

Sub Group on Advanced Biofuels

NER 300 Initiative and Status of the Selected Bioenergy Projects

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NER300 Take away Messages

The key take away messages from the experience of the industry with NER300 up to **March 2016** are:

1. NER300 has failed to promote several promising technologies from the pilot/demonstration to the first-of-a-kind plants.
2. Only 90% of the allocated budget was attributed to projects.
3. As of March 2016 only three projects have yet become operative, two in bioenergy and a wind project representing only 4 % of the budget.
4. In particular NER300 was not the right tool for advanced 2nd generation biofuels technologies. The cancellation of the four bioenergy projects of the 1st call represents 45 % of the bioenergy budget (23 % of the total budget), and combined with the two projects in other RES areas, a total of 31 % of the overall budget from the 1st call has been cancelled.
5. Two other projects (one in bioenergy and the other in CCS) are in high risk of cancellation too, if this would take place the total cancellation of projects would amount to as much as 50 % of the overall budget.

There are several limitations in the design of the NER300. If the aim is to promote and support promising technologies for first-of-a-kind plants any new similar programme (e.g. NER400) should be re-designed along the following recommendations:

1. Support should be provided during the design and construction phases of a plant and not only when the plant becomes operation and sells its energy vectors in the market.
2. Preparing detailed feasibility studies for first-of-a-kind plants entails a significant cost up to several hundred thousand Euro and at present there is no support for such work. Support should be provided under separate tier for promising technologies that have been proven at demonstration scale either via FP7 or H2020 or national and corporate funds and prepare applications for such a call.
3. Technology development has its own pace and it doesn't follow the pace of either the Commission or EIB. Thus a more flexible call system or better an open call should be designed if the aim is for the Commission and the EIB to facilitate the industry and not the other way round.
4. There is a paradox; from one point of view the more innovative the technology the more attractive it is (e.g. the gasification projects for Fischer-Tropsch). However, from the other point of view such projects are much more sensitive to any disturbance on external factors and thus the higher the risk for cancellation. At the same time such technologies need support much more than other less risky technologies.

NER300 Institutional Background¹

NER300 is an instrument offering grants to installations of innovative renewable energy projects, grid integration projects and CCS projects. It was created by the European Council and the European Parliament as part of the revision of the Emissions Trading Directive² in 2008.

In 2010, the EC appointed the European Investment Bank (EIB) as an implementing agent for the NER300 initiative. The roles of EIB are;

- monetization of the 300 million EUAs
- NER300 asset management
- technical and financial due diligence
- appraisal of projects submitted by MS for funding (feasibility, funding, organization, comparator, cost of performance (CO₂ reduced etc.)
- negotiates with successful applicants, contracts
- contract management and disbursements to contractors

The funds for the NER300 grants were obtained by selling up to 300 million carbon allowances (rights to emit 1 ton of CO₂) from the set-aside for the New Entrants' Reserve (NER i.e. new industries established after the ETS system was implemented). The sales of the EUAs was in total EUR 2.15 billion, EUR 1.65 from the sales of the first tranche of 200 million EUAs in 2011-2012 and EUR 0.55 billion from the sales of the remaining 100 million EUAs in the second tranche in 2013-2014³.

The money from the first tranche was allocated to finance projects selected from a 1st call for proposals in 2011, with the remainder disbursed in a 2nd call in 2012. First funding in of any project was in 2014.

The NER300 Funding Scheme

The funding from the NER300 program can be obtained for installations of different innovative energy projects including renewable energy, smart grids and CCS. The technologies funded are further described in Table 1 below.

The selection of projects was based on call for proposals. Each of the EU Member States could be granted at least one project and no Member State would be granted more than three projects in total.

One difference between the NER300 funding and other funding available for technology demonstrations in e.g. the EC Framework Programs or from national support was that is not considered as state-aid, i.e. other sources of public funding and support can be complementing a NER300 grant.

