



## Systems integration – Dutch-German cooperation possibilities

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### **Report on the outcomes of two workshops exploring cooperation possibilities.**

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## Summary

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The Netherlands and Germany share strategic interests in terms of energy infrastructure and energy (systems) technology development, while being neighbours and having a comparable socio-economic structure. It is therefore relevant to learn from each other's approach to systems integration and related innovation challenges. Moreover, these common threads offer starting points for sharing knowledge and setting up new collaborations, such as joint research projects.

In two workshops organized in February 2021 (one on public acceptance and citizen participation in the energy transition and the other one on sector coupling and flexibility) it became clear that German and Dutch stakeholders are looking for cooperation possibilities. They want to work together on projects and learn from each other's experiences. However, they find it hard to get in contact with the right collaboration partners and they indicate a lack of (cross-border) funding opportunities.

Therefore, the Topsector Energy should look for (a) **German "co-owner(s)" that support German-Dutch collaboration in the R&I field and are willing to commit to bringing stakeholders together.** As the topic of systems integration is wide, the scope of the German counterpart may be different than that of the Dutch Systems Integration Programme. The initial effort for organising workshops does not have to be very large, but it contributes to recognition on both sides of the border.

Second, we recommend **increasing the number of contact moments and opportunities for exchanging ideas.** Stakeholders are looking for cooperation possibilities in many areas related to systems integration (even public participation, which was not mentioned as an important field for cooperation in our interviews, attracted many stakeholders who indicated to look for cooperation possibilities). **The challenge is therefore not to find topics that are suitable for cooperation but to scope the topics in such a way that they bring together stakeholders working on similar challenges.** We recommend **holding the workshops predominantly within 1 target group and making the themes as specific as possible, so that there is sufficient common ground between the German and Dutch stakeholders.** This makes it easier to find cooperation opportunities and, once collaborations started, these stakeholders can attract other parties from related sectors.

## Context

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At the end of 2020, Technopolis Group was contracted by the Netherlands Enterprise Agency (RVO) to explore partnerships with Germany in the field of system integration. In this brief report, we show the main outcomes of this project.

The Netherlands and Germany share strategic interests in terms of energy infrastructure, energy (systems) technology development, while being neighbours and having a comparable socio-economic structure. It is therefore relevant to learn from each other's approach to systems integration and related innovation challenges. Moreover, these common threads offer starting points for sharing knowledge and setting up new collaborations, such as joint research projects. Strengthening structural cross-border cooperation in the field of energy R&D was therefore one of the recommendations from the report Energy R&D Made in Germany: Strategic Lessons for the Netherlands, prepared by HCSS (2018).

This assignment aimed at increasing the synergy between the Dutch Systems Integration (SI) program and similar German projects and programs, by promoting new structural cooperation and sharing knowledge and results. The emphasis of this assignment was on exploring possible collaborations, by organising two workshops with relevant Dutch and German parties. It started with **10 interviews** with German and Dutch stakeholders to get a better view of the topics for collaboration. Then, stakeholders in relevant programs and projects were identified. We organised **two online workshops**, one on public acceptance and citizen participation in the energy transition and the other one on sector coupling and flexibility. For the first one 47 stakeholders were invited of which 18 participated in the workshop. For the second one 49 stakeholders were invited and 29 participated in the online workshop.

In this brief report we describe the opportunities for Dutch-German cooperation we see on systems integration, based on stakeholder workshops and interviews, and the main barriers to cooperation, followed by recommendations on next steps. In the appendix we give the Mentimeter results from the workshops and preliminary lists of stakeholders in different areas.

## Opportunities for Dutch-German cooperation on systems integration

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As a starting point for Dutch-German cooperation we looked at the **themes mentioned by stakeholders** as the most interesting ones for cooperation. There are many German projects and programs focused (among other things) on systems integration related topics. Usually, projects contain multiple topics relating to systems integration. Therefore, for Dutch parties there are ample opportunities to learn from German stakeholders and cooperate with them; finding German stakeholders who work on a specific sub-topic is not the largest challenge. However, it is difficult to scope and define different sub-topics within this area as this may be done along a range of lines.

