day of an SDE++ phase, then some projects will be selected for support ahead of cheaper projects because the cheaper projects did not submit their bid for subsidy until day two of the final phase of an allocation round.

(134) However, the Commission notes that, since all participants in the SDE++ know that there is a greater chance of success with an earlier bid into the scheme, competitive pressure should prompt participants to submit their bids for subsidy on day one of the relevant phase. In addition, the Netherlands has explained that the evaluation plan (see Section 2.10) will examine the efficiency of the competitive process compared to system in which there was no advantage in placing earlier bids for subsidy. Further, the Netherlands has explained that the costs of accepting any higher priced bids will be monitored each year, and if in any year these costs exceed 3% of the SDE++ budget for that year (ie. 3% higher EUR/tCO_2equivalent reduced), then the Netherlands will either:

(a) Alter the rules of the competitive process so that, in the next feasible application round[29], bids submitted earlier in a round no longer have any advantage compared to bids submitted on the last day of a round; or

(b) Produce analysis demonstrating that the existing competitive process delivers quantifiable benefits that could not be achieved by a competitive process in which the bids submitted earlier in a round did not have an advantage compared to bids submitted on the last day of a round, and that these benefits exceed the additional costs identified. Such analysis must receive a favourable opinion from the National Regulatory Authority (the Netherlands Authority for Consumers and Markets); or

(c) Re-notify the SDE++ to the Commission for assessment before granting further subsidies.

(135) The Netherlands has also explained that, to ensure the budget for the SDE++ should always be a binding constraint, the budget will be calculated annually and the calculation will take into account the likely number of projects that will come forward (including by reviewing the planning consent pipeline), as well as the possible impacts on competition if any of the ceilings mentioned in Section 2.4.3 are met, so that the budget can be set to limit the risk that all potential projects in a single year could receive support. The impact of these ceilings on the cost-effectiveness of the SDE++ will also form part of the evaluation plan (see Section 2.10).

(136) The Commission therefore considers that the SDE++ involves a competitive bidding process that meets the definition in EEAG point 19(43).

[29] Because of the time needed to allocate the budget for each application round and the preparations for the new application round (preparations for participants, IT-systems and implementation by RVO), this will be one year after the year in which the allocation process of the SDE++ that exceeded the 3% threshold was concluded.

3.3.6.2. Target rate of return and 'banking' rules

(137) In addition to the competitive bidding process, the risk of overcompensation is further limited by the technology specific base amounts (subsidy caps for each technology). As explained in Section 2.4.2, these are calculated annually based on a detailed analysis of the cost of making GHG emissions, taking into account avoided costs and any revenues from selling on the market, as well as the benefits of other support measures received by a beneficiary (such as local authority grants). These calculations include a profit margin (internal rate of return) set by PBL. As described in Section 2.4.2, for the planned 2020 allocation round the rate of return implied by the technology specific base amounts (ie. the maximum subsidy possible for each beneficiary type) are 2.7%-5.6% nominal / 1.2%-4.0% real, post-tax.

(138) The competitive bidding process plays an important role to ensure projects receive the minimum aid necessary, but the Commission considers that these represent reasonable maximum target rates of return for the SDE++ beneficiaries.

(139) Consistent with its decision in case SA.39399 (2015/N) on the SDE+, the Commission considers that the 'banking' rules described in Section 2.5 allowing some flexibility for production to be transferred to alternative contract years for subsidy do not lead to concerns, since the overall number of production hours eligible for subsidy remains capped, and this cap forms the basis for the calculation of the technology specific base amounts.

3.3.6.3. Energy from renewable sources

(140) The scheme includes support to electricity from renewable sources, for which the EEAG include specific rules, in particular in points 124, 126 and 129.

(141) The scheme complies with EEAG point 124. As explained in Section 2.5, the aid to producers of renewable electricity is provided in the form of a variable premium which takes into account revenues from the sale of electricity. The Netherlands has confirmed that beneficiaries will have standard balancing responsibilities. And no subsidy will be paid for hours in which the APX intra-day price (assessed as close to real time as possible) is negative, whenever negative prices persist for at least 6 consecutive hours[30].