The background to this was that the grant was determined on the basis of the cost arising from the application of an innovative renewable energy technology, relative to a "conventional comparator". The level of funding awarded to a project is capped at 50 % of these extra costs (investment and operating) and hence the support would neither distort the market nor give an over-compensation.

¹ http://ec.europa.eu/clima/policies/lowcarbon/ner300/index_en.htm

² 2008/101/EC

³ NER300 MONETISATION. Maurizio Cudemo, EIB. Argus European Emissions Markets 2015. Amsterdam, The Netherlands, 04-05 March 2015

Table 1 **NER300 eligible categories**

Bioenergy category	
Lignocellulose	Product capacity
to solid, liquid or slurry bioenergy carriers via <i>pyrolysis</i>	40 kt/y
to solid, liquid or slurry bioenergy carriers via <i>torrefaction</i>	40 kt/y
to Synthetic Natural Gas or synthesis gas and/or to power via <i>gasification</i>	40 MNm ³ /y or 100 GWh/y
to biofuels, bioliquids and/or to power include. via directly heated <i>gasification</i>	15 million Ml/y or 100 GWh/
to electricity with 48 % efficiency based on LHV @ 50 % moisture	> 40 MWe
to ethanol and higher alcohols via chemical and biological processes	40 Ml/y
Lignocellulose and/or household waste	Product capacity
to biogas, biofuels or bioliquids via chemical and biological processes	6 MNm ³ /y of CH ₄ or 10 Ml/y
Lignocellulosic raw material (e.g. black liquor, pyrolysis or torrefaction products)	Product capacity
to any biofuels via <i>entrained flow gasification</i>	40 Ml/y
Algae and/or micro-organisms	Product capacity
to biofuels or bioliquids via <i>biological and/or chemical processes</i>	40 Ml/y
Other categories (sub-categories not included)	
Concentrated solar power	
Geothermal power	
Photovoltaic power	
Wind energy	
Ocean energy	
Smart grids	
Carbon capture and storage (CCS)	

However, the grant was not received directly in the beginning of a project or in proportion to the project spending. Instead, the grant funding to a project is only receivable once the plant has been constructed and has come into operation. The grant will then be paid during the initial five years of operation based on a pro rata basis of the actual production achieved relative to the nameplate production capacity, but with a margin for reduced capacity factor for the use of new technologies. This margin required that in order to obtain 100 % of the grant funding allocated to a project, the actual capacity over the first five years of operation must reach 75 % of the nominal output.

Since the NER300 grant funding was not payable for use during the project's investment phase, there is a mechanism to allow the use of future NER300 revenues as a security for a loan from a bank, or similar institution, for use in the early stages of a project. In addition, a Member State with a successful NER300 project applicant can make all the NER300 grant available at the investment stage on the condition that it acts as a guarantor for the funds by agreeing to refund the EIB if the project underperforms excessively.

The NER300 Calls for Proposals and Their Outcome

In the first call of the NER300 Initiative with a deadline of May 2011 resulted in 79 applications for which the EIB completed the technical and financial due diligence, and a selection of these were made based on performance (e.g. cost per kg of GHG emissions reduced) and other factors. The Member States having successful application were informed of these and had to provide a

confirmation of their support for these projects. After this confirmation by the individual member states, the award decisions for 23 projects were made official⁴ in December 2012, i.e. after 1½ years. The selected projects are shown in Table 2. The projects awards amounted to EUR 1,222 million, i.e. less than the money available from the first tranche of selling emission rights. Of these 23 projects, 8 were in the bioenergy category and had 52 % of the overall budget of projects awarded.

The second call had a deadline in July 2013. It resulted in 33 submitted project applications, and following the same appraisal procedure, in July 2014 the EC published the award decisions for 19 projects⁵, see Table 2. The projects awarded sum up to EUR 716 million. In this call, 6 of the 19 projects were in the bioenergy category and had 43 % of the overall budget.

