

The Research Council of Norway  
Division for Energy, Resources and the Environment

Midterm Evaluation of the Centres for Social Science-related Energy Research (FME  
Samfunn)

A - The Centre Self-evaluation

CREE - Oslo Centre for Research on Environmentally friendly Energy  
(Name of centre)

.....**209698**.....  
(Project number)

*To be prepared by the centre and signed by the Centre director and Chair of the Board.  
Maximum length 14 A4 pages. Word format, Times New Roman,  
12 pitch font, single line spacing*

## Background

This Self-evaluation should devote special attention to the items listed in “Success criteria for Centres for the Social Science related Energy Research (FME Samfunn)”. The main sections below are the same as in this document. In addition to the Self-evaluation for the centre, each of the partners should submit a report (template C).

### Brief summary (max. ½ page)

*Progress of the centre regarding the main objectives of the centre, (main achievements, breakthroughs etc).*

Since the start of the center in 2011, we have made progress in several areas that we think are important for expand the knowledge base in the field:

- Better collaboration between the research partners
- Better contact with users
- More interdisciplinary collaboration
- More media activity
- Made new contributions to PhD courses
- Improved the quality of research

The collaboration between the research partners has become very close since the start of the center in 2011. The Norwegian research partners – and in several cases also the Dutch - collaborate on most research proposals, papers and seminars. The annual research workshop is a meeting place for all national and international researchers who are connected to CREE as partners and subcontractors. The collaboration with users is also much more organized, fruitful and concrete than before due to the regular meeting places. For instance, several Norwegian ministries and agencies have during the recent years made use of our competence.

As we have several subcontractors connected to CREE, we have also much more contact and collaboration with other disciplines, such as technology researchers (IFE and SINTEF Energy), social anthropologists (SUM) and law (University of Oslo). We have also given PhD courses at interdisciplinary research schools, and we are very active in the media, including interviews, debates and chronicles, as much of our research is policy relevant.

Measured in the quality of journals, our research publications are now of higher quality than before the establishment of CREE. We have more publications in Level II journals (the highest quality level) than before, more publications in general economic journals, and more publications in the top ranked journals. New models are developed that are important for our research.

Based on this, we think we are closer to the primary aims of providing better knowledge in the debate on climate and energy issues, and to be a leading international research center.

..

## 1. Objectives

*Primary and secondary objectives of the centre as stated in the contract/ project description.*

The primary objectives of CREE are, as indicated in the announcement, to

- i) expand the knowledge base for national energy policy and the international energy and climate policy debate,

- ii) generate knowledge that is vital to trigger innovation, mainly through the design of policy instruments,
- iii) be an international leading research center on social research on energy and the environment, and
- iv) develop social science and economic methodology and models to facilitate the achievement of the preceding objectives.

The secondary objectives are

- i) to publish our research in international leading peer-reviewed journals and books and to present it at international and national conferences,
- ii) to disseminate our research to our users such as the user partners, policy makers, firms and the general public, and
- iii) to improve the education in energy and environmentally related fields at the University of Oslo and the University of Tilburg.

Based on this, as stated in the "Strategic Plan for CREE", the center's long term aim is to satisfy the Research Council's success criteria for the FME Centres for Social Science-related Energy Research (FME Samfunn) as documented in the governing documents from the Research Council ("Requirements and Guidelines" and "Information for applicants for the announcement of the Research Centres of green energy within the social sciences (FME Society)").

## 2. Research (max. 3 pages)

- *Main research achievements concerning the thematic areas of the centre*
- *Provide an overview of the research activities*
- *Core competence of the research team*
- *Comment on new types of research collaboration since establishing the centre*
- *Comment on the multidisciplinary approach in the research activities; also efforts done to strengthen the links between social science-related energy research and technology-related energy research, describe cooperation with other FMEs.*
- *Comment on the centre concerning critical size*

### Main research achievements concerning the thematic areas of the center

CREE's activities are divided into five work packages as described in the project plan.

WP1: The International Politics of Climate and Energy

WP2: Innovation and Diffusion Policy

WP3: Regulation and Market

WP4: Evaluation of Environmental and Energy Policy Measures

WP5: The Next Generation of Numerical Models

The main research achievements are manifold:

The *quality of our research* publications has increased measured by the quality of journal publications. While most research in energy- and environmental economics are published in field journals, we have been successful in publishing in general economic journals as well as the top 5 economic journals. Examples of the first category are *Scandinavian Journal of Economics*, *European Economic Review*, *Journal of the European Economic Association*,

while examples of the latter category is *American Economic Review*, *Review of Economic Studies* and *Journal of Political Economy*. In addition we have also published several papers in the highest ranked field journals such as *Journal of Environmental Economics and Management*.

We have been successful in developing and updating our *numerical models* to be in the front in our fields. This includes the energy market model LIBEMOD, the petroleum model PETRO2 and the general equilibrium models SNoW. These models are developed under WP5 and applied in areas relevant for the remaining packages (with the exception of WP4).

