

**Analysis of the European energy system  
under the aspects of flexibility and technological progress**

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**D7.4 Dissemination and Communication Plan**

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## ABBREVIATIONS

CA	Consortium Agreement
DCP	Dissemination and Communication Plan
DIE	Data Interface Engine
DMP	Data Management Plan
DSM	Demand Side Management
EAB	External Advisory Board
EIM	Exploitation and Innovation Manager
eLCA	Environmental Life Cycle Assessment
EMS	Energy Models System
EU	European Union
FAIR	Findable, Accessible, Interoperable and Reusable
GA	Grant Agreement
IP	Intellectual Property
QR Code	Quick Response Code
R2B	Research to Business
RES	Renewable Energy Sources
SET-Plan	Strategic Energy Technology Plan
sLCA	Social Life Cycle Assessment

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## **SCOPE OF THE DOCUMENT**

This document provides the updated version of the Dissemination and Communication Plan (DCP) for the REFLEX project according to the project's grant and Consortium Agreements (GA and CA). The purpose of this DCP is to support a wide reach and recognition of qualitative and quantitative project results, targeting all stakeholders in the energy system area, including policy makers and regulators, industry and associations, the scientific community as well as the general interested public.

The following sections outline the project's strategy for knowledge management, dissemination and communication, elaborating also on the role of the Exploitation and Innovation Manager. Recipients and contacts for dissemination are all stakeholders related to the energy sector and interested in system transformation. We further give a detailed overview on all communication and dissemination activities carried out so far and reflect the activities that the consortium is envisaging to disseminate and exploit the project results in the remaining project duration and after the project lifetime. Special attention is given to the dissemination of research data, as the collection, use and generation of data was one key aspect in REFLEX. Finally, the exploitation of the main project results is outlined in the last section.

## **1. STRATEGY FOR KNOWLEDGE MANAGEMENT, DISSEMINATION AND COMMUNICATION**

In what follows, we summarize the general REFLEX strategy for knowledge management, exploitation and dissemination. To coordinate the whole process of the exploitation of project results, an Exploitation and Innovation Manager has been appointed. A strategy for the dissemination of research findings and research data has been defined. The common project identity thereby allows for a branding and thus recognition of any project-related material.

### **1.1 REFLEX EXPLOITATION AND INNOVATION MANAGER**

Within REFLEX, the dissemination and exploitation of research outcomes and model results, in the form of knowledge, insights, source codes, a collection of datasets, etc., are coordinated by the Exploitation and Innovation Manager (EIM) – Martin Jakob (ESA<sup>2</sup>/TEP). According to the project's Grant Agreement, the EIM is responsible for:

- maintaining a registry of background data and information;
- maintaining a registry of data and related information produced and gathered in the work packages during the project;
- assessing the opportunities for exploitation, for example by following political events in the energy sector or searches of other scientific databases for similar developments; and
- proposing specific exploitation measures, e.g. policy briefs and events.

Periodic analyses of transfer opportunities to adjust the exploitation strategies take place during the project lifetime. All consortium partners contributed to the regularly updated internal exploitation plan. Thereby, the EIM is in close contact with all consortium members and regularly inform about the exploitation plans of the partners to benefit from synergies and to ensure the best and suitable use and exploitation of results. Furthermore, the EIM regularly advise the consortium and individual partners about possible strategies.

### **1.2 EXPLOITATION AND DISSEMINATION STRATEGY**

In order to ensure efficient dissemination and exploitation activities, free of any legal conflict, the REFLEX project partners signed a Consortium Agreement (CA), which, among other things, is dealing with the details on the partners' background knowledge and Intellectual Property (IP), and on the rights to, the protection of and the exploitation of pre-existing datasets and results generated solely and/or jointly during the lifetime of the project (see also Deliverable D2.4). Moreover, the CA sets up specific rules on how to deal with dissemination activities and to ensure open access to peer-reviewed scientific publications.

Dissemination and exploitation of data and results are executed in accordance with EU laws and with respect to specific laws in the participating countries. Guidelines on Open Access to

Scientific Publications and Research Data in Horizon 2020 ([EC, 2016b](#), Version 2.1) are respected.