In total 112 applications have been made and 42 projects have received award decisions, and a budget of EUR1.9 billion relative to the 2.15 billion available has been allocated. Bioenergy holds a large share of the overall funding, 48 % of the combined 1st and 2nd call funding on 14 projects, relative to 37 % of the budget allocated that was 27 Renewable Energy (RE) projects and 15 % of the budget allocated to 1 CCS project. After the CCS project, bioenergy projects have on average received more funding than in other RE categories. The CCS project White Rose has a grant of EUR 300 million while the closest are three gasification projects at EUR 208, 199 and 170 million, respectively and then as last in top five a wind project at EUR 112 million.

Developments after the Award Decisions

There have been changes since the award decision. In early 2014 changes to projects, end dates for the funding and the award of pre-funding were notified⁶. Also in February 2015 there were changes⁷ implying an extension of the time up to Final Investment Decision (FID) by two years and subsequently the time to operation up to four years, respectively, after the award decision, i.e. extending the time to operation to 2018, and 2020, respectively for the projects in the first and second call.

The status of the projects in February 2016 is included in Table 2 and Table 3 based on EC and other documents. When no status is indicated, the projects are neither confirmed as “operating” or “cancelled” but whether they are actually still pursued, and in that case how actively, is not possible to tell from open sources. Only three projects, two bioenergy (BEST on cellulosic ethanol and VERBIO on biogas) and one wind project (Blaiken) from the first call is operative today. These three projects, however, only represent 4 % of the total budget allocated by award decisions.

⁴ Commission Implementing Decision of 18.12.2012. Award Decision under the first call for proposals of the NER300 funding programme. C(2012) 9432 final

⁵ Commission Implementing Decision of 8.7.2014. Award Decision under the first call for proposals of the NER300 funding programme. C(2014) 4493 final

⁶ Commission Implementing Decision amending Commission Implementing Decision C(2012) 9432 so as to modify the Award Decision under the first call for proposals of the NER300 funding programme, C(2014)383

⁷ COMMISSION IMPLEMENTING DECISION of 13.10.2015 amending Commission Implementing Decisions C(2012) 9432 and C(2014) 4493 so as to modify the Award Decisions under the first and second call for proposals of the NER 300 funding programme. C(2015) 6882

Table 2 NER300 First Call Award Decisions⁸

RES Category	Project.	Product	Member State	Max. funding (MEUR)	Op. date MM.YYYY ⁷	Status
Bioenergy (adv. Biofuels,)	Ajos BTL	FT liquids	Finland	88.5	12.2016	Cancelled
Bioenergy (adv. biofuels)	BEST	Ethanol	Italy	28.4		Operating
Bioenergy (adv. biofuels)	CEG Plant Goswinowice	Ethanol	Poland	30.9	12.2016	
Bioenergy (adv. biofuels)	UPM Stracel BTL	FT liquids	France	170.0	12.2018	Cancelled
Bioenergy (adv. biofuels)	Woodspirit	Methanol	Netherlands	199.0	11.2016	Received pre-funding 3*39.8 M€, 2014, 2015, 2016 ⁷
Bioenergy	Gobigas phase 2.	Bio-methane	Sweden	58.8	12.2020	Cancelled in December 2015
Bioenergy	Pyrogrot.	Pyrolysis oil	Sweden	31.4	12.2018	Cancelled
Bioenergy	Verbiostraw.	Biogas	Germany	22.3		Operating
Total funding				629.3	52 % of total funding decision. Cancelled projects 45 % of Bioenergy budget.	
RES Category	Project.		Member State	Max. funding (MEUR)	Op. date MM.YYYY ⁷	Status
Concentrated Solar Power	HeliosPower		Cyprus	46.6	12.2018	Received pre-funding 2*14 M€ 2017, 2018 ⁷
Concentrated Solar Power	Maximus		Greece	44.6	12.2018	
Concentrated Solar Power	Minos		Greece	42.1	12.2018	
Concentrated Solar Power	PTC50-Alvarado		Spain	70.0		Cancelled
Distributed Renewable Management (smart grids)	SLim		Belgium	8.2	12.2015	
Geothermal	S. Hungarian Enhanced Geothermal System (EGS)		Hungary	39.3	12.2018	Received pre-funding 16+ 7.6 M€ 2014, 2015 ⁷
Ocean	Stroma (fka Kyle Rhea) Tidal Turbine Array		UK	18.4	12.2017	Received pre-funding 10 M€ 2014 ⁷
Ocean	Sound of Islay		UK	20.7	12.2018	Received pre-funding 2*6.2 M€ 2017, 2018 ⁷
Ocean	Westwave		Ireland	19.8		Cancelled
Wind	Nordsee One (fka Innogy)		Germany	70.0	12.2017	
Wind	Veja Mate		Germany	112.6	07.2017	
Wind	Vertimed		France	34.3	12.2018	
Wind	Windfloat		Portugal	30.0	12.2018	Received pre-funding 2*9 M€ 2017, 2018 ⁷
Wind	Windpark Blaiken		Sweden	15.0		Operating
Wind	Windpark Handalm		Austria	11.3	12.2018	
Total funding				582.9	48 % of total funding decision. Cancelled projects 15 % of other RES budget.	

