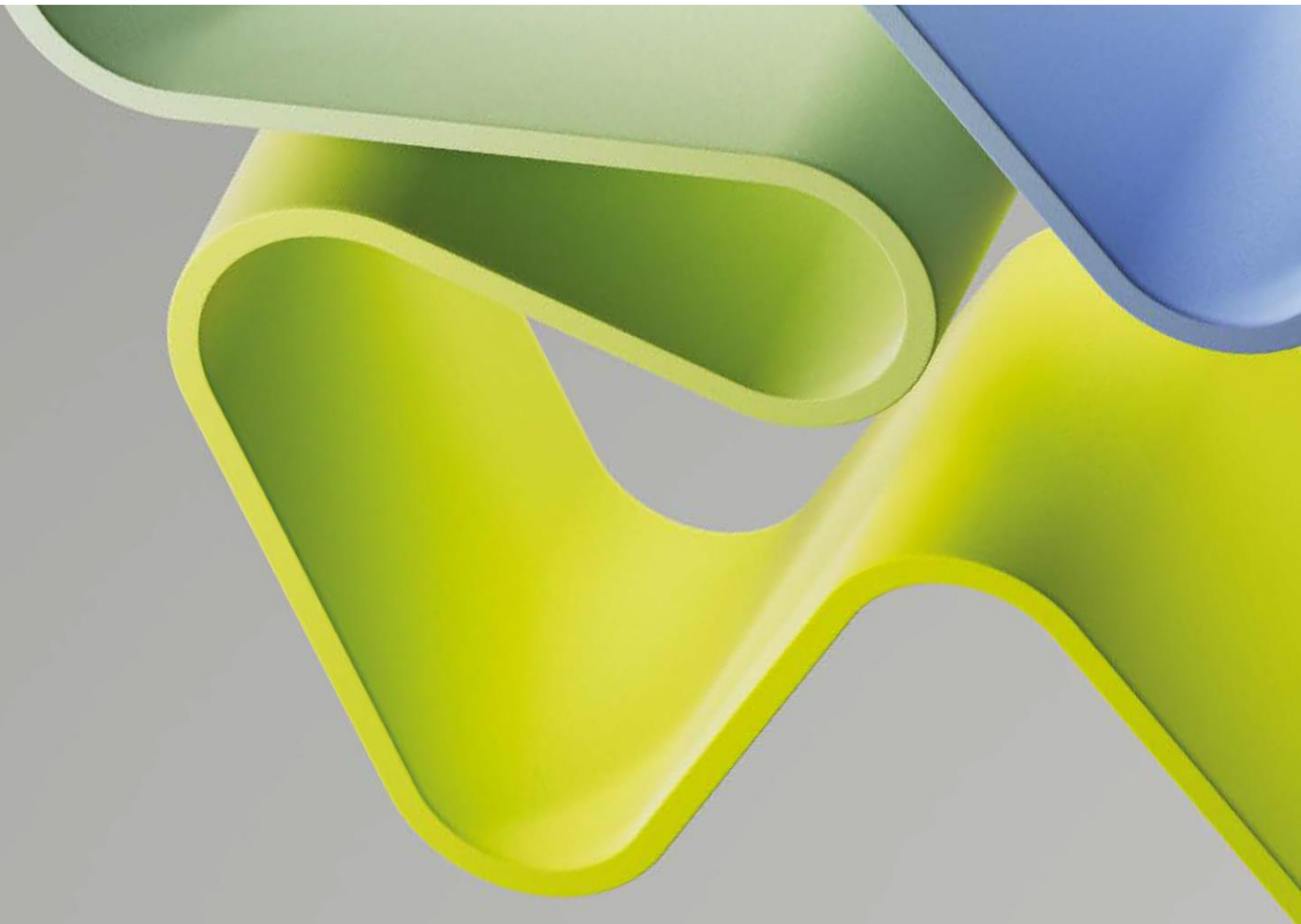


Department for Energy and energy transition

# **Underway evaluation of two Centres for Social Science-related Energy Research**



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# Preface

This evaluation report presents the underway evaluation of the Centres for Social Science-related Energy Research, FME Samfunn, which started in 2019.

The FME scheme is one of the Research Council's most important instruments for research on environment-friendly energy research. The FME scheme was launched in 2010 with the first group focusing on technology.

The overall objective of the FME Samfunn scheme is to establish centres that will contribute widely to developing a fact-based knowledge pool for strategic decision making in the public and private sectors. The FME Samfunn centres will conduct social science research to generate knowledge to solving challenges and exploiting opportunities in the fields of energy and climate. This evaluation is of the second group of FME Samfunn with main focus on social science energy research.

The Research Council of Norway wants to express a great appreciation to the international evaluators. The evaluation teams have produced a report which will be of great value both for the further activities of the centres and for the Research Council in administration of this and similar schemes.



Rune Volla  
Director Department of Energy and Energy transition

# Underway evaluation of two Centres for Social Science-related Energy Research



# About the evaluation process

The centres are co-financed by the Research Council, host institutions and the centre partners. User partners from industry and public sector participate actively in governance and research.

*The purpose of the evaluation is to give advice on how to improve and further develop the centre and if necessary, set new conditions in the contract for the activity in the centre's last three years, so that the success criteria are fulfilled in the best possible way.*

When the centres were established, they were given a contract for five years. Based on a successful underway evaluation the contract will be extended for the last three with or without renewed conditions.

In this underway evaluation, each centre has been evaluated by a panel of three international experts; two scientific experts with expertise to evaluate the research activities of the centre, and one generalist expert with responsibility for the overall process and experience to evaluate organisation, management and innovation activities. The two scientific experts had the scientific responsibility for one centre each.

The evaluation interviews were, due to limited financial and personnel resources, held by video conferences. The international experts received beforehand information about the two centres and the FME Samfunn scheme. Thanks to very good preparation from both the international experts and the FME's, the evaluation process worked very well.

It is the Research Council of Norway's decision whether the centres should have renewed conditions or not.

# Final report from the international evaluation team

The Underway Evaluation of two Centres for Social Science-related Energy Research (FMEs) took place on the 26th and 27th June 2024. It focused on the Research Centre for Socially Inclusive Energy Transitions, led by University of Oslo (Include) and the Norwegian Centre for Energy Transition Strategies, led by NTNU in Trondheim (NTRANS). Both centres were established in 2019 following an open call for proposals. They are part of a larger programme of FME centres on environmentally-friendly energy research, funded by the Research Council of Norway (RCN).

The evaluation was carried out by an international evaluation team: Professor Jim Watson (generalist and chair), Professor Harald Rohracher (with special responsibility for NTRANS) and Dr. Ståle Holgersen (with special responsibility for Include).

This report comprises three main sections. Section 1 discusses the overall performance of the two social science energy research centres, and makes some general recommendations. Section 2 focuses more specifically on the Include centre, and Section 3 focuses on NTRANS. Both of these sections evaluate these centres with respect to the success criteria, and make some specific recommendations for their last three years.

We would like to thank everyone who took the time to meet us during the evaluation – including centre staff, PhD researchers and partner organisations. We are also grateful to the RCN team for organising the evaluation, and their support and advice.