The exploitation and dissemination strategy defines that project partners inform the EIM and other consortium members if they wish to publish research results, whether in a direct way or indirectly. Before any dissemination activity takes place, the partner(s) must examine the possibility of protecting generated results. Upon (affirmative) dissemination decision the following cases are distinguished:

- *Open access publication:* Owners will be granting royalty-free access of a meaningful selection of generated results to other participants and to the public, possibly restricted by appropriate embargo periods and/or respecting restrictions from editors of scientific journals and organizers of conferences. The consortium also consider the possibility of green open access<sup>1</sup> which is for free and sufficient to be in line with the requirements of the Grant Agreement.
- *Commercial exploitation:* Preferred partner for commercial and other exploitation is ESA<sup>2</sup>, a R2B spin-off of the project partners KIT and TU Dresden. ESA<sup>2</sup> was established with the purpose to exploit research results and outcomes related to (coupled) energy systems modelling. Such exploitation may include the further use of structure, content and source code of the model coupling activity (Data Interface Engine (DIE) within the Data Warehouse of ESA<sup>2</sup>).

### 1.3 PROJECT IDENTITY

A project visual identity was developed for REFLEX at the beginning of the project and is used in all communication and dissemination activities in order to achieve a project branding and related recognition. Figure 1 shows the REFLEX logo, which is used in combination with one or more key visuals, also illustrated below.

Figure 1: REFLEX logo and key visuals




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<sup>1</sup> Green open access means in general a publication of the manuscript before type-setting by the publisher. Green open access journal publishers endorse immediate open access self-archiving by their authors. What is deposited can be either a preprint or the peer-reviewed postprint. A preprint is an article without any reviewer control. A postprint is an article after reviewing control and adaption. A list with journals, which allow green open access publications can be found under the following link: <http://www.sherpa.ac.uk/romeo/index.php>.



Templates are available for reports, policy briefs, factsheets, flyers, posters and PowerPoint presentations. These are consistently used by all partners for external communication activities, including conference presentations, workshops, teaching, etc.

**Figure 2: REFLEX templates for presentations and posters**



## 2. TARGET AUDIENCES FOR DISSEMINATION AND COMMUNICATION

Recipients and contacts for dissemination are all stakeholders related to the energy sector and interested in system transformation. They can be classified into

- **Policy makers and regulators:** These include politicians at European and national level, decision makers in national ministries, or public authorities shaping energy policy and accompanying system transformation, such as ACER, the Agency for the Cooperation of Energy Regulators or DG ENER; the Directorate-General for Energy of the European Commission. REFLEX project results are interesting for this group of stakeholders to understand challenges associated to the transformation of the energy sector, and to develop – based on a good understanding – effective and efficient policy measures, to support the implementation of the EU's SET-Plan.
- **Industry and associations:** These include for instance energy suppliers, transmission and distribution companies/associations, manufacturers of electric vehicles, manufacturers of plants of renewable energy sources (RES) and intermediaries such as aggregators of Demand Side Management (DSM), amongst others. REFLEX project results are interesting for this group of stakeholders amongst others to support the development of new business models (e.g. in the area of DSM) or to help to adapt to changing sector fundamentals.
- **Scientific community:** These include not only researchers but also persons with higher education and related activities in teaching and holding PhD seminars. Especially the research done related to experience curves, energy system modelling / model coupling and life cycle assessment will be of high value to the research community.
- **General public:** These include all people with an interest in the European energy system and its transformation.

### 3. COMMUNICATION ACTIVITIES

In the following section the main objectives of the REFLEX's communication activities are highlighted. Furthermore, an overview is given about communication activities carried out so far and planned future activities. Next to the project website, the consortium communicates project news in form of publications, workshop invitations or policy briefs via social media as LinkedIn and ResearchGate.

#### 3.1 OBJECTIVES FOR COMMUNICATION ACTIVITIES

The main objectives for all communication activities are:

- to show how the REFLEX project can contribute to support the scientific underpinning for the implementation of the EU's SET-Plan and thereby to achieve the European energy targets and adapt to the ongoing system transformation with continuously increasing volumes of intermittent RES;
- to involve the different stakeholders (see Section 2 above) during the entire project lifetime to discuss modelling assumptions regarding their validity and impacts, to discuss technical solutions for model coupling and data exchange, and to discuss final project results and their implications on stakeholders themselves and their future decision making as well as on society in general; as well as
- to ensure that results are taken up by policy makers and regulators when adapting the legal context to changing energy system fundamentals, by professionals when deciding on future strategies and by the research community in order to avoid a duplication of work but instead to allow further research building on REFLEX findings, as well as by the general public.

