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Assessment of NOVEL Approaches to Alignment

Case Study No.1- European Energy Research Alliance (EERA) as a case for institutional alignment

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DEFINITION OF ALIGNMENT

"Alignment[1] is the strategic approach taken by Member States to modify their national programmes, priorities or activities as a consequence of the adoption of joint research priorities […] and improve the efficiency of investment in research at the level of Member States and the European Research Area." National research priorities and programmes are usually implemented via national research performing organisation and/or national research funding organisations. The approach to coordinate research in national research performing institutes in a European research alliance on all stages of the research programming cycle is called 'institutional alignment'.

ABSTRACT

This case study examines the key features, outputs and overall strengths and limitations of the **'European Energy Research Alliance' (EERA)** as a mean to support institutional alignment. The objective of EERA is to coordinate research activities in the field of energy. EERA brings together over 175 organisations from 28 countries.

The case shows the following **strengths of research alliances** as a tool for alignment:

- potential of a research alliance to align national research activities in public research organisations at all stages of the research programming cycle (research strategy, funding, implementation, evaluation, training, mobility of researchers, research infrastructure, and dissemination)
- Strong 'voice' of a European research alliance to define European research priorities , if it is connected to one of the European Union goals
- Joint outreach beyond Europe
- Promoting national research alliances to align the entire national research and innovation system

However, the EERA case also reveals **limitations of a research alliance**:

- influence on national research programmes (apart from organisations own research programme) is limited and takes a long time
- mobilisation of funding for joint research in a substantial and systematic way is challenging, overcoming this challenge will decide on the impact of a research alliance
- Moving from EXCHANGING knowledge to USING knowledge from other member organisations needs dedicated tools and willingness of research organisations
- Following a bottom-up approach in terms of membership causes geographical imbalance and divergence of competences

EERA demonstrates how a network of research organisations can turn in a professional and ambitious network over time, build strategic intelligence and generate commitment for 'Strategic and Implementations Plans' to address development needs. EERA has the potential to reduce research fragmentation and duplication, and achieve greater cost-efficiency in Europe.

The EERA case **provides lessons** how to develop and support institutional alignment to

- **Coordinators of JPIs** or coordinators of other research performing organisations networks to assess the potential of a research alliance to contribute to ERA and take lessons from EERA to develop the perspectives and tools to shape research alliances (e.g. JPI Urban Europe, JP Neurodegenerative Disease Research)
- **Scientific Directors of research performing organisations** to learn about the opportunities of institutional alignment and support institutional alignment with dedicated means (e.g. commitment to use of basic funding for joint research, sharing of research priorities with other European research organisations)
- **Coordinators of national research programmes at RTDI ministries and research funding organisations** to get aware of the potential of institutional alignment and support research alliances with tools in power of

[1] Definition of 'Alignment' provided by the Working Group on Alignment of High Level Group for Joint Programming

the ministries (e.g. research priority setting, basic funding) or the funding organisations (e.g. cross-border coordinated project funds)

- **Policy makers at European Commission** to learn about the existing limitations of EERA and how to overcome barriers using tools in power of the EC (e.g. EC Top-Up funding for projects)

The case study builds on the ERA-LEARN 2020 "Definition and Typology of Alignment" and relies on a review of existing literature and targeted interviews. The case is part of a series of case studies investigating NOVEL approaches towards alignment.

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1. Introduction

The European Energy Research Alliance (EERA) brings together over 175 organisations from 28 countries (status 2016) and serves as a case for analysing types of institutional alignment. The objective of EERA is to coordinate research activities in the field of applied energy research in Europe. EERA works on a long-term vision and transition of the energy system with focus on 2030/2035 and therefore focus on Technology Readiness Levels (TRL) 2-5 (see Annex 1). EERA links to the EU Strategic Energy Technology Plan (SET-Plan) and will play a central role in delivering research and innovation to contribute to the Energy Union. EERA becomes operational by 17 Joint Programmes[2] dedicated to specific themes.

For the time being, EERA activities concentrate on establishing shared research priorities setting between research organisations, networking among research organisations and internal and external dissemination of research results. The main challenge for EERA is to actually integrate and implement joint research among the research organisations.

The 'Strategy and Implementation Plan 2015-2020' aims on developing the full potential of EERA with focuses on research collaboration in joint projects, moving from exchanging to using knowledge of other research organisations and wider knowledge transfer and engagement of industry. This makes EERA to a special case, because it shows the power of a research alliance as a tool to align national institutionalised research along the full research programming cycle (research strategy, funding, implementation, evaluation, training, mobility of researchers, research infrastructure, and dissemination). Considering the potential of institutional alignment, other public to public (P2P) networks can learn from the analysis of key features, outputs, strengths and limitations of EERA.

