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[The information in square brackets is covered by the obligation of professional secrecy]

## EFTA SURVEILLANCE AUTHORITY DECISION

of 11 November 2015

not to raise objections to individual aid in favour of Tizir Titanium & Iron AS for the construction of a demonstration plant at Tyssedal

(Norway)

The EFTA Surveillance Authority (“the Authority”),

HAVING REGARD to the Agreement on the European Economic Area (“the EEA Agreement”), in particular to Article 61(3)(c) and Protocol 26,

HAVING REGARD to the Agreement between the EFTA States on the Establishment of a Surveillance Authority and a Court of Justice (“the Surveillance and Court Agreement”), in particular to Article 24,

HAVING REGARD to Protocol 3 to the Surveillance and Court Agreement (“Protocol 3”), in particular to Article 1(3) of Part I and Article 4(3) of Part II,

Whereas:

### I. FACTS

#### 1. Procedure

- (1) Following pre-notification contacts, the Norwegian authorities notified an individual aid to Tizir Titanium & Iron AS (“TTI”) pursuant to Article 1(3) of Part I of Protocol 3 by letter received and registered by the Authority on 14 September 2015.<sup>1</sup>

#### 2. Description of the notified measure

##### 2.1. The notified aid measure

- (2) The notification concerns an individual state aid in the form of a non-reimbursable grant of 122 734 320 NOK in 2015 values to TTI for a full-scale demonstration project for novel

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<sup>1</sup> Document No 772999. The letter enclosed 8 Annexes (Document Nos 773001, 772996, 772998, 773002, 773000, 772994, 772995, 772993).

roof technology related to the smelting furnace at the company's premises at Tyssedal, in Odda municipality, in the county of Rogaland, Norway ("the notified measure").

- (3) The aid will be distributed to TTI in the period 2015-2016.

## 2.2. Enova's New Energy Technology Programme

- (4) The notified measure would be financed by the Energy Fund, which is managed by Enova SF ("Enova"), a state enterprise fully owned by the Norwegian State via the Ministry of Petroleum and Energy. Enova was established on 1 January 2002 with the purpose of managing the Energy Fund and administering several Norwegian support programmes aimed at promoting the use of energy-efficient technologies. One is the New Energy Technology Programme ("NETP"), which assists demonstration projects for innovative technologies in order to foster their market diffusion. By Decision No 248/11/COL,<sup>2</sup> the Authority declared the Energy Fund scheme, including the NETP, compatible with the EEA Agreement.
- (5) Enova grants aid through regular calls for applications, which are available on its website as well as published in major national and regional newspapers. Under the NETP, projects are evaluated in competition with each other based on their projected energy savings as well as the likely future environmental impact of the new technology to be verified.
- (6) The NETP envisages that eligible costs will normally be calculated by reference to a counterfactual investment. However, it foresees that a "no investment" counterfactual may be a more realistic counterfactual alternative under certain circumstances.<sup>3</sup>
- (7) Enova undertakes a net present value ("NPV") calculation of each project in order to ensure that projects only generate a normal return on capital. Projects with an estimated return on capital which equals or exceeds what is considered normal for the relevant projects and industry are ineligible for aid. Aid is only considered proportionate if the same result could not be achieved with less aid. In practice, Enova will evaluate the expected rate of return of each project and compare it to the rate generally applicable for the relevant activity.
- (8) The NETP foresees a maximum aid intensity of 50% for large enterprises. According to Decision No 248/11/COL, an individual notification to the Authority of any aid measure above EUR 7.5 million is required.<sup>4</sup> The notified aid is higher than this notification threshold.
- (9) TTI applied for aid on 30 June 2014. The application was handled through the second half of 2015 and the decision was made on 26 February 2015. In 2014, Enova received ten applications under the NETP.

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<sup>2</sup> Decision No 248/11/COL of 18 July 2011 on the Norwegian Energy Fund scheme. OJ C 314, 27.10.2011, p.4. The full text is available at the Authority's website: <http://www.eftasurv.int/media/decisions/249-11-COL.pdf>.

<sup>3</sup> *Ibid.*, para. 142.

<sup>4</sup> *Ibid.*, para. 58, cross-referring to para. 160 of the Guidelines on State aid for environmental protection ("EAG"), published on 10 June 2010 (OJ L 144, 10.6.2010, p. 1 and EEA Supplement No 29, 10.6.2010, p. 1).

### 2.3. The beneficiary

- (10) TTI produces titanium dioxide (TiO<sub>2</sub>) slag and high purity pig iron based on smelting of ilmenite at Tyssedal. For TTI, TiO<sub>2</sub> slag is an end-product but it is a raw material for other products, primarily to the TiO<sub>2</sub> pigment industry (see paragraphs (15) and (16) below).
- (11) The production was started in 1986 by the company “KS Ilmenittsmelteverket” which was owned 100% by the Norwegian state. From 1988 to 2008, the company was named Tinfos Titan & Iron AS and the main shareholder was the Norwegian Tinfos group. In 2008, the French company Eramet acquired the company and the name was changed to Eramet Titanium & Iron AS. Since 2011, the company has been 100% owned by the English company Tizir Limited under the name Tizir Titanium & Iron AS (“TTI”).
- (12) Tizir Limited is a joint venture company which is owned 50% by the French company Eramet SA and 50% by the Australian company Mineral Deposits Limited (“MDL”). In addition to TTI, Tizir Limited also owns (90% of) the mine Grande Côte Operation (“GCO”) in Senegal.
- (13) The beneficiary does not have any pending recovery order and it is not an undertaking in difficulties; the company has sound financial accounts. TTI is a large company.

### 2.4. The market on which TTI is active

- (14) As indicated, TTI is producing titanium dioxide (TiO<sub>2</sub>) slag and high purity pig iron.
- (15) TTI produces and sells TiO<sub>2</sub> slag to customers in Europe, China and South America. TiO<sub>2</sub> slag is part of the «Mineral Titanium Feedstock»<sup>5</sup> market. Mineral titanium feedstock consists of titan containing raw materials with different levels (%) of TiO<sub>2</sub> and other characteristics. The mineral titanium feedstock consists of the following products / raw materials:
- Ilmenite (TiO<sub>2</sub> content of 40-60% depended on mine)
  - **Titan dioxide slag (77-87% TiO<sub>2</sub>)**
  - Synthetic rutile (93% TiO<sub>2</sub>)
  - UGS (93% TiO<sub>2</sub>)
  - Rutile (95% TiO<sub>2</sub>)
- (16) Approximately 90% of the mineral titanium feedstock is consumed by industries that are producing TiO<sub>2</sub> pigment while the remaining share mainly consists of titanium metal and welding wire industry. The largest consumer of TiO<sub>2</sub> pigment is the paint industry with a share of approximately 60%.
- (17) TTI’s production facility at Tyssedal is one out of only five production facilities in the world that produce TiO<sub>2</sub> slag (leaving aside various small Chinese facilities) and the only which is located in Europe. Rio Tinto is the major producer of TiO<sub>2</sub>, accounting for approximately 75% of the total production while TTI has a small share, some 6.6%, of the total market.<sup>6</sup> Other producers are Tronox with some 12% of the market and Chinese producers with around 6.6%, mainly producing for the Chinese market.

<sup>5</sup> Mineral titanium feedstock consists of various raw materials containing titanium with different TiO<sub>2</sub> contents and other characteristics.

<sup>6</sup> No other company of the group produces TiO<sub>2</sub> slag.

- (18) There is no overcapacity in the TiO<sub>2</sub> production. Demand is higher than total world capacity.
- (19) The total group of TiO<sub>2</sub> customers is very fragmented, but it is estimated that 80% of the market is covered by the 40 biggest costumers.
- (20) High purity pig iron is a by-product in the production of TiO<sub>2</sub> slag. The main actors in this market are Canada, South Africa and Norway. TTI is the only European producer in the market. Over the last 5 years, the market share of TTI's high purity pig iron has been stable at 20 to 25%,<sup>7</sup> with volumes comparable to imports from Canada. TTI sells most of its production in the Northern European market.

## 2.5. TTI's current technology

- (21) TTI produces TiO<sub>2</sub> and high purity pig iron from an ilmenite ore in a two-step process, pre-reduction and smelting. The diagram shows a very simplified process description:

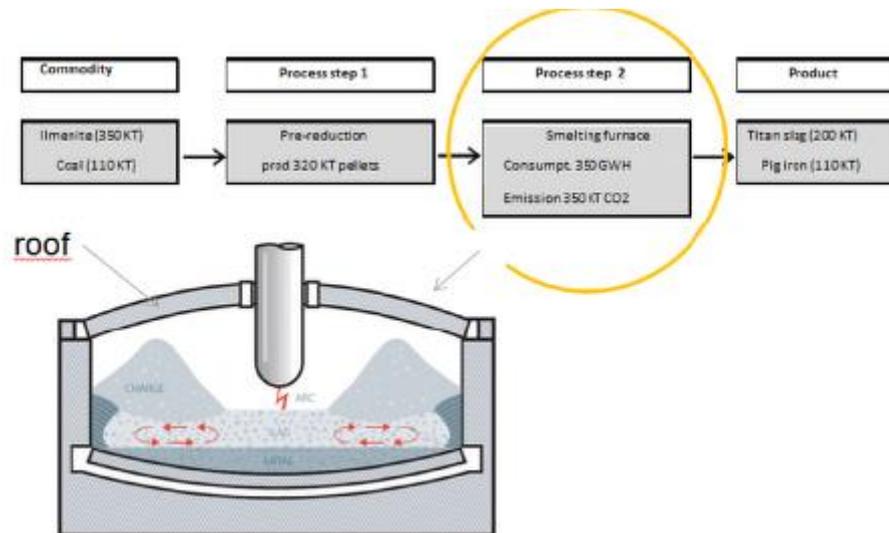


Figure 24 Principle sketch of open arc process (the roof is the top of the furnace)

- (22) The pre-reduction process means that pelletized ilmenite is fed into the furnace together with coal. Carbon reduces iron oxides in the ilmenite to metallic iron.
- (23) The smelting furnace process is an electric reduction smelter with Söderberg-electrodes. The smelter is fed with pre-reduced ilmenite pellets and charcoal. Liquid slag and iron is tapped from the smelter in two levels.
- (24) Since 2001, the production volume of titanium dioxide slag has been 180 000 – 200 000 MT per year. Every 4 to 6 years a periodic maintenance stop is executed, and these stops entail production loss the actual year. In 2005 and 2009, such maintenance shut-downs were done and a new one is due soon. The planned investments are supposed to be implemented during the next maintenance shut-down.
- (25) The project relates to new furnace technology in *process step 2* (step 2 refers to step 2 in the above diagram).