Our *multidisciplinary* approach is better, as we have been able to establish cooperation with other fields, see below. One especially successful cooperation has been under WP4 where we have regular meetings and discussions on evaluation of policy measures with our social anthropology sub-contractors.

Our research has *attracted attention internationally* as our researchers have received prizes and have held leading positions in research organizations as well as in IPCC, see section 4 below. Our research is regularly presented at the important international research conferences within our field such as EAERE and IAEE. We also participate in international consortia collaborating in EU projects and project proposals.

Our research is considered important by Norwegian policy makers as we are regularly asked to contribute to *governmental expert groups and committees*, see section 3 below.

We have followed the plan for *research recruitment* by employing three PhD students and one Post Doc. These are working on topics related to all research packages.

An overview of the research activities (see also “CREE Workplan 2015”)

#### *WP 1: The International Politics of Climate and Energy*

The main question in this work package is how international climate treaties best can achieve greenhouse gas (GHG) abatement. This raises questions regarding how treaties should be structured to raise participation rates, abatement targets and policy implementation, and how abatement efforts will influence other important goals – such as global equity issues, as well as how equity principles may affect treaties.

Abatement treaties are the type of international climate treaties mostly studied in the literature. However, other designs like sectorial treaties, regional treaties or “topical” treaties focusing, for example, on R&D efforts are also possible. The increasing pessimism regarding prospects for a single, UN-led, ambitious “top-down” abatement treaty with global coverage has raised the question of whether such smaller, partial treaties could be coordinated and gradually integrated with each other, thereby addressing the climate problem “bottom-up”.

We are also concerned with how climate policies both directly and indirectly through for instance technical change affect global energy markets.

The research activities in this work package span from theoretical studies to numerical models and experimental studies using laboratory participants.

#### *WP2: Innovation and diffusion policy*

Atmospheric greenhouse gas stabilization targets as low as 450 ppm CO<sub>2</sub> equivalents could be needed in order to avoid dangerous anthropogenic interferences with the earth's climate system. Such targets may require more than twice as much carbon-free power by the middle of this century than we now derive from fossil fuels - this is the technological challenge of the century.

Environmentally friendly R&D is a tale of several market failures. First, there are environmental externalities which need to be internalized through appropriate environmental policy measures. This is essential since it is the internalizing of the environmental externalities that create the demand for the new environmental technology. Second, there may be market failures in the innovation and diffusion processes. Research creates new knowledge which benefits other firms, and thus entails a positive externality. On the other hand, competing research firms may duplicate each other and/or exhaust the pool of good ideas, thereby negatively affecting other research firms.

Economists have realized that there are market failures also in the adoption and diffusion of new technologies. For a number of reasons, the value to a user of a new technology may depend on how many other users have adopted the technology. This type of "increasing returns" may be created by learning-by-using, learning-by-doing or network externalities. When the qualities of a product are hard to assess, consumers may assess it by observing the number of other people who are purchasing the product, inducing informational cascades which creates a scope for advertising. Similarly, the responsibility to act in an environmentally friendly manner is shaped by observing others, although this may cause market failures with multiple equilibria. The adoption of new technologies may also be hindered by principal-agent problems and cognitive costs. In this work package we address a broad set of topics which are of interest from both a research and political perspective.

#### *WP3: Regulation and Market*

In this work package, the main question is how regulation of energy markets affects the development of green energy, and how measures to promote green energy impact the functioning of energy markets. It is of particular interest to study the implication of regulation across national borders, especially with respect to infrastructure, since an international regulatory framework is crucial for the exploitation of Norwegian energy and environmental resources, both in traditional areas and in new areas like capture and storage of CO<sub>2</sub>. The work was planned mainly as theoretical and empirical studies, but numerical models, either already existing or developed in other work packages, have also been utilized. As such, part of the work within this package is conducted in cooperation with or as part of WP4 and WP5.

#### *WP4: Evaluation of Environmental and Energy Policy Measures*

This is an empirical part of the project where we study the success of environmental and energy policy measures so far. The main focus is Norway, but we also do studies for the EU. As the project is interdisciplinary, we base on different methodologies. For instance, the economists apply micro econometric analysis to estimate how policy tools affect household energy demand based on micro data, while the social anthropologists apply social practice theory to describe how energy is a part of daily tasks, and how policy measures affect habits and the interrelation between household members. The aim is to learn from the traditional research approaches within each field, discuss differences in results and assess the strengths and weaknesses of each approach. The final goal is to combine the analytic approaches.

Different methodologies are used to evaluate the success of different policy measures such as monetary (taxes and subsidies), direct regulations (standards, emission quotas) or softer policy tools such as information campaigns, energy labeling and voluntary agreements. We study questions such as the rebound effect of energy savings measures, unintended effects of regulations on close substitutes, and how the demand for energy efficient vehicles is affected by climate policy.