Systems integration is the link between a range of aspects of the energy transition. The physical link of the energy infrastructure (using storage, conversion and other flexibility options), the link to society (public acceptance, energy justice) and the link between sectors. Systems integration looks at the bigger picture: how to combine **all** technologies and developments in the energy transition. It looks at the market mechanisms and revenue models needed, at decision making and the data models that are needed for this. Therefore, the topic is difficult to grasp and is always closely connected to other aspects of the energy transition. This makes it **difficult to scope and difficult to find stakeholders that work on similar challenges**. Concepts like sector coupling, flexibility and 'the energy system' are very broad and stakeholders working

on those topics may have a very different understanding of topics that fall within or outside these concepts.

Asking German stakeholders on which topics they see most opportunities in Dutch-German cooperation they often mentioned **hydrogen (or power-to-x), energy storage, flexibility and digitalization**. Several stakeholders also mentioned the **North Sea** as a renewable energy hot spot as well as **cross-border energy transport** (electricity/ hydrogen). In the workshops focused on flexibility and sector coupling, hydrogen infrastructure, storage, energy models and cross-border flows were mentioned again. In the workshop focused on public acceptance and citizen participation, many topics related to this were mentioned (as can be seen in appendix 1).

Given the interest from stakeholders to attend the workshops and given that the main reason for their presence was to explore cross-border cooperation possibilities<sup>1</sup>, it seems that **stakeholders are looking for cooperation possibilities in many areas** related to systems integration (even public participation, which was not mentioned in our interviews, attracted many stakeholders). Furthermore, both Germany and the Netherlands have projects on different aspects of systems integration (e.g. citizen participation, flexibility, integral design of the energy infrastructure, new market mechanisms and revenue models, operational management of the energy system and cooperation and decision making). Appendix 2 gives preliminary lists of stakeholders working on those topics.

Many stakeholders were interested in **sharing lessons learned**. During the workshops they could already share some lessons learned and we created the LinkedIn group “Integrated energy systems – cooperation between Germany and the Netherlands”<sup>2</sup> in which more information can be shared. One lesson that could be translated to the German-Dutch context is that of the Smart Border Initiative (<https://www.sbi-energy.eu/>) in which French and German communities jointly build up integrated local energy systems.

Regarding information sharing, there are some sites that provide more insight in activities on each side of the border.

In the Netherlands, projects and findings on system integration originating from the Topsector can be found at <https://projecten.topsectorenergie.nl/projecten>. In Germany, there is not one place that provides an overview of system integration projects. However, several websites do present many system integration related projects (Kopernikus projects <https://www.kopernikus-projekte.de/en/projects>, including the Ariadne project and ENSURE project; the SINTEG programme <https://www.sinteg.de/en/programme>, including Designetz and NEW4.0; the Enargus database <https://www.enargus.de>)<sup>3</sup>.

Other cooperation opportunities are to jointly work on projects. The most apparent opportunities for this are in **EU calls** (e.g. Horizon Europe). Cooperation could therefore also be arranged based on coming EU calls, strategically matching partners for specific EU calls.

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<sup>1</sup> As seen in the Mentimeter results, appendix 2.

<sup>2</sup> <https://www.linkedin.com/groups/9026721/>

<sup>3</sup> <https://www.kopernikus-projekte.de/en/projects/ariadne>, <https://www.kopernikus-projekte.de/en/projects/ensure>, <https://www.designetz.de/>, <https://www.sinteg.de/en/showcases/new-40>

## Barriers in cooperation

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Although there are several examples of German-Dutch collaboration in the energy transition (including system integration)<sup>4</sup>, more cooperation would be beneficial. This can already be seen by the fact that 47 people joined the workshops and indicated that exploring cooperation possibilities was their main goal for participation. In the interviews and in the workshops we asked what the largest barriers for cooperation were. An overview of the most mentioned barriers is given in the table below. The answers workshop participants gave to the question concerning the most important barrier to cooperation are given in the figures below.