<sup>7</sup> No other company of the group produces high purity pig iron.

- (26) Today's roof technology consists of refractory bricks. Many smelting furnace operations have developed different variations of water cooled roofs. TTI evaluated these technologies in a separate pre-study project in 2009 and concluded that water cooled copper is the option upon which to base the improved new roof technology for TTI's smelting furnace.
- (27) Water cooled copper is commonly used in thermally very exposed parts of smelting furnaces, such as the electrode equipment (clamps, pressure rings, cooling shield, etc.) and tap holes. This is also the case today for TTI's smelting furnace.
- (28) Water cooled copper is, however, rarely used for roofs. It is known to be used in a few ferrochromium furnaces in South Africa. Even there, this is new and due to the short operational experience from ferrochromium processes and the differences between the ilmenite smelting technology and the ferrochromium smelting technology, this provides relatively little technology transfer utility.

## 2.6. The demonstration project

### 2.6.1. The water cooled roof project

- (29) The aim of the demonstration project is to verify at full-scale the use of roof technology related to the smelting furnace at TTI.
- (30) The demonstration project will test the technology at full scale and will operate the process with higher temperature and greater quantities of more unevenly distributed off-gas than can be achieved in a smaller scale. The project will verify the possibilities and effects of the technology and successful results will trigger further development of the rest of the production process, bringing substantial reductions in climate gas emissions.
- (31) The technology to be verified by the demonstration project will result in both reduced specific energy consumption and reduced emissions of CO<sub>2</sub>:
- Since the furnace can be run with a higher load, the production will increase by 13% compared to ordinary direct reduction. Higher production will give lower specific energy consumption (kWh/ton slag).
  - Furthermore, the new technology will mean that TTI can avoid the pre-heating and cooling of the material that is necessary in an ordinary direct-reduction process. These are also elements that will reduce specific energy consumption.
  - In addition to the reduced specific energy consumption, a larger portion of the energy put into the process will be electricity instead of coal, resulting in reduction in the CO<sub>2</sub>-emissions.
- (32) Today TTI consumes approximately 115 000 MT coal per year and has CO<sub>2</sub> emissions of 1.7 ton/ton of slag produced. With the new technology this can be reduced substantially.
- (33) TTI has an energy consumption equivalent to 6.4 MWh/ton of slag. With the new technology, recirculating smelting furnace off-gas for preheating of ilmenite/gas and hot charging of the smelting furnace, there is also a potential to reduce energy consumption.
- (34) The notified project represents a project that stands alone but also represents an enabler for future technology. In fact, the project is **step 1** of a 3 step project. Steps 2 and 3 have not yet been decided on and no aid is notified for those potential steps.

- (35) The notified project is step 1 in a strategy for TTI to take environmentally safe production technology into commercial use.
- (36) Step 1 (the notified project) is to prepare the smelting furnace for hot-charging feed from a future “hydrogen-based” new pre-reduction technology. The notified project includes three technologies which will be tested and verified:
- New roof technology
- (37) By feeding pre-reduced ilmenite hot (“hot charging” > 600 °C) a significant energy saving is achieved. To do this the smelting furnace must have the capability to handle the increased process temperature. Today’s smelting furnace has limited capacity to do this.
- (38) The main challenges are the design, safety and heat loss. The innovation is in solving this. The tool is the full scale pilot roof, including the continuous following-up during operation/verification.
- New charging system
- (39) In order to handle the increased production rate from “hot charging” (the lower power consumption of the furnace will provide increased production rate for the same furnace power load), the process control system needs to be adapted.
- (40) The main challenge is to keep the “freeze lining” stable despite the increased production rate and increased process temperature.
- New off-gas system
- (41) In order to handle the increased production rate and increased variation in the off-gas production from the smelting furnace today’s two-stage venture scrubber systems need further improvements and verification. In order to be able to recycle the smelting furnace off-gas (CO rich), the off-gas treatment plant is developed from the two-stage process to include a third step.
- (42) The main challenge is to clean the smelting furnace off-gas to the degree where it can be recycled, even at the increased production rate and the increased variations from smelting furnace off-gas production.

#### 2.6.2. *Expected environmental impact of the demonstration project*

- (43) The notified project (step 1) can stand on its own, bringing both reduced CO<sub>2</sub>-emissions and energy savings:
- The CO<sub>2</sub>-emissions will be reduced from 1.73 (Base Case) to 1.62 tons per ton of produced slag. That means a total reduction of 23 980 tons of CO<sub>2</sub> per year. (A reduction achieved with 11% direct charging of ore).
  - The energy consumption will be reduced by 22 GWh in total.
- (44) Despite the fact that the water cooled copper roof will entail a larger loss of heat from the furnace, this will be more than compensated by reduction of coal consumption (11 % direct reduction) and increased production.

- (45) Table 1 below shows the CO<sub>2</sub>-emissions and energy consumption for the base case scenario with the current technology (after the next maintenance stop) and after the implementation of the notified project. The table shows the figures of total emissions and total consumption per year and the emissions and consumption per ton slag produced.

Table 1		BASE CASE	Step 1
Technology pre-reduction		Coal	Coal
Furnace charging		Cold	Cold
Furnace of gas		Flared	Flared/recycle
Slag production volume	ton/year	[...]	[...]
Iron production volume	ton/year	[...]	[...]
CO <sub>2</sub> emission total	ton/year	[...]	[...]
CO <sub>2</sub> emission per ton slag produced	ton/tons slag	[...]	[...]
Power consumption total	TWh/year	[...]	[...]*
Percentage carbon energy (coal+electrode+gas)	%	[...]	[...]
Percentage electrical energy	%	[...]	[...]
Energy consumption per ton slag produced	MWh/tons slag	[...]	[...]
Reduction of CO <sub>2</sub> emission relatively to Base Case	Mton		0,023
Reduction of power consumption relatively to Base Case	TWh		0,022

(\*) Increase in *total power* consumption is due to small increase in production – *energy* consumption and emissions per ton slag is reduced.

- (46) By reducing or dismissing the coal consumption, TTI will in addition gain a set of various other positive environmental benefits. Table 2 shows emission figures for mercury, sulphur and dust which all will be kept at today's level or lower. Possible future steps 2 and 3 will give the answers on these and other possible gains, e.g. NO<sub>x</sub>. These steps include the new pre-reduction technologies related to natural gas and/or hydrogen that are not included in this project.

Table 2		Current situation	Step 1
Technology pre-reduction		Coal	Coal
Emission of mercury to sea and air	Kg/year	< 5	< 5
Emission of sulphur to air	ton/year	< 25	< 25
Emission of dust to air	ton/year	< 127	< 127
Emission of NO <sub>x</sub>	ton/year	150	150

### 2.6.3. Costs and benefits of the demonstration plant

- (47) The **investment costs** of the demonstration project are divided into the following:

Table 3	Investment (NOK)	Share (%)
Water cooled copper roof	[...]	[...]
Off-gas system	[...]	[...]
Feeding/charging system	[...]	[...]
De-phosphoring	[...]	[...]
Upgrading of furnace transformer	[...]	[...]
Project management, etc.	[...]	[...]
<b>TOTAL</b>	<b>256 100 000</b>	<b>100</b>

- (48) The total investment of the project amounts to NOK 256 100 000 which will be financed by means of the aid and a loan subscribed by TTI.
- (49) **Operating costs** comprise several elements: cost of raw materials, energy prices, maintenance costs, etc. There is a steady relation between consumption of raw material from the different factors and the final product. The prices for raw materials are in the calculations based on the prices at the application date and a minor increase over the lifetime of the project.
- (50) In this project, the energy prices are based on long term contracts and are kept at fixed levels. The electricity price is NOK [...] to [...] per kWh in the contract that is valid until [...].
- (51) In the calculations the yearly maintenance costs are assumed to be 5% of investment cost. The different elements of the copper roof will have an expected lifetime of one year. This means a continuous need for maintenance.
- (52) Total operating costs are estimated to be MNOK 114.08 per year in 2021.
- (53) **Operating benefits** of the project include income for increased production of TiO<sub>2</sub> and pig iron. The income will be influenced by production volume and price.
- (54) Operating benefits of the project are calculated to be MNOK 136.27 per year in 2021.