### 3.2 TAKEN AND PROSPECTIVE COMMUNICATION MEASURES

Communication with the named stakeholder groups is a high priority for REFLEX. Several measures to maximize the outreach of the project have been taken, including the creation of dissemination material (project flyer, project reports and policy briefs), a public website and press releases. Table 1 lists specific taken and prospective communication activities targeted at the different stakeholders.

**Table 1: REFLEX communication activities**

Platform	Expected use	Target audience	Lead partner	Project month
<b>Press release kick-off*</b>	Provide information about the project in general at the start of the project	General public including potential users, research organizations, industry, professionals	TUD	M1 (05/16)
<b>Social media**</b> (LinkedIn, ResearchGate, Strommarkttreffen)	Provide up-to-date project information, attract attention for the project, inform on upcoming events and published reports or policy briefs	General public including potential users, research organizations, industry, professionals	TUD	M2-M36 (06/16 and beyond 04/19)
<b>Project flyer and One/Two-pager</b>	Provide information about: - the project in general - contents of different project workshops	General public including potential users, research organizations, industry, politicians, regulators	ESA <sup>2</sup>	M4-M36 (08/16 – 04/19)
<b>Public project website</b> (see Section 3.3)	Provide general and up-to-date project information, attract attention for the project, provide contact information, distribute dissemination material, inform on upcoming events	General public including potential users, research organizations, industry, professionals	ESA <sup>2</sup> / TUD	M6-M36 (10/16 and beyond 04/19)
<b>Project poster</b>	Provide information about the project in general	General public including potential users, research organizations, industry, politicians, regulators	TUD	M13 (05/17)
<b>Project brochure***</b>	Provide information about the project in general	General public including potential users, research organizations, industry; politicians, regulators	TUD	M17 (09/17)
<b>Press release at end of project**</b>	Provide information about the project's outcomes and specific policy recommendations	General public including potential users, research organizations, industry, professionals	TUD	M36 (04/19)
<b>Project results brochure***</b>	Provide information about the project's outcomes and specific policy recommendations	General public including potential users, research organizations, industry; politicians, regulators	TUD	M36 (04/19)
<b>Project poster with final results</b>	Provide information about the project's outcomes and specific policy recommendations	General public including potential users, research organizations, industry, politicians, regulators	TUD	M36 (04/19)

\* A **press release** was issued by TUD at the occasion of the kick-off meeting in May 2016 and is available under the following link:

[https://tu-dresden.de/tu-dresden/newsportal/news/Forschung-fuer-das-Energiesystem-von-morgen-EU-Projekt-untersucht-wie-die-Energiewende-in-Europa-gelingen-kann?set\\_language=en](https://tu-dresden.de/tu-dresden/newsportal/news/Forschung-fuer-das-Energiesystem-von-morgen-EU-Projekt-untersucht-wie-die-Energiewende-in-Europa-gelingen-kann?set_language=en)

Another press release will be issued by TUD at the occasion of the REFLEX last stakeholder workshop, i.e. closing event. This press release will be also distributed in the above-mentioned social media channels. Further, the consortium inform about internal project's events about the REFLEX website [\[LINK\]](#) and the website of the project coordinator TUD [\[LINK\]](#).

\*\* As coordinator of REFLEX, TUD actively participates in the **LinkedIn group** [\[LINK\]](#) "Energy Storage, Demand Response & Grid Technologies" to provide up-to-date project information, e.g. information on upcoming events and published reports or policy briefs. In this group about 5.008 LinkedIn-users can follow the news of REFLEX. Up to now REFLEX has sent five posts regarding new publication, upcoming events or workshop invitations. Additionally, the REFLEX-project has an active **LinkedIn profile** [\[LINK\]](#), where LinkedIn-users can directly get in touch with the project consortium. Another social media channel is the **ResearchGate profile** [\[LINK\]](#) of REFLEX. This profile is used to disseminate the project results among the scientific community and to connect the different research profiles of the REFLEX partners. Further, the project coordinator TUD is participating in an open and free of charge network of professionals working in research institutes, universities, for ministries and regulators, with network operators and utilities as well as associations and consulting firms. The network is known as **Strommarkttreffen** [\[LINK\]](#). In this community issues regarding energy policy, electricity markets and power systems are discussed. The network includes a mailing list [\[strommarkt@googlegroups.com\]](mailto:strommarkt@googlegroups.com), where daily several requests regarding different research questions or invitations for upcoming events are distributed. On behalf of REFLEX policy briefs and workshop invitations are disseminated in this group. The consortium reach about 2.000 professionals with this channel. In the following project duration and beyond the project's end further project results will be disseminated and communicated on **LinkedIn**, **ResearchGate** and the network **Strommarkttreffen**.