## **23rd August 2024**

Jim Watson, University College London, UK

Ståle Holgersen, Örebro University, Sweden

Harald Rohracher, Linköping University, Sweden

# 1. Overall performance of the social science energy research centres

## 1.1 Overall impression of success

Overall, both centres are very successful and impressive. They have already made major contributions to research and impact, and have demonstrated how to develop and implement close collaborations with partner organisations. The centres have ambitious research agendas, and have successfully brought together and integrated a wide range of disciplines and theoretical perspectives in an interdisciplinary programme. A key rationale for funding research centres is that they provide a 'critical mass' of expertise with a longer-term agenda, and can therefore deliver much more than a loosely co-ordinated collection of research projects. Include and NTRANS have achieved this, and taken full advantage of the opportunities provided by long-term centre funding.

The centres are also performing an important role that is complementary to the technical FME centres. Social science insights are essential for a successful energy transition to take place – by understanding costs and benefits, the social conditions for success, the role of different actors and how to navigate politics that can (and will) be challenging. Both centres have embraced this agenda, and demonstrated the value of social science-led research well beyond academia.

## 1.2 Performance of the centres as a whole against the success criteria

### **Research activity**

The two centres have distinct profiles. Their interdisciplinary programmes bring together diverse disciplines and theoretical perspectives. Whilst they both focus on the transitions to sustainable energy systems that are required, they have complementary research agendas: Include has a particular focus on justice in energy transitions; whereas NTRANS brings together sociotechnical, techno-economic and environmental sustainability perspectives.

They have implemented these agendas successfully, as demonstrated by large numbers of academic outputs, providing an interdisciplinary 'home' for strong cohorts of PhD students, and by collaborating successfully with a range of partner organisations. The large numbers of academic papers produced so far suggest that both centres have the scope to be more ambitious – with a particular focus on papers that integrate and synthesise research, and make 'higher level' contributions to knowledge.

It is also clear that host institutions have played a crucial role in both centres through the provision of space, high level support and other resources. Research and user partners have also been centrally important in shaping their research agendas and plans. There are many good examples of the

benefits of the centres to user partners – for example through access to expertise, collaboration on research projects and participation in events.

There is clear evidence that the centres have strengthened links between social science-related and technology-related energy research. Some of this is embedded within the centres (especially within NTRANS), whilst there are also multiple collaborations with technology-related FME centres.

### **Relevance and benefit to users**

Both centres work closely with user partners, pursuing agendas and activities that are highly relevant to those partners. Their contributions to policy and practice have been substantial, and there is significant evidence of co-creation of research agendas and knowledge. Whilst views vary about the extent of co-creation, surveys of user partners give a positive assessment of their work.

Although there have been some changes in user partners, both centres have recruited new partners since they started work. During their next phase of work, we would encourage both to continue to explore new partnerships that could increase the value and impact of their work. There is some scope to improve communication with partners to ensure that they are kept updated with each centre's work, and can take full advantage of collaborative opportunities.

In the evaluation meetings, we discussed potential tensions between working closely with partners and academic independence. There were contrasting responses from the centres, and it was clearly a more salient issue for NTRANS. This may be because each centre works with different types of partner organisation. For example, NTRANS works more closely with incumbent energy companies such as Equinor.

### **Internationalisation**

Whilst their focus is largely on the Norwegian energy transition, both centres have developed an international profile. This includes publishing widely in strong international academic journals, participating in international conferences, hosting international visiting academics and engaging in international collaborations. They have also attracted international funding, including from European Horizon research programmes.

The centres differ in the extent of their international collaboration. Include has a close collaboration with a UK research partner (Durham University) that is involved in the centre. By contrast NTRANS works with a wider range of international universities and research organisations. There are merits in both approaches, which have produced substantive outcomes.

We note that the centres do not have an explicit strategy for international collaboration. We'd encourage them to develop such a strategy in the near future. In particular, the centres could make more use of their international advisory boards to identify priorities for international collaboration, learning from other contexts and increasing the international visibility and impact of their work.



## **Researcher training and recruitment**

PhD research projects are centrally important for both centres, and both have strong cohorts of students – including some students who are working directly with partner organisations. Progress is good overall, and some students have already completed their PhDs

We heard positive comments about their integration into the centres' research programmes. They value having an interdisciplinary 'academic home' provided by the centres, and the opportunity to meet a diverse group of other researchers. Based on our discussions in the evaluation meetings, there may be scope for more systematic integration of students into research themes. In addition, some of the newer students are still settling in, and might require more support to understand where they fit into their centre.

With respect to training, both centres run courses for their PhD students. They have also developed Masters-level courses, which help to broaden their impacts – and to provide opportunities for students to get involved in centre research.

## **Partners and funding**

Both centres have raised substantive co-funding (in cash and in kind) from their host institutions and from user partners. This co-funding significantly exceeds the required minimum stipulated by the RCN. As noted above, they have made efforts to attract new partners since the centres were established, with some success. There are welcome plans to continue this process in future, as the research strategy and priorities of each centre continues to evolve. As outlined in their annual reports, the centres have also been successful in securing funding for related research from national and international sources – including EU Framework programmes.

## **Organisation**

Both Centres are operating well, and meet the RCN's success criteria. They are well managed and organised, with clear structures and responsibilities. Our impression from the evaluation meetings is that they both have strong and collaborative leadership teams. They also have good working relationships with their Boards, which have an important role in decisions about their priorities.

We note that the centres have taken a different approach to organising their research. For example, our impression is that Include have a more project-based focus in the way they describe their research programme. NTRANS places more emphasis on broader work packages and how they relate to each other and their overall focus on energy transitions. Both approaches have merits. We'd encourage both centres to learn from each other in their remaining few years, so that it is clear how individual projects contribute to broader strategic themes and the overall 'mission' of each centre.

## 1.3 Gender issues

Based on our analysis of each centre, it is clear that both of them have worked positively to ensure gender balance. Whilst there is some room for further improvements, their gender balance is likely to be better than in the energy sector as a whole. It is important to note that Include is led by two women: the Director and Programme Co-ordinator.

In common with the situation elsewhere in academia, there are differences across levels of seniority. Men constitute a majority of senior decision-makers with the management groups of both centres, whereas women outnumber men in some more junior roles (e.g. among students working with Include).

## 1.4 Recommendations

In addition to the recommendations for each centre in sections 2 and 3, we have seven overall recommendations:

1. Confirmation of funding. Both Centres should be funded for a further three years. They are performing very well, and are very likely to continue to make significant contributions to knowledge and positive impacts on society.
2. Research integration. This should be a key focus in last three years. The centres should devote enough resources to integration, and think carefully about how it will be achieved in practice. We encourage them to build on work already underway to identify key topics and societal questions that will provide a focus for integration of each centre's research.
3. Balancing independence with working closely with partners. Working with partners is valuable, and both centres have demonstrated clear benefits of doing so. However, it also comes with the potential for tensions – especially when the focus is on contested dimensions of energy transitions. We encourage centres to continue to reflect on how they manage these tensions, and to implement strategies to do so in an active and explicit way.
4. The value of social science research. The centres have demonstrated that social science-led research is essential for understanding and informing the transition to sustainable energy systems. They should identify opportunities to ensure that all stakeholders understand the value of social science research, drawing on examples of success from their work.
5. Flexibility and speed of response. The energy transition is unfolding rapidly, often in unpredictable ways, due to changes in markets, geopolitics, technologies and policy priorities. Both centres have already shown how they can adapt to significant change – whether due to the Covid-19 pandemic or the more recent energy price shock that was exacerbated by Russia's invasion of Ukraine. During their remaining period of activity, the centres should ensure that they can respond

quickly to this changing context – and consider experimenting with new processes or ways of working to do so.