## 3. Comments by the Norwegian authorities

### 3.1. Legal framework for the assessment of the measure

- (55) According to the Norwegian authorities, the notified measure entails an individual state aid measure that should be assessed in line with Decision No 248/11/COL as aid granted under

the NETP of the Energy Fund scheme, which the Authority declared compatible with the functioning of the EEA Agreement on the basis of Article 61(3)(c) of the EEA Agreement.<sup>8</sup>

- (56) Since the measure has an environmental objective, the Norwegian authorities use the guidelines for environmental protection adopted in 2010 (hereinafter “the EAG”<sup>9</sup>) and the guidelines on state aid for environmental protection and energy 2014-2020 (hereinafter “the EEAG”<sup>10</sup>) as a proxy for their legal assessment.
- (57) In their assessment of the measure, the Norwegian authorities have firstly assessed whether the project is eligible for aid under the NETP. Secondly, as required by Decision No 248/11/COL, they have appraised whether the balancing test of the aid is positive. In that regard, the following questions have been answered: (i) is the aid aimed at a well-defined objective of common interest? (ii) is there a need for State intervention? (iv) is the aid measure an appropriate instrument? (v) is there an incentive effect? (vi) is the aid measure proportionate?, and (vii) are the distortions of competition and effects on trade limited?

### **3.2. Eligibility of the project under the NETP**

- (58) The Norwegian authorities explain that all applications under the NETP are subject to detailed scrutiny by Enova. In order to ensure that there is no overcompensation in relation to eligible projects, all applications are subject to the following procedure.
- (59) First, Enova carries out an individual assessment of the information provided by the applicant on the technical potential of the project and the relevant costs and benefits.
- (60) Secondly, Enova undertakes a financial analysis of the project in order to determine the aid required to ensure a normal return on capital, taking into account operating benefits and costs. Projects with an estimated return on capital which exceeds what is considered normal for the relevant industry are not eligible for aid.
- (61) Thirdly, Enova compares the aid required to ensure a normal return on capital with the applicable maximum aid intensities.
- (62) Finally, Enova gives priority to projects according to the level of aid needed (per KWh saved), as well as the likely future environmental impact of the new technology to be verified, until the annual budget is allocated. Thus, projects which qualify under steps one to three of its assessment might in the end not be awarded aid due to budgetary limits and competition from other, more efficient projects.
- (63) According to Decision No 248/11/COL, demonstration projects have to fulfil a number of criteria in order to be eligible for aid under the NETP. The fulfilment of these criteria are supervised by Enova. The criteria are:

<sup>8</sup> With reference to the Commission Decision N 521/2008, *Alpha Ventus*, the Authority concluded that the programme falls within a gap between the scope of the EAG and the R&D&I Guidelines. See Decision No 248/11/COL, paras. 132-137. State aid guidelines for environmental protection (“EAG”), OJ L 144, 10.6.2010, p. 1 and EEA Supplement No 29, 10.6.2010, p. 1. Decision No 248/11/COL refers to the former R&D&I state aid guidelines (“R&D&I Guidelines”), OJ L 305, 19.11.09, p.1 and EEA Supplement No 60, 19.11.09.

<sup>9</sup> State aid guidelines for environmental protection (“EAG”). See footnote above.

<sup>10</sup> Guidelines on state aid for environmental protection and energy 2014-2020 (“EEAG”). OJ L 131, 28.5.2015, p. 1 and EEA supplement to the OJ No 30, 28.5.2015, p.1.

### 3.2.1. Limited market dissemination and no prior full-scale testing

- (64) TTI has been working on the technology for developing the water cooled copper roof. The R&D project focused on the design of the cooling circuits, design of the cooling finders, material used in the cooling fingers, refractory material combined with the cooling fingers and geometrics. In the period 2009-2013, different test modules (elements) were installed on the existing furnace roof. Therefore, the technology has been tested in a smaller scale at TTI from 2009 to 2014.
- (65) The next step in the process of developing the water cooled copper roof is a full scale demonstration plant.
- (66) The technology has not yet been tested in a full-scale demonstration plant, and therefore not used in production. The technology thus has not yet been introduced in the market. The technology has not been used for this purpose by other industries.
- (67) On this basis, the Norwegian authorities consider that in line with Decision No 248/11/COL there has been no market dissemination of the novel technology nor any prior full-scale testing.<sup>11</sup>

### 3.2.2. End-user participation

- (68) TTI intends to put the new water cooled copper roof technology in its production plant in Tyssedal.
- (69) The Norwegian authorities thus consider that the project involves an end-user in line with Decision No 248/11/COL.<sup>12</sup>

### 3.2.3. Full scale testing under typical operating conditions

- (70) TTI intends to test the new technology at full scale under typical operating conditions. Indeed, TTI demonstration project is a full-scale project that will be implemented into an existing production.
- (71) The Norwegian authorities thus consider that the project involves a full-scale version of the new technology in line with Decision No 248/11/COL.<sup>13</sup>

### 3.2.4. Two-years operational period

- (72) The company will need a period of five to six years for running in and optimising the new technology with increasing load. The demonstration project will run for at least 15 years.
- (73) The Norwegian authorities thus consider that the minimum operational period requirement set out in Decision No 248/11/COL is met.<sup>14</sup>

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<sup>11</sup> Decision No 248/11/COL, para. 111.

<sup>12</sup> *Ibid.*, para. 112.

<sup>13</sup> *Ibid.*, paras. 113 and 114.

<sup>14</sup> *Ibid.*, para. 115.

### 3.2.5. Measurable energy result and positive cash flow.

- (74) If successful, the project will result in a reduced energy consumption of 22 GWh per year and a reduction of CO<sub>2</sub> emission of 23 980 tons per year.
- (75) According to the projections of TTI, the demonstration plant is expected to generate a positive cash flow in its operating phase, i.e. the revenue generated from its TiO<sub>2</sub> and pig iron production is expected to exceed operating cost.
- (76) The Norwegian authorities therefore consider that the requirement for a measurable energy result and a positive cash flow during the operating phase as set out in Decision No 248/11/COL is met.<sup>15</sup>

### 3.2.6. Sufficient market diffusion of the new technology

- (77) It follows from Decision No 248/11/COL that the long term aim of the NETP is to contribute to environmental protection by the diffusion of new and more energy efficient technologies.<sup>16</sup> Sufficient market diffusion of the new technology – once verified in the demonstration plant – is therefore a necessary condition for a project to be eligible for aid under the NETP.
- (78) The notified project is a one of a kind process. No other producers use the same technology, though elements can be taken out for other purposes and processes.
- (79) The TiO<sub>2</sub> processing industry is characterized by many different choices of technology and the results will not necessarily be of any direct use to TTI's competitors but TTI will give access to the results to any interested party. The technology will, however, be of interest in other industries.
- (80) Enova has contacted Swerea MEFOS<sup>17</sup> to evaluate the possibility to transfer the technology for the new and improved furnace cover design which has been developed for TiO<sub>2</sub> production in Tyssedal, to other parts of the metallurgical industry. The conclusion is that the results from the project will be of interest for the industry.
- (81) Once the potential interest of the novel technology has been ensured, Enova has also checked how the technology will be spread. The Norwegian authorities argue that in order to facilitate the spreading it is useful to take advantage of the already established channels and cooperation arenas where TTI is present. These channels will be the Eramet system<sup>18</sup> and the FFF (the Norwegian Ferroalloy Producers Research Association<sup>19</sup>). TTI will also

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<sup>15</sup> *Ibid.*, para. 116.

<sup>16</sup> *Ibid.*, para. 11.

<sup>17</sup> A Swedish research company working with process metallurgy, heating, metalworking, the environment and energy technology. [www.swerea.se/en/mefos](http://www.swerea.se/en/mefos). The report issued by Swerea MEFOS was sent to the Authority as Annex 3 to the notification (Event No 773000).

<sup>18</sup> The Eramet system is divided into three divisions: Manganese, Nickel and special steel. Technology developed within one division will be spread to the others if relevant. This can be done through different channels: Eramet has a program called "Challenge Initiative" that covers all divisions. Here the best innovations through the year are ranked and awarded. This is where we can find the most targeted activity on technology spread within Eramet. The Industrial Management department in Eramet is also a channel for spreading the technology within the Eramet system.

<sup>19</sup> FFF is an association founded by the Norwegian ferroalloys industry to carry out joint research on ferroalloy processes and products.

grant open access to technology and experiences for all interested parties, and it will provide for visits at the plant. There will be no patents or licencing attached to the new technology.

- (82) On this basis, the Norwegian authorities consider that the requirement for market diffusion as set out in Decision No 248/11/COL is fulfilled.

### **3.3. Contribution to an objective of common interest**

- (83) The Norwegian authorities argue that the measure responds to an objective of common interest, namely environmental protection. The Norwegian authorities also recall that promoting research and development and innovation is in itself an important EEA objective laid down in Article 1.2.(f) and 78 of the EEA Agreement.

### **3.4. The need for the State intervention**

- (84) The Norwegian authorities recall that the most common market failure in the field of environmental protection is related to negative externalities. Undertakings acting on its own have no interest in taking into account the negative externalities arising from the production.
- (85) Without the aid, TTI will have no incentive to gain environmental protection in its production process. As a consequence, the aid intends to correct a market failure that leads to a sub-optimal level of environmental protection.