#### *WP5: The Next Generation of Numerical Models*

Integrated economy-energy-environment models are necessary tools in our research. At CREE we have the energy market model LIBEMOD, the petroleum market model PETRO2, and the new family of integrated macroeconomic Computable General Equilibrium (CGE) models; the SNoW-models (Statistics Norway World models). The development and update of these models are placed in WP5, while the models are used in most of the work packages described above.

#### Core competence of the research team

While we have subcontractors from different fields such as law, technology and social anthropology, the core research team consists of economists from the four research partners. The competence of these economists are wide as they use different methodologies such as theoretical/mathematical models, numerical simulation models, econometrics (applied statistics) and experimental economics. The interests of the research team are also quite wide and include questions related to moral philosophy and ethics, human behavior, energy technology, game theory, macro economy and ecology. As seen from our publication lists, we, therefore, approach the different questions in the work packages from several different angles.

#### New types of research collaboration since establishing the center

The center has made it possible to have a much more close collaboration between the research partners. We organize joint workshops, seminars and lunches, and almost all our research proposals are now close collaboration between the research partners. Thus, the center has made the Oslo group of energy- and environmental economists a closely integrated team of researchers.

The center has also strengthened our multidisciplinary approach significantly, and many of our new research proposals now include researchers from different fields, see below.

#### The multidisciplinary approach in the research activities

The subcontractors contribute to the research in several of the research packages. In WP1, we have cooperation with political scientists at CICEP as climate negotiations and treatments are of special focus in both centers. The technology institutes have mainly contributed to the numerical modeling of energy markets (WP2 and WP5), while social anthropologists are involved in evaluation of policy measures (WP4). We have also been successful in starting a new cooperation with psychologists, particularly on experiments and behavioral economics. We also have lawyers as subcontractors, and we have got funding for a project (ENERGIX) where we will have close collaboration with them. Efforts taken to strengthen links between the different fields have mainly resulted in applications for joint research projects. Much effort has been spent on this the last few years.

When it comes to cooperation with other FMEs, our main contact is CICEP. This is mainly due to common research subjects as well as geographical proximity. We coordinate with CICEP our annual user conference that is held in April every year. Some research cooperation has been undertaken, and we have submitted several research proposals to the Research Council of Norway. Further, we contribute to the research school of all the FME centers; NORREN, and we have organized several workshops with CenSES on numerical energy market models with the aim of establishing closer contacts. Note that our subcontractors IFE and SINTEF Energy are also partners in CenSES. See also section 7 below.

#### Critical size of the centre

At the four research partners, we are about 40 researchers (including PhD students and Post Docs). This number has been relatively constant since 2011. Due to the financial situation of energy and climate research within social science in Norway, there is no room for expansion. We plan to keep the number of researchers relatively constant also for the final years of the center.

..

### 3. Relevance and benefit to user partners and the society (max. 3 pages)

*For the centre as a whole describe:*

- *Visibility and participation in the public debate:*
  - o *The way the centre has participated on national and international arenas in which energy and climate-related questions are discussed.*
  
- *Cooperation and communication with centre user partners:*
  - o *The way key issues are identified by partners, ( how user partners are involved in strategy work and annual work plans.)*
  - o *Measures for establishing links and integration between research institutions and user partners and between the different user partners*
  - o *Measures taken to secure that the competence and results achieved by the research are effectively transferred to and utilised by the partners*
  - o *Describe steps taken to stimulate mutual personnel mobility between user partners and research institutions.*
  
- *Has the centre research generated additional concurrent R&D projects between research institutions and user partners?*
  
- *Describe expectations of value of the centre for society at large beyond the partners' participation in the centre's activities.*
  - o *Have the dissemination activities been directed towards other than the partners in the centre including the public at large?*

#### Visibility and participation in the public debate

CREE is visible in the public debate via the following channels

- media activity
- popular science articles
- IPCC
- governmental reports
- public hearings
- reports and advice for policy makers.

CREE researchers participate in media activity regularly through chronicles, articles and debate in newspapers and interviews in newspapers, radio and TV, see [http://www.cree.uio.no/CREE\\_in\\_the\\_news.html](http://www.cree.uio.no/CREE_in_the_news.html) for more details. Some of the topics that we have been involved in the last couple of years and that have attracted a lot of attention, are electric cars, electrification of offshore oil platforms, the effect on CO<sub>2</sub> emissions of reduced production of Norwegian oil, the climate effects of using biofuels, and the effects of energy saving equipment in households. While most of the media activity has been in Norwegian media, some research has attracted attention also internationally. One example is Bård Harstad's paper on buying fossil fuel deposits as a way to reduce the supply of fossil fuels and therefore CO<sub>2</sub> emissions ("Buy Coal! A Case for Supply-Side Environmental Policy", *Journal of Political Economy*, 2012), that attracted a lot of attention in the USA, see [http://www.cree.uio.no/docs/In%20the%20news/2012/2\\_tertia/Harstad\\_Buy\\_Coal\\_Div.pdf](http://www.cree.uio.no/docs/In%20the%20news/2012/2_tertia/Harstad_Buy_Coal_Div.pdf).