(142) The scheme complies with EEAG point 126 because all aid will be granted through a competitive bidding process (see Section 3.3.6.1).

(143) The scheme also complies with EEAG point 129 because, other than for existing biomass plants benefitting from the extended lifetime subsidy described in Section 2.3.4, the technology specific base amounts in the SDE++ are designed to ensure that subsidies will not be paid beyond the point at which the benefitting plants have been fully depreciated according to normal accounting rules.

[30] The Netherlands may reduce the grace period in future (number of consecutive hours of negative prices that can occur before subsidies are no longer payable), but it will not exceed 6 hours. A 6 hour grace period has been found to be acceptable previously in the UK Contracts for Difference case (SA.36196, 2014/N) and in the German Erneuerbare-Energien-Gesetz case (SA.38632, 2014/N).

(144) EEAG point 133 stipulates that, subject to various cumulative conditions, operating aid for biomass may be compatible with the internal market even if it is granted after plant depreciation, if a Member State demonstrates that the operating costs borne by the beneficiary after plant depreciation are still higher than the market price of the energy concerned.

(145) The Netherlands has confirmed that the conditions in EEAG point 133 will be met and that:

(a) Subsidies will only be paid for the production of energy from renewable sources;

(b) The calculation of the technology specific base amount for biomass life extension projects only takes account of operating costs. Expected market revenues are deducted, so that the subsidy covers the additional operating costs borne by the operator because of the lifetime extension that cannot be covered by market revenues.

(c) Annual monitoring based on updated production cost information will be undertaken to verify whether the operating costs borne are still higher than the market price of energy.

(146) Existing and new biomass will also compete in the same competitive bidding process as other renewable energy producers.

(147) When setting the correction amount the value of market revenues but also guarantees of origin is taken into account (see Table 4), which is another way the scheme ensures that projects are not overcompensated.

(148) For aid to eligible producers of renewable gas and heat, the conditions in EEAG point 131 apply. As for other technologies, PBL will produce annual calculations of the technology specific base amounts applicable to each technology. The Netherlands has confirmed that these calculations are carried out in line with the requirements in EEAG point 131. Proportionality of support for producers of renewable gas and heat is further assured because all renewable energy producers must compete for subsidy in the same process, and the competitive pressure in this process should help ensure aid is kept to the minimum.

3.3.6.4. CCS

(149) The EEAG contain specific compatibility criteria for assessing the proportionality of aid for CCS in points 164-165.

(150) The Commission observes first that in line with point 164 of the EEAG, the technology specific amount only takes the costs of capture, transport and storage into account and does not include aid for the emitting industrial installation (see recital (19) above). Also, in, line with point 165 of the EEAG, the support does not exceed the funding gap of the projects given that the aid takes the form of the difference between positive and negative cash flows over the lifetime of the project. It includes all relevant costs on the negative side (in particular depreciation costs and operating costs). Also, all cost savings from a reduced need for ETS allowances are deducted given that those are included in the correction amount (see Table 4). Investment support obtained from other sources is also deducted (see Section 2.8). In addition, the technology specific base amount

differs based on three possible situations (new capture for a new facility, new capture for an existing facility and additional storage for an existing facility in which capture already occurs) so as to reflect their respective cost differences (see Section 2.3.3). Also, the fact that the beneficiaries are selected based on a competitive bidding process will further ensure that beneficiaries integrate in their bids any further additional benefit they might derive from the CCS project. Finally, given the design of the SDE++ (competitive bidding process in which various technologies and decarbonisation solutions are in competition), the SDE++ only grants subsidies to CCS projects if no other technology is available to reduce the greenhouse gas emissions in an equal or more cost-effective manner.

(151) Finally, the Dutch authorities have indicated that if their assumptions in terms of costs are not correct, they will be corrected, including for projects having already been selected (see recital (58)).

(152) The Commission therefore concludes that the support for CCS under the SDE++ is in line with points 164-165 of the EEAG and is proportionate.