⁸ http://europa.eu/rapid/press-release_MEMO-12-999_en.htm

Table 3 NER300 Second Call Award Decisions⁹

RES Category	Project.	Product	Member State	Max. funding (MEUR)	Op. date MM.YYYY ⁷	Status
Bioenergy	MET	Ethanol	Denmark	39.3	07.2017	
Bioenergy	Fast pyrolysis	Pyrolysis oil	Estonia	6.9	11.2017	
Bioenergy	TORR	Torrefied fuel	Estonia	25.0	12.2016	
Bioenergy	CHP Biomass pyrolysis	Pyrolysis oil	Latvia	3.9	04.2017	
Bioenergy	W2B	Ethanol	Spain	29.2	06.2020	
Bioenergy	Bio2G	Biomethane	Sweden	203.7	06.2018	
Total funding				308.0	43 % of total funding decision.	
RES Category	Project.		Member State	Max funding (MEUR)	Op. date MM.YYYY ⁷	Status
CCS	White Rose		UK	300.0	06.2018	Withdrawal of Drax from investment phase and UK support policy change in 2015 makes future uncertain. Consortium dissolved in early 2016. Cancelled?
Concentrated solar power	EOS GREEN ENERGY		Cyprus	60.2	06.2020	Received pre-funding 2*18.1 M€ 2018, 2019 ⁷
Concentrated solar power	Mazara Solar		Italy	40.0	10.2016	
Geothermal power	Geothermae		Croatia	14.7	01.2017	Received pre-funding 8.8 M€ 2015 ⁷
Geothermal power	GEOSTRAS		France	16.8	06.2020	
Ocean energy	NEMO		France	72.1	06.2020	
Ocean energy	WestWave		Ireland	23.3	06.2018	Project cancelled in 1 st call, resubmitted in 2 nd call. Requesting extension ⁷ .
Ocean energy	SWELL		Portugal	9.1	01.2020	Received pre-funding 5.4 M€ 2016 ⁷
Photovoltaics	Santa Luzia Solar Farm		Portugal	8.0	07.2019	Received pre-funding 2*2.4 M€ 2017, 2018 ⁷
Smart grids	Green+		Cyprus	11.1	06.2020	
Smart grids	Puglia Active Network		Italy	85.0	06.2018	Received pre-funding 3*14.2 M€ 2015, 2016, 2017 ⁷
Wind power	BALEA		Spain	33.4	06.2020	
Wind power	FloCan5		Spain	34.0	06.2020	
Total funding				407.7	57 % of total funding decision.	

⁹ http://europa.eu/rapid/press-release_MEMO-14-465_en.htm

There are also projects from the first call that have been cancelled as the parties concerned have decided not to go forward with the projects. This applies to one pyrolysis project (Pyrogrot), three gasification projects (Ajos BTL, Gobigas2 and Stracel, once CSP project (PTC 50 Alvarado) and one Ocean project (Westwave). However the latter project was resubmitted in the 2nd call and received an award decision again.