### **3.5. Aid as an appropriate instrument**

- (86) The Norwegian authorities argue that state aid represents an appropriate instrument to achieve the environmental objective of the aid.
- (87) The Norwegian legislation does not require undertakings, e.g. producers of TiO<sub>2</sub> slag and pig iron such as TTI, to construct plants using new innovative technologies. Provided that they respect applicable standards (i.e. with regard to pollution or building codes), conventional production facilities or buildings using conventional technologies known to the market may thus be authorised and built. As a consequence, state aid is an appropriate instrument to change the market behaviour.
- (88) They also consider that less distortive aid instruments, e.g. a loan or a guarantee, would not be suitable to trigger investment in the new technology. In particular, loans and guarantees may be appropriate in situations where a distinct incident could trigger a relevant change of an uncertain cash flow. Such instruments are therefore appropriate for companies in strong growth or business venturing into new areas. However, this is not the case with TTI. The company's business rests on a stable platform. TTI does not plan to produce new products for new markets and the technical risk in the project is manageable.
- (89) Furthermore, other instruments would have a limited impact on the NPV calculation and would therefore be less suitable to address the funding gap compared to an aid grant.

### **3.6. Incentive effect of the state aid**

- (90) As stated above (paragraph (6) above), the NETP foresees that for a demonstration plant, the assessment may be undertaken based on a "no investment" counterfactual. The Norwegian authorities argue that such a "no investment" counterfactual approach is

particularly appropriate in the case of the proposed demonstration plant for the following reasons.

- (91) First, TTI has not considered a counterfactual in the form of an alternative reference investment. The project is to demonstrate the new furnace technology in an existing full-scale production line. The increased production that may occur as a result of introducing this technology will be a consequence of the project, but not the purpose of the investment.
- (92) Secondly, TTI does not lack production capacity, satisfactory technology or equipment in relation to the volume currently demanded by the market. TTI can thus continue producing its needed production volume using existing facilities.
- (93) As set out in Decision No 248/11/COL, in case of a “no investment” counterfactual the following elements need to be assessed in order to determine whether the aid has an incentive effect: (i) whether any relevant EU or national standards will be introduced in the foreseeable future; (ii) whether the investment in the relevant project represents normal market behavior; (iii) the level of risk connected to the project; (iv) whether the investment, without the aid, would generate an appropriate profit; (v) the project’s level of increased environmental protection; and (vi) the extent of the production advantages obtained by the aid recipient.<sup>20</sup>

*(i) Relevant EU or national standards*

- (94) The Norwegian authorities state that to their knowledge, there are no on-going negotiations on EU or national level to introduce new or higher mandatory standards which the investment aid in favour of TTI would help the company to achieve faster than its competitors or gain any other advantages from.

*(ii) Normal market behaviour*

- (95) The investment in a full-scale non-verified new technology demonstration plant in order to verify a step-change, energy efficient, highly productive, and low emission production technology is not considered normal market behaviour.
- (96) TiO<sub>2</sub> is for the time being sold on the market without any form of labelling with regard to environmental product image. Some costumers are now starting to express interest, but this is not on a scale that can give any incentive to invest in expensive new green technology. In light of this, a more environmentally friendly production process is unlikely to have an impact on customer demand and general market conditions for TiO<sub>2</sub> from TTI. It is likely that the aid gives TTI an incentive to invest in environmental protection, which would not be present in the absence of aid.

*(iii) Level of risk and the extent of the production advantages*

- (97) The technological risks of the project would prevent TTI from investing in the demonstration plant in the absence of aid.

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<sup>20</sup> Decision No 248/11/COL, para. 142.

- (98) The calculations of the project show that with the proposed aid the project will have a NPV of [...] NOK and IRR of [...] and without the aid the numbers will be [...] NOK and [...] respectively. The sensitivity of the NPV has been calculated for different scenarios:

	Change of NPV if -10% of factor)	Change of NPV if + 10% of factor
Product price	-66.9 MNOK	+66.9MNOK
Exchange rates	-35.1 MNOK	+35.1 MNOK
Production volume	-25.1 MNOK	Not possible

- (99) The Norwegian authorities argue that change of product price is the most powerful element when it comes to influencing NPV, since they consider that there is no indication that any of these factors have a higher probability than the others.

*(iv) Profitability of the project*

- (100) The Norwegian authorities have presented an NPV calculation. As indicated, the financial calculations shows that with a proposed aid of 122 734 320 NOK the project will have an NPV of [...] NOK and an IRR of [...] (6.6% discount rate and 15 years lifetime for the investment are used). Without aid the numbers will be [...] NOK and [...] respectively.
- (101) As part of the NPV calculation Enova has analysed the rate of return required by TTI for the demonstration plant and found it to be reasonable and not exceeding what is considered normally required by the beneficiary.
- (102) The corporate policy guidelines of TTI gives a lower limit of [...] for the IRR before taxes, and even with the proposed aid the project will not meet this policy. TTI is normally not comfortable with this level of IRR but is willing to accept this as long as the project has strategic relevance for the company.
- (103) The certified bond TTI has acquired has an interest of [...] and runs from [...] to [...]. This proves the difficulty of financing TTI's investment plans and specifically the more risky technology projects.
- (104) As already explained, with the proposed aid the project will have an IRR of [...]. This is considerably lower than both policy guidelines and interest on the certified bond. The strategic value related to possible future steps towards more environmental processes is the major reason why TTI can accept the IRR of [...] and implement the investments, though this is considered to be the lower limit.
- (105) Hence, the project clearly suffers from a funding gap. The Norwegian authorities consider that the unprofitability of the project serves to demonstrate that the aid has an incentive effect. The Norwegian authorities refer to point (57) of the EEAG stating that: “*Where no specific counterfactual scenario is known, the incentive effect can be assumed when there is a funding gap, that is to say when the investment costs exceed the NPV of the expected operating profits of the investment on the basis of an ex ante business plan*”.

*(v) Level of environmental protection*

- (106) The notified project will increase the level of environmental protection as compared to the counterfactual scenario. The TTI demonstration plant is expected to generate annual energy

savings of 22 GWh per year compared to business as usual and will also result in a reduction of climate gas emissions of 23 980 tons CO<sub>2</sub> per year.

*(vi) The extent of the production advantages*

(107) The new technology will make it possible to increase the production at TTI by 25 000 tons of TiO<sub>2</sub> slag. This is a level that will not influence the world market for TiO<sub>2</sub>. It is moreover not possible to increase to a higher level since there are limitations in the existing plant and furnace. There is however a possibility that production will not increase as much as expected and if this happens the NPV will be reduced.

### **3.7. Proportionality of the state aid**

#### *3.7.1. The aid is limited to the minimum necessary*

(108) The Norwegian authorities regard the aid to be proportionate only if the same result could not be achieved with less aid. Consequently, the aid amount must be limited to the minimum needed to achieve the higher level of environmental protection.

(109) The Norwegian authorities have explained that Enova applies the general method of the Energy Fund scheme for selecting eligible projects under the NETP. In accordance with point (174) of the EAG, in making the assessment of whether the aid is proportionate account shall be taken (i) of an accurate cost calculation (limiting the costs to the necessary); (ii) of the presence of an open and non-discriminatory selection process; and (iii) that the aid should not exceed the lack of profitability (including a normal return over its life time).

(110) Enova applies a selection process to eligible investment projects in order to select those which can address the environmental objective using the least amount of aid or in the most cost-effective way. Enova's selection processes (including under the NETP for 2014/2015) are conducted in a non-discriminatory, transparent and open manner without excluding any undertakings that may compete with projects addressing the same environmental objective falling within the ambit of the respective aid program.

(111) Enova has found that the significant potential for energy saving and reduced climate gas emissions that the project can trigger indicates a substantial contribution to strengthening the energy change in the long term. In light of TTI's market diffusion plan, Enova has furthermore assessed the project as fit to enhance competence and reduce barriers for new installations.

(112) Finally, the calculation of eligible costs in the project is based on Section II.7 of Decision 248/11/COL, i.e. only the extra cost necessary to meet the environmental objectives is eligible for aid. According to the EAG, whether that cost is not easily identified in the total investments cost, the extra investment costs can be established by comparing the investment to a counterfactual.

(113) The Norwegian authorities consider that in the present case, the counterfactual will be the no-investment, due to the aim, risk profile and unprofitability of the project.

(114) The extra cost methodology requires that, in order to establish how much aid can be granted, all the economic benefits which the investment gives TTI have been subtracted from the additional investment costs. As the NPV analysis demonstrates, operational benefits have been subtracted from the additional investment costs. The extra cost approach applied by Enova in the TTI project is thus net of all operational benefits. In accordance with Decision

248/11/COL, cf. the EAG, the eligible costs are calculated net of any operating benefits and operating costs related to the extra investment for energy saving and arising during the first five years.

- (115) As described above, the eligible investment costs of the demonstration project are MNOK 256.1. The pilot plant project's discounted operating revenues during the first five years of operation amount to MNOK 348.6, while the discounted operating costs the first five years are MNOK 333.9.
- (116) In the absence of a counterfactual investment, the eligible costs are calculated as the eligible investment costs, merely net the operating benefits related to the extra investment for energy saving and arising during the first five years.
- (117) Consequently, applying the calculation method of the EAG as reflected in the program criteria for the NETP, the proposed aid amount of MNOK 122.7 results in an aid intensity of 47.9% of eligible extra costs.

	TTI demonstration (MNOK)	Counterfactual (MNOK)
Investment costs	256.1	0
Operating extra costs first five years	333.9	0
Operating extra benefits first five years	348.6	0

Eligible costs	
Total eligible costs	MNOK 256.1
• Aid intensity according to Decision 248/11	50%
➤ Max aid intensity	MNOK 128.1
➤ Max aid granted to TTI	122.7
➤ Aid intensity	47.9%

- (118) The eligible costs have been estimated by applying the methodology laid down in Section II.7.3 of 248/11/COL. The NPV analysis shows that the project suffers from a funding gap as the investment cost exceeds the NPV of the expected operating profits of the investment on the basis of an *ex ante* business plan. Therefore, the aid does not exceed this funding gap.
- (119) Consequently, the investment costs of the project are to be strictly confined to the extra costs necessary to meet the positive environmental effects.
- (120) TTI is a large undertaking and a participant in the ETS,<sup>21</sup> hence the operating costs and benefits are calculated with a five year reference.<sup>22</sup>

<sup>21</sup> ETS: Emission Trading system.