3.3.6.5. Heat pumps, industrial waste heat electric boilers and hydrogen based on electrolysis

(153) According to points 69-70 of the EEAG environmental aid is considered to be proportionate if the aid amount per beneficiary is limited to the minimum needed to achieve the environmental protection or energy objective aimed for, i.e. in the present case the development of the economic activities at issue in an environmentally friendly manner. Aid will be considered to be limited to the minimum necessary if the aid corresponds to the net extra cost necessary to meet that objective, compared to the counterfactual scenario in the absence of aid. The net extra cost is determined by the difference between the economic benefits and costs (including the investment and operation) of the aided project and those of the alternative investment project which the company would carry out in the absence of aid, that is the counterfactual scenario.

(154) According to points 71 and 79 of the EEAG, for measures which are not subject to an individual assessment, the Commission will consider the aid to be proportionate if the eligible costs are correctly calculated and the maximum aid intensities set out in Annex I of the EEAG are respected.

(155) However, according to point 80 of the EEAG, where aid to the beneficiary is granted in a competitive bidding process on the basis of clear, transparent and non-discriminatory criteria, the aid amount may reach 100 % of the eligible costs, given that under such circumstances, it can be assumed that the respective bids reflect all possible benefits that might flow from the additional investment. Such a bidding process must be non-discriminatory and provide for the participation of a sufficient number of undertakings. In addition, the budget related to the bidding process must be a binding constraint in the sense that not all participants can receive aid. Finally, the aid must be granted on the basis of the initial bid submitted by the bidder, therefore excluding subsequent negotiations.

(156) As the SDE++ will be based on a bidding process, the Commission has verified first whether under the SDE++ competitive bidding process only the net extra cost necessary to meet the decarbonisation objective, compared to the counterfactual

scenario in the absence of aid, are eligible for support. Second, it has verified that the competitive bidding process would qualify as i) transparent and non-discriminatory competitive bidding process, ii) would provide for the participation of a sufficient number of undertakings and iii) where the aid is granted on the basis of either the initial bid submitted by the bidder, therefore excluding subsequent negotiations and iv) whether the budget or volume related to the bidding process is a binding constraint leading to the situation where not all bidders can receive aid.

(157) Concerning eligible costs, the Commission observes that that the definition of the technology specific base amount and the correction amounts are based on comparisons between decarbonisation technologies and the counterfactual scenario. For heat pumps, electric boilers and hydrogen, the counterfactual consists in the production of heat in a gas-fired boiler or the production of hydrogen from SMR respectively. Operating costs like insurance, overheads, which would also apply to the counterfactual scenario are not included in the costs for the determination of the technology specific based amount (only additional operating costs). Operating costs linked to the counterfactual scenario and which the decarbonisation solution does not incur correspond to cost savings which are deducted as part of the correction amount. Investment costs linked to the counterfactual scenarios are not deducted as the Netherlands has demonstrated that currently the environmental-friendly solutions do not replace the conventional equipment but are added to it. In the case of heat pumps the conventional equipment serves as back up or in case of additional heat demand. For electric boilers and hydrogen based on electrolysis, they cannot yet be used as baseload but only in hours where the electricity is low carbon (see section 2.3.5) and thus in addition to the gas-based technologies. The Netherlands has committed to verify that this assumption remains correct as part of the evaluation (see section 2.10 above).

(158) Concerning hydrogen, the Commission observes in addition, that the Netherlands has shown that the aid is limited to the number of hours in which the electricity supply is expected to be 100% low carbon. As for other electrification technologies, indirect support of electricity production as such must be avoided to avoid indirect subsidy for polluting forms of electricity production. By introducing a cap on hours in which production is eligible for subsidy, the Netherlands has ensured that demand for electricity for hydrogen is enabled in particular at times of abundant supply of renewable electricity in the grid (since these hours also correspond to the lowest cost hours for electricity thanks to the lower running costs of low carbon electricity generation sources). The design of the SDE++ ensures that the support does not exceed the net extra cost for environmental protection as the correction amount ensures deduction of gas costs for the production of hydrogen through SMR, as well as the deduction of ETS allowance revenues. The latest calculation by PBL shows that hydrogen is expected to require a subsidy intensity of 1064 EUR/tCO_2. However, the SDE++ includes a cap on the maximum possible subsidy intensity at 300 EUR/tCO_2. PBL's calculations show that even with 5000 full load hours per year where electricity is low carbon, the unprofitable component of hydrogen production based on electrolysis would still amount to 400 EUR/tCO_2. To be competitive in the SDE++ therefore, the average hydrogen project is likely to need to decline significantly in cost.