Publications in popular science journals in Norwegian is another way of participating in the public debate. While chronicles and debate articles in newspapers are relatively short, popular science articles give us the possibility to go deeper into the arguments in a way that policy makers and journalists may understand. Many of these articles, therefore, are the starting point for interviews and newspaper articles. The two main Norwegian journals for popular science articles in economics are *Samfunnsøkonomen* and *Økonomiske analyser*, and CREE researchers publish regularly in these journals on topics studied in all of our work packages, see [http://www.cree.uio.no/publications.html#Popular\\_scientific\\_articles](http://www.cree.uio.no/publications.html#Popular_scientific_articles). In addition to this, popular science articles are also written in English such as in different handbook chapters, newsletters etc, see also [http://www.cree.uio.no/publications.html#Other\\_publications](http://www.cree.uio.no/publications.html#Other_publications).

Climate change is the underlying factor of all the research in CREE as this creates the need for environmentally friendly technology, and IPCC (Intergovernmental Panel on Climate Change) is setting the agenda for most debate and policy making on this issue. CREE researchers have been involved in the IPCC process since the second assessment report (published in 1995). In the fifth assessment report (published in 2013 and 2014), CREE researchers have been involved in working group III (Mitigation of Climate Change). Reyer Gerlagh (Tilburg Sustainability Center) has been a coordinating lead author, Annegrete Bruvoll (Vista Analyses/Statistics Norway) has been a lead author, and Snorre Kverndokk (Frisch Centre) has been a review editor. In addition, Gerlagh also contributed to the Synthesis Report. These researchers have also been active in the media activity following the publications of the reports.

Governmental reports such as Official Norwegian Reports (NOU) are important for policy making in Norway. CREE researchers constantly contribute to such reports as members of commissions and expert groups. Some recent examples are the green tax commission that was established in 2014 and where three out of seven experts are CREE researchers (Bye, Hoel and Rosendahl), the expert group on investments in coal and petroleum companies that presented their report in December 2014 (Hoel), the expert commission on the value of ecosystem services that presented their report in 2013 – NOU 2013:10 (Aslaksen and Brekke), and the expert committee on cost benefit analyses that presented their report in 2012 NOU 2012:16 (Bye and Nyborg). In addition we have contributed with appendices and input reports to these and other governmental reports. CREEs CGE models are main tools for the Government's Long Term Perspectives and National Budget Reports.

CREE researchers also participate in public hearings at the Parliament or at the ministries. Recent examples of this is the hearing on Norwegian climate targets before the Paris climate



negotiations that will take place in the Ministry of Climate and Environment in January 2015, the hearing about the Norwegian position on the proposed EU framework for climate and energy policies towards 2030 that took place in the Ministry of Foreign Affairs in 2014, and the hearing in the Parliament on Norwegian climate policy in 2012. In addition to this, we write statements on several governmental reports and also research programs at the Research Council of Norway.

Finally, we write several consultancy reports and reports to governmental bodies on policy relevant issues, see also above. Recent examples are reports to the Green Tax Commission (policy measures that can promote the development and use of environmental technology), the Norwegian Water Resources and Energy Directorate (on heating equipment), the Ministry of Petroleum and Energy (the energy report), and the Office of Auditor General of Norway (evaluation of policy measures in energy policy).

#### Cooperation and communication with centre user partners

CREE has seven user partners:

Gassnova SF  
Norwegian Environment Agency  
Norwegian Ministry of Petroleum and Energy  
Norwegian Water Resources and Energy Directorate  
Statkraft Energy AS  
Statnett SF  
Statoil ASA.

The communication with the user partners take place through different channels (see also below) such as regular user partner conferences, seminars and workshops, the Model Forum where modelling of energy markets and environmental/technological policy tools are discussed, meetings and joint research proposals.

The user partners are mainly involved in strategy work and annual work plans through the board of CREE, where two of the board members come from the user partners (see below), and through input to our research at seminars and meetings.

User partners contribute to our research by supporting data and information that are implemented in our economic models, comment on the relevance of our research, and also hopefully through joint projects. The policy of the Research Council of Norway is to include user partners from industry and governmental agencies in Knowledge-building Projects for Industry (KPN) by letting industry fund parts of the project and also contribute to the research questions. This is one of the priorities for CREE in the coming years.

The results from our research are disseminated through the different channels described above. However, we are not able to determine how the user partners use our results.

It is hard for user partners to be directly involved in our research as this requires experience with methodologies and knowledge of economic theory that most of our user partners do not have. Thus, we do not have mutual personnel mobility between user partners and research institutions.