2. Key features of the EERA

2.1 Overview: Embeddedness of EERA in the European Research Area

The European Commission's Energy Union strategy, adopted in February 2015, dedicates one of its five dimensions to research, innovation and competitiveness. The integrated EU Strategic Energy Technology Plan (SET-Plan) will play a central role in delivering research and innovation designed to accelerate the energy system transformation to contribute to the Energy Union. In order to stimulate and integrate European research and innovation in the energy area, the following actors cooperate within the SET-Plan:

- SET-Plan Steering group comprising high-level national delegates appointed by national ministries,
- European Technology and Innovation Platforms (ETIPs) comprising industrial networks,
- **European Energy Research Alliance (EERA)** comprising national research performing organisations and
- SET-Plan Information System

Whereas the Steering group is a strategic steering group; EERA, ETIPs and SET-Plan Information Systems are responsible for implementation of research and innovation.

2.2. EERA Members and diversity

EERA is open to any entity or organisation (bottom-up approach) that is (1) public or (2) non-profit or (3) an "umbrella organisation" in the European Union or associated countries that can contribute with substantial research activities to one or more of the EERA Joint Programmes. Typically, public research performing organisations, universities, non-profit private research organisation or the respective networks are EERA members. Companies can join as industrial associate. This leads to a diversity of members.

- **Research performing organisations are embedded in different national research and innovation systems** and Member States organise their energy research in different ways. Research organisations differ in terms of size (employees and basic funding rate), type of research performed and their specific expertise in the concerned field. Diversity is given and should be considered in the configuration of alignment activities within EERA.

[2] EERA 'Joint Programmes' do not correspond with the definition of Joint Programming in ERA (see COM(2008)468). In nature they are close to the Networks of Excellence in FP6 and FP7.

- **Size of research performing organisations**: Interested organisations must formally prove a specific expertise and critical mass of research measured in Full-Time-Equivalent in one or more of the themes of the Joint Programmes to become a member of EERA. This may cause difficulties for smaller research organisations. Additionally, organisations with lower basic funding from national level may have reduced opportunities to participate effectively in meetings as this works on pure in-kind basis although EERA follows a bottom-up approach and each member can benefit from the activities in equal terms.
- R&D activities of the members mainly meet **Technology Readiness Level (TRL) 2-5** (see Annex 1), but expertise involved in EERA spans the whole value chain.
- **Majority of members from the Western part of Europe**, Central and Eastern European country involvement is low, however EERA manages to actively involve and empower Poland and the Czech Republic.

2.3 Governance Structure and Re-organisation: moving from a club of friends to a professional network

EERA started in 2008 with ten organisations. In the beginning, no formal selection procedure and no membership fees were applied. However, with a growing number of member organisations it was challenging to ensure quality and suitability of research organisations, plan research strategies and activities in Joint Programmes (JPs), effectively implement projects and ensure coherent management. Therefore, in 2014 a process of re-organisation was started with an agreement of all members on the following changes (for details on the re-organisations and figure on governance structure see Annex 2):

a) **Introduction of two types of membership**: full and associated membership based on the engagement of members, engagement is measured in Full Time Equivalents (FTE), full-memberships asks for a minimum contribution of five FTE per year to at least one Joint Programme, industry can become associated member
b) **Re-organisation of the governance structure with new internal rules and establishment of a legal body EERA AISBL**: The General Assembly, composed of representatives of all the members, takes general decisions. Interestingly, decision making power has also been given to the Executive Committee – the strategic steering body of EERA. It provides guidance to the alliance, takes the decisions on its functioning and approves new Joint Programmes. The Executive Committee acts on consensus, which is considered as a crucial success factor.
c) **Introduction of a formal selection and quality assurance process for members**: Interesting organisations apply for membership in a specific Joint Programme. They must provide information on the research expertise, prove a critical number of staff in the field of expertise and commit personal-resources to the JP. The JP members will then assess whether added-value to the JP in terms of alignment is given by the interested organisation. If there is a positive decision, new organisations are appointed to the governance bodies of EERA and can participate in decision making. Affiliation and association to EERA does not follow a selection process.
d) **Introduction of membership fees to fund coordination and management activities**: Full Members pay a 3000€ fee on annual basis and are entitled to participate in all decision processes of the EERA. Associate members pay a reduced membership fee of 1000€. Some JPs raise additional fees as this is crucial in some JPs to get the activities started.
e) **Hiring professional staff**: Coordination and management of EERA is delegated to 6 member organisations working on institutional in-kind basis. It has reached agreement that EERA starts to hire staff on the pay-roll of EERA for the coordination and representation of the EERA in the future. A Secretary General and an Office Manager are first open positions.

The re-organisation process took about two years and was a challenging task to go through for all members. Finally, the members reached agreement and the re-organisation is perceived as one of the success factors by the majority of members.

3. Principal joint actions and outputs at the level of EERA Joint Programmes with respect to alignment

In this section, joint actions at the level of Joint Programmes are first described and analysed. Then joint actions are connected to the stages of research programming cycle to show the alignment power of research alliances as a tool to build ERA (see Figure 1).

EERA becomes operational in its 17 Joint Programmes, among which are Smart Grids, Photovoltaics, Wind Energy (Status April 2016). This is where alignment takes place. Each JP comprises 3-6 sub-programmes; which cover the key areas in the field reflecting the priorities of the SET-Plan. Joint actions (overall coordination and management) taking place at EERA level are provided in Annex 3.