6. Internationalisation. Whilst both centres have significant international activities and engagement, they lack an explicit strategy for international collaboration. We encourage them to develop such a strategy as soon as possible in collaboration with their international advisory boards. This would help them to prioritise the most promising opportunities, and increase their international visibility.
7. Exit strategies. It is important that the work carried out by the centres has long-lasting effects, and continues in some form beyond their current funding period. Both centres should explore how to create more long-term structures (e.g. networks, platforms or collaboration agreements) to preserve the research competences, collaborations and capacity they have built.

## 1.5 Reflection on the evaluation process

The evaluation process has been very well managed and organised by RCN and the centres themselves. We have a couple of suggestions for future evaluations:

- Whilst the online meetings worked well, meetings in person would be preferable in future. Given the large amount of written material provided to the review panel in advance, these meetings could include shorter presentations and more time for questions.
- We would also recommend a separate meeting with Centre board members and partners, without the research teams present. We had separate meetings with PhD researchers for this evaluation, and this helped the panel to have a full and frank discussion with them.
- It may also be useful for evaluation panels to hold at least some meetings without the Research Council of Norway (RCN) representatives present. The answers to some questions could be influenced by having RCN staff present.

# 2. Include – Research centre for socially inclusive energy transitions

## 2.1 Research activities

### **Summary: Aim, Scope and Outcome**

Due to contextual changes and the engagement of user partners, the main vision for Include has been slightly reformulated from the original version. The primary objective was previously to “produce critical knowledge on how to achieve socially inclusive decarbonisation and energy transition (DCET) in Norway”. This has changed to: “Include’s vision is to contribute to making [the energy transition that will protect the environment and prevent further climate change] socially inclusive and just. Co-creation of knowledge and learning through experimentation form the cornerstones of our methodology.” It almost goes without saying that these are extremely relevant issues.

The work at the centre is organized through six Work packages (WP). The first three are “empirical fields to be examined”: *Energy systems in transition* (WP1), *Energy spaces and flows* (WP2, urban and rural spaces, transport, consumption), and *Municipalities as change agents* (WP3, including multi-level governance). In addition, WP4 is called *Interventions* (“where we would conduct and evaluate experiments in collaboration with user partners”), WP5 *Learning across borders* is dedicated to comparative research between the UK and Norway, and WP6 focused on synthesis work, communication, and education.

Researchers within the centre belong to various academic disciplines, e.g., Human geography, Political science, Anthropology, Informatics, Economics. The research methodology is based on three key concepts: energy transition, energy justice and transdisciplinarity; while the three main angles are transformation, justice and co-creation. Research topics include, for example, energy practices, energy democracy, sustainable consumption, social implications of energy smart and compact city strategies, municipal climate and energy practices and land-use management.

According to *The Centre Self-evaluation*, the centre has produced 100 research articles (as of April 2024), and 155 presentations to international audiences. There are 40 ongoing projects (as of December 2023), 10 of them cutting across WPs, and 23 projects are completed. There are 15 PhD candidates in the centre, all affiliated with a WP, and three of them employed by the public or private sector. Nine of the candidates have co-supervisors representing different disciplines. There has been collaboration with other actors in Norway, not least with five other FMEs: NTRANS, Zero Emission Neighbourhoods (ZEN), CINELDI, HyValue and BioFuels.

### **Comments: on content**

According to the *Self-evaluation*, the centre has “clearly demonstrated the connection between clean energy systems and social consequences in two important ways”: i) highlighting how the energy

transition can have various social implications, and ii) that social ramifications of the energy transition might have “detrimental consequences and hinder the energy transition itself, particularly if social aspects and perceived justice issues are not sufficiently addressed.” The implications for social justice and inclusion are analysed in urban, regional and transport planning. The centre also emphasises their work on how “municipalities can develop strategies and measures to ensure socially inclusive transformation and delivered important results”, as well as developed a “methodology that has a high degree of user partner involvement in developing innovative measures for socially inclusive transformation”. This is very much in line with what we find when reading the publications from the project. These are very important – and difficult – questions that can and should be further elaborated on in the next phase of the process.

### ***On quantity and quality***

The initial milestones, according to *The Centre Self-evaluation*, was to publish 66 academic articles (30 by senior researchers and 36 by 12 PhDs), but already by April 2024 the centre had reached 100 articles. This is impressive. And nothing indicates that the number will stop here.

Now that the centre has over-achieved on number of publications, there is no need to stress further the *number* of publications. The centre should use this opportunity to focus even more on *quality*. Individual researcher might still have personal reasons publishing ever more papers, but from the perspective of the centre, there is no need to prioritise higher numbers of publications. The quality is already good, indeed often very impressive, and quality and quantity are not always mutually exclusive when it comes to academic publishing. The performance of Include has been highly impressive so far, and the centre has become a very important source of research on justice and climate change internationally.

We do think the centre has placed itself in such a good position that it can now focus and emphasis even more on quality – where the sky is the limit – rather than for example setting up new targets on 150 or 200 papers. This will be especially important in the last three years of the funding period, when – as we will also return to below – focus should be on synthesising the work that has been conducted, and further developing the core ideas and findings from the research that has been done so far.

## **2.2 Internationalisation**

### ***Summary: Aim, Scope and Outcome***

The international work focuses to a large degree on Durham University. Researchers from Durham are active in the centre, Norwegian researchers have visited Durham and researchers from Durham have been to Norway, and Include’s international conference 2022 was organized in Durham. The centre has also worked extensively with international actors in various ways: from co-publishing papers and having visiting scholars (in 2023/2024, 6 visiting scholars, staying between 1 and 4 weeks, and having 2 senior researchers from the centre visiting abroad). Among the 15 PhD students, 2 are Swedish, 1 is Dutch, and the remaining 12 are Norwegian.

New successful applications have been written with international collaborators. Among 41 new successful applications related to the centre that received funding, 20 were written with international collaborators, involving in total 39 different international research partners. Some of these are spin-off projects that originate directly from Include, while in some projects, the researchers from the centre and user partners lead or participate.

There have been 155 presentations to international audiences, and various researchers are active in specific networks. The *Self-evaluation* mentions explicit the conferences ECPR (European Consortium for Political Research) and ISA (International Studies Association). The *Fact sheet* also mentions that four PhD-candidates have international co-supervisors, and four PhD-candidates have completed or will do international exchange visits, and from the *Annual Report 2023* we see for example that members of Include have been to a study trip to the Netherlands.

The centre argues that language barriers have been greater than expected, considering that much of the communication with user partners takes place in Norwegian. The self-evaluation mentions the benefit that one participating researcher from Durham speaks Norwegian, and the centre is translating issues of *Results and Recommendations* into English. In addition to Durham, the *Self-evaluation* also mentions collaborations, in various forms, with Wageningen University, Ian Bailey at the University of Plymouth, University of Amsterdam, Utrecht University.

### **Comments:**

The role of internationalisation should be understood in the light of the fact that the research project is highly focused on Norway: it is situated in Norway, research *focus* is on Norway, most research *is done* in Norway *on* Norwegian cases, and often *with* Norwegian *user partners* where Norwegian is the working language. The question of e.g. producing knowledge with international partners should also be discussed from this perspective.

The interaction with Durham seems very productive. And there are indeed advantages of working more closely with a handful of people at *one* place, than having dozens of partners in various countries which are hardly involved or familiar with the Norwegian context.