(159) Concerning the characteristics of the competitive bidding process, the Commission has already observed under section 3.3.5.1 that:

a) The rules for the competitive bidding process in the SDE++ are transparent and published in advance.

b) The level of subsidy paid to beneficiaries in the SDE++ will be established via a bidding process where successful participants will receive the level of support for which they bid. No subsequent negotiations are possible.

c) The budget will be limited, so that not all applicants can obtain support

d) While the SDE++ system is based on different phases where applicants can also bid for the phase amount or the technology-specific base amount, the system incentivises them to bid below the phase amount and the technology specific base amount. On the day that the budget limit is reached, the applications with the lowest subsidy intensity (EUR/tCO_2equivalent) are granted subsidy first (see Section 2.4.1). The Netherlands has demonstrated based on previous tender rounds that this incentivises applicants to bid their true costs and that they generally submit bids below the phase amount or the technology specific base amount.

e) The SDE++ contains as an additional safeguard in the form of technology specific base amounts above which the technology concerned cannot bid.

f) Competitive pressure should prompt participants to submit their bids for subsidy on day one of the relevant phase. In addition, the Netherlands has explained that the evaluation plan will examine the efficiency of the competitive process compared to system in which there was no advantage in placing earlier bids for subsidy. Further, the Netherlands has explained that the costs of accepting any higher priced bids will be monitored each year, and if in any year these costs exceed 3% of the SDE++ budget for that year, then the Netherlands will either alter the rules of the competitive process so that, in the next feasible application round, bids submitted earlier in a round no longer have any advantage compared to bids submitted on the last day of a round; or produce analysis demonstrating that the existing competitive process delivers quantifiable benefits or re-notify the SDE++ to the Commission for assessment before granting further subsidies (see recital (135) above).

g) Finally, the design of the SDE++ will allow many different eligible technologies to compete in the same bidding process, and allow less widespread technologies the possibility to outcompete more established technologies where their developers have found solutions for reducing costs. This should not only provide for the participation of a sufficient number of undertakings but also enable the roll-out of the most cost-effective green-house gas reducing technologies including hydrogen when it is more cost-effective than competing alternatives.

(160) On this basis, the Commission concludes that the SDE++ makes use of a competitive bidding process on the basis of clear, transparent and non-discriminatory criteria that will ensure the proportionality of the aid in line with point 80 of the EEAG.

3.3.6.6. Cumulation

(161) As explained in Section 2.4.2, the technology-specific base amounts will be set taking into account any revenues from aid measures applicable to all beneficiaries within a category, for example tax relief measures, or the value of Guarantees of Origin for renewable energy. As explained in Section 2.8, where there is a risk that particular beneficiaries in the SDE++ receive aid from another source such as subsidies for innovation, the RVO will carry out a specific cumulation test to ensure that the SDE++ subsidy amount is reduced to correct for this.

3.3.6.7. Conclusion on proportionality

(162) Based on the above, the Commission considers that the aid granted under the notified measure is proportionate.

3.3.7. Distortion of competition and balancing test

3.3.7.1. Positive effects

(163) The scheme can be expected to have a range of positive effects because the eligible activities contribute to environmental protection

(164) On 24 October 2014, the European Council endorsed a binding EU target of an at least 40% domestic reduction in GHG emissions by 2030 compared to 1990[31].