Several users have access and actively use our research, methodology competence and analyses. They are not formal user partners, either because they do not want to be associated with single FMEs or because they establish and maintain relations with the CREE center in other ways. Examples are ministries (FIN, KLD), Office of Auditor General of Norway and the statistical production at Statistics Norway.

Our experience with user involvement is that we have been successful in establishing fruitful connections and mutual gains with ministries and other public agencies. Our research is policy relevant and applicable for policymakers. However, we have not yet achieved the same level of mutual gains/synergies in relations with private companies.

Has the center research generated additional concurrent R&D projects between research institutions and user partners?

As mentioned above, one aim of the center is to get funding for Knowledge-building Projects for Industry (KPN). We have invested much effort in building networks and creating suitable projects for this purpose, and have involved users in many projects and project proposals, but so far we have not succeeded to establish a full KPN with 20% funding from users, whereof minimum 10% funding from a private company. A large part of the topical research ideas and knowledge gaps in social sciences are not particularly relevant for private companies. Much of the research and research competence in CREE deal with policy choices from a social point of view and typically takes the perspective of policy makers. The main user of our research is, therefore, policy makers such as governmental bodies, and as mentioned above, we have been involved in different projects initiated by these. However, we are working hard at the moment to try to involve industry in KPN projects in the future.

Expectations of value of the center for society at large beyond the partners' participation in the center's activities

As mentioned above, CREE participates broadly in the public debate on climate and energy issues. Our expectations is that this will have an influence on Norwegian energy and climate policy, and that we will contribute to a better understanding of energy and climate issues in the general public. We also believe that the novel insight achieved by our research will help industry in making decisions that can help us in the transformation to a carbon free society.

#### 4. Internationalisation (max. 1 page)

- *Describe how international research cooperation is attended to (including if the partners have engaged in the EU's framework programme based on research projects in the centre)*
- *Describe collaboration with international partners in the centre and other international research groups and other ways of international collaboration*
- *Describe international exchange of researchers, both centre staff going abroad and visiting foreign researchers to the centre, including post docs, research fellows and senior scientific staff from other institutions*
- *Describe the role of the centre staff in international strategic fora.*

Each of the Norwegian research partners in CREE has a large international network and it will be difficult to give a comprehensive and detailed report of all the collaboration with foreign researchers. Below we give some examples of this activity.

There is an international research partner in CREE, Tilburg Sustainability Center, and we also

have contracts with several foreign researchers who have part-time positions paid by CREE:

Fridrik Baldursson, Reykjavik University  
Matti Liski, Aalto University  
Christoph Böhringer, Oldenburg University  
Jared Carbone, University of Calgary.

CREE organizes an annual research workshop where we invite our international research partners, those having a part-time position in CREE, as well as other relevant researchers from our network.

Our seminar series also has presentations by foreign scholars, see the chart on our website <http://www.cree.uio.no/seminars.html>, and our researchers are active presenting their research at seminars at different international research institutes and universities, and at conferences and seminars. We also have an exchange of researchers as our researchers and PhD students regularly visit foreign universities for shorter and longer stays, and foreign researchers visit our institutions.

We have ongoing collaborative projects with foreign researchers in CREE. Some of these projects are reported in the CREE working paper series, while others have been reported in other series and in international publications (see “Fact sheet”). We also have cooperation that has not yet resulted in publications, for example through the CESifo network where several of our researchers are research fellows (Michael Hoel is also area director of Energy and Climate Economics at CESifo), both under projects that are directly funded by CREE, and also under projects that count as our own funding (ENERGIX, MILJØ2015 and NORKLIMA).

CREE is part of the ENTRACTE project (Economic iNsTRuments to Achieve Climate Targets in Europe) funded by the seventh EU Framework Programme. The project group consists of a consortium of nine European applied research centers, and is headed by Zentrum für Europäische Wirtschaftsforschung (ZEW). CREE heads one of the work packages and three research tasks, which involve collaboration with researchers from the other research centers. CREE further has achieved funding from the Research Council of Norway to deepen the collaboration with the ENTRACTE network. We are also involved in other international consortiums that are planning proposals for HORIZON2020 and Nordic Flagship Projects (Nordic Energy Research).

As mentioned under section 3 above, CREE researchers have been involved in the IPCC process since 1995, and contributed to the fifth Assessment Report, both WGIII - Mitigation of Climate Change - (Gerlagh, Bruvoll, Kverndokk) and the Synthesis Report (Gerlagh).

One CREE researcher - Karine Nyborg - at the University of Oslo was the president of the European Association of Environmental and Resource Economists (EAERE) in 2012 and 2013. CREE researchers have received international prizes for their research, for instance by EAERE, the last few years (Hoel, Harstad, Nyborg), and CREE (together with CICEP and UiO Energy) has applied for organizing the EAERE conference in 2017.

As most of our researchers have an international network, we do not have a coordinated policy on internationalization, apart from helping PhD students to get contacts abroad.