Given the Norwegian focus, it seems to us that the benefits from working with Durham is feedback, co-authorships and mutual intellectual stimulation. On this the centre is delivering, and having in-person meetings and conferences are highly productive in this respect. We are not sure about the added value of making comparative studies between Norwegian cases and the city of Durham. The findings might be interesting, but what makes the Durham connection valuable is more the people than the place, in our understanding of the situation. Comparing a Norwegian case with for example Durham might be seen as doing “more” internationalisation, but it is worth asking if focus in the last phase should rather be on synthesising and even further improving the work already done in Norway. And views from outside – i.e. feedback, comments and critique from researchers outside Norway – could be very valuable also in this process.

When centres are focused on a national context, like this one, there are always risks of becoming too limited in perspective. In this regard, perspectives from outside can be valuable. We think the Durham connection has already had a productive impact in this respect. The 8 international researchers on the Advisory Board, to our knowledge, have mainly contributed to the centre with lectures and general input, though two members have been actively involved in a project and a publication, respectively. It is worth considering whether these researchers could also be involved in commenting on the actual research of the project, as well as in the process of synthesizing the work in the next phase of the centre.

## 2.3 Relevance and benefit for the users and society at a whole

### **Summary: Aim, Scope and Outcome**

There are 29 partners in the centre. Some of these are, for example, research centres, state agencies, municipalities NGOs or voluntary organizations. The centre's 23 user partners are participating in the different projects to varying degrees, ranging from one single project to 14 projects (Viken County). Four user partners (in six different projects) are heading specific projects, as listed under "User partner involvement in research (as part of co-creation), Partner led projects". The total number of popular science publications and presentations performed by user partners (internal and external events) are 189: i.e. 27 in 2020, 35 in 2021, 46 in 2022, and 81 in 2023.

The centre has actively collaborated with five other FMEs: NTRANS, Zero Emission Neighbourhoods (ZEN), CINELDI, HyValue, BioFuels. The Fridtjof Nansen Institute are involved in a new FME, SecurEI.

The centre has had almost 100k hits on the web site, there are over 500 recipients of the newsletter, the centre is active on Facebook and X, have been organizing and co-organising conferences, seminars and workshops, including 14 lunch seminars (where 4 has been in English and 10 in Norwegian), and contributed with 722 presentations in total. The centre also has a part-time communication officer based at SUM, in addition to communication officers employed by research partners who allocate part of their time to Include.

The centre established in 2021 two new mechanisms to "stimulate innovation based on our work": a policy brief series entitled *Results and Recommendations [Policy Briefs]* (which has published 24 issues), a *Partner Forum* (8 in total, where user partners and researchers were invited to discuss specific topics (*Fact sheet*, part 5), and a *Report series* (8 reports).

Numbers from the *Survey for user partners* (see pages 12, 18) show that user partners find the centre relevant for their organisations: 24% answered 6 (highest), 47% answered 5, 18 % answered 4 and 12 % answered 3). One the claim: "The centre has case studies/user cases that are of interest to us», no less than 70% answered 5 or 6 (from 1-6).

## **Comments: Impact**

We must start with acknowledging the quality and quantity of impact and outreach. The *Survey for user partners*, filled out by user partners in preparation for the evaluation, show a high level of satisfaction with Include - and the impact the centre has on many of the organisations. 59 user partners participants, for example, were engaged in projects in 2023, and 9 organizations outside the centre have been “influenced” (according to *Fact sheet* page 5). This might be user partners bringing tools, transformative strategies, perspectives, and learning from Include, into own activities and practices. The centre’s *Self-evaluation* reports that their articles in Store Norske Leksikon (encyclopaedia) are widely read, and the consulting firm Rambøll draws on Include PhD projects in their own organisation. The *Self-evaluation* goes on to claim Include has a strong position “within relevant decision-making circles at the governmental level”.

While this is hard to specify, it seems clear to us that the centre has managed to reach out to a broader audience, impacted user partners and, arguably, also exerted influence on governmental level. There are, however, potential tensions between critical research and influence. There is a danger that the closer one’s policy recommendations are to the interests and worldviews of power holders, the more likely one is to have made an ‘impact’. And that small changes are more likely to be implemented than more dramatic changes, regardless of what is actually needed to solve a given problem. In some cases, quantifying impact is therefore problematic.

## **Communication**

From the *Survey for user partners*, 94% answered YES that they had participated in “meetings/workshops for project plans and idea generation”. And 82% answered YES on “Participation in research activities or case studies / user case in the centre”. This is impressive and gives the impression that communication within the project has worked well.

Collaboration between the centre and user partners are strengthened when user partners are involved in more academic events, and when researchers are represented outside academia, in for example conferences like the *European Health Network* conference and the municipalities’ *Green Practice* conference, or at the circular economy network at Norwegian Association of Local and Regional Authorities. To improve communication, the centre has also put emphasis on translating results to Norwegian stakeholders/decision makers.

Some presentations and reports have been held and written jointly by researchers and user partners. There are even examples of user partners initiate project that overlap with the focus of the centre (Future in Our Hands or FIVH, and The City of Oslo’s Municipal Energy Forum was mentioned in the *Self-evaluation*).



## ***Co-creation of knowledge***

The centre argues that one cornerstone in its methodology is “co-creation of knowledge”, which implies “producing knowledge through collaboration between researchers and user partners who represent the public, private and voluntary sectors.” The interactions between the centre and the user partners have clearly been good. From the publications it is evident that the researchers have benefitted from this interaction, and from the *Survey for use-partners* and *Self-evaluation* we see how user partners have benefitted from the research. The number of workshops, meetings and other forms of collaboration, further display this. The processes in 2020 and 2023 with defining and developing projects and topics seem to be very constructive in this regard. In the *Self Evaluation* we read that co-creation of knowledge became more extensively than initially anticipated (originally only meant for WP4, this now applies for all WPs).

That interaction, dialogue and collaboration is good, is one thing; “co-creating knowledge” is a more difficult task. First, it is not always clear what exactly it means (apart from having very good communication and having mutual benefits from the interactions), and it remains a bit unclear how the centre has done this. In *Survey for user partners*, 71% answered NO to “Involvement in development of new platforms and tools for knowledge sharing and co-creation”. It is worth acknowledging that this is indeed very difficult for everyone. However, if this is a cornerstone of the centre, perhaps this aspect of collaboration could be further improved. Alternatively, the centre could place less emphasis on this particular goal – or qualify what it means in practice.

## ***Possible tensions between user partners and critical research***

The *Self-evaluation* argues that “there is no contradiction between accommodating research to the needs of user partners and producing high quality research”, and this was also the feedback from the evaluation meeting on 26<sup>th</sup> June 2024. It is worth noting that energy transitions is a field that is sometimes characterised by tensions. We’d encourage Include to be conscious about these potential tensions. For example, if a PhD-student starts doing a case study on a user partner, to what degree can they criticise this user partner? To what degree are the research questions (consciously or not) formulated in ways that secure a good working relationship in the first place? To what degree is this compromising critical perspectives? To what degree will user partners have an interest in hands-on and concrete results that can be implemented, while researchers or PhD students also need to frame broad questions and be able to discuss “alternatives” that are not possible to implement under current conditions? In addition, PhD students funded by and working in public and private institutions face specific challenges, particularly with potential tensions between the expectation to remain loyal to their workplace and the need to conduct critical research.

Having said this, these are general challenges that go far beyond this research centre. Here, we just want to encourage the centre to be conscious and work pro-actively to manage possible tensions between the needs of user partners and the critical nature of academic research.

