

Evaluation of Strategic Area: Energy and Petroleum – Resources and Environment

The strategic area is a very logic and natural one, though the combination of disciplines into a well functioning and operational organisation is not trivial. This has however been done with great skill, enthusiasm and encouraging leadership.

Accomplishments and direction forward

The activity within the area is in all respects impressive and especially in the cross-cutting between actors, topics, disciplines etc. This cross-cutting in itself has certainly added value without diluting quality. It seems as if this is the result of two factors, seemingly incompatible:

- 1) Persistent focus on the main issue, and
- 2) Ability to adjust to new circumstances as the societal priorities change

The documentation however does not make it perfectly clear how the research is guided by the perception of:

- a) The innovation process (is there a model?).
In a trivial sense most work has relevance for innovation but is there a systematic approach?
- b) Sustainability (Continued economic development subject to environmental and social concerns in a way that enables long-term development without depletion of resources)
Nuclear energy is mentioned in the Annual Report, no doubt carbon-lean but sustainable? Hydrogen is certainly relevant with respect to gas resources but from a primary energy use point of view less obvious. The Petroleum focus area is a good addition since fossil fuels will certainly have a role for several years to come but it needs to be explained in relation to sustainability issues.
- c) Industry involvement and role (especially manufacturing industry)
In the evaluation-report the strategic area, illustrated on page 1, includes a feed-back loop from end-use to energy system, but should also rather include the (equipment-) manufacturing industry

There have been some profound changes in the world since this area was first conceived. The organisation has no doubt met some/most of the new challenges, but only the last few months there has been a definitive change in e.g. public awareness and political commitment to the climate change issues, including the need to change the energy system, energy-use etc. In Norway there have been further commitments to meet the climate-change with reductions in GHG-emissions nationally as well as abroad by making use of the so called “flexible mechanisms”.

These changes should motivate some of the basics for the area to be re-considered. A good point of departure is the Stern-Review both in its way to calculate the value of climatic effects (which is different from common practice) and the way to look at technology development (primarily by conscious use of “learning curves”). Such a re-consideration could result both in re-affirmation of present work but also in changes of both topics and partners. A tool that might be useful in the look upon the societal connection of the work could be the IEA-

publication “Creating Markets for Energy Technologies”
(http://www.iea.org/textbase/nppdf/free/2000/creating_markets2003.pdf) .

Norway has a comparative advantage in areas related to the oil-industry and the geopolitical situation (Arctic applications).

In this case it would however be interesting to see how e.g. the Arctic applications relate to sustainability.

The strategic area has formed important strategic alliances across the world

The well developed co-operation with foreign universities and the work in EU-projects bear witness to this, but here it would be interesting to see how this relates to the innovation-process and to the industry-involvement as mentioned above. Norway has very well developed R&D on heat-pumps but no industry and very little use of heat-pumps in households. Has the selection of partners been guided by the need to “compensate” for such anomalies?

An important issue however is how the focus areas corresponding and **how the strategic area interfaces to societal needs and goals**. This has worked well in the past, but needs to be a continuous opportunity and concern for the management. The entire group need to be able to relate to issues such as those mentioned (innovation, sustainability, market development) and to “position” themselves. They may not have to have a consensus on either perception or solutions but just be able to explain their role.

The capable area leader has managed to raise very large resources from the Research Council and Industry outside of the CoE- CRI processes, which is a sign of commitment and success.

Production

Publications

There are a large number of articles published in the period 2000-2006, a bit over 3000, in various journals. Approximately 1/3 of these have been peer-reviewed.

CoE's 8 Applications, but none established

CRI's 4 Applications, of which 3 are established

YFF's None

EU projects Involved in 27 EU Projects

The biggest group among projects (11) are related to CO₂-management (CCS, low-CO₂ etc.), which seems logical. There are however also 10 projects related to renewable energy and 6 to buildings. It could however indicate that some other areas are “neglected” or still in an earlier stage of development, e.g. electric-grid issues?

Scientific networking

Cooperation to SINTEF or other research institutes

It is obvious that the operation within Norway has succeeded. It is stated that the co-operation

in the beginning (year 2000) was primarily with SINTEF but has since then widened and now there is a high degree of integration with several institutions.

It might however be needed to check if there has been a slanting towards applied research and that might explain the low amount of reviewed papers?

Research networks and scientific cooperation

As the documentation states there are interesting development of networks with very strategic partners in growth-areas (such as China), knowledge-centres (such as the U.S. and the EU) and for topical issues (such as Kyoto-based programme in Japan).

But all this could have happened even within a “normal” framework? There could be a need to put these choices of partners into a new perspective of innovation, sustainability and market feed-back as indicated above.

It could also be worth to notice the absence of such networking within the Nordic and/or Baltic Region especially for Buildings and Renewable Energy, where these close countries have a lot in common (climate, resources) and in the area of “Energy and Society” where tradition and societal structure show resemblances.

Opportunities for important industrial, social or cultural dividends?

The strategic area leadership has worked long and hard to successfully put together partnerships such as the one million dollar per year Statoil, Norsk Hydro, Research Council, MIT, NTNU Gas Technology Program. It has been so successful that the partners are considering doubling the projects and funding. We have suggested to the Strategic Area leadership were other industrial- university collaborations should be developed.

As mentioned above in relation to the EU projects there seem to be a focus on very specific technological issues and less on those that are of importance to development of buildings, cities, end-use of energy, exploitation of renewable resources etc.

The area of energy demand management is one with tremendous opportunity and will require not only technology but social and economic inputs. We see the group as a whole evolving in this direction. Finally we see a commitment by the participants to do a better job of translating to educational and to public service its important findings.

Researcher training.

The new joint projects involve NTNU MIT research partnerships with strong student exchange. The momentum of the Strategic Area will help to attract the best and brightest of students to this area. We suggest more emphasis on student design projects and student prize competitions to increase student involvement. Strengthen student entrepreneurial activities and the spinning off of new ideas to start ups.