## 5. Recruitment (max. 1 page)

- Describe how the centre has organised researcher training at PhD level.
- Describe how the centre has engaged in education, especially at the master's level. Examples are researchers taking part in teaching, thesis of master students related to the research topics in the centre and summer jobs for students on projects in the centre.
- Describe in particular how increased recruitment of women is given attention.

The overall aim for CREE has been to recruit three PhD students and one post-doc researcher over the lifetime of CREE. Originally the plan was to recruit two post-doc researchers, but due to lack of external funding as well as satisfactory funding of post docs at the Department of Economics, University of Oslo, we decided to only fund one post doc directly. Two PhD students were recruited in 2011 and one in 2014, while we recruited one postdoc researcher in 2012. The research recruits are studying at the PhD program at the Department of Economics, University of Oslo. The Post Doc is also employed at the same department. In addition, we contribute to the funding of one PhD student at Statistics Norway and one Post Doc at Tilburg University.

CREE gives a master scholarship of NOK 20.000 to up to three master students annually. These are offered an office at one of the Norwegian research partners, supervision by one or two of the CREE researchers, access to all CREE arrangements, and the possibility to publish their thesis in the CREE Working Paper series.

In connection with the recruitment of candidates, we are also engaged in research training through teaching and supervising at the Tilburg University and the University of Oslo, both at the masters and PhD level. Further, we were involved in MILEN's research school, an interdisciplinary research school for PhD candidates in energy and environment at the University of Oslo that existed until 2014. At this research school, we gave seminars, lectures, and also organized a one-week PhD course on integrated assessment models in 2013. In 2014, we have also financially supported a PhD course at SUM (Centre for Development and the Environment, University of Oslo) called 'Consumption, Capitalism and Everyday Life: Understanding the Social Dimensions of the Growth Imperative'. Finally, we contributed to the research school of all the FME centers; NORREN, by providing lecturers.

When it comes to recruitment of women, two out of three PhD students funded by CREE have been women. Also, the majority of students receiving a master scholarship has also been women. At the moment no special attention is needed to recruit women, as a significant part of PhD students in economics are women. For instance, at the Frisch Centre, six out of seven PhD students are women. When it comes to permanent research positions, the situation is different, however, environmental and energy economics seems to be one of the most attractive fields for women within economic research. Due to the difficult funding situation at the CREE partners, we have not been able to employ permanent researchers within this field the last few years.

## 6. Funding (max. 1 page)

- Discuss concerns regarding the funding of the centre. Note that numbers (budget tables) will be submitted to the expert panel by RCN
- What have been done to attract new user partners? (It is realised that some centres from the start have a rather complete set of partners, while others should have a greater potential to attract additional partners)

- *To what degree has the centre been able to obtain other external funding?*

A challenge for economic and social research on environmental and energy issues is funding. The direct annual funding of the center (NOK 9.1 millions) has been constant since the start in 2011, thus the actual number of man months dedicated to research has been decreasing due to inflation and wage increases.

When it comes to external funding, our experience is that funding for environmental and resource economics (and in general funding for social science on environmental and energy projects) shows large cyclical fluctuations. Our external funding from the Research Council of Norway has decreased, and we experience that we have less success with our research proposals than we had when the center started (from an acceptance rate of about 50% to 10-20%). This is particularly true for climate research, while the success rate has been higher for energy research. In our opinion this is not due to a lower relative quality of our research (see also the Fact sheet for our publications), rather the following aspects may be relevant:

- There has not been a real increase in funding of climate and energy research
- More disciplines than before compete for these funds
- Calls for research proposals are much more specific than before
- There has been much more focus on technology in the calls
- A larger proportion of the announced funds requires co-funding from industry, which makes it harder for social science research
- One main objective of the research policy in Norway is that research should be industry relevant and increase industry competitiveness.

Based on the lack of external funding, the number of CREE working papers has been significantly reduced from 2013 to 2014. The lower activity follows from the fact that more time is devoted to writing research proposals, and that some of our researchers have also started working in other fields. To be able to keep research man months in the core institutions at an acceptable level, we have made some changes in the long-term budget (2015-19) as to not employ an additional Post Doc, and to reduce the number of technology subcontractors and part time researchers.