<sup>22</sup> Point 98 (c), section 3.1.5.1., of the EAG states that “[...]eligible costs must be calculated net of any operating benefits and operating costs related to the extra investment for energy saving and arising during

### 3.7.2. Aid intensity

- (121) The Norwegian authorities state that there are difficulties in fully taking into account all economic benefits that TTI will derive from the investment. Consequently, in order for the aid to be proportionate, Enova considers that the aid amount to this project must be less than the maximum aid intensity. Consequently, the aid amount granted to TTI amounting to MNOK 122.7 is equivalent to an aid intensity of 47.9% which is below the maximum aid intensity of 50% allowed for large undertakings, laid down in Decision 248/11/COL.<sup>23</sup>
- (122) The Norwegian authorities consider that reducing the maximum aid intensity constitutes a means to ensure the proportionality of the aid.

### 3.7.3. Adjustment of the aid amount

- (123) In order to ensure that the aid is proportionate, the Norwegian authorities have further explained that TTI is not automatically entitled to the full aid amount. The amount of MNOK 122 (nominal value) effectively represents a maximum threshold for aid. In accordance with the rules for disbursements of aid under the Energy Fund Scheme as explained in chapter I.7 of Decision 248/11/COL, the aid amount will be reduced in case the incurred investment costs are lower than budgeted. In case of realized savings, the aid amount will be proportionately reduced. Furthermore, TTI is not free to redistribute costs between budget posts. Changes are subject to Enova's approval. The adjustment of the aid is facilitated by the fact that Enova holds back the last 20% of the aid until the project is completed and will only disburse the remaining aid when it has approved an audited final project report with audited final project accounts.
- (124) Furthermore, the assessment of profitability and appropriate aid level is based on available data/estimates updated at the time of Enova's board decision to grant the aid to TTI, in February 2015. The basis for the estimates could change further before TTI takes the decision to initiate the project. The aid will be adjusted to the final investments costs (but never to increase the established maximum aid amount).

## 3.8. Limited distortion of competition and trade

### 3.8.1. The relevant markets

- (125) The Norwegian authorities submits that a relevant product market in the case at hand can be defined as the total TiO<sub>2</sub> and pig iron market. There are no national preferences, brands, regulatory or technical barriers that prevent competition across borders and the Norwegian authorities, therefore, consider the geographic market for TTI's products as global.
- (126) Since TTI plans to give full access to the technology to all interested parties, an affected market can also be defined as the market for furnace technology which, since furnaces are used in a wide range of industries (including metal smelting and chemical industry), also is a global market.

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*the [...] first five years in the case of large undertakings that are part of the European CO2 Emission Trading System."*

<sup>23</sup> Decision No 248/11/COL, para. 149.

### 3.8.2. *The lack of distortive effects*

- (127) The Norwegian authorities note that according to point (176) of the EAG: "*if the aid is proportional, notably if the calculation of the extra investment or operating costs has taken into account all advantages to the undertaking; the negative impact of the aid is likely to be limited.*"
- (128) As indicated above (section 3.7.), the Norwegian authorities indicate that the extra cost approach is based on (1) a credible counterfactual (no investment) and (2) the investment aid is granted net of any operating benefits. Moreover, the aid intensity in the pilot plant project is 47.9% which is below the maximum aid intensities applicable. Enova has further submitted an NPV analysis showing that the project will be unprofitable even with the aid. Consequently, at the outset the Norwegian authorities consider the effect on competition limited to the positive effects on the environment.
- (129) TiO<sub>2</sub> and pig iron are both globally traded commodities. The demonstration project will produce an insignificant amount of TiO<sub>2</sub> that cannot be expected to have any impact on the prices. It would seem unlikely that TTI could increase sales by reducing its prices. As demonstrated above, even with the aid, the project does not become profitable, including a normal return over the lifetime of the equipment. Therefore, TTI is in any case likely to maintain its regular price levels in order to recoup the investment costs.
- (130) Furthermore, TTI is not likely to benefit from tangible advantages in terms of an improved product image. The company is active in an upstream market high up the value chain. TiO<sub>2</sub> and pig iron are currently sold in the market without any form of labelling with regards to environmental product image. Consequently, it is unlikely that an improved environmental image of TTI's products could generate a notable increase in sales, even if certain customers are becoming interested in the environmental footprint of the product.
- (131) As the new technology in question aims at reducing energy consumption, it is furthermore worth noting that production advantages are to a certain degree inherent in energy efficiency measures. On this issue, the Norwegian authorities refer to point 85 of the EEAG which establishes that "*Aid for environmental purposes will by its very nature, tend to favour environmentally friendly products and technologies at the expense of other, more polluting ones and that effect of the aid will, in principle, not be viewed as an undue distortion of competition, since it is inherently linked to the very objective of the aid, that is to say making the economy greener [...].*"
- (132) The global market for TiO<sub>2</sub> and pig iron is expected to grow over the coming years. The growth will predominantly take place in countries where the energy is provided by fossil fuels resulting in substantial indirect emissions of greenhouse gas (GHG) per kg produced. This is in particular the case for China, where costs of labour and construction are noticeably lower than for EEA-based production. Increased cost efficiency for production based on hydropower will hence contribute to maintain and increase the competitiveness of TiO<sub>2</sub> and pig iron produced with renewable energy. Indirect CO<sub>2</sub> emissions from power consumption are a significant part of the global carbon footprint of the metallurgical industry. In combination with the reductions of direct emissions, as well as TTI's intention to give full access to the technology, the Norwegian authorities find that TTI's water cooled copper roof project will contribute to making the economy greener.

### 3.8.3. *Dynamic incentives/crowding out*

- (133) The Norwegian authorities consider that the investment undertaken by TTI is innovative and as such technologically strategic. The new technology in the demonstration project may possibly provide TTI with a first mover advantage when it comes to introducing new reduction technology.
- (134) A certain first mover advantage will often be an inherent part of funding demonstrations of new technologies. In the opinion of the Norwegian authorities, this advantage is outweighed by the positive effects of the verification of a vastly more energy efficient furnace technology and its introduction on the market.
- (135) The technology will be spread in the markets for metallurgical industry and others. Furthermore, in line with market practice, TTI will present the results in all interested fora.
- (136) In any case, potential gain from a new production technology does not provide a long lasting competitive advantage.
- (137) Firstly, other producers and technology vendors are constantly pursuing technology research activities, in particular related to productivity. This is how the global industry works - continuous development towards more efficient production and cost reduction. The results of new methods are quickly spread among the different operators. Due to the fierce competition between the large players in the market, competitors will learn from the possibilities that the demonstration project provides and will catch up as soon as possible.
- (138) Secondly, new production technology will not change TTI's market position over night. Due to the quite large investment and the innovative aspects of the project it will take time to work up the production to full capacity. It may take 5 to 6 years. Considering the competitors vast innovation activities, they will therefore have ample time to catch up.
- (139) The Norwegian authorities consider that the testing and possible market introduction of the water cooled copper roof technology will rather be a driver towards further innovation and development amongst other market players that develop production technology for both proprietary use and/or for licensing.
- (140) Furthermore, as the aided project concerns an innovation activity, the existence of exit barriers in the relevant market is of particular relevance. The R&D&I state aid guidelines<sup>24</sup> recognizes that "*Competitors are more likely to maintain, or even to increase their investment plans when exit barriers to the innovation process are high. That may be the case when many of the competitors' past investments are locked in to a particular R&D&I trajectory.*"
- (141) In the view of the Norwegian authorities, the aid is unlikely to cause any of TTI's competitors to exit the market.
- (142) Moreover, the aid amount is fairly limited as compared to TTI's activities (MNOK 122.7 vs. TTI's 2013 revenue of MNOK 1 259), the demonstration project is a one-off investment aid and is not meant to meet new EU standards expected to be adopted in the foreseeable future, see paragraph (94) above.

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<sup>24</sup> Guidelines on state aid for research and development and innovation. OJ L 209, 6.8.2014, p. 53 and EEA Supplement No 44, para. 112.

- (143) The increased production capacity is also low compared to global production. It will make up 0.8% of the global production of TiO<sub>2</sub> in 2014 numbers.
- (144) With its market share, TTI is a small market player in the TiO<sub>2</sub> market with a market share of 6.6%, and somewhat larger in the high purity pig iron market with 20 to 25%, faces competition from several strong international market players with major investment capacities, proprietary innovation activities and larger market shares than them. Thus, the aid is unlikely to weaken the competitive constraint exerted by competitors on the recipient undertaking. It is therefore the opinion of Enova that the aid will not discourage competitors from competing on the markets concerned in the future.
- (145) The Norwegian authorities submit therefore that the aid does not distort the dynamic incentives and crowd out investments.

#### 3.8.4. *Maintaining inefficient firms afloat*

- (146) The Norwegian authorities consider TTI to be an efficient undertaking with sound financial accounts. Moreover, TTI has participated and has been elected as eligible in an open and transparent selection process, with a high degree of competition among a high number of potential recipients of aid under the Energy Fund. Consequently, the Norwegian authorities are of the opinion that the aid granted is not used to maintain an inefficient firm afloat.
- (147) In addition, the measure covers a relatively high amount of potential beneficiaries; all companies in the market are eligible for aid. However, there is a competition for aid and only the projects with the highest potential to save or produce energy receive aid.