JPs coordinate the (1) strategic priority setting of research, (2) the implementation of research and (3) the knowledge transfer of research results mainly based on the participating organisations own resources. Common to all JPs is that progress depends on the active participation of all members. However, diversity of JPs is high: All JPs have successfully defined strategic research priorities and have established knowledge transfer activities but only a limited number of JPs actually jointly implement research projects.

From the European Commission perspective, EERA has not yet delivered to the level required and therefore has not reached its full potential. In the 'Strategy and Implementation Plan (SIP) 2015-2020', emphasis is on joint actions overcoming the existing weaknesses and increase alignment on specific stages: joint research implementation, strengthening of knowledge transfer, especially in an advisory role, and alignment of research priorities with industry.

The following list of activities includes all existing and planned activities within EERA JPs, but it should be considered that not all JPs perform the full list of joint actions.

(1) Strategic priority setting and sharing of resources

a) **Developing joint strategic research agenda for the alignment on programme level**
At the level of JPs a joint strategic research agenda, called 'Description of Work', has been developed. This agenda aims to align research objectives, deliverables and results of member organisations at programme level. Four out of 17 JPs benefit from 'Integrated Research Programmes', an FP7 project type, to receive EC support for the development and coordination of the joint research agendas.
Despite the existence of joint strategic research agendas in EERA JPs, the potential of EERA as a mean to align national research agendas, programmes and funding is not fulfilled yet. Although, research conducted in national research organisations is oriented towards national research priorities, substantial alignment of organisations own research strategy and/or national agendas usually calls for support and commitment from Scientific Directors and high-level representatives at national ministries.
In small countries with one or two large organisations at the national level (e.g. Norway, Finland, Cyprus) alignment of national research programmes towards EERA is fulfilled, once the organisations are involved. In larger countries or countries with a fragmented system, it takes more effort to align the national system at the European level.

b) **Collaborating with European industry**
Some JPs work together closely with European industrial platforms to align research and innovation priorities and to reduce the duration for the market launch of new technologies. These priorities are implemented through joint projects both within the framework of a JP and bilaterally between single institutions and industry. This activity has not reached its full potential yet and is therefore reinforced within the new EERA strategy.

c) **Realising of national alliances**
EERA promotes the establishment of national alliances as 'mirror' organisations of EERA (not of single JPs). The objective of EERA is to foster alignment at the national level, at least in terms of (mainly) institutional funding and institutional programmes. The national alliances are national coordination platforms on energy research. Those alliances can be softly "sponsored" and "promoted" by the EERA, but they are built up by national actors. The establishment of national alliances is ongoing in FR, IT, CZ, UK, NL, ES, BE. In the majority of countries the establishment of national alliances has not started.

d) **International collaboration with partners outside Europe**
JPs are important points of contact for collaboration outside Europe. EERA JP members regularly represent the EU scientific community at events in Asia, USA and Brazil. However, only a few JPs have strategically developed international cooperation activities, e.g. using the INCO projects instrument (Status April 2016). Moreover, an internationalisation strategy at EERA level will only be developed in the future. The implementation of this strategy will then become task of the JPs. So far bilateral activities dominate and joint international collaboration has only been achieved to a very low degree.

e) **Cooperation with other initiatives and networks in the field**
JP liaise with other initiatives and network in their respective field.

In the SIP 2015-2020 the following activities are envisaged:

- Developing '*Common research and innovation agenda*' is intended as a further step on the integration of research activities within JPs. In comparison to the existing joint research agendas called 'Description of Work' the 'Common research and innovation agendas' should go beyond the alignment of research programmes of research organisations, but aim on additional alignment with industrial stakeholders within the ETIPs to accelerate the delivery of the SET-Plan targets. Common priorities provide an important reference point for the EU research agenda.
- Developing *technology roadmaps* in the specific field of a JP in cooperation with industry and other relevant stakeholders is aimed for to express a common position and act jointly as policy advisors
- Increasing the *mobility* of researchers among JP members
- Providing input for *online-training courses*, in collaboration with university stakeholders (in particular the European University Association)
- *Building a data base on existing data and infrastructure and identifying gaps in data and infrastructure*, some JPs work already into this directions, but in many JPs infrastructure development or sharing will be crucial in the future

(2) Implementing Research Projects

f) **Joint research**
Ideally, joint research agendas should be implemented in joint projects funded by organisations own in-kind resources, which would lead to the alignment of institutional funding. Although EERA mainly aims on the alignment on programme level, the implementation of joint research is an essential part towards real integration. However, the implementation of joint projects is one of the main challenges within EERA, which is caused by a lack of external funding, difficulties to allocate national in-kind funding to joint projects, and major differences in availability of in-kind funding (basic funding) of member organisations. Four EERA JPs have successfully applied for research actions (Integrated Joint Programmes). Other JPs jointly scan the H2020 work programmes for suitable projects and develop joint proposals. A new opportunity have the H2020 calls for 'European Common Research and Innovation Agendas (ECRIAS)' which have been used by many JPs. Joint projects based on in-kind funding of the research organisations are rare. One reason is that EERA members have different national backgrounds in terms of basic funding and therefore different starting positions. As most organisations are applied research organisations, the basic funding is limited.