(165) As described in Section 2.3, the technologies that are eligible for support under the scheme can be grouped as follows:

a) renewable energy production technologies (see Section 2.3.1).

b) technologies based on the re-use of waste heat (see Section 2.3.2),

c) CCS (see Section 2.3.3); and

d) two technical solutions based on electrification (see Section 2.3.4 and 2.3.5) enabling the operator to reduce GHG emission resulting from his activity beyond the level required by Union standards. The scheme is designed in such a way that in each year GHG emissions are actually reduced and not merely transferred to another sector (carbon intensive electricity is not eligible for aid under the electrification options – see sections 2.3.4 and 2.3.5 which explain that the number of hours eligible for subsidy each year are set based on expectations of the rate of decarbonisation of electricity generation in the Netherlands).

(166) The Commission has already recognised that schemes supporting renewable energy production, resource efficiency and CCS (see points 107, 152, 160-161 of the EEAG) all contribute to achieving the ambitious climate change and sustainability objectives of the Union.

[31] EUCO 169/14, https://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/ec/145397.pdf

(167) In addition, as far as the support for electric boilers and hydrogen from electrolysis is concerned, the support aims to reduce GHG emissions and contributes to achieving the climate targets of the Union.

(168) Notably as regards hydrogen, the inclusion of hydrogen in the categories of supported investments, is in line with both the Commission's New Industrial Strategy for Europe [32] and more recently the EU Communication 'A hydrogen strategy for a climate-neutral Europe' (EU Hydrogen Strategy)[33], part of the Green Deal. The EU hydrogen Strategy is geared at scaling up hydrogen production, both as renewable or low carbon hydrogen as well as through decarbonisation of existing hydrogen production by way of CCS.

(169) The Netherlands has confirmed that Directive 2000/60/EC of the European Parliament and the Council of 23 October 2000 establishing a framework for Community action in the field of water policy[34] is respected with regard to the support provided to hydro power plants under the notified scheme (in line with point 117 EEAG). All hydropower developments are required to obtain relevant environmental permits.

(170) There are no current plans for extra capacity or new investments in existing plants for waste incineration for the period of the SDE++ scheme (2020-2025), and for the SDE++ 2020 it will not be possible to apply for subsidy for renewable energy from waste incineration. However, if this category is reintroduced in future annual reviews, the Netherlands has confirmed that the waste hierarchy, as set out in Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives[35] (Waste Framework Directive) will be respected, with regard to any support provided under the notified scheme to plants using waste (in line with point 118 EEAG).

(171) The renewable energy generation technologies eligible for support all meet the EEAG definition of 'renewable energy sources' (see point 19(5) EEAG).

(172) Projects referred to under Section 2.3.3 all meet the definition of carbon capture and storage (see point 19(33) of the EEAG). To be eligible for aid, it is required under the scheme that the carbon capturing equipment be connected to a carbon storage facility (see Section 2.3.3).

(173) Both the industrial waste heat solutions and the heat pump solutions referred to in Section 2.3.2 are eligible for support under the SDE++ only when effectively reusing waste heat. The waste heat is turned into an (energy) resource for others (industrial waste heat solutions) or for the emitted of the waste heat (heat pump solutions) and therefore fall under the scope of section 3.4 of the EEAG as this solution turns the waste heat into a resource and makes it possible to safe primary resources.

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32 COM(2020) 102 final.

33 COM(2020) 301 final.

34 OJ L 327, 22.12.2000, p. 1

35 OJ L 312, 22.11.2008, p. 3

(174) As far as the electric boilers and hydrogen from electrolysis referred to under sections 2.3.4. and 2.3.5. above, the Netherlands has demonstrated that the scheme will be limited to the use of electric boilers and electrolysis leading to effective GHG emission reductions in each year subsidy year (see Section 2.3.5), with no possibility of circumventing these limits (see recital 62). Furthermore, with regard to hydrogen projects, as indicated in recital (21) the Netherlands has confirmed that the SDE++ will be amended if needed to comply with the EU framework on green and low carbon hydrogen, based on upcoming sectorial legislation.

(175) The Commission has also investigated the risk that support for the construction of electrification technologies will create a situation where those technologies are profitable to run in additional hours beyond those for which a subsidy will be granted by the SDE++, even without subsidy, at times when electricity does not come from low carbon sources. The Netherlands has provided the following information in that regard:

(a) For an average electric boiler project to break even, ignoring capital costs, the electricity price would have to be 23.8 EUR/MWh[36];

(b) For an average electrolyser to break even, ignoring capital costs, the e-price would have to be 22.9 EUR/MWh[37].