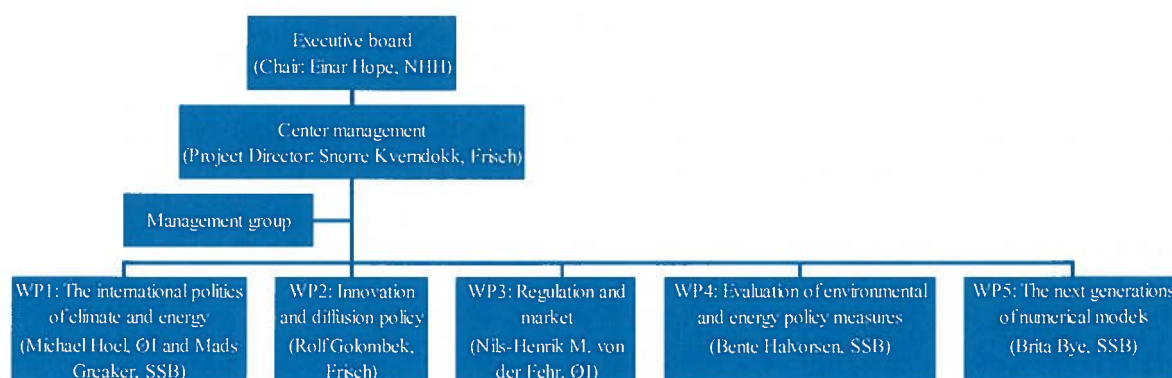
Thus, a big challenge for the center is to ensure a stable funding of our activities. This means to work closely with users to be able to organize KPN projects (require co-funding from industry), and to apply to other external sources than from the Research Council of Norway. The administration at CREE, as well as the research partners, are working hard to solve this problem. In our opinion, the answer is not to attract more user partners, as the user partners provide only a minor share of the funding for the center (NOK 600.000 annually). Thus, we have decided to keep the number of user partners constant. However, we will work with the existing user partners to see if we can involve them more effectively in the research.

## 7. Management and Organization (max. 2 pages)

- *Describe role and activities of the:*
  - o *Board*
  - o *Centre director*
  - o *Management team*
- *Comment on the scientific leadership of the centre.*

- Describe the process of idea generation, project selection, project planning and project review (including processes of cooperation when geographically distributed).
- Describe status and role of the Centre in relation to different organisational levels of the host institution.
- What steps are taken to develop cooperation with other FME-centres?
- Describe how gender balance has been managed in the centre.

The organization of the center in 2014 is as shown in the figure below. It is also described in a separate CREE document in Norwegian (“Styringsstruktur – CREE”).



The chair of the executive board should not represent any of the research partners, user partners or sub-contractors, and is therefore independent of the partners in CREE. The board also consists of one member from each of the three Norwegian research partners, while the user partners should be represented by two members, one from industry and one from government.

The board has the overall responsibility for the direction of future research activities, including adoptions of research issues and potential modifications of the working packages. The board is also responsible for constructive interaction between the center, the host institution and partners in the consortium. More precisely, the board is responsible for ensuring that the center’s vision and activities formulated in the strategy document are followed up in key documents such as project and work plans as well as budgets. This means adoption of the strategic plan, annual work plan, annual report, progress reports, budget, and to make sure that the accounts well presented.

The administration of CREE is located at the Frisch Centre. It consists of a center director (Snorre Kverndokk) and a center coordinator (Jørg Gjestvang). They are responsible for the daily coordination of activities and administration of CREE, and of preparing documents to the board and to the Research Council of Norway (RCN). They have regular meetings with the management group consisting of all the working package leaders to discuss matters of importance for the center. The management group consists of the work package leaders, who are responsible of reporting the activities for the different work packages.

CREE is organized as a big project at the Frisch Centre, the host institution. This means that it has its own internal project number and its own accounting. While Kverndokk is the project director, CREE is not a legal entity, thus all contracts have to be signed by the director of the Frisch Centre, Oddbjørn Raalum, who also is the Frisch Centre’s representative in the CREE board.

CREE has resulted in a very close collaboration between the Norwegian research partners. We organize CREE seminars and regular lunches together. Also, when a call for a research program is launched, we usually have a meeting for all interested researchers where we discuss ideas and possible research proposals. Then we decide on different ideas to follow up, and the responsibility to do this is given to different researchers. Usually, this leads to a proposals where all the research partners are involved. However, we do not sensor ideas, so if somebody wants to follow up an idea, they are welcome to do that even if they do not have a big team involved. All core researchers have a large international network, so most of our proposals include international cooperation, including joint projects with the Norwegian and the Dutch research partners. Also, if the call is user oriented (for instance KPN), we get in contact with our user partners and discuss ideas and a possible collaboration.

CREE has a close collaboration with CICEP, one of the other social science-related energy research centers (FME Samfunn) funded by the Research Council of Norway. CICEP has many overlapping projects with CREE as both have a large interest in international climate negotiation and agreements. Every spring CREE and CICEP organize a user conference together for our research partners and other interested institutions. We also organize research workshops together, write joint research proposals and have some joint research projects. CREE and CICEP have also sent an expression of interest to organize the EAERE conference in 2017 together with UiO Energy. EAERE is the European Association of Environmental and Resource Economists. In addition, we have some common interests with CenSES, the third FME Samfunn, in numerical modelling of energy markets, and we organize workshops and Model Forums together. When it comes to the technological FME centers, we do not have any formalized cooperation as we work in quite different fields, use very different methodologies and address quite different research questions. However, we do have regular meetings with them, both during the RCN contact meetings for FME centers and also by inviting them to CREE seminars. In addition, our technological subcontractors, IFE and SINTEF Energy, are partners in some of these FME centers, and we, therefore, have input from the technological research through them.