An option to enforce substantial commitment of institutional funding is the use EC instruments like ERA-NET Cofunds or European Joint Programme Cofunds, which provide EC Top-up funding on the basis of national in-kind funding. First examples (ERA4CS, ERA-Planet) show how ERA-NET Cofunds can work with in-kind instead of cash funding. For the time being, the integration on project level seems to be the most critical step for future development. Many JPs have already adopted an 'EERA label', acknowledging those project that are in line with its strategic research agenda.

(3) Knowledge Transfer and delivery of results

g) **Organisation of knowledge sharing events and publications**
Knowledge sharing and transfer activities are the focal point of many JPs at the moment, as this is easier to realise than joint research agendas and projects. JPs organise regularly workshops, conferences or participate in exhibitions to reach a wider audience. Additionally, JP members jointly publish scientific books and papers.

In the SIP 2015-2020 the following activities are foreseen to more strategically approach knowledge transfer internally and externally:

- Set-up a *Repository of Intellectual Property assets* as a tool to foster exchange and use of know-how between industry and JPs

- Developing a *Result Showcase tool* to promote the results generated by each JP member to the outer world
- Bringing experience and knowledge to *policy advisory role* (e.g. in expert workshops, consultation processes or issue papers)
- Development of *white papers*

Governance Structure of an EERA Joint Programme

The Joint Programme is led by a Joint Programme Coordinator. Together with the Sub-Programme leaders he or she forms the Joint Programme Management Board. The management board takes over the strategic steering and management of the JP. Leadership abilities and engagement of the Coordinator and the Sub-Programme leaders are crucial pre-requisites for the success of JPs. For the starting phase of a JP it is important to get the right people in the driving seat of the JP. Additionally, there is a JP Steering Committee installed, made up of all participants of the JP. It is formally responsible for: drafting the research programme of that JP, reviewing the progress of the JP, selecting the Coordinator of the JP and related sub-programmes and deciding on the admission of new members.

Monitoring and Evaluation of JPs

All JPs produce an annual management report (relationship with industry, strategic issues, joint projects, conferences, etc.). 4-5 JPs have formal assessments by external reviewers with 1 day site meeting and report of reviewers published on the website. In addition to the existing monitoring and evaluation measure, EERA has defined eight Key Performance Indicators in agreement with the EC in its SIP 2015-2020 to monitor EERA Progress (see Annex 4).

Alignment at different stages of the research programming cycle in EERA

The following figure shows the outputs of the EERA JPs with respect to alignment based on the described joint actions. An output is considered to be a line of joint actions, a tool or an instrument which EERA set in place to actually support institutional alignment. The left side of the figure reflects the various phases of the research programming cycle during which alignment activities can be implemented; they are based on the alignment typology developed in the project ERA-LEARN 2020[3].

The figure clearly shows that EERA JPs managed to set up alignment activities on all stages, however in reality not all EERA JPs cover all stages of the research programming cycle. There is a special weakness in the research funding and research implementation phase. Some activities are already well developed across all JPs (e.g. regular conferences and workshop for knowledge transfer), other activities have started in a few JPs (e.g. exchange of data, joint use of infrastructure, researchers mobility).

[3] https://www.era-learn.eu/alignment/definition-typology/D4.1_ReportontheDefinitionandTypologyofAlignment_INRA_final_Nov2015.pdf