#### 3.8.5. *Market power/exclusionary behaviour*

- (148) According to point (181) of the EAG: *"Aid for environmental protection given to a beneficiary may be used to strengthen or maintain its market power in the given product market. The Authority will assess the market power of the beneficiary concerned before the aid is granted, and the change in market power which can be expected as a result of the aid. Aid for environmental protection given to a beneficiary with substantial market power may be used by this beneficiary to strengthen or maintain its market power, by further differentiating its products or excluding rivals. The Authority is unlikely to identify competition concerns related to market power in markets where each aid beneficiary has a market share below 25% [...]"*
- (149) The Norwegian authorities do not consider that the aid will have the effect that TTI could strengthen or maintain market power, neither in the TiO<sub>2</sub> market nor in the pig iron market. Consequently, neither the market structure as such nor TTI's behaviour will be altered as an effect of the aid.
- (150) As the product is priced based on global quotations, the buyer power in this market is strong. To the extent TTI changes behaviour in its bilateral agreements with potential buyers, those undertakings have a number of alternative sources of supply, and that behaviour would then be counterbalanced by the market forces as the buyer simply would change its source of supply.

- (151) Furthermore, the aid is not likely to prevent new entry on the TiO<sub>2</sub> or pig iron market since the beneficiary is a small market player and does not benefit from a dominant position, be it in Europe or worldwide levels.
- (152) The Norwegian authorities rather consider that the entrance of a furnace technology in the market will contribute positively both to more energy efficient production and to reduce climate gas emissions from TTI and other industries based on different furnace technologies not necessarily comparable to the processing technology at Tyssedal.
- (153) Finally, Enova's selection process among eligible investment projects leads to the selection of beneficiaries that can address the environmental objective using the least amount of aid or in the most cost-effective way. The selection process as described above is conducted in a non-discriminatory, transparent and open manner without excluding any undertakings that may compete with projects addressing the same environmental objective falling within the ambit of the respective aid programme. All companies in the market are eligible for aid, including new entrants. However, applicants compete for the aid and the award of the aid is decided based on the energy saving or production potential of the applicant's technology.
- (154) The Norwegian authorities conclude that the aid will not have as an effect that the beneficiary can strengthen or maintain market power in the market.

#### 3.8.6. *Effects on trade and location*

- (155) When the technology has been verified in the demonstration project it will, in case of positive results from the testing, be used permanently in the processing plant at Tyssedal. The results will also be spread to the rest of the industry increasing the probability that other metallurgical industry production plants in the future will be retrofitted to or built with this technology.
- (156) Moreover, the demonstration project location will not result in the Tyssedal area benefiting from more favourable production conditions in general, neither in terms of comparatively lower production costs or in higher production standards. The aid is only granted to one beneficiary. As explained, TiO<sub>2</sub> slag and pig iron is sold on a global arena and is priced based on global market quotations. Hence, the Norwegian authorities consider that it is unlikely that the aid will attract more investments in the region where the demonstration project is located. Therefore, the aid will not have a significant effect on trade and location.
- (157) In addition there is no evidence that TTI considered other locations for its investment and overall the project represents a very minor increase in production, thus having limited effects on trade and competition.
- (158) In the view of the Norwegian authorities, the effects on competition and trade are therefore limited to the positive effects on the environment.

### 3.9. **Cumulation**

- (159) The Norwegian authorities have also confirmed that TTI has not received other aid for this project; neither from Enova nor from other public authorities. TTI received aid in 2014 for carrying out a study regarding the use of waste energy from CO-gas for preheating and by this to reduce the consumption of oil and propane. In 2011, the company was also granted aid for a project which related to energy efficiency production regarding heating of buildings.

## II. ASSESSMENT

### 1. The presence of state aid

(160) Article 61(1) of the EEA Agreement reads as follows:

*“Save as otherwise provided in this Agreement, any aid granted by EC Member States, EFTA States 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 Contracting Parties, be incompatible with the functioning of this Agreement.”*

(161) In Decision No 248/11/COL approving the Energy Fund (including the NETP), the Authority concluded that disbursements to undertakings under the Energy Fund constitute state aid within the meaning of Article 61(1) of the EEA Agreement.<sup>25</sup> There is nothing in the current notification to alter that conclusion.

(162) TTI will be awarded aid by Enova under the Energy Fund, the funding of which comes from various sources controlled by the State and therefore constitutes state resources.

(163) An individual financial grant will be awarded to TTI, which will thus receive an economic advantage it would not have received in the normal course of business. Given that the aid is granted to a single undertaking, it is clearly selective.

(164) At the moment, TTI is active mainly in the market for TiO<sub>2</sub> slag and pig iron, which is subject to competition and trade within the EEA. The economic advantage conferred on TTI by the notified measure is therefore liable to distort competition and affect trade between the Contracting Parties to the EEA Agreement.

(165) For these reasons, the Authority concludes that the notified measure constitutes state aid within the meaning of Article 61(1) of the EEA Agreement.

### 2. Procedural requirements

(166) Pursuant to Article 1(3) of Part I of Protocol 3: *“the EFTA Surveillance Authority shall be informed, in sufficient time to enable it to submit its comments, of any plans to grant or alter aid (...). The State concerned shall not put its proposed measures into effect until the procedure has resulted in a final decision”*.

(167) The notified measure is based on the NETP under the Energy Fund scheme as authorised by Decision No 248/11/COL. That decision foresees the obligation to notify individual aid grants over EUR 7.5 million to the Authority for a detailed assessment.<sup>26</sup>

(168) The Authority notes that under the Energy Fund, the award of aid above this threshold is conditional upon the Authority’s approval.<sup>27</sup> Accordingly, the Norwegian authorities have not yet implemented the individual aid measure in favour of TTI. Furthermore, by submitting the notification received and registered by the Authority on 14 September 2015, the Norwegian authorities have complied with the notification requirement.

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<sup>25</sup> Decision No 248/11/COL, para. 54.

<sup>26</sup> *Ibid.*, para. 58, cross-referring to para. 160 EAG.

<sup>27</sup> *Ibid.*, para. 57.

(169) The Authority therefore concludes that the Norwegian authorities have respected their obligations pursuant to Article 1(3) of Part I of Protocol 3 and Decision No 248/11/COL.

### **3. Compatibility of the state aid**

#### **3.1. Legal framework**

(170) The Norwegian authorities have conducted their assessment to grant aid to TTI according to the procedures approved by the Authority for the NETP in its Decision No 248/11/COL (see paragraph (55) above). For the reasons provided by the Norwegian authorities (see paragraphs (58) to (82)), the Authority finds that the notified aid is eligible for aid under the NETP.

(171) The NETP was assessed directly on the basis of Article 61(3)(c) of the EEA Agreement. The Authority considers that this is the correct legal framework for the compatibility assessment of the aid to TTI. However, since the aid to TTI has an environmental objective, the Authority finds that the EAG and the EEAG can be used for general insight into relevant principles for this assessment.

(172) Pursuant to Article 61(3)(c) of the EEA Agreement, aid to facilitate the development of certain economic activities or of certain economic areas may be considered compatible with the functioning of the EEA Agreement where such aid does not adversely affect trading conditions to an extent contrary to the common interest.

(173) In order to confirm that this is the case regarding the notified measure, and in line with Decision No 248/11/COL, a detailed assessment of the measure must be carried out. In order to do so, the following issues have been assessed:<sup>28</sup>

1. contribution of the measure to a well-defined objective of common interest;
2. need for the State intervention;
3. appropriateness of the state aid;
4. existence of incentive effect;
5. proportionality of the aid amount (aid limited to the minimum necessary); and
6. avoidance of undue negative effects on competition and trade.

#### **3.2. Detailed assessment of the notified measure**

##### *3.2.1. Contribution to a well-defined objective of common interest*

(174) An objective of common interest is an objective that has been recognised as being in the common interest of the EEA States. The Authority acknowledges that the protection of the environment is an objective of common interest.

(175) The determination to protect the environment is already established in the EEA Agreement, when the Contracting Parties defined themselves as “*determined to preserve, protect and improve the quality of the environment*”. This determination is reflected in Chapter 3 of Part V of the EEA Agreement, entitled “Environment” (Articles 73 to 75). In particular, Article 73(1) of the EEA Agreement states that “*action by the Contracting Parties relating to the*

<sup>28</sup> *Ibid.*, para. 139, cross-referring to para. 87.

*environment shall have the following objectives: (a) to preserve, protect and improve the quality of the environment”.*

- (176) Furthermore, the Authority has already recognised that the protection of the environment by means of the reduction of CO<sub>2</sub> emissions are in the common interest of the Contracting Parties to the EEA Agreement.<sup>29</sup> Both the EU Member States and the EFTA States have made a commitment to achieve at least a 20% reduction in greenhouse gas emissions compared to 1990 and at least a 20% saving in energy consumption compared to the projections for 2020.<sup>30</sup>
- (177) The notified project has positive environmental effects. As already described in paragraph (74) above and in table 1, if successful, the project will result in a reduced energy consumption of 22 GWh per year and a reduction of CO<sub>2</sub> emission of 23 980 tons per year.
- (178) The project also contributes to develop a new more efficient production technology. Therefore, the project promotes innovation within the EEA. The Authority notes that research and innovation is covered by Protocol 31 to the EEA Agreement. The promotion of innovation is under the scope of the EEA Agreement. Research and Innovation is, in particular, one of the core objectives of the Europe 2020 Strategy for smart, sustainable and inclusive growth.<sup>31</sup> Norway is an associated country of the Horizon 2020 programme.<sup>32</sup>
- (179) Based on the above, the Authority concludes that the aid measure is aimed at well-defined objectives of common interest, i.e. environmental and innovation objectives.