## 2.4 Researcher training and engagement in education

### **Summary: Aim, Scope and Outcome**

There are 15 PhD students affiliated with the centre and 2 postdocs. 37 MA degrees have already been completed (2020–2023), and further 23 MA theses will be added in 2023/24. There are currently two public sector PhDs linked to Include – employed by City of Oslo's climate agency and the Norwegian Environment Agency – and one industrial PhD employed by Rambøll AS. To facilitate academic cooperation, exchange of experiences and socialising among the PhD candidates, a PhD group led by one of doctoral students, has been established.

In terms of education, there are two PhD courses developed within the centre, together with the research school Empowered Futures, and two Master's courses are developed and led by the centre. The “most central courses”, mentioned in *Self-evaluation* is: *SUM4502 INCLUDE – Socially inclusive energy transition* (Master course); *SUM4002V Sustainable Transformation Management* (in Norwegian) (Continuing education course for practitioners) and *Empowered Futures* (PhD course).

### **Comments**

Potential tensions concerning PhD-candidates working for public or private sector are discussed in the previous section.

According to *The Centre Self-evaluation*: “All our PhD candidates have an affiliation with a WP, and three of them are employed by the public/private sectors.” There is also an active involvement of PhD and MA students in research. This is valuable, as is the PhD students having second supervisors from abroad. The publications also shows that the centre has integrated the PhD students into the research activities, which is very valuable.

Our impression from the evaluation meeting on the 26<sup>th</sup> June was that the PhD students are well integrated in the centre: socially, intellectually and formally. The centre could consider formalising their integration, for example by including a PhD representative on their Board.

## 2.5 Organisation, management and funding aspects

### **Summary: Aim, Scope and Outcome**

The centre has a budget for 170 555 000 NOK. The *cost vs budget* was 96% in 2021, 90 % in 2022 and 98% in 2023. The centre receives stable funding from the host UiO, and is fulfilling the criterion from The Research Council of Norway that participating research and user partners each contribute minimum 15% of the RCN funding (see *Self-evaluation*, p. 8). Circa NOK 3.8 million is set aside as a buffer, for forthcoming research needs.

Collaboration within the centre is facilitated through various internal meetings and events for researchers and user partners. The centre is organized with a general assembly, board, and management group. The Centre for Development and the Environment (SUM) at UiO provides office facilities for meetings and office space for researchers and visiting scholars. SUM also facilitates centre activities and provides support for management, accounting, and communication. The self-evaluation mentions that there is "space for scientific and administrative autonomy."

Three new user partners have been recruited since the project started: Union of Education Norway (in 2021), SABIMA (in 2024), and Troms Kraft AS (in 2021). Troms Kraft then withdrew after completing the agreed three years, and the user partner Aspelin Ramm left the project. When Viken County Municipality in 2024 was divided into Akershus, Østfold, and Buskerud, the first two of these new county municipalities decided to continue their engagement with Include.

Beyond the regular and ongoing dialogue that exists, the secretariat also makes an annual telephone call to each user partner to discuss plans for further contributions. Several surveys have been conducted among user partners to capture their research needs. According to the *Self-evaluation*, the centre's organisation and research (and co-creation of knowledge with user partners) have resulted in modified practices among several user partner organizations.

While new project ideas are approved by the management group, researchers have significant autonomy in developing new projects. For larger and external events, the centre might bring in artistic elements, from improv-theatre, live drawings of the content of the meeting to classical music performances and inviting comedians. There is also an informal Include Choir, and the *Self-evaluation* highlight that relations between 13 participants were strengthened as they travelled by train from Oslo to Durham in 2022.

### **Comments**

The centre has distributed most of the funding among the research partners at an early stage, rather than, for example, distributing funding on an annual basis. This was according to the *Self-evaluation* done with an eye to the distribution of PhD positions and researchers' responsibilities. It is argued that this worked well and that alternative models could have spurred tensions and conflicts. Although it is hard to know what would have happened with another distribution model, we believe the centre is right here. Our impression is that there is a positive spirit of collaboration within the centre, and that the overall management seems very good.

That the centre is well organised is also evident from the feedback in the *Survey for Host and Research Partners* and the *Survey for User Partners*. This can be exemplified by comments like, "The professional and administrative management is of high quality." The centre model ensures long-term and strategic research while also enhancing flexibility and the ability to respond to impromptu and urgent events and knowledge needs. We believe the Include organization seems robust and capable of both steering the ship forward and being flexible when needed.

One example of flexibility is when the centre wrote a response to a hearing on future electricity demand in Norway, and the centre was able to join a European Horizon research project at short notice. The centre sees itself as a trust-based organization, “with participants who are dedicated to fulfilling their obligations and responsibilities”. This is evidenced, among other things, by over 100 publications.

The organization seems pragmatic and able to manoeuvre under changing conditions, such as providing insight on a tax relief scheme for the petroleum industry during the COVID-19 pandemic and responding to Ministries’ needs for commissioned work on increased energy prices. The centre also reformulated its vision and even changed its title. The centre was running during the COVID-19 pandemic, and from what we can see, it seems to have been handled well, with an emphasis on webinars and online activities, while reallocating funds from some areas (travel) to others. We see it as a strength that the centre, and the leadership in particular, has demonstrated such flexibility.

The demands on the leadership might change during the final three years. Until now, the combination of good communication and giving researchers flexibility has proven to be a fruitful strategy. The intention to focus more on synthesising and bringing insights from various WPs together in the next phase might also demand more hand-on leadership and more direct steering from above. We have no doubt the leaders of the centre will manage this, but it might be wise to inform and discuss this thoroughly with the whole organisation before changing the style of leadership.

## 2.6 Gender aspects

### ***Summary: Aim, Scope and Outcome***

The centre argues that they seek to have a good gender balance, and that they have achieved good gender balance in all groups. This is also supported by the statistics in their annual reports: In 2023 the distribution of representatives and deputies were as followed: The Board of Directors (8 women, 8 men); voting representatives include the 2023 Annual Meeting (5 women, 10 men); Management group (3 women, 4 men). Among the active participants from the (user) partners, 73% are women and 27% are men. Our 46 senior researchers consist of 45% women and 55% men. PhD students (5 men, 9 women). Current Master's students affiliated with Include (18 women, 7 men). Completed master's projects in 2023 (7 women, 3 men).

### ***Comments***

We agree with the centre that the gender balance is fairly good. It is worth noting that there is a pattern observed here that mirrors trends seen elsewhere in academia, where women are overrepresented among students, but men constitute a majority among voting representatives at Annual Meetings and in management groups. It's worth noting that the centre is led by a woman.

## 2.7 Plans for final three-year period

In 2020 and 2023 the centre had processes for defining and developing projects, which were also used to collaborate with user partners. From what we can see, this seems to have been a productive strategy. From the *Working plan 2024* we see how the various WPs have different plans. The WPs will start new projects, continue working on projects and complete projects, as well as applying for funding for new projects. In WP2 an announced PhD will start at ISS.

### **Comment**

As mentioned above, the flexibility and the ability to respond to changing circumstances has been a strength for the centre. From the evaluation meeting on 26<sup>th</sup> June, it was also clear that there is no lack of ideas for new topics and further projects. However, there is a strategic decision that the centre needs to take: whether continuing the flexible and open-minded approach (that has worked well so far), or steer the centre in a certain direction in the next three years. We argue for more emphasis on the latter.

The annual RCN funding will be reduced in the coming years, which will limit capacity for new research. To prepare for this, the centre argues in the *Project plan* in the *Centre Self-evaluation*, it will also be valuable to prioritise synthesis projects to maximise output and impacts during our remaining years. We think this is a wise strategy.