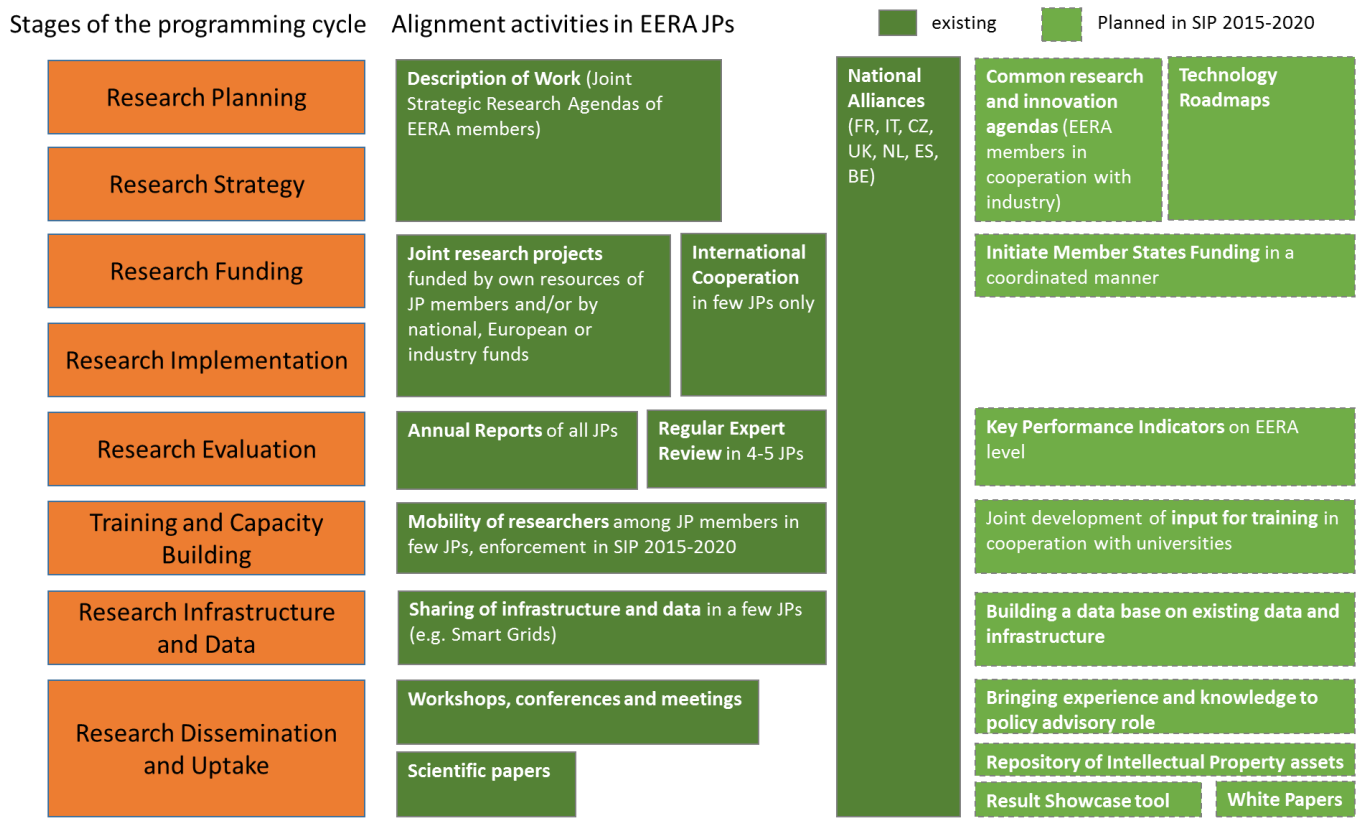

Figure 1 : Alignment at different stages of the research programming cycle in EERA, own compilation

4. Overall strengths and key achievements of this instrument with respect to institutional alignment

The overall strengths and achievements of the EERA as an example for institutional alignment can be summarised as follows:

Building critical mass - cooperation of 175 research organisations

EERA established itself as a research alliance for low carbon energy research, bringing together more than 175 organisations from 28 countries (status 2016). EERA started in 2008 as a network of ten research organisation. Within seven years, EERA managed to grow by 17 times.

Setting up Joint Programmes in dedicated topics and ensure manageability

The establishment of 17 Joint Programmes within EERA dedicated to specific research needs ensures that workability is kept within one Joint Programme due to reduced number of members. Additionally, JP topics are aligned with the SET-Plan priorities.

Trust-Building and networking at the level of researchers

Through EERA, individual researchers working on the same topics but within different countries get to know each other and can exchange their knowledge and experience. This is the foundation for any further step towards real knowledge sharing and using, implementation of joint projects or sharing of infrastructure.

Alignment at the programme level via joint research and innovation agendas

The joint research and innovation agendas ('Description of Work') in each JP is based on alignment of research priorities of public research organisations in Europe. This activity goes beyond the knowledge sharing of national agendas but on the development of a joint agenda at programme level. The identification of joint research priorities among EERA members is already one of the outputs and strengths of EERA. The future development of common research and innovation agendas in cooperation with industry is a further step towards alignment.

Motivating national research alliances

EERA promotes the set-up national alignment platforms as mirror organisations of EERA. This includes the establishment and coordination of research alliances at national level as not all active organisations in energy

research are EERA members. Such a tool like EERA can certainly be a driver to promote national alliances in specific topics, however EERA itself cannot become active

Potential to align activities along the entire research and innovation cycle

EERA shows that an institutional alliance has the potential to align activities along the entire research and innovation cycle: joint research planning, joint research strategy, joint research funding, joint research implementation, joint evaluation and reporting, training and capacity building of researchers, joint or shared research infrastructure and data and joint dissemination activities.

Embeddedness in European Policy setting

The EERA is an alliance of public research organisations set up to coordinate research activities in the field of energy**.** EERA is a cornerstone of the integrated European Strategic Energy Technology Plan (SET-Plan). The SET-Plan will play a central role as the Research & Innovation Pillar in the Energy Union strategy of the EC. The embeddedness and dedication of a research alliance towards a high level policy goal in Europe is certainly one of the drivers and strengths of the EERA and makes it relevant.

Joint outreach beyond Europe

A jointly developed research agendas and technology roadmaps enables EERA or the respective JPs to make them visible beyond Europe and become partner for international cooperation, e.g. for the US or China. Without joining forces and providing a structured joint research programme it would be challenging for some members to go international, especially for smaller size research organisations.