\*\*\* A **project brochure** was prepared in cooperation with Impact SE and was published in the November edition of Impact. In addition, it is available as hard copy and online version to interested stakeholders. The online document is available under the following link:

[http://reflex-project.eu/wp-content/uploads/2017/09/REFLEX\\_Impact\\_Brochure.pdf](http://reflex-project.eu/wp-content/uploads/2017/09/REFLEX_Impact_Brochure.pdf)

The project brochure has been distributed at the following events/occasions:

**Table 2: REFLEX past events, where the project brochure has been distributed**

Workshops	Activities	Target audience	Project month
<b>Expert Workshop</b> Karlsruhe, Germany	Technological Learning in the Energy Sector	Scientific community (higher education and research)	M19 (11/17)
<b>LCE 21 - Energy system modelling clustering event</b> Brussels, Belgium	Exchange with other projects funded under the LCE-call	Other projects	M19 (11/17)
<b>INEA - Decarbonisation Project Networking Workshop</b> Brussels, Belgium	Exchange with other EU-funded projects with focus on decarbonization pathways	Other projects	M22 (02/18)

Furthermore, the above-mentioned project brochure and later in the project lifetime as well as beyond the new project brochure with the most important insights and project results will be distributed at the following/upcoming events:

**Table 3: REFLEX upcoming events, where the project brochures will be distributed**

Workshops / Conferences	Activities	Target audience	Project month
<b>EMP-E 2018</b> Energy Modelling Platform for Europe Brussels, Belgium	Oral and poster presentations	Policy makers and regulators, industry and scientific community	M29 (09/18)
<b>EcoBalance 2018</b> Tokyo, Japan	Oral presentation	Scientific community (higher education and research)	M30 (10/18)
<b>YEEES 2018</b> Young Energy Economists & Engineers Seminar Florence, Italy	Paper presentation	Scientific community (higher education and research)	M31 (11/18)
<b>ICTE 2019</b> International Conference on Transport and Environment Rome, Italy	Paper presentation	Scientific community (higher education and research)	M33 (01/19)
<b>IEWT 2019</b> Internationale Energiewirtschafts-tagung Vienna, Austria	Paper presentation	Scientific community (higher education and research)	M34 (02/19)
<b>Final Project Event</b>	Exchange in a workshop with professionals from policy, research institutes, universities, utilities and regulators about final project results and consequently policy recommendations	European Commission, policy makers, scientific community (higher education and research)	M36 (04/19)

<b>Public Workshop</b> Brussels, Belgium	Presentation of main project results	European Commission, industry, Scientific community (higher education and research)	M36 (04/19)
<b>IAEE, EEM or YEEES 2019</b>	Oral presentation	Scientific community (higher education and research)	tbd

### 3.3 REFLEX PROJECT WEBSITE

The REFLEX project website probably is the most effective and most comprehensive communication tool. First, it presents the REFLEX vision, project background and objectives, as well as approaches taken. Project partners and the related model pool, as well as the model coupling procedure undertaken within the Energy Models System (EMS) are introduced. Interested stakeholders can also download the project brochure (see above).

Figure 3: REFLEX project website – project overview



Second, the website is regularly updated over the course of the project. It lists all achievements and outcomes, including (public) project deliverables (available for download as .pdf), project documentation in the form of thematic reports, policy briefs (available for download as .pdf) and scientific publications as well as conference presentations. A list with all policy briefs, scientific publications, conference contributions and project reports is given on the REFLEX project website [\[LINK\]](#). Beyond the project lifetime, the publication list will be updated, if scientific journal contributions are published on behalf of REFLEX project's results.