*Table 1: Overview of most mentioned barriers for cooperation*

Barrier type	Emerging issues
Financial	<ul style="list-style-type: none"><li>• Lack of suitable calls at the European level</li><li>• No specific funding scheme for cross-border cooperation</li></ul>
Regulatory	<ul style="list-style-type: none"><li>• Misaligned regulations and subsidies in both countries</li><li>• Cross-border regulation not in place</li></ul>
Networking	<ul style="list-style-type: none"><li>• Limited visibility of research projects</li><li>• Difficulties in finding the right collaboration partner</li></ul>
Cultural	<ul style="list-style-type: none"><li>• Cultural differences</li></ul>
Organisational	<ul style="list-style-type: none"><li>• Lack of joint vision and joint research agenda</li><li>• Lack of coordination/leadership</li><li>• Lack of a common framework for cooperation</li></ul>

First and foremost, participants indicated that the **lack of funding** is an important barrier for cross-border cooperation. While funding opportunities are available at a national level (e.g. national calls), there are few opportunities for joint funding on the topic of system integration (e.g. cross-border subsidies). Moreover, participants indicated that calls at the European level on this topic are scarce. The lack of funding for energy R&D has been reported as a challenge in both the Netherlands and Germany.<sup>5</sup> One should realise that more than a simple matter of money, funds or grants provide a **concrete reason** to cooperate; without such a concrete reason, cooperation remains "a good idea" that depends on dedicated persons on both sides.

Second, regarding regulations and legislation, participants indicated that **regulations and subsidies are often ill-suited** for cross-border cooperation. Especially regarding subsidies for energy R&D, there are differences between the Netherlands and Germany. The Dutch energy R&D approach is more short-term focused and politically biased, whereas German R&D programmes are more long-term and strategically focused.<sup>6</sup> These differences could result in

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<sup>4</sup> Examples are cooperations in the Pentalateral Energy Forum (<https://www.benelux.int/nl/kernthemas/holder/energie/pentalateral-energy-forum/>), cooperation between Fraunhofer and TNO, and consortia involving Dutch and German stakeholders, e.g. DNV GL and SAP SE work together in a consortium, as are NWO and Karlsruhe Institut Fuer Technologie.

<sup>5</sup> De Vries, et al. (2015) "Grensoverschrijdend Samenwerken in de Energietransitie (Cross border cooperation in the energy transition)", North Rhine Westphalia: Stichting kiEMT.

<sup>6</sup> HCSS (2018). *Energy R&D Made in Germany: Strategic Lessons for the Netherlands*. URL: <https://hcss.nl/report/energy-rd-made-germany-strategic-lessons-netherlands>

different priorities for energy R&D. A specific example mentioned regarding the topic of public participation in the energy transition, concerns the fact that Germany, as opposed to the Netherlands, allows citizens to challenge plans (rather than concrete projects) and to implement models for participation. Furthermore, Dutch DSOs (Distribution System Operators) mention they have different regulation and therefore different possibilities in the field of system integration compared to their German counterparts.

Third, the opportunity for **networking and finding the right collaboration partner has been challenging**. Participants stated that they often are not aware of relevant research on the other side of the border. Additionally, participants find it a challenge knowing where to meet the right people to collaborate with, due to a lack of networking opportunities. The report by HCSS mentions the importance of "an experienced (cross-border) facilitator (or project manager) who can support consortia and project formations by connecting the right parties and mediating in agreements".<sup>7</sup> Another possibility that was mentioned during the workshops is the organisation of conferences about cross-border cooperation on the topic of system integration. An example of such a conference is the annual Combined Energy Conference, of which its most recent edition focused on cooperation between the Netherlands and North Rhine Westphalia in the energy sector.<sup>8</sup>

Fourth, participants reported that **cultural differences** are sometimes a barrier to cooperation. For instance, not knowing the common rules and attitudes on the other side of the border may result in ineffective cross-border collaboration. Specific examples of cultural differences include differences in formality of collaboration and the degree of hierarchy.<sup>9</sup>

Such cultural differences have been formally codified by researchers such as Geert Hofstede<sup>10</sup>, who identifies six key dimensions:

- **Power distance** is defined as the extent to which the less powerful members of institutions and organisations within a country expect and accept that power is distributed unequally.
- **Individualism** is the degree of interdependence a society maintains among its members. It has to do with whether people's self-image is defined in terms of "I" or "We".
- **Masculinity** indicates that the society will be driven by competition, achievement and success, with success being defined by the winner / best in field – a value system that starts in school and continues throughout organisational life. A low score (Feminine) on the dimension means that the dominant values in society are caring for others and quality of life.
- **Uncertainty Avoidance** is the extent to which the members of a culture feel threatened by ambiguous or unknown situations and have created beliefs and institutions that try to avoid these.
- **Long term orientation** describes how every society has to maintain some links with its own past while dealing with the challenges of the present and future, and societies prioritise these two existential goals differently.