It can also be noted that WoodSpirit, the second largest of the bioenergy projects, and Mazara Solar projects, in spite of that the respective governments were part of the group of member states that lobbied and successfully negotiated for project time line extensions, did not apply for any extensions and have the date of operation in late 2016 retained. Thus if these negotiations are not reopened, their respective deadlines cannot be met.

None of the second call projects are yet operative and officially none is cancelled. However, the only CCS project is facing difficulties as one of the investors and also the owner of the power plant site, Drax, in September 2015 decided¹⁰ to withdraw as a partner in the investment phase. In addition, the UK Government in November 2015 withdrew the GBP 1 billion ring-fenced capital budget allocation for the Carbon Capture and Storage (CCS) Competition started in 2012, only six month before the Front End Engineering Design (FEED) documentation, being the basis for the selection, was due. The competition involved a handful of projects in the beginning, but at the time only White Rose, a consortium originally composed of DRAX, GE and BOC, and a second project in the UK, Peterhead CCS, backed by Shell and SSE, as preferred bidders. The combined effect of these two changes is that the White Rose consortium was reported to being dissolved¹¹ in early 2016, and the project appears to in effect be cancelled.

On a more positive note, in October 2015, Kerstin Lichtenvort, co-ordinator for the NER300 funding program at the European Commission, said that yet two projects would reach Final Investment Decision in 2015, with another four expected to do so in 2016¹². As of yet, there is no official information from any of the projects that the FID has been taken. The situation is summarized Table 4.

Table 4 Status summary of the NER 300 projects

Bioenergy	1 st call	Funding MEURO	2 nd call	Funding MEURO	Percent of funding		
					1 st call	2 nd call	Total
Projects awarded	8	629,3	6	308	52 %	43 %	48 %
Projects cancelled	4	348,7		-	29 %	-	18 %
Projects in operation	2			50,7	4 %	-	3 %
Other categories	1 st call	Funding MEURO	2 nd call	Funding MEURO	Percent of funding		
					1 st call	2 nd call	Total
Projects awarded	15	582,9	13	407,7	48 %	57 %	52 %
Projects cancelled	2	89,8	-	-	8 %	-	5 %
Projects in operation	1	15	-	-	1 %	-	1 %

¹⁰ <http://www.drax.com/news/news-articles/2015/09/drax-announces-plan-to-end-further-investment-in-white-rose-carbon-capture-storage-project/>

¹¹ <http://www.constructionnews.co.uk/markets/sectors/infrastructure/energy/white-rose-2bn-ccs-plant-abandoned/10001861.article>

¹² Ner300.com

Only three projects have yet become operative, two in bioenergy and a wind project representing 4 % of the budget. As stated above some more projects can be moving towards becoming operative.

However, the cancellation of the four projects of the 1st call projects in bioenergy represents 45 % of the bioenergy budget (23 % of the total budget), and combined with the two projects in other RE areas, a total of 31 % is cancelled. A cancellation of Wood Spirit could raise this number to 77 % of the bioenergy budget and 35 % of the total budget). If White Rose is also heading in this direction, the total cancellation of projects would amount to as much as 50 % of the overall budget.

It is not clear what will happen with the funding which is not going to be spent on projects from these two calls. A third call has been discussed but there is no official information on the subject.

NER400

In the Council meeting agreeing on EU's Framework for Climate and Energy 2020-2030¹³, a successor program, NER400, was decided which would be "initially endowed with 400 million carbon allowances" to fund projects covering "low carbon innovation in industrial sectors" as well as CCS and renewable, this time including also a reference to "small projects". The expected budget could run up to EUR 9 billion.

The modality¹⁴ is to set up an Innovation Fund based on the said 400 million allowances to support innovation in low-carbon technologies and processes in industrial sectors and the commercial demonstration CCS and renewable energy projects that are not yet commercially viable. "In order to promote innovative projects, up to 60% of the relevant costs of projects may be supported, out of which up to 40% may not be dependent on verified avoidance of greenhouse gas emissions provided that pre-determined milestones are attained taking into account the technology deployed."