Third, events related to the project, such as expert or public stakeholder workshops and conferences as the EMP-E 2018<sup>2</sup>, are advertised through the website – in order to allow interested parties to register, as well as ex-post including workshop summaries and presentations available for download.

<sup>2</sup> For more information about the EMP-E 2018 see section 4.5 Engagement with other projects.

**Figure 4: REFLEX project website – updated content on publications and events**



Fourth, the website offers the access and download of REFLEX research data, including – as far as possible by avoiding any legal conflicts regarding existing copyright provisions – modelling input data as well as generated final result data. See Section 5 and Deliverable D2.4 (Updated Data Management Plan) for more information.

The REFLEX website is administered by the project partner ESA<sup>2</sup>. It can be accessed through the following link: <http://reflex-project.eu/>. A “QR Code” (Quick Response Code) leading directly to the REFLEX website is included in all printed communication of REFLEX (see Figure 5).

**Figure 5: REFLEX QR Code**





## 4. DISSEMINATION ACTIVITIES

In what follows, we summarize REFLEX dissemination activities including scientific publications, conference presentations and public stakeholder workshops. Moreover, being part of the LCE21-2015 project family, REFLEX has close interaction with the projects Set-Nav, REEEM and MEDEAS.

### 4.1 SCIENTIFIC PUBLICATIONS RELATED TO REFLEX

A key activity of this project is to publish the main results and findings. This is done in different ways. On the one hand, short **policy briefs** are prepared to publish a summary of science-based findings, which are relevant for energy policy, in a non-scientific manner. They are released to stakeholders and public administrations once or twice a year via e-mail and the project website. Their short and easy-to-read nature allows a wide dissemination of the project's main ideas and research findings.

To provide more detailed and highly sophisticated information on the different topics addressed in REFLEX, **survey reports** are prepared. In this vein, for each Work Package (except WP1 and WP2) the most interesting results have been identified. All reports will be combined in a paper collection and published on the project website.

In addition to policy briefs and survey reports, **scientific articles** are prepared. This form of publication aims to present more theoretical and methodology-related topics. Research papers are planned to be published in peer-reviewed journals of the relevant scientific community (e.g. Energy Economics, Energy Policy, Transportation Research, Technological Forecasting and Social Change, International Journal of Life Cycle Assessment, Journal of Cleaner Production, etc.). As the submission-review-resubmission process typically lasts for several months up to about two years, a part of the paper publications might be finalized only after the end of the project. However, the scientific articles will be published on the project website also after the end of project's lifetime.

Working papers – in their full length or as summarized version – are published in the form of **conference proceedings** when researchers present REFLEX-related research at conferences.

Table 4 lists all scientific publications related to REFLEX – completed to date and currently planned until the end of the project and beyond.

**Table 4: Scientific publications related to REFLEX**

Type of publication	Title	Target audience	Lead partner	Project month
<b>Published Publications</b>				
<b>Article</b> Special Issue IAEE Energy Forum	The Impact of Auctioning in the EU ETS: Are Utilities Still Profiting? <a href="#">[LINK]</a>	Scientific community (higher education and research)	TUD	M2 (06/16)
<b>Policy Brief</b>	Capacity remuneration mechanisms in Europe <a href="#">[LINK]</a>	General public	KIT	M8 (12/16)
<b>Conference Proceedings</b> IEWT 2017 (Internationale Energiewirtschafts-tagung)	Simulation von lastglättendem und preisbasiertem Einsatz der deutschen Pumpspeicherkraftwerke <a href="#">[LINK]</a>	Scientific community (higher education and research)	KIT	M10 (02/17)
<b>Conference Proceedings</b> International Symposium on Energy System Optimization 2017 Springer	Curtailing Renewable Feed-in Peaks and its Impact on Power Grid Extension - A Load Flow Model Using an Enhanced Benders Approach <a href="#">[LINK]</a>	Scientific community (higher education and research)	TUD	M11 (03/17)
<b>Journal Publication</b> uwf UmweltWirtschafts Forum	Scenarios for a European energy system – Challenges in the development of consistent scenarios for international systems in an interdisciplinary context <a href="#">[LINK]</a>	Scientific community (higher education and research)	TUD	M12 (04/17)*
<b>Conference Proceedings</b> EMP-E 2017	Modelling of flexibility and technological progress <a href="#">[LINK]</a>	Policy makers and regulators, industry and scientific community	TRT	M13 (05/17)
<b>Journal Publication</b> Energies	Mapping Urban Heat Demand with the Use of GIS-Based Tools <a href="#">[LINK]</a>	Scientific community (higher education and research)	AGH	M13 (05/17)
<b>Policy Brief</b>	Flexibility options in the context of future energy systems – some scenario-based reflections <a href="#">[LINK]</a>	General public	KIT	M15 (07/17)
<b>Conference Proceedings</b> IEEE Xplore EEM 2017 (European Energy Market Conference)	Comparison of the techno-economic characteristics of different flexibility options in the European energy system <a href="#">[LINK]</a>	Scientific community (higher education and research)	ISI	M15 (07/17)
<b>Conference Proceedings</b> IEEE Xplore EEM 2017 (European Energy Market Conference)	The Role of Demand Side Management for the System Integration of Renewable Energies <a href="#">[LINK]</a>	Scientific community (higher education and research)	TUD	M15 (07/17)