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<sup>7</sup> De Vries, et al. (2015) "Grensoverschrijdend Samenwerken in de Energietransitie (Cross border cooperation in the energy transition)", North Rhine Westphalia: Stichting kiEMT.

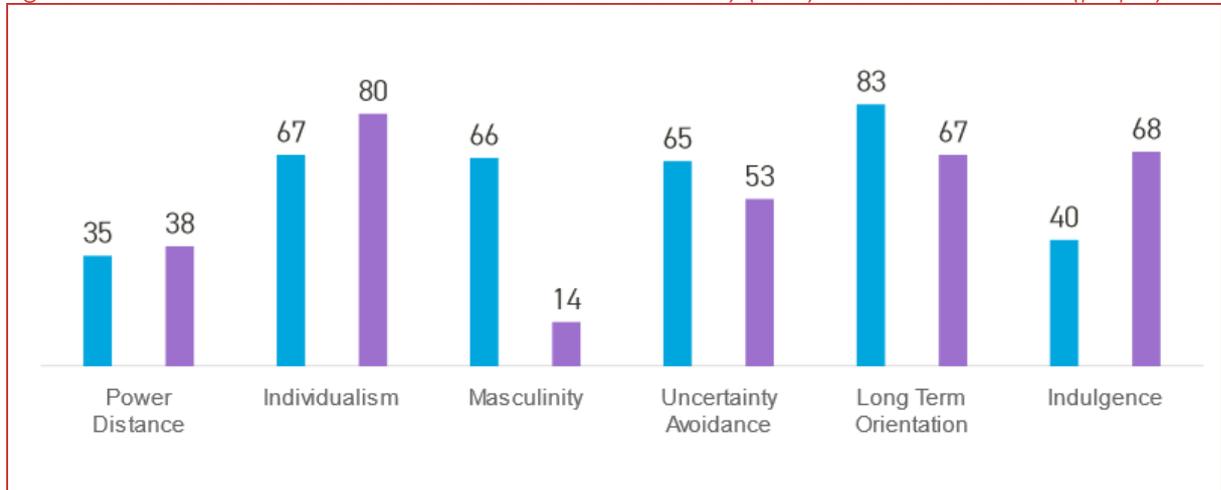
<sup>8</sup> <https://www.topsectorenergie.nl/agenda/3rd-combined-energy-conference-2020-0>

<sup>9</sup> De Vries, et al. (2015) "Grensoverschrijdend Samenwerken in de Energietransitie (Cross border cooperation in the energy transition)", North Rhine Westphalia: Stichting kiEMT.

<sup>10</sup> See e.g. Hofstede, G. & Hofstede, G. J., Cultures and organizations: software of the mind, McGraw-Hill, 2005

- **Indulgence** is defined as the extent to which people try to control their desires and impulses, based on the way they were raised. Relatively weak control is called “Indulgence” and relatively strong control is called “Restraint”.

Figure 1 Dimensions of cultural differences between Germany (blue) and the Netherlands (purple)



Source: Hofstede Insights

Looking at the differences between Germany and the Netherlands, there is a clear difference in the dimension of masculinity/competition drivenness (Germany more competition driven) and indulgence (Netherlands more indulgent).

Finally, participants indicated that a **lack of coordination** impedes cross-border collaboration. This includes the lack of a joint vision and shared research programmes, as well as the absence of a common framework that provides a cross-border perspective on common challenges and R&D needs.

Possible actions for government:

- Investigate joint funding schemes on the topic of system integration, including for long term research, short & medium term R&D and demonstration projects.
- Develop a common framework for system integration R&D that integrates a cross-border perspective. The mapping of common challenges and research gaps should inform the framework.