5. Overall limitations of this instrument with respect to institutional alignment

The main limitations and challenges of the EERA as an example for institutional alignment are:

Influence on national programmes is limited

The most challenging part for EERA members will be to agree on joint priority setting in EERA research agendas to a substantial extent on the one hand and make sure these priorities are mirrored and met in the organisations own strategy and/or the respective national research strategy on the other hand. Only if research priorities in EERA meet national and/or own organisations research strategies, alignment of national research strategies is fulfilled. For the time being, this level of alignment has not been reached. Scientific Directors of research organisations and/or programme owners at national ministry level must support and commit to alignment of research priorities and the joint implementation of projects.

Funding opportunities for joint research mainly depend on organisations own resources

The implementation of joint projects research needs funding. Ideally, the main source for project funding is are(?) members own resources. Without joint research projects the actual integration of research is very limited. In many JPs it is challenging to actually mobilise the members' own resources for projects, therefore the number of joint projects is rather low. Alternatives like funding from national level, transnational level, European level and industry is considered by all JPs, but it isthis type of funding is very competitive and limited. In some JPs the majority of funding comes from the European Commission (EC).

In the future, it will be crucial whether JPs really manage to mobilise in-kind contribution of member organisations in a substantial manner. Substantial in-kind from research organisations forFor establishing joint projects based upon in-kind funding, certainly needs support from the Scientific Directors of research organisations is certainly needed. Involving Scientific Directors or even responsible persons at programme owner level could be a way to mobilise in-kind recourses . Another way helping to overcome this barrier is to use or design a respective instrument at EC level which provides EC Top-Up Funding based on organisations in-kind contribution for projects (e.g. European Joint Programme Cofunds, ERA-NET Cofunds). Additionally, national ministries and funding agencies could support research alliances by strengthening their transnational coordination (e.g. Smart City Member States Initiative) and build funding alliances with other countries.

Moving from EXCHANGING knowledge to USING knowledge from other organisations

Sharing of knowledge at the level of information on planed research priorities, ongoing projects and project results is established. However, EERA aims to a higher level of knowledge integration, particularly the use of knowledge or data developed in one organisation by the other research organisations. It has been identified by EERA members that this needs a repository for on Intellectual Propertyassets to use Intellectual Properties within EERA, which really enables member organisations to integrate their knowledge. At EERA level, agreement has reached that

knowledge sharing policies will be developed in the future. The sustainability of the network depends on whether organisations manage to share their know-how effectively.

Bottom-up approach causes geographical imbalance and divergence of competences

EERA has established a pure bottom-up approach. Any interested public organisation, non-profit entity or umbrella organisation can apply for membership. This leads to a strong presence of members from Member States in Western Europe and an underrepresentation of organisations from New Member States. E.g. there is not a single member out of 175 organisations from Estonia, Lithuania, Hungary or Slovenia. The other countries in Eastern Europe are only presented by very few organisations. Taking the role of EERA as a reference network for energy research many organisations in the New Member States do not contribute with their competencies and do not benefit from joint capacity building. This causes the risk that the competence gap between participating and non-participating organisations is widening with the consequence that research organisations in the New Member States will lag behind in the future.

Dependency on leadership of JP coordinators

Leadership abilities and engagement of the individual coordinators are crucial pre-requisites for the success of JPs. Especially in the starting phase of a JP it is important to get the right people in the driving seat of the JP. Coordinators of the JP must ideally be outstanding scientists, excellent managers and well known in the scientific, industrial and policy community. Additionally they must have leadership skills in order to make the JP a success. It is challenging to find the right person for the coordination of a JP and if the right person is there, JP mainly depend on this person. With a growing number of members and growing commitment, EERA can and has already overcome this issue.

6. Conclusions: Key success factors of EERA and transferability to other P2Ps

This part summarises the success factors in developing the EERA (1) at strategic level and (2) at operational and funding level. The success factors are described in a way they can serve as lessons learnt and transferred to other P2P.

1) At strategic level:

Join forces to be relevant for RTDI policy makers in Europe

EERA clearly shows that research organisations joining forces in an alliance can have a "voice" at the European policy level. However, joining forces at the European level is more important for national research organisations in smaller than in larger countries. As EERA is one of the SET-Plan bodies, it is very well embedded in the European Policy landscape. However, it has the potential to grow to an advisory entity to EC/SET-Plan governance bodies to an even higher extent.

A trustful relationship to the EC to increase relevance for EERA, however it took some time for EERA to establish a good and stable working relationship with the EC. Lessons learnt for other research alliances is:

- embeddedness in European RTDI landscape and connection to a larger policy goal helps to become relevant and to be given a "voice" as a network
- a good working relationship with the EC and other relevant bodies should be established, mutual expectations should be defined and a realistic plan how to approach them should be developed

Develop an ambitious, but realistic strategy and implementation plan for a multiple year period

EERA has developed a 'Strategy and Implementation plan 2015-2020'. This includes an evaluation of the state of the art, identification of potential for improvement and the definition of the right joint actions. This helps JPs to define the next steps and ensures coherent development of JPs. Additionally this plan must be discussed with the connected bodies in the RDTI landscape (in EERA case the SET-Plan Steering Committee and EC), which ensures that mutual expectations are met. Lessons learnt for other research alliances is:

- develop a strategic AND implementation plan for multiple years that is ambitious and realistic
- ensure commitment by all members to implement the strategy
- discuss this plan with connected or neighbouring organisations to make mutual expectations clear

Strategic Steering on the basis of Consensus

One of the outlined success factors in EERA is the establishment of a strategic steering group with decision making power (Executive Committee). It is a body that acts between the Secretariat doing the operative work and the

General Assembly. EERA benefited from giving decision power to a group with a workable size, which acts on consensus making. Lessons learnt for other research alliances is:

- A strategic steering group of engaged and willing members contributes to the development of a research alliance (instead of discussions with all members)
- If the strategic steering group enjoys trust of all members, decision making power to a specific extent can be given to them
- The strategic steering group should act on consensus

Find the "right moment" for change management to become more professional

EERA managed to find the right moment to introduce changes and new developments. E.g. EERA successfully managed to grow fast, but at the same time it became more difficult to ensure coherent management at JP level, agree on research priorities and ensure commitment of organisations. EERA went through a two years process to introduce a new governance structure, new internal rules, a selection process and quality assurance criteria for members. This was a critical and essential step to move from a club of friends to a professional network. Lessons learnt for other research alliances is:

- although continuous development of a research alliance take place, there is a need for structural reforms or re-organisation at some time to move from a club of friends to a professional network
- creating agreement among members on the direction to move to takes a lot of time
- the network needs to balance the need of members at the one hand and be ambitious at the other hand

Agreement of members to move to a legal organisation and hire staff on the pay-roll of EERA

Management of EERA is shared responsibility of members, meaning EERA members delegate staff to overtake the EERA Office Management. In the cause of re-organisation, EERA members agreed to set-up an own legal entity and employ a Secretary General and an Office Manager on the pay-roll of EERA. The aim is to act more professionally in Brussels, but also ensure maintenance and sustainability of networks. Lessons learnt for other research alliances is

- continuity of management staff ensure continuous development of the research alliance and continuity of contacts
- pool resources to fund professional management staff and establishment of a legal entity might be an option to professionalise the network at some point

2) At financial and operational level:

Manage to gain commitment of organisations in the start-up phase

The most challenging period is the start-up phase, when only few organisations are involved and committed. It is essential to find the right incentives, priorities and tools for cooperation and alignment in the very beginning to ensure the first movers stay involved on the one hand and give room for growth on the other hand. The EERA has managed to grow from 10 organisations in 2008 to 175 organisations in 2016. Lessons learnt for other research alliances is

- finding the right incentives, priorities and tools and the right persons with leadership skills in the start-up phase of a research alliance is essential

Manage to gain cash and in-kind funding for coordination and management activities

Funding, either in-kind or cash, have been gained for coordination and management at EERA level and JP level. Some funding also came from the EC. This made the start of activities easier.

Ensuring added-value of new members

In order to keep the network manageable with a growing number of organisations and make sure all members align their research priorities and provide respective commitments, EERA has introduced an application and selection system for members. Before that, any organisation could become member of EERA. Within that application procedure, interested organisations need to prove that five FTE are working on this theme in organisation. This process leads to quality assurance at the level of (1) research and (2) engagement of organisations. This ensures that new members add value to the JP. Lessons learnt for other research alliances is

- research alliance should re-evaluate their system how to gain new members from time to time
- If selection criteria are introduced for new members, the criteria should be well-developed and suitable

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- SET-Plan website: http://ec.europa.eu/energy/en/topics/technology-and-innovation/strategic-energy-technology-plan
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Interviews

- Salvatore Amico Roxas, ENEA, Coordinator of EERA Secretariat, interview 2016-04-25
- Rachele Nocera, ENEA, Coordinator of EERA Secretariat, written interview, 2016-05-27
- Hans-Martin Neumann, AIT-Austrian Institute of Technology, Manager of the Joint Programme Smart Cities, interview 2016-05-02

Annex 1: TRL - Technology Readiness Level

According to H2020 Work Programme 2016-2017

TRL	Description
1	basic principles observed
2	technology concept formulated
3	experimental proof of concept
4	technology validated in lab
5	technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies)
6	technology demonstrated in relevant environment (industrially relevant environment in the case of key enabling technologies)
7	system prototype demonstration in operational environment
8	system complete and qualified
9	actual system proven in operational environment (competitive manufacturing in the case of key enabling technologies; or in space)

Annex 2: Re-organisation of EERA

a) Membership Types

EERA has introduced two membership categories:

- Full members: An organisation contributing a minimum of five FTE to at least one Joint Programme shall apply the full membership.
- Associate members: An organisation whose contribution does not reach five FTE in any of the Joint Programmes shall apply the associate membership. Industry can apply as associated member.

b) New Governance Structure and the establishment of a Legal Body

The EERA has evolved into a legal entity named "EERA AISBL" since April 2014. It is governed by the **General Assembly** composed of representatives of all the members and by the Executive Committee. The General Assembly is the decision making body (approval of the budget, the membership fees, the annual report of activities, the determination of the Executive Committee, the change of the Internal Rules, etc.). The **Executive Committee** is the strategic steering body of EERA. Any full member can be appointed to the Executive Committee. It provides guidance to the alliance, takes the decisions on its functioning and approves new Joint Programmes. The Executive Committee acts on consensus, which is considered as a crucial success factor. The Executive Committee is supported by the EERA secretariat. The **secretariat** takes over operative activities and serves as a point of contact between the Executive Committee and the EERA Joint Programmes.