In addition, and since the above Innovation Fund is not going to become operative before 2020, 50 million unallocated allowances from the market stability reserve shall supplement any existing resources remaining under this paragraph for projects referred to above, with projects in all Member States including small-scale projects, before 2021.

Overall Experience of the NER300 Program This Far

In conclusion the NER300 program has not achieved the expected impact of pushing several promising technologies into a wider demonstration and deployment at industrial scale or first-of-a-kind-plants.

Out of the 2.15 billion Euros obtained, 1.94 billion Euros has been distributed for the 42 projects selected.

But, still after four years only three out of 42 projects are in operation, meaning that they have been constructed or that firm investment decisions have been taken, and these only represent a small fraction of the budget, 4 %. At present six projects have been cancelled representing 31 % of the budget. Four of these were bioenergy projects (one pyrolysis and three gasification projects). As yet at least another two projects are in a very uncertain position (one gasification project and the only

¹³ European Council (23 and 24 October 2014) Conclusions on 2030 Climate and Energy Policy Framework. SN 79/14

¹⁴ Proposal for a DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments. COM(2015) 337 final

CCS project), the cancellation could come as high as 50 % of the budget, and bioenergy projects be over half of this budget.

However, there are some projects that could become operative but for most projects public information is lacking.

It also appears that the projects that have received most potential support are also more vulnerable, which in particular applies to gasification projects.

There is probably more than one reason why projects have been cancelled or have not come into operation as planned.

It is obvious that the investment climate has in general not been good in the period and some Member States have in particular seen severe economic difficulties. In addition this has also caused governments to reduce or abandon support mechanisms for renewable energies such as feed-in tariffs etc. that have affected the viability of projects (however this does not apply to biofuel projects). In the case of the CCS project, UK has completely withdrawn a dedicated support program for developing such technologies.

Furthermore, the drop in energy prices over the last few years has been making the investment decision-making more complex.

The introduction and deployment of a new technology with both technical and market challenges is difficult.

In the case of biofuels in the EU, an additional external factor is that in many member states the longevity of the support system (mandate, green tickets, tax breaks etc.) commitment is shorter than the time span required to recover the capital invested, i.e. the long-term market situation is not clear.

On the EU level, the ILUC debate generated significant uncertainty putting investment decisions on hold. In the end, the conditions for meeting the biofuels target in 2020 were redefined, but there are no targets or commitments post-2020, a situation also affecting the Member States internal deliberations.

With regard to the NER 300 program, in retrospect, basing support of novel technologies on that it would only be payable once the plant is operating and producing decreased its value when the investment was evaluated, the grant support could not off-set the initial risks or contributed positively to the cash flow during the project development, construction and commissioning. Even if the future grant could be used as security for a loan, the lender would in the case of novel technologies most likely also want additional securities for the period up to being eligible for receiving the grant. And inevitably there is always the risk that the support is lost due to delays and low capacity factor over the five-year time span, partially or totally. In the case of NER 300, EIB has the key role and other lenders are either engaged by the parties or if funds are to be used before the operational period.

The time between the deadline for the application to when the results became known was 1½ years for the first call and one year for the second call, and required communication with EIB on various

matters in the meantime. During such a relatively long assessment period the circumstances for the investment decision may change which affects the boundary and internal conditions of the projects such that some flexibility must be included in the grant award contracts. The uncertainty on the outcome of the evaluation process may slow down the project activities in this period to avoid spending resources on an uncertain outcome. As discussed above, the grant was solely payable based on the sales of products, there was no element of cost sharing in the investment phase, neither for equipment or any form of engineering or project work.

The lack of co-funding during the initial engineering phase in NER 300 tends to lead to hibernation of the project activities instead of improving the quality of the investment decision information.

Information management was also an area discussed as the extent of this obligation was not known and it was feared that it could be detrimental to the possibilities of the parties engaging in the pioneering projects to fully exploit the know-how and IPR created. From the other side, the value of the grant award for each project was made public, and was suspected to influence the vendors and suppliers raising their prices to have as high a share of this funding as possible.