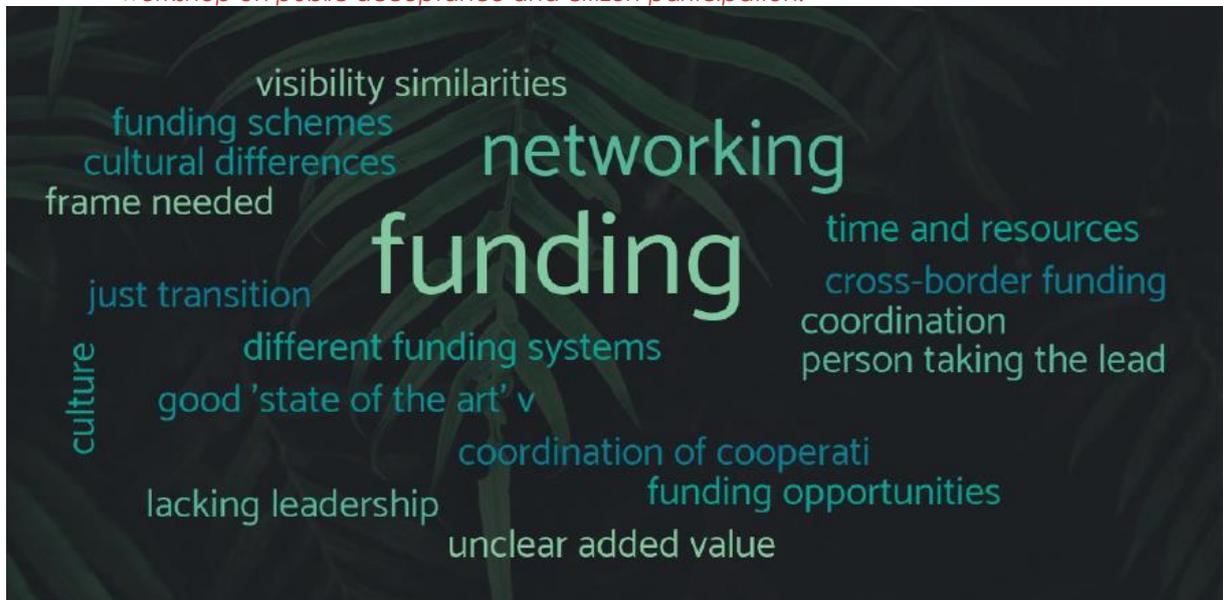
Possible actions for researchers/institutes:

- Establish strategic joint research programmes (e.g. the joint research programme of TNO and Fraunhofer “Smart Infrastructure for Energy System Transformation”).
- Seek opportunities for physical exchange of researchers.
- Seek collaboration opportunities between industrial clusters (e.g. harbours of Rotterdam and Hamburg)

Figure 2 Barriers to cross-border cooperation reported by the workshop participants via Mentimeter - workshop on sector coupling and flexible demand.



Figure 3 Barriers to cross-border cooperation reported by the workshop participants via Mentimeter - workshop on public acceptance and citizen participation.



## Recommendations for next steps

### Search for German “co-owners”

The Top Sector Energy is an organisation that has no direct German counterpart. Nevertheless, it is advisable to find supporters for the German-Dutch collaboration in the R&D&I field who are willing to commit to bringing stakeholders together and organising workshops. This may also be

interesting if the scope of the German counterpart is broader or narrower than that of the System Integration Programme. The initial effort for organising workshops does not have to be very large, but it contributes to the recognition on both sides of the border. The database of stakeholders provides a clear starting point. The cooperation partners can be from the German government (e.g. the Bundesministerium für Wirtschaft und Energie) or on some German states (e.g. Nordrhein-Westfalen or Lower Saxony. Some states have agencies dedicated to the energy transition, such as EnergieAgentur.NRW). Other important stakeholders in Germany are various research institutes that also have broad networks with political decision makers, local/regional authorities, companies (e.g. Fraunhofer Integrated Energy Systems, IASS Potsdam, MCC). Additionally, it is important to consider cooperation with stakeholders from industry that have a key interest in sector coupling in order to decarbonise their activities (e.g. stakeholders from large industrial clusters such as the Rotterdam harbour, Chemelot, and BASF Ludwigshafen). Finally, cooperation can be sought on a programme level (e.g. on the social aspects, cooperation can be sought with Copernicus project Ariadne).