Environmental and resource economics, the core research field of CREE, is probably the field in economics with the best gender balance. This is also reflected in the gender balance of CREE researchers. When it comes to the board and management team, we are also concerned about the gender balance as two of five work packages are headed by a woman, and three out of six in the CREE board are women. Unfortunately, the funding of environmental and resource economics has been quite difficult the last few years, and we have, therefore, not been able to hire new researchers in permanent positions to the center. However, three out of four PhD students partly or fully funded by CREE at the Norwegian research partners are women.

#### 8. Communication (max. 1 page)

- *Link to centre home page*
- *Describe communication activities both within the centre and to the public at large*

The main users of CREE are, in addition to the research community, industry, Government and the general public. The communication to users are mainly through the following channels:



- Dissemination of research and media activity through our webpage ([www.cree.uio.no](http://www.cree.uio.no))
- Hold an annual user conference (April). This is organized together with CICEP. In addition we give a seminar for all users every fall (November)
- Organize user activities such as meetings and seminars
- Organize a Model Forum (once or several times a year) where users together with researchers in other disciplines can make contributions to economic modeling.
- Publish in Norwegian-language journals such as *Samfunnsøkonomen* and *Økonomiske analyser*.
- We contribute to hearings in the Parliament and public debates.

CREE has invested heavily in communication, for instance through an internal reward system for communicating through the media. We have dedicated a website for news on CREE research, see [http://www.cree.uio.no/CREE\\_in\\_the\\_news.html](http://www.cree.uio.no/CREE_in_the_news.html), and had more than 50 reports in the media in 2014. Researchers from CREE have been involved in key debates in the media over the past year on subjects such as global warming, electric vehicles and the effect of reduced extraction of oil as climate policy.

When it comes to user-oriented communication measures, we usually give about 100 presentations each year. This includes meetings with all user partners, seminars, workshops and conferences. In addition to the two regular user arrangements in the spring and the fall, we organize seminars for users that are interested in certain topics. In 2014 we organized a seminar at the Ministry of Climate and Environment, and in 2015 we plan seminars for Statoil and the Norwegian Environment Agency.

The communication plan of CREE is available at:

[http://www.cree.uio.no/adm/Strategi\\_Komunikasjon/Communication%20plan%20CREE%20October%202012.pdf](http://www.cree.uio.no/adm/Strategi_Komunikasjon/Communication%20plan%20CREE%20October%202012.pdf).

## 9. SWOT analysis

Based on the previous self-evaluation of the centre, a SWOT analysis should be performed. This is considered to be a useful way to present the highlights of the status of the centre and may constitute a basis for the plans for the final three years of operation for the centre. This SWOT analysis should include the following steps:

- ***Describing internal factors:***

The strengths and weaknesses of the organisation. These are related to the organisation's resources (people, knowledge, financial means, and activities). The sources for this are the analysis mentioned above.

- ***Describing external factors:***

The opportunities and threats in the environment that have an effect on the organisation. These include changes in the policy domain, economic factors and other framework conditions.

- ***Confronting internal factors (strengths, weaknesses) with external factors (opportunities, threats):***

It is important to weigh the strengths, weaknesses, opportunities and threats by using a point system or a qualitative specification.

- ***Developing ideas on strategic options:***



Strategy development often occurs on the basis of a matrix in which the factors are presented in four cells based on strengths, weaknesses, opportunities and threats.

SWOT table for CREE

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>• High competence researchers; the best energy- and environmental economists in Norway;</li> <li>• High quality of research measured by the quality of journals;</li> <li>• The research has impacts on the political processes on energy- and climate policy in Norway;</li> <li>• A wide and active network, both nationally and internationally.</li> </ul>	<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>• Applied research funding such as Knowledge-building Projects for Industry</li> <li>• Funding from other resources than the Research Council of Norway, for instance Horizon2020 and Nordic Energy Research;</li> <li>• Advisory activities and collaboration with governmental agencies in order to fund activities and achieve policy impact, confidence and national visibility.</li> <li>• The possibility to arrange the EAERE conference in 2017 as this will increase the visibility and network.</li> </ul>
<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>• We have not been able to involve user partners directly in research projects for instance in Knowledge-building Projects for Industry;</li> <li>• We still should have some more integrated cooperation with other fields.</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>• Possible cuts of user partners funding and resources</li> <li>• Lack of public funding, especially for climate projects through RCN.</li> <li>• A potential conflict between internationally relevant social scientific knowledge gaps and the knowledge needs of domestic stakeholders.</li> </ul>

Signatures

Place and date *Oslo/Bergen 09.01 2015*

*Snorre Kverndokk*

Centre director  
(Signature and name in print)

*Einar Hope*

Chair of the board  
(Signature and name in print)

Snorre Kverndokk

.....

Einar Hope

.....