(c) No fossil-fired power plants can run for the electricity prices that these electrification options need to break even. The cheapest fossil fuel generation in the market has marginal costs that exceed 25 EUR/MWh[38].

(d) According to PBL's projections, electricity prices will be 40 EUR/MWh or higher after the cheapest low carbon hours in which the plant is eligible for a subsidy from the SDE++.

(176) Finally, the Commission has investigated whether 'must run' demand caused by certain forms of hydrogen production could lead to significant demand for electricity in hours when electricity is not low carbon. However, the scheme involves a specific pre-qualification check for hydrogen projects and projects that are insufficiently flexible will be unable to benefit from the scheme (see Section 2.3.5).

(177) The Commission also welcomes the quantification of the environmental benefit that will be achieved (EUR/tCO_2equivalent) which provides a clear indication of the contribution the different supported activities make to environmental protection.

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36 Based on the current long term product market value of heat (0.024 €/kWhth)

37 Based on the current long term product market value of hydrogen (1.33 €/kgH_2), and based on an efficiency of 58.01 kWh per kg H_2 (1.33/0.05801=22.9).

38 Note there are two 'must-run' fossil plants that are required to ensure safe system operation, that have lower marginal costs. However, these are not relevant for this exercise since the SDE++ has no impact on the need for these plants to run (ie. these plants will run regardless of the incentives created by the SDE++).

(178) The Commission therefore concludes that for all categories of beneficiary and in all years of operation the SDE++ will create incentives for emissions reductions, and that these reductions exceed Union standards.

3.3.7.2. Negative effects

(179) EEAG point 97 explains that, when assessing the negative effects of an aid measure, the Commission assesses the impact on competition between undertakings in the product markets affected and on the location of economic activity. Point 98 explains that, where aid if proportionate, its negative impact is in principle softened. Point 99 explains that the Commission will place great emphasis on the selection process, which should not exclude companies and projects that may compete to address the environmental or energy objective, i.e. in the present case the development of the economic activities at issue in an environmentally friendly manner. The selection process should lead to the selection of beneficiaries that can address that objective using the least amount of aid or in the most cost effective way.

(180) As explained in Section 2, the notified measure involves a competitive bidding process that has been carefully designed to be open to a particularly wide range of technologies that may contribute to facilitating the development of the economic activities in question. As well as supporting a reduction in the costs of achieving that objective in an environmentally friendly manner, this approach is appropriate to help to ensure possible distortions to competition are minimised compared to an approach targeting a specific technology or approach.

(181) However, as described in Section 2.4.3, the scheme may also include ceilings to limit the maximum support to particular beneficiaries. The Netherlands has explained that this may be desirable if an approach based purely on short term cost-effectiveness results in all subsidies flowing to one specific technology. As many technologies are interdependent, this could delay the overall reduction of GHG emissions. For example, if renewable electricity supply grows much faster than demand for this low carbon electricity, or if limitations in spatial planning and technical integration obstruct the implementation of projects selected for subsidy. In relation to the three possible ceilings:

(a) The Netherlands has explained that a ceiling for CCS is needed because from an environmental point of view over the longer term low carbon technologies that prevent GHG emissions are preferable to those that store GHG emissions.

(b) The Netherlands has explained that a ceiling for industry may be needed to ensure that the Netherlands not only achieves its 2030 targets but also takes the initial steps needed to ensure longer term targets are met – in particular a target, set in the Dutch Climate Law 2019, for a 95% reduction in 2050 emissions compared to 1990 levels. To ensure the 2050 target is met, action is needed in many sectors, not only industry. Therefore a ceiling on the amount of subsidy allocated to industrial decarbonisation is expected to support earlier action in other sectors – eg. in agriculture and heating in the built environment – to ensure these sectors begin making progress early enough to enable the attainment of the 2050 target.