### **Increase the number of contact moments and opportunities**

Interviewees and workshop participants indicate that the possibilities to "find each other" are limited. To bring stakeholders into contact with each other, it is useful to organise more workshops - the two workshops in the framework of this assignment can be seen as a "pilot". **There appeared to be sufficient interest and calls for cooperation and follow-up appointments were already made.** The stakeholder database can help to identify stakeholders, the created LinkedIn group can be used to disseminate announcements and as a public place to express interest. We recommend to organise workshops on a regular basis (e.g. every two months 1-2 workshops with a small number of participants) and to hold the workshop predominantly within 1 target group (researchers, or government agencies, network operators or market parties) because the shared interests between similar parties are the highest. We also recommend that the themes for these workshops be as specific as possible so that there is room for extensive exchange on the content. One of the reactions we received to the workshops reflects this: *"It was a good meeting yesterday - it is not easy to bring together so many people who don't know each other. I hope, there will follow more meetings, maybe with a smaller participation list."*

We also think that in order to get market parties on board, it might help to make the subject of **any future workshops more specific and more short-term oriented.** For instance, market parties that are working on electric transport or hydrogen are expected to participate rather in workshops on electric transport or hydrogen, than on a broader and more abstract subject such as systems integration or sector coupling. Market parties can be invited as speakers and presenters of good practice, which may increase their willingness to participate.

### **Encourage cross-border research**

A clear (and expected) barrier was **the lack of research funds for specific German-Dutch research.** The logic of systems integration does not stop at national borders, but at present it does stop in physical, legal and financial terms. It may be possible to lobby on both sides of the border for an expansion of financing possibilities. The Top Sector Energy can encourage the Dutch government to support research opportunities, possibly also in a European Regional Development Fund (ERDF), Trans-European Networks (TEN) or Connecting Europe Facility context.

## Appendix 1: Mentimeter results

In the workshops we asked participants a few questions using Mentimeter. The results are shown in the figures below.



# What are your expectations for today?

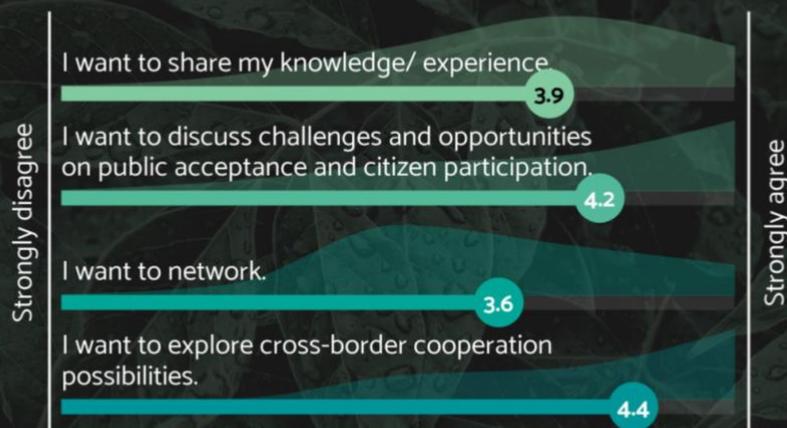
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# What are your expectations for today?

Mentimeter



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# What is your field of expertise?

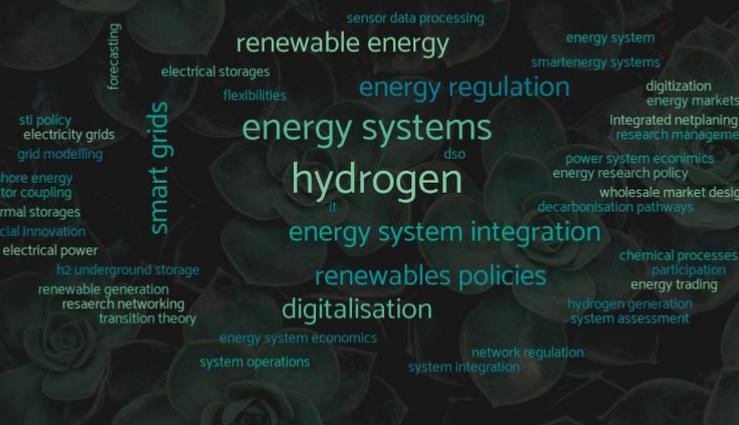
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# What is your field of expertise?