### 3.2.2. *Need for the state intervention*

- (180) As a general consideration, the Authority considers that state aid should be targeted towards situations where it can bring about a material improvement that the market cannot deliver itself.
- (181) As recognised by the Authority in Decision No 248/11/COL, the primary objective of state aid under the NETP is to introduce new energy technologies to the market.<sup>33</sup> The substantial environmental benefits pursued by the project are more effective energy production and saving technologies. The NETP attempts to favour the market diffusion of such technologies and to address a market failure in the sense that the long term positive externalities such as knowledge spill-overs stemming from the testing and deployment of new technologies are not sufficiently taken into account when profit seeking undertakings make investment

<sup>29</sup> See the Authority's Decision No 150/15/COL of 21 April 2015 on the state aid measures in favour of electric vehicles (OJ C 231, 16.7.2015, p. 13.) and Decision No 37/15/COL of 4 February 2015 not to raise objections to individual aid in favour of Hydro Aluminium AS For the construction of the Karmøy demonstration plant, para. 141 (OJ C 193, 11.6.2015, p. 6). Full text available at the Authority's website: <http://www.eftasurv.int/media/decisions/150-15-COL.pdf> and <http://www.eftasurv.int/media/state-aid/-aid-to-Hydro-Aluminium-AS-final.pdf>

<sup>30</sup> Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources, incorporated into point 41 of Annex 4 to the EEA Agreement by Joint Committee Decision No 162/2011 (OJ L 76, 15.3.2012, p. 49 and EEA Supplement No 15, 15.3.2012, p. 56).

<sup>31</sup> Further information regarding the 2020 Strategy is available at: [http://ec.europa.eu/europe2020/index\\_en.htm](http://ec.europa.eu/europe2020/index_en.htm)

<sup>32</sup> Horizon 2020 is the financial instrument implementing the Innovation Union, a Europe 2020 flagship initiative aimed at securing Europe's global competitiveness. More information is available at: <http://ec.europa.eu/programmes/horizon2020/en/what-horizon-2020> See further: [http://ec.europa.eu/research/participants/data/ref/h2020/grants\\_manual/hi/3cp/h2020-hi-list-ac\\_en.pdf](http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/3cp/h2020-hi-list-ac_en.pdf)

<sup>33</sup> Decision No 248/11/COL, para. 106.

decisions. Due to the perceived unattractive rates of return from a commercial perspective, the number of investments in this field risk being sub-optimal from a community perspective.<sup>34</sup>

(182) The notified measure is aimed at addressing this market failure. The purpose of the demonstration plant is to verify a new and more effective energy saving technology, which will be made available to the market once the verification has been successful. Without the aid, the project would not materialise.

(183) The Authority concludes therefore that the aid is needed to cover the defined market failure.

### 3.2.3. *Appropriate instrument*

(184) In its Decision No 248/11/COL, the Authority found that state aid represents an appropriate instrument to achieve the objective of common interest identified above, namely to verify a new and more effective energy saving technology.

(185) This finding was based on the information provided by the Norwegian authorities that there are no other, less distortive instruments to achieve the same results, and that the goals of the NETP could not be attained through regulation.<sup>35</sup>

(186) Regarding the notified measure, the Authority notes in particular that the Norwegian legislation does not require undertakings, e.g. producers of TiO<sub>2</sub> slag and pig iron such as TTI, to construct plants using new innovative technologies (see paragraph (87) above).

(187) The Authority also notes, as done by the Commission in the *Salzgitter* case,<sup>36</sup> that in the present case it is not possible to use a regulatory instrument to achieve the same result in terms of environmental protection as with the aid. The Authority considers that the Norwegian authorities could only set certain standards but not impose a specific technology upon the industry. However, standards may provide a less efficient incentive for further improving a given technology compared to the aid. Therefore, in the current situation the Authority concludes that investment aid constitutes an appropriate instrument to obtain the objective of environmental protection, given that less distortive instruments will not allow to achieve the immediate objective of the aid, i.e. to implement the project.

(188) The Norwegian authorities have also demonstrated that a less distortive aid instrument, e.g. a loan or a guarantee, would not be suitable to trigger investment in the new technology (see paragraph (88) above).

(189) The Authority concludes therefore that the notified measure is an appropriate instrument to verify a new and more effective energy saving technology.

### 3.2.4. *Incentive effect*

(190) As set out in Decision No 248/11/COL, aid generally does not present an incentive effect for the beneficiary in cases where the project has already started prior to the aid application

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<sup>34</sup> *Ibid.*, para. 140.

<sup>35</sup> *Ibid.*, para. 141.

<sup>36</sup> Commission decision of 14 April 2010. State aid case N 451/2009 – Germany Energy saving by direct strip casting technology for light steels – aid to Salzgitter Flachstahl GmbH. (OJ C 154, 12.6.2010, p. 1.)

by the beneficiary to Enova.<sup>37</sup> TTI's application for aid to Enova was submitted before the start of the project.

- (191) State aid for environmental protection must result in the recipient of the aid changing its behaviour so that the level of environmental protection will be higher than if the aid had not been granted. The Authority thus needs to verify that TTI would not, without the aid, build the planned demonstration plant, e.g. because of its intrinsic benefits.
- (192) The NETP foresees that the incentive effect will normally be assessed by reference to a counterfactual investment.<sup>38</sup> However, as the Norwegian authorities correctly point out, Decision No 248/11/COL recognises that in some cases, aid applicants may not have considered an alternative investment.<sup>39</sup> For many investors, the key element for a demonstration project is to reduce the perceived risk of investing in the innovation on a larger scale, and to increase the user acceptance of a new alternative technology or solution. A demonstration project is a risk mitigation measure related to future investment decisions. Alternative investments may be further research, technology monitoring or to wait until others have made the investment necessary to demonstrate the technology.<sup>40</sup>
- (193) As set out in section 3.6 (see paragraph (91) above), TTI has not considered a counterfactual in the form of an alternative reference investment. The purpose of the notified project is to demonstrate water cooler copper roof technology in a full-scale production line. This objective of the project is not to increase TTI's production, but rather to verify technology enabling the reduction of energy consumption and gas emissions. The Authority notes that this objective cannot be attained by building a conventional production plant like the one currently used by TTI.
- (194) The Authority accepts therefore that the business as usual scenario would be a credible counterfactual scenario in the present case. The Authority notes that TTI has steady and economically sustainable operations as it is today. Consequently, the notified project is not necessary for further operations. If no aid would be granted, it does not seem realistic to consider that other investments costs would be incurred as an alternative to the demonstration plant. The Authority has achieved similar conclusions in previous cases,<sup>41</sup> as has the Commission.<sup>42</sup> Consequently, the Authority accepts that alternative investment costs would be zero.
- (195) As also set out in section 3.6 above, NPV calculations have been used to examine whether the aid has an incentive effect. NPV calculations determine how much aid is needed in order to trigger an investment. A project is triggered when it reaches an NPV of zero with a reasonable rate of return.

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<sup>37</sup> Decision No 248/11/COL, para. 142.

<sup>38</sup> *Ibid.*, para. 142.

<sup>39</sup> Annex 2 to the EEAG contains a list of relevant counterfactual scenarios for various kinds of environmental measures. The list does not contain a counterfactual scenario for situations of aid to energy efficiency. The project at hand is an integrated project, i.e. it is a technological project but ensures some energy efficiency.

<sup>40</sup> Decision No 248/11/COL, para. 142.

<sup>41</sup> See Decision No 37/15/COL of 4 February 2015 not to raise objections to individual aid in favour of Hydro Aluminium AS for the construction of the Karmøy demonstration plant, para. 141.

<sup>42</sup> In the AMEH case, the Commission approved aid from Germany to Arcelor Mittal Eisenhuettenstadt GmbH for the deployment of a Top Gas Recycling (TGR) demonstration project at a steel production plant. The Commission found that in absence of aid AMEH would not invest in TGR, but would follow the business as usual scenario. State aid case – Germany – N 450/2009 Top Gas Recycling (TGR). Project - Aid to ArcelorMittal Eisenhüttenstadt GmbH. (OJ C 94, 14.4.2010, p. 9.)