(c) The Netherlands has explained that a ceiling on renewable electricity production may be appropriate to ensure that the level of renewable electricity supply does not significantly exceed electricity demand and/or to ensure that supported electricity projects can actually be built once spatial planning and infrastructure considerations are taken into account.

(182) The Netherlands has explained that, if the ceilings are used, the evaluation plan see Section 2.10) will assess whether the ceilings have delivered cost-effective GHG emissions reductions and ensured competition between technologies.

(183) The Commission welcomes the fact that the ceilings, if used, will be carefully evaluated, and concludes that the ceilings proposed by the Netherlands are in line with the objectives of the scheme and do not give rise to undue competition distortions:

(a) The Commission notes that CCS has a role to play in decarbonisation but in particular in the transition phase and in areas where CCS represents one of the rare technology options able to reduce process-related emissions (see also EEAG point 160). However, technology evolves and CCS does not necessarily represent the only option even today. The Commission therefore agrees that it may be desirable to limit the amount of subsidies that flow to CCS in favour of alternative technologies that completely avoid rather than store emissions.

(b) The Commission notes that there may be a need to stimulate early action in other sectors than industry to ensure that very ambitions longer term emissions reductions targets like the statutory targets in the Netherlands can be met.

(c) The Commission notes that a ceiling on renewable electricity production may be appropriate to ensure that the development of renewable electricity does not significantly exceed demand.

(184) The Netherlands is in the process of developing cooperation mechanisms with other Member States to enable foreign projects to compete within the scheme. As noted in EEAG point 122, the Commission considers the opening of renewable energy schemes to enable cross border participation to be, in principle, a positive development.

(185) The aid instrument has also been designed to limit distortions to market functioning, since to maximise their profits beneficiaries must sell their output on the market in the normal way. The aid element is only a feed-in premium as top up in addition to market revenues.

3.3.7.3. Conclusion on distortion of competition and balancing test

(186) In light of the above, the Commission considers that the scheme is in line with the relevant provisions of the EEAG. The Commission considers that the negative effects on competition and trade are limited by the broad eligibility of the scheme and use of a competitive bidding process, and are outweighed by the environmental positive effects that the supported activities will deliver.

3.3.8. Financing mechanism

(187) As indicated in point 29 of the EEAG, if a State aid measure or the conditions attached to it (including its financing method when it forms an integral part of it) entail a non-severable violation of Union law, the aid cannot be declared compatible with the internal market. In the field of energy, any levy that has the aim of financing a State aid measure needs to comply in particular with Articles 30 and 110 TFEU.

(188) The payments under the SDE++ will be financed through the general State budget. The Dutch authorities have confirmed that there is no legal hypothecation between the top up applied to the energy tax and the support scheme (see Section 2.9). Therefore the Commission considers that the financing mechanism of the notified aid measures does not introduce any restrictions that would infringe Article 30 or Article 110 TFEU.

3.3.9. Transparency

(189) According to point 104 of the EEAG, Member States must ensure the transparency of aid granted by publishing certain information on a comprehensive State aid website.

(190) The Netherlands has committed to comply with the transparency requirements in EEAG points 104 – 106 for the SDE++.

3.3.10. Evaluation

(191) The EEAG (point 28 and Chapter 4) state that the Commission may require that certain aid schemes be subject to an evaluation, where the potential distortion of competition is particularly high, that is to say when the measure may risk significantly restricting or distorting competition if their implementation is not reviewed in due time. Given its objectives, evaluation only applies for aid schemes with large aid budgets, containing novel characteristics or when significant market, technology or regulatory changes are foreseen.

(192) The present scheme fulfils the criteria of being a scheme with a large aid budget and containing novel characteristics; therefore it will be subject to an ex-post evaluation.

(193) The Netherlands has notified an evaluation plan, setting out the scope and modalities of the ex-post evaluation. The plan is described in section 2.10.

(194) The Commission considers that the notified evaluation plan contains the necessary elements: the objectives of the aid scheme to be evaluated, the evaluation questions, the result indicators, the envisaged methodology to conduct the evaluation, the data collection requirements, the proposed timing of the evaluation including the date of submission of the final evaluation report, the description of the independent body conducting the evaluation or the criteria that will be used for its selection and the modalities for ensuring the publicity of the evaluation.