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## Appendix 2: Stakeholders in the sub-areas

Stakeholders on several topics were already identified in preparation of organizing workshops. For 'public acceptance and citizen participation' and 'sector coupling and flexible demand' the lists of organizations that participated in the workshops in February 2021 is included. For other topics, the preliminary list of (mostly German) stakeholders that were already identified are included below. These are not complete but can offer a starting point.

<b>Preliminary list of organisations working on Public acceptance and citizen participation</b>
Potsdam Institute for Climate Impact Research
Forschungszentrum Jülich (cooperation partners: Institut für ökologische Wirtschaftsforschung, IZES gGmbH, ..)
Federal Ministry for Economic Affairs and Energy (BMWi)
50Hertz Transmission GmbH
Institute for Advanced Sustainability Studies (IASS) Potsdam
DNV-GL
Utrecht University
Eindhoven University of Technology
Fraunhofer
Hanzehogeschool Groningen
Topsector Energie
IZES - Institut für ZukunftsEnergieSysteme GmbH
DRIFT
ECOLOG-Institut für sozial-ökologische Forschung und Bildung GmbH
Kulturwissenschaftliche Institut Essen (KWI)
German Watch
Technische Universität Darmstadt
Mercator Research Institute on Global Commons and Climate Change
Insitut Für Ökologische Wirtschaftsforschung
German Watch
University of Groningen

<b>Preliminary list of organisations working on sector coupling and flexible demand</b>
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Energie agentur NRW
VKU
Utrecht University
IZES
TNO
Eindhoven University of Technology
Enexis
Dena
New Energy coalition
Dutch Ministry of Foreign Affairs - Dutch embassy in Berlin
TNO
Energie-Forschungszentrum Niedersachsen
Helmut Schmidt University
Groningen Energy and Sustainability Programme - University of Groningen
Guidehouse
Topsector Energie
Energieforschungsverbund Hamburg / TU Hamburg
Universiteit Utrecht
SEREH/ Policy advisor Emmen
Topsector Energie
TU Delft
New Energy coalition
SEREH
Siemens AG
E.ON SE
Technolution
Dena

<b>Preliminary list of organisations working on (integral design of the) energy infrastructure</b>
Siemens AG

Forschungszentrum Jülich
Federal Ministry for Economic Affairs and Energy (BMWi)
Fichtner IT Consulting AG
Innogy SE
EWE AG
HAW Hamburg
50Hertz Transmission GmbH
Agora Energiewende
Fraunhofer Cluster of Excellence Integrated Energy Systems CINES
Fraunhofer IEE
Institute for Advanced Sustainability Studies (IASS) Potsdam
RH <sub>2</sub> INE
Dutch H2 platform
TKI New Gas
Fraunhofer, TNO
Karlsruhe Institut fuer Technologie (GE)
DNV-GL
NWO

<b>Preliminary list of organisations working on Market mechanisms and revenue models</b>
Forschungszentrum Jülich (cooperation partners: Institut für ökologische Wirtschaftsforschung, IZES gGmbH, ...)
Forschungszentrum Jülich
Federal Ministry for Economic Affairs and Energy (BMWi)
Innogy SE
EWE AG
HAW Hamburg
Agora Energiewende
Fraunhofer IEE
DNV-GL

<b>Preliminary list of organisations working on Operational management of the energy system</b>
Fraunhofer Institute for Manufacturing Engineering and Automation IPA
Forschungszentrum Jülich
Federal Ministry for Economic Affairs and Energy (BMWi)
HAW Hamburg
Fraunhofer Cluster of Excellence Integrated Energy Systems CINES
Fraunhofer IEE
Fraunhofer, TNO
DNV-GL
NWO

<b>Preliminary list of organisations working on Cooperation and decision making</b>
Potsdam Institute for Climate Impact Research
Federal Ministry for Economic Affairs and Energy (BMWi)
HAW Hamburg
Agora Energiewende
Fraunhofer, TNO
DNV-GL