## 2.8 Future activities beyond the centre period

Some of the activities planned in 2024 will by their nature go beyond the centre period. For example, it is possible that some PhD students starting in 2024 will not finish their work until after the end date for the centre. There was not much in the written material that indicated thinking beyond the centre period, but from the conversations on the 26<sup>th</sup> June, it is clear that the members of Include are working on what they see as a longer-term agenda. We would encourage them to use the last three years to develop their plans for a longer-term research legacy, new research agendas that build on this legacy and how they could be supported and funded.

## 2.9 Conclusion and recommendations to the centre

Our general conclusion is that the centre seems to be very well managed and organised. Given the size and heterogeneity among research projects and researchers – with 100+ publications, 7 WPs, hundreds of presentations – and how well communication seem to be handled, we are impressed how the centre is managed.

The previous sections make recommendations on specific aspects of the centre's work including managing potential tensions between independence and working with user partners, internationalisation and the centre's legacy. The recommendations about research synthesis are particularly important, so we elaborate on them here.

The centre has excelled in research, particularly in the number of publications. However, with annual funding from RCN expected to decrease in the coming years, the main priority should not be on just increasing the number of publications. Instead, the focus could shift towards enhancing quality, and particularly towards synthesizing projects, as also indicated by the centre themselves.

The next significant intellectual challenge lies in leveraging the existing framework and knowledge to draw broader conclusions and formulate overarching arguments. It's important to clarify that this shift in focus towards synthesis is not a criticism of past approaches; rather, it reflects an evolving priority that is increasingly crucial to take the centre one step further.

The three figures developed during a research event in 2022 are very useful in this respect: i) A framework for projects in Include; ii) Include conceptual triangle; and iii) Network diagram showing connections between user partners and projects (see Appendix in *The Centre Self-evaluation*). This is productive and indicates an interest in – and capability to – synthesize and go beyond doing numerous separate case-studies.

One comment from a user partner in *Survey for user partners* (page 11) also indicates this: “The research is mostly very useful we think, but sometimes the focus may be slightly too narrow or a bit too much centred on very small components of the society we think, for it to be useful for our work, and the rapid transformation of the society needed.”

One intellectual challenge when aiming for synthesizing the research is to go beyond simply adding all the case-studies and findings you have and arguing that “all this is important”. The focus should rather be to extract the more important parts from the core of the centre, and then further develop these. Especially when working with the concept of justice – “the equitable distribution of costs and benefits and various groups’ degree of recognition and involvement in the processes” – we are curious about general conclusions and policy recommendations the centre could propose.

# 3.NTRANS – Norwegian Centre for Energy Transition Strategies

## 3.1 Research activities

### ***Summary of aims and scope***

NTRANS focuses on strategies for a transition towards a decarbonised and just energy system in Norway. The topic is extremely relevant to meet the challenges of the unfolding climate and energy crisis and to understand linkages of the required transition of the energy system with questions of democracy and social policy. Research at the centre is accordingly characterised by a whole-systems perspective and aims at a widening of transition processes by e.g. including citizens; it aims at a deepening of the transition by linking it to fundamental societal transformation processes; and it aims at accelerating the transition in face of the urgency of reducing greenhouse gas emissions. In order to achieve a holistic approach the centre combines different perspectives and bodies of knowledge - a sociotechnical, a techno-economic and an environmental sustainability perspective. The ambition is to integrate these perspectives in the development of energy models and the identification of different transition pathways. The centre's research is organised into different research areas which are each led by one of the consortium partners, but closely collaborate and integrate findings with other research areas and consortium members. The first research area (RA1) focuses on deep decarbonisation and wide societal changes and deals with questions of justice, inclusion and democracy, investigates key controversies, and provides reflections and concrete suggestions on governance strategies such as experimentation and upscaling. RA2 deals with accelerating the transition and studies ways to alter the rate and directionality of innovations, the mobilisation of financial and knowledge resources at scale and the coordination of policy arrangements across sectors and multiple socio-technical systems. RA3 focuses on the future of the energy market and puts emphasis on the design of energy markets in a way that supports the interaction of energy carriers and economic sectors and that uses the potential of digitalisation. RA4 integrates insights from other research areas into an analysis of different transition pathways. A final area, RA5, utilises the knowledge and perspectives from the other research areas for studying concrete user cases (e.g. on CCS, hydrogen or the transport sector), pilots and transition arenas in collaboration with practice partners from the consortium.

### ***Research results and outcome***

During the first half of the NTRANS funding period the centre has significantly contributed to the research frontier on energy transitions. In total more than 100 scientific journal publications are reported in the Annual Reports 2021-23. More importantly than the number of publications, this research provides important insights about the dynamics of energy transition, the understanding and shaping of different pathways of transitions, new and more differentiated approaches to modelling energy system change and designing energy markets, but also the embedding of energy transitions in broader societal changes and questions of justice, democracy and participation. Also a shift in focus

from transitions as consensual processes to the centrality of controversies and conflicts as part of transformative change can be seen as key contribution, as much as a better understanding of the coordination between different policy fields and its implications for policy design. These research results have also provided a basis for the collaborative work on user cases together with a range of practitioner partners - and has led to policy reports which proved to be important inputs to the work of policy committees and expert groups. A notable role of the centre has also been that it served as a platform for a broad range of other collaborative research projects within Norway, but also in international collaborations such as EU Horizon projects. In this sense, the core research activities of the centre have created a host of spin-offs which potentially multiply the academic results and impact of NTRANS and the academic partner institutions involved. Moreover, the centre has been the main or co-organiser of several highly visible and important conferences and a large number of workshops, which has helped to install it as an important node not only in academic discussions on energy transition but also in conversations between universities, industry, NGOs and public sector organisations about how to accelerate the transformation of the energy sector.

Summing up, NTRANS has resulted in a range of academic contributions about the understanding of different dimensions and the dynamics of energy transitions, but has also provided a foundation and input to policy making, and a background and important context to the work of other more technically oriented FMEs.

### **Comments**

The scope and organisation of research in NTRANS is ambitious, well argued and fascinating in many ways. It develops a thoroughly interdisciplinary perspective by bringing together approaches from sociology, science and technology studies, economics, modelling or sustainability sciences and thereby manages to cover and integrate various dimensions of the energy transition which often are discussed separately from each other. This inevitably creates tensions and potential frictions (e.g. between economic modelling and a qualitative socio-technical understanding of change processes), but the discussions with the consortium and the research outputs clearly demonstrate that these tensions have been handled in a productive way. They can even be seen as a productive force in the research of the centre leading, for example, to attempts of integrating a broader set of social science perspectives in energy models. The representatives of NTRANS made a strong case for how this capacity for interdisciplinary research and knowledge integration requires an extended period of collaboration to evolve, build up trust and learn to understand each others' positions - the foundations for which have already been laid earlier in the precursor of NTRANS, the FME CenSES. At the same time, however, the organisation of thematic research areas built around specific theories and approaches also allows for the deepening of e.g. sociotechnical and techno-economic analysis.

A strength of the organisation of the centre's research is also the involvement of a broad range of stakeholders as practice partners of the centre and their inclusion in the formulation of relevant research problems. Beside the production of new research insights, the centre thus can also be regarded crucial for national competence building and nurturing a new generation of energy researchers with the ability of collaborating across disciplinary boundaries, applying social science approaches in a critical and at the same time constructive way, and not least doing such research in



close interaction and communication with practice partners from business, the public sector and civil society. Such competences are crucial for driving the energy transition in Norway further and are also a condition for a successful deployment of technical innovations and the research from other FMEs. The research of NTRANS is also designed in a way that creates interfaces with technical research and opportunities for collaborations. However, making such collaborations work does not only require effort from the social science side, but also requires a deeper understanding of potential social science contributions beyond acceptability studies from the side of technically oriented FMEs.