(195) The Commission notes that the scope of the evaluation is defined in an appropriate way, and adheres to the principles set out in the Commission Staff Working Document on Common methodology for State aid evaluation[39]. It comprises a list of evaluation questions with corresponding result indicators. Data sources are individually defined for each evaluation question.

(196) The Commission holds the view that the proposed methods are based on tried and tested ex-post counterfactual evaluation principles to assess the causal effects of aid. In particular, the method aims to compare the investment behaviour of the aid beneficiaries with that of an adequate control group consisting of comparable non-successful applicants. The proposed approaches are empirical in nature, employing data available at project level for both sets of actors and taking into account, to the extent possible, factors other than the SDE++ support that may also exert an influence on investment decisions into renewable projects in the Netherlands. Given that the approach works with individual data at project level, it can give insight into the distribution of outcomes (not only averages).

(197) In addition, the evaluation will also allow assessing the cost of abatement (in EUR/tCO_2) of the subsidy scheme as a whole and of individual technologies, a highly relevant parameter for assessing the efficiency of the decarbonisation scheme and designing future schemes.

(198) The Commission welcomes the possible analysis of supply curves, constructed on the basis of bids submitted in individual SDE++ bidding rounds. These can form a good basis for running simulations of auction results when using different auction designs (e.g. with other selection principles than 'first come first served'), or in the absence of the budget ceilings. Separate supply curves can be drawn to see how, for instance, the curves differ by technology; year; geography/location; size of the projects; revenue characteristics; cost characteristics.[40] Supply curves can effectively inform the evaluator on the effectiveness of the aid, insofar as the supply curves are reflective of the underlying cost curves.

(199) The Commission also welcomes the proposed review of some of the assumptions underlying the design of the SDE++, in particular whether electrification technologies have indeed only run during periods of low carbon electricity generation and whether electric boilers indeed operated alongside gas boilers which remained in service.

(200) Reviewing whether pre-qualification and collateral requirements have been sufficient incentive to ensure projects are realised should also prove useful to ensure these aspects of the scheme can then be adapted if necessary to ensure the scheme meets its objectives.

(201) The extent to which the auctions are undersubscribed or oversubscribed provides for a first indication as regards the competitiveness of the auctions. The

[39] Staff Working Document on Common methodology for State aid evaluation, SWD(2014) 179 final.

[40] In the same way as one can draw separate supply curves as described above, one can also go a step further and establish the statistical relationship between aid amounts/bid prices and the underlying factors (technology, year, location, …) through regression analysis, provided sufficient data are available.

evaluation of projects' profitability indicators (IRR) can shed further light on the question of incentive effect and proportionality at project level, as well as the distribution of outcomes. They can also be informative as to how well the supply curve reflects the underling cost curve (cf. previous recital).

(202) The Commission notes that the evaluation will be conducted according to the notified evaluation plan by an independent evaluation body. Moreover, the envisaged publication of the evaluation plan and its results on a public website are adequate to ensure transparency.

(203) The Commission also notes that the Netherlands plans to submit the final evaluation report when it comes available (in the first half of 2024).

(204) The Commission therefore considers that the notified evaluation plan meets the requirements in EEAG point 28 and Chapter 4.

3.3.11. Conclusion with regard to the compatibility of the measure

(205) The Commission concludes that the aid facilitates the development of an economic activity and does not adversely affect trading conditions to an extent contrary to the common interest. Therefore, the Commission considers the aid compatible with the internal market based on Article 107(3)(c) TFEU and on the relevant provisions of EEAG.

4. AUTHENTIC LANGUAGE

As mentioned in recital (2), the Netherlands has accepted to have the decision adopted and notified in English. The authentic language will therefore be English.

5. CONCLUSION

The Commission has accordingly decided not to raise objections to the aid on the grounds that it is compatible with the internal market pursuant to Article 107(3)(c) of the Treaty on the Functioning of the European Union.

Yours faithfully,

For the Commission

Margrethe VESTAGER
Member of the Commission