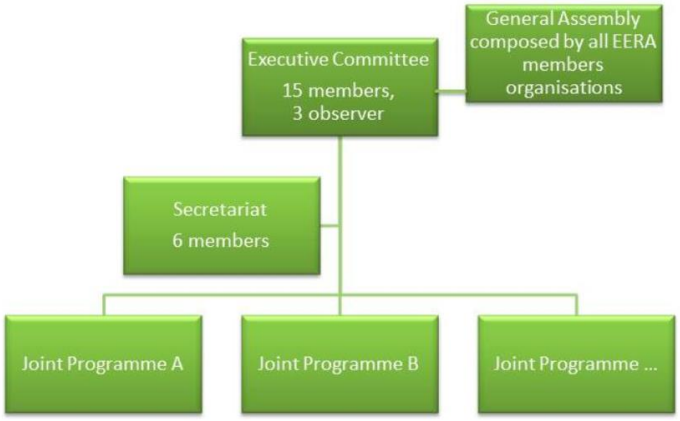

Figure 2 EERA Governance

c) Selection and Quality Assurance of Members

Previously, any organisation could become member of EERA. Within the re-organisation, as selection systems has been introduced for members who actively want to engage in the governance bodies of EERA and the decision making. Affiliation and association to EERA does not require a formal process.
Within that application procedure, interested organisations must prove that their internal research priorities meet the priorities theme set in the respective JP. Additionally, they need to prove that five FTE are working on this priority theme in the organisation. However, it is not mandatory that the five FTE work in research collaboration with other EERA JP members. An example of the step-wise process of applying for EERA JP Membership is presented in the following:

1. Interested members contact the Joint Programme Management Team and provide information in a systematic way on the organisations/departments research facilities, commitment of personal-resources to the JP and the total number of staff in the field your organisation etc. (standardized form).
2. The JP management team assesses whether the provided expertise can be aligned to the JPs existing strategic priorities and to EERA's aim.

3. If added-value to the JP in terms of alignment is given interested organisations will be invited for a presentation at the next meeting of all active members in the JP. Within that meeting it will be decided whether or not to approve the membership application. The Executive Committee only finally confirms the membership.
4. If membership is accepted, organisations need to complete a Letter of intent (LoI) and a Declaration of Support (DoS) to confirm that the organisation adheres to EERA rules and governance. An organisation should sign the LoI for each JP it joins, but will only have to sign the DoS once, when it first joins an EERA JP.

d) **Membership Fees: Funding and Spending**

Full members pay a 3000€ fee on annual basis and are entitled to participate in all decision processes of the EERA. Associate members pay a reduced membership fee of 1000€. They cannot participate on decisions, but have the right to speak in the decision making body. EERA fees are used for the coordination and management of EERA level activities.
Some JPs raise additional fees for full participants and in some cases also for associate participants. The fee ranges from 7500€ to 500€ per year. JP fees are used for coordination and management of JP level activities, this is crucial in some JPs to get the activities started.

e) Hiring professional staff on the pay-roll of EERA

Coordination and management of EERA is shared responsibility, meaning EERA members temporarily delegate staff (nine persons) to overtake EERA Office Management. It has reached agreement that EERA starts to hire staff on the pay-roll of EERA for the coordination and representation of the EERA in the future. A Secretary General and an Office Manager are first open positions.

Annex 3: Joint Actions at the level of EERA

1. Strategic Activities
    - Overall strategic steering of the EERA, e.g. Development of the Strategy and Implementation Plan 2015-2020
    - Taking over an advisory role in specific bodies
    - Development of common guidelines, e.g. knowledge sharing via IP repository or internationalisation strategy
    - Support to the development of the Joint Programmes (e.g. on knowledge transfer and relation with industry, on financial sustainability etc.)

2. Coordination and Communication
    - Coordination with the other SET-Plan bodies
    - Link to the different JPs
    - Main contact point to the European Commission

3. Organisational and Administrational Work
    - Facilitation of meetings, e.g. meeting of General Assembly or Executive Committee
    - Communication material (website, flyer, etc.)
    - Contact point

Annex 4: Key Performance Indicators of EERA

1) Number of FTEs active in the energy sector employed by EERA members
2) Number of EERA members
3) Number of EERA members participating in each JP
4) Number of scientific high quality publications containing the "EERA" label
5) Number of EERA JPs systematically providing support for the implementation of structured student training
6) Number of months of mobility activities taking place at JP level
7) Number of exploitable EERA research results available on the EERA Result showcases
8) Number of expressions of interest triggered by the EERA research results