A further notable point is the strong policy orientation of the centre and an emphasis not only on academic publications, but regular policy briefs and reports as well as contributions to the work of expert committees and policy advice. As in other contexts, a strength of the centre is its diversity of approaches, in this case also of different ways of understanding and practicing science-policy interactions and interventions in socio-political processes beyond formalised committees.

## 3.2 Internationalisation

The centre definitely has a high international visibility and is embedded in international research networks. This international embedding mostly appears to happen through the personal networks of the leading researchers at the centre, through the organisation of international workshops and conferences, through the participation in international project proposals and projects (e.g. within the EU Horizon or Nordic Energy Research programmes), and through active participation of centre members in international conferences, events and research networks. Moreover, NTRANS hosts international guest researchers and NTRANS researchers spend time at international institutions. International researchers are also represented in the Scientific Committee of NTRANS and are involved as co-supervisors for several of the PhD students.

### **Comments**

Overall, NTRANS is excellently networked internationally, has an impressive number of collaborations and international co-publications and international staff exchange. What is less visible, though, is an explicit strategy to institutionalise such collaborations through more formalised advisory boards, collaboration agreements or more formalised exchanges. This might help to make particular international research links more visible and explicit and strengthen collaborations at an institutional level. One such step has already been taken in 2024 by recruiting an international advisory board.

## 3.3 Researcher training and engagement in education

The education and training of PhD students, and to a lesser extent postdocs, is a central strategy of NTRANS. Each research area except RA5 (user cases in collaboration with stakeholders) employs between 3 and 5 PhD students who consume a considerable share of the centre's research funding. The Annual Report 2023 lists 19 PhD students and 4 postdoctoral researchers receiving financial support from the centre as well as 7 PhDs and 2 postdocs working at the centre through other funding sources. According to the report, 6 PhD students have already defended their thesis at the time of the

midterm evaluation. The centre provides significant training to its PhD students, such as PhD courses (e.g. environmental sustainability and societal transformations), joint summer or winter schools and gatherings, but also training on e.g. research dissemination and communication.

NTRANS is also involved in education at the masters level by developing courses and programs. Moreover, the centre supervises and hosts a large number of MA-theses in the different institutions of the consortium.

### **Comments**

Overall, NTRANS appears to be highly engaged in education and researcher training and to have a significant impact on competence building in the field of energy, environment and societal transformation in Norway. The PhD students interviewed during the evaluation were very content with the support they get (in particular from the current coordinator of PhD research) and their collaboration as a group. The geographical spread of the centre and the travel efforts needed for gatherings and joint workshops were pointed out as a challenge. What did not become fully clear in the evaluation and could be an area of improvement, was the integration of the PhD projects in the research plans of the research areas and the systematic involvement of PhD students in the research activities and conversations within the centre. It is not always clear how the topics of PhD theses were chosen and how they are part of the research plans of the different research areas. Given the high number of PhD students, a more formalised integration of PhD education in the form of a joined research school with partly shared courses and part of the courses in their home institutions could contribute to a stronger collaboration, exchange and identity building among PhD students and could be considered for the second wave of PhD recruitments, if time still allows.

## **3.4 Relevance and benefit for the users and society at a whole**

NTRANS has a wide range of so-called 'user partners' from business, civil society and the public sector. Among these are large incumbent firms from the energy sector such as Equinor, Hydro or Statkraft, but also firms with a focus on IT and smart technologies. Representatives from the public sector comprise national public authorities such as Miljødirektoratet, Statens vegvesen or Enova, but also municipalities. Many of these partners contribute to the centre in cash and all of them in-kind. The collaboration with these partners is mostly organised through research area 5 'User cases'. Research from the other areas feeds into these user cases which are defined together with practice partners. A strong focus in these user cases was put on workshops and collaborative activities. User partners were also involved in developing the research plans for the centre.

As presentations and discussions with user partners and written evidence shows, the work of the centre has been of great relevance for these partners and for society as a whole. NTRANS did contribute to solving concrete problems and research challenges for its partners, it resulted in close interactions and mobility as well as the involvement of spin-off projects. Examples of mobility between research and practice are not only researchers taking up positions in the energy sector or in

municipalities, but also examples of energy sector employees starting a PhD at NTRANS or becoming involved in research. Moreover, members of NTRANS and the expertise provided by its research played an important part in a number of energy and climate policy processes in Norway, both at national and regional / municipal level.

The questionnaire filled in by user partners in preparation for the evaluation gives evidence of the high level of satisfaction of user partners and of the impact NTRANS has on the work of many of these organisations. Most of the partners confirm that they have participated often in several user cases, made use of the centre's network, have participated in workshops and have presented themselves at different centre events. Several partners also expressed their appreciation of the social science orientation of the centre and the importance of such work for the successful implementation of climate strategies. The usefulness and relevance of the centre's research was generally seen as high, while there is still potential to improve the communication between research and practice partners (though overall this was seen positively). The strongest benefits for the partner organisations were seen in a strengthened knowledge base, an improved collaboration with research and an improved network with other partners. In terms of opportunities and gains created by the centre for partner organisations, the interdisciplinary insights into problems, the holistic approach taken by the centre and the increased awareness and attention to social science stood out in the responses of partner organisations and the presentations at the evaluation meeting. The centre was also seen as important for shifting the public debate on energy and climate issues, for taking up new and emerging topics and being an important voice towards politicians. A remarkable achievement of the centre and a great example for the involvement of a wider public are the NTRANS-related (and funded) initiatives UngKlima and UngEnergi which both work in various and innovative ways with young people on issues of climate change and the energy transition.

### **Comments**

Overall, the impact of NTRANS on its user partner organisations and the wider public has been remarkable. Various innovative initiatives have been developed to contribute to policy processes and be involved in the public discourse. At least as important appears to be the direct impact of NTRANS on partner organisations, especially given their central positions in the Norwegian economy and public sector. While the big number and high diversity of user partners certainly contributes to its wide impact, it also comes with various challenges. Possible frictions between vested interests of the energy industry and its representatives in the consortiums, and the centre's ambition to also contribute with critical research on the need for transformation and change have been discussed during the evaluation. Centre members showed a high degree of reflection and awareness of this situation, which can be seen as an important precondition to have an open debate about these contradictions in the consortium and for creating opportunities for deliberation and critical reflection not only among research partners, but also participating public and industry partners. Some user partners have apparently left the centre for different reasons (not related to centre performance), so further efforts could be put into attracting additional practice partners. Without doubt, and also stated by centre representatives themselves, there is also potential to further improve the communication activities of the centre in the remaining period. It has not become fully clear either to what extent user

partners have been chosen strategically in relation to the themes and goals of the centre. Such a reasoning could be made more explicit and included in the narrative of the centre.

### 3.5 Organisation, management and funding aspects

The centre organisation and management appears to work very well. Regarding the organisation and integration of the centre's research, the structuration into the respective research areas is convincing and seems to have created many opportunities for interdisciplinary collaboration. Also the concentration of collaborative research with practice partners within a separate research areas with much higher influence of practice partners and at the same time close connection to other, academically defined research areas appears to have been a successful strategy. In terms of funding, the participants of the centre have shown great ability in attracting additional and complementary research funding from other sources, both nationally and internationally. Some funding challenges have appeared through losing some user partners and their funding contribution and the general phase out of funding during the remaining years. However, the centre representatives showed confidence and have plans to deal with this situation without causing problems for the functioning and performance of NTRANS.