- (196) The data submitted by the Norwegian authorities indicate that, without the aid (122.7 MNOK), the demonstration project would have [...] NPV of [...] NOK and an IRR of [...] (see paragraph (100) above). With the aid, the project will have an NPV of NOK 0 at an internal rate of return before tax of approximately [...] (6.6% discount rate and 15 years lifetime for the investment are used).
- (197) The Authority also notes that the corporate policy guidelines of TTI give a lower limit of [...] for the IRR before taxes (see paragraph (102) above), and therefore even with the aid, the project will not meet this policy. The Norwegian authorities have explained that TTI can exceptionally accept such a low rate of return in case of projects with particular strategic relevance. As explained before, the project has a strategic value for TTI, since if successful the project will allow for energy savings and CO<sub>2</sub> emissions reductions. Additionally the project is step 1 of a 3 step project, which would allow TTI – if implemented – further environmental savings.
- (198) Furthermore, the estimated rate of return does not exceed the estimated rate of return for the industry in Norway, which is 6.6% as estimated by a third party analysts (Menon Business Economics<sup>43</sup>).
- (199) Based on the above premises, the Authority concludes that the NPV calculation demonstrates that the project is not viable without the aid. In addition, the rate of return is within the scope of what can be considered reasonable in this market.
- (200) As set out in Decision No 248/11/COL, in case of a “no investment” counterfactual the following further elements need to be assessed in order to determine whether the aid has an incentive effect: (i) whether any relevant EU or national standards will be introduced in the foreseeable future; (ii) whether the investment in the relevant project represents normal market behaviour; (iii) the level of risk connected to the project and whether the investment, without the aid, would generate an appropriate profit; (iv) the project’s level of increased environmental protection; and (v) the extent of the production advantages obtained by the aid recipient.<sup>44</sup>
- (201) As stated in section 3.6 (i) above, the Norwegian authorities have confirmed that there are no ongoing negotiations at EU or national level to introduce new or higher mandatory standards in respect of which the aid would result in any advantages to TTI. Furthermore, the Norwegian authorities have explained that the construction of demonstration plants without state support to verify a completely new water cooler copper roof technology does not represent normal market behaviour. This is mainly due to the risks involved and the highly unprofitable nature of the investment.
- (202) As regards the levels of risk and profitability, as well as the extent of production advantages, Enova’s financial analysis of the project using an NPV calculation has taken into account all production advantages, as well as the levels of risk and profitability over the lifetime of the project (see section 3.7.1 above). These factors do not affect the finding in the NPV calculation that the investment is not viable without the aid.
- (203) Finally, as regards the likely level of environmental protection resulting from the aid, the Authority refers to the estimate of the environmental impact of the water cooler copper roof

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<sup>43</sup> *Rapport nr. 2/2013. Vurdering av normalavkastningskrav for utvalgte næringer i Norge.* January 2013. See table 1.

<sup>44</sup> Decision No 248/11/COL, para. 142.

technology provided by the Norwegian authorities as set out in paragraph (106) above and table 1.

- (204) Having assessed these factors, the Authority concludes that TTI, with the aid, will change its behaviour so that the level of environmental protection will be higher than if the aid had not been granted. Thus, the notified measure fulfils the conditions regarding the incentive effect.

### 3.2.5. Proportionality

- (205) A state aid measure is proportionate if the measure is designed in such a way that the aid is kept to the minimum necessary.
- (206) Enova carries out a competition for aid under the NETP. The competition contributes to promoting an efficient use of state resources and limiting the risk of overcompensation. However, given the influence of qualitative elements (e.g. the potential of a new technology to create future energy savings) in the selection process, competition for aid does not by itself ensure that the notified measure is proportionate. An *ad hoc* assessment of this criterion is required.
- (207) The eligible costs calculation presented by the Norwegian authorities (see paragraph (117) above) shows that the aid intensity of the notified measure is about 47.9%. This is below the maximum aid intensity of 50% for large enterprises under the NETP.
- (208) As explained in Decision No 248/11/COL, Enova also carries out an NPV calculation to ensure that the aid amount is limited to the amount necessary to trigger the project. The result of the NPV calculation – as described in paragraphs (100) to (105) above – demonstrates the extent of the funding gap for the project and that the aid amount does not exceed this funding gap.
- (209) Finally, the rules for disbursements of aid under the Energy Fund Scheme, as explained in paragraph (123) above, ensure that there is no overcompensation in case the investment costs or the main profitability drivers change between the date of this decision and the implementation of the project.
- (210) The Authority also notes that the aid will not be cumulated with other aid for the same project as described in paragraph (159) above.
- (211) On the basis of the above, the Authority concludes that the aid measure is proportionate.

### 3.2.6. Avoidance of undue negative effects on competition and trade

- (212) Based on the information provided by the Norwegian authorities and summarised in paragraphs (127) to (158) above, the Authority has examined the potential for distortions of competition and an effect on trade in the light of the foreseeable impact of the aid on competition and trade between undertakings in the relevant market (TiO<sub>2</sub> and pig iron).
- (213) The Authority notes that, as a general rule, if the aid is proportionate, its negative impact on trade and competition is likely to be limited.<sup>45</sup> As set out above in section 3.2.5. of the

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<sup>45</sup> For instance the former Environmental Aid Guidelines (EAG) stated that: “if the aid is proportional, notably if the calculation of the extra investment or operating costs has taken into account all advantages to the undertaking; the negative impact of the aid is likely to be limited”.

assessment part of this decision, the Authority has concluded that the aid is proportionate. The Authority considers therefore that any negative effects on competition and trade are likely to be limited.

- (214) The Authority further notes that the investment in the demonstration project is technologically strategic and may confer a first-mover advantage on TTI (see paragraph (134) above). However, this sort of first-mover advantage represents an inherent part of funding demonstrations of new technologies.<sup>46</sup> Its effect will moreover be mitigated by the positive spill-over effects of the project. The purpose of the project is to demonstrate the merits of the water cooler copper roof technology. The Authority notes that the results of the demonstration plant as well as the technology itself will be available to all market players, by the means described in paragraph (81) above. Furthermore, competitors continuously undertake new research activities (see paragraph (137) above). Consequently, any possible first-mover advantage in favour of TTI will be limited in time. The size and market power of its competitors also support this conclusion.
- (215) Furthermore, the Authority notes that the foreseen production capacity due to the project is low compared to global production. It will make up 0.8% of the global production of TiO<sub>2</sub> in 2014 numbers (see paragraph (143) above). This small increase in TTI's production will not alter the market structure to any significant degree.
- (216) The low increase of capacity is not expected to have an impact on prices. In other words, it is unlikely that TTI will increase its sales by reducing its prices. In any event, as described above, even with the aid, the project does not become profitable, including a normal return over the lifetime of the equipment. Therefore, it is likely that TTI will maintain prices at its current level to recoup the investment costs.
- (217) The Authority also observes that TiO<sub>2</sub> and pig iron are sold on the market based on fixed prices without any form of labelling with regard to environmental matters (paragraph (96) above). The more environmentally friendly production process is therefore unlikely to have an impact on customer demand and general market conditions for TTI's products.
- (218) The Authority has also considered the respective market shares of TTI on the relevant markets as well as the structure of these markets (see section 2.4 Part I above), to assess whether the aid will enable TTI to exercise market power. TTI is a small player in the TiO<sub>2</sub> market, with a 6.6% market share, and a somewhat larger share in the high purity pig iron market with 20 to 25% of market share. Moreover, TTI faces competition from strong international market players. TTI's market shares in the pig iron market has remained stable the last 5 years. Therefore, the Authority considers that it is unlikely that the aid will weaken the competitive constraints in the referred markets.
- (219) The Authority also notes that TTI's customers (mainly the TiO<sub>2</sub> pigment producers) are very fragmented, it is estimated that 80% of the market is covered by the 40 biggest customers (see paragraph (19) above). Therefore, customers enjoy strong buying power positions.
- (220) Because of the above reasons, the Authority considers that it is unlikely that the aid will limit or impede competition in the markets or result in any TTI's competitors to exit the market.

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<sup>46</sup> See e.g. Decision No 249/11/COL of 18 July 2011 on the aid to Sway Turbine AS, para. 116 (OJ C 314, 27.10.2011, p.3. Full text available at the Authority's website: <http://www.eftasurv.int/media/decisions/249-11-COL.pdf>) and Decision No 37/15/COL, para. 159.

- (221) The Authority does not consider that the aid will keep an inefficient firm afloat, nor that it will have an actual effect on trade and location. The Norwegian authorities have shown that TTI is not an inefficient producer (see paragraph (13) above), and that the project is not affected by overcapacities in the market (see paragraph (18) above). Furthermore, the Authority notes that TTI – as well as any other producer using the new technology – will evaluate the location of future investment projects on the basis of an individual commercial assessment, and not based on the location of the demonstration plant.
- (222) The Authority considers that the aid to TTI, as an individual aid, will not result in the Tyssedal area benefiting from more favourable production conditions. For the same reason, it is also unlikely that the measure will attract more investment in this area.
- (223) The Authority further notes that Enova has carried out an open and transparent competitive process to select TTI as an aid recipient, in line with the requirements of Decision No 248/11/COL. Such a process further reduces the distortions of competition, as any undertaking can potentially apply to receive support for eligible projects under the NTP.
- (224) Therefore, the Authority concludes that the aid measure has limited effects on competition and effect on intra-EEA trade.

#### *3.2.7. Conclusion on the compatibility assessment*

- (225) Based on the detailed assessment set out above, the Authority has balanced the positive and negative effects of the notified measure. The Authority concludes that the distortions resulting from the notified measure do not adversely affect trading conditions to an extent contrary to the common interest.

### **4. Conclusion**

- (226) On the basis of the foregoing assessment, the Authority concludes that the notified individual aid to TTI is compatible with the functioning of the EEA Agreement pursuant to Article 61(3)(c) thereof.

HAS ADOPTED THIS DECISION:

#### *Article 1*

The individual state aid to Tizir Titanium & Iron AS, notified by the Norwegian authorities on 14 September 2015, for the construction of a demonstration plant at Tyssedal is compatible with the functioning of the EEA Agreement pursuant to Article 61(3)(c) thereof.

#### *Article 2*

The implementation of the notified measure is authorised accordingly.

#### *Article 3*

This Decision is addressed to the Kingdom of Norway.

#### *Article 4*

Only the English language version of this decision is authentic.

Done in Brussels, on 11 November 2015

*For the EFTA Surveillance Authority*

Sven Erik Svedman  
President

Helga Jónsdóttir  
College Member