The management and organisation of the centre has proven to be highly flexible and successful in adapting to a host of new challenges during the first period of the centre, from dealing with the Covid-19 pandemic and the move to online-forms of collaboration to the energy crisis in relation to the war in Ukraine and the increased public awareness for energy questions. Given the gravity and urgency of these new situations and crises, the management of the centre has responded exceptionally well and has proven to be highly competent, resilient and up to the task of leading such a complex research organisation.

### 3.6 Gender aspects

The centre appears to be aware of and to actively work with questions of gender equality and diversity. While there are more women than men in the board of the centre, the management group is tilted towards male representation with two thirds of the group members being men. Also the key researchers are more male (58%) than female, while PhD and masters students are more or less balanced. However, given the general gender imbalance in the energy sector with a higher representation of men (and the same can probably be said for research environments such as NTNU or SINTEF), the centre certainly does not stand out in a negative way and most likely has a greater gender balance than the sector in general.

### 3.7 Plans for final three-year period

NTRANS has a detailed plan for the final three-year period which more or less continues on the research pathway of the first period of the centre. The research focus for the remaining years is plausible and sufficiently well argued. The centre will start two new user cases, among these an additional focus on urban transitions. Moreover, a 'second wave' of PhD students has just been

recruited and will carry out their doctoral studies and projects during the remaining 3 years. Beyond the shorter evaluation document 'Project plan for the final three-year period', NTRANS has also developed more specific research plans 2024-2027, with expected results for each of the remaining years, detailed lists of planned deliverables, involved researchers, PhDs and postdocs as well as detailed plans for the work packages and research areas. The plans are convincing and well worked out and there is no doubt that NTRANS will keep its high level of performance also for the remaining three years. What could, however, be developed more strongly, are the efforts and plans to further synthesise the work carried out in the centre (including the diverse themes of user cases) with a view to achieve as much impact on the governance of the Norwegian energy transition as possible.

### 3.8 Future activities beyond the centre period

The documents provided do not say much about planned activities beyond the centre period. Discussions during the centre evaluation have shown that a focus beyond synthesizing and wrapping up the work carried out during the centre period will be the creation of further spin-off projects with other funding sources and in case of a new call for social science FMEs, a joint application for a new FME. Both strategies make sense. New project spin-offs will allow for further collaboration and joint research between different partners of the centre, though in a much more limited way and without overall coordination and integration. A new FME in a new constellation, similar to the transition from CenSES to NTRANS which built on earlier experiences and interdisciplinary collaboration, would retain and further extend the capacity and competence built by the previous two research centres. Without doubt funding through the FME scheme has played an important role in strengthening the collaboration between key partners in the Norwegian 'energy innovation system' and has resulted in contributions that would not have been achieved without this support. It can be assumed that such an institutional infrastructure (including social science perspectives) will also be of great relevance for the coming phases of the energy transition.

### 3.9 Conclusion and recommendations to the centre

All in all, the performance of NTRANS has been highly impressive so far and NTRANS has become a cornerstone for social science research on energy transitions in Norway, but has also had a significant impact on energy transition research internationally. We consider that the work of NTRANS is of excellent quality, both in terms of its outcomes and the quality and international standing of the institutions involved. A particular strength of the centre is its interdisciplinary organisation bringing together key research actors in Norway, but also bringing often separated research approaches from economics, modelling, science and technology studies, innovation research and others in conversation with each other. This helps create a more integrated and holistic perspective on energy transitions, their dynamics and potential pathways. It also helps to develop governance strategies to shape the energy transition in a more inclusive, democratic and just way without covering up inherent tensions and conflicts between the interests of different actor groups, the ways different actors are affected differently by transition policies and the challenges of handling a wicked problem without clear solutions in a context of great uncertainty. A further strength of NTRANS is its emphasis on PhD education and the building of research capacities and the creation of competences which will be

highly useful for research, industry and the public sector for decades to come. At the same time, NTRANS is very strong in collaborating with actors from business, civil society and the public sector and creating benefits for these actors, involving them in the definition of new research problems and establishing stable networks for future collaborations. Beyond these main strengths, NTRANS also strengthens the international positioning and integration of Norwegian research on energy transitions and has become a platform for a host of new national and international projects and collaborations with funding other than the existing centre funding. The plans of NTRANS for the remaining three years are detailed, well-worked out and plausible and will guarantee a strong performance for the remaining time.

### **Recommendations**

Our conclusion is that NTRANS performs excellently and provides crucial knowledge for the Norwegian energy transition. We have not found any significant problems in the organisation, management, research and collaborations of the centre. Our main recommendation thus is to give NTRANS the opportunity and conditions to continue on its path for the rest of the funding period.

In addition, we have some suggestions that can be taken into consideration by the NTRANS management, but are not essential for the further operation of the centre:

- **Coordination of PhD research:** Obviously, PhD students at the centre are geographically dispersed across Norway which poses a challenge for collaboration. As the second wave of PhD students is about to start their work, there is an opportunity to consider ways for their better integration into the work of centre. This could comprise a closer integration in the operation and discussions of the different research areas, but also more collaboration opportunities of PhDs with RAs beyond their own field, or the involvement in the development of research agendas. An aim should be a quicker integration from the beginning than during the first wave of PhDs who often felt isolated during the first time. The centre could also consider more joint courses (similar to a joint research school) and additional meeting opportunities. Also the involvement of PhD students in user cases should be an aim.
- **User cases:** As pointed out during the evaluations, user cases have been developed at the beginning of the centre and have been on hold for a while. Two new user cases are already planned for the remaining three years. We think that the development of additional user cases should be considered. They could help to attract further practitioner partners, could be organised with shorter time spans and thus be a flexible and dynamic collaboration instrument and an opportunity to quickly take up new topics. Given the rapid changes in the energy sector due to technology development, geopolitical contexts and social and political pressure from an escalating climate crisis, such flexible instruments which further increase the responsiveness of NTRANS to its dynamic environment would be highly welcome.
- **User partners:** The integration of further practitioner partners should be considered, not so much for funding reasons but to further increase the impact and potential longevity of the centre. Further

efforts may also be needed for handling the diversity of external partners and developing more explicit strategies for their involvement in knowledge co-production. Part of these efforts would also be a more explicit rationale and argument for how user partners are linked to the centre's goals and which additional competences and perspectives would be desirable in the portfolio of partners.

- Internationalisation: Internationalisation efforts could be better structured and more strategically oriented. Setting up an advisory board is an important step, the identification of strategic international collaboration partners and the institutionalisation of such collaborations could follow up on this.
- Communication: Despite successful communication efforts of the centre, communication strategies could be further developed. This should also include raising the awareness for the need of social science FMEs among government institutions, public authorities, research funders and the wider public.
- Exit strategy: Significant efforts should be put into creating long-lasting effects of the centre and retaining the capacity for interdisciplinary collaboration and social science research on the energy transition built up during the past years. This could include the development and communication of a long-term research agenda in this field, the creation of organisational structures and networks which last beyond the current FME, and the synthesis and communication of findings and contributions from current FME. Without doubt, the research themes of NTRANS will remain highly relevant for the Norwegian energy transition in the future, whatever organisational structure they are embedded in. NTRANS has the potential to act as a steward for these types of research efforts and their positioning in the Norwegian research landscape.

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