<b>Conference Proceedings</b> IEEE Xplore EEM 2017 (European Energy Market Conference)	The Value of Energy Storages under Uncertain CO <sub>2</sub> -Prices and Renewable Shares <a href="#">[LINK]</a>	Scientific community (higher education and research)	TUD	M15 (07/17)
<b>Conference Proceedings</b> IEEE Xplore EEM 2017 (European Energy Market Conference)	Price-based versus load-smoothing pumped storage operation: Long-term impacts on generation adequacy <a href="#">[LINK]</a>	Scientific community (higher education and research)	KIT	M15 (07/17)
<b>Project Brochure</b> Science Impact Ltd.	REFLEX, Analysis of the European energy system under the aspects of flexibility and technological progress, H2020 <a href="#">[LINK]</a>	Scientific and societal audience	TUD	M17 (09/17)
<b>Policy Brief</b>	How to balance intermittent feed-in from renewable energies? A techno-economic comparison of flexibility options <a href="#">[LINK]</a>	General public	TUD	M20 (12/17)
<b>Journal Publication</b> Energy Policy	Demand Response Potential: Available when Needed? <a href="#">[LINK]</a>	Scientific community (higher education and research)	TUD	M21 (01/18)*
<b>Journal Publication</b> Current Sustainable/Renewable Energy Report Springer	Which Flexibility Options Facilitate the Integration of Intermittent Renewable Energy Sources in Electricity Systems? in Current Sustainable/Renewable Energy Reports <a href="#">[LINK]</a>	Scientific community (higher education and research)	TUD	M21 (01/18)*
<b>Working Paper</b> Series in Production and Energy	A survey on electricity market design: Insights from theory and real-world implementations of capacity remuneration mechanisms. <a href="#">[LINK]</a>	Scientific community (higher education and research)	KIT	M22 (02/18)
<b>Policy Brief</b>	Demand side management - Empirical data from the service sector <a href="#">[LINK]</a>	General public	TEP	M25 (05/18)
<b>Journal Publication</b> Energy	The effect of electric vehicles and heat pumps on the market potential of PV + battery systems <a href="#">[LINK]</a>	Scientific community (higher education and research)	ISI	M28 (08/18)*
<b>Planned Publications</b>				
<b>Journal publication</b> Energy Strategy Reviews	Bottom-up modeling of industrial energy transitions - the FORECAST model	Scientific community (higher education and research)	ISI	submitted after review - 2018
<b>Conference Proceedings</b> ISEC 2018 (International Sustainable Energy Conference)	Decarbonizing industry: Extending the scope of mitigation options	Policy makers, industry and scientific community	ISI	M29 09/18

<b>Conference Proceedings</b> IEECB & SC'18 (International Energy Efficiency in Commercial Buildings and Smart Communities)	Demand side management in the services sector – Empirical study on four European countries	Policy makers, industry and scientific community	TEP	M29 (09/18)
<b>Policy Brief</b>	Experience Curves in the Energy Sector (tbd)	General public	UU	M29 (09/18)
<b>Policy Brief</b>	Social and Environmental Life Cycle Assessment within the European energy transition (tbd)	General public	ITAS	M31 (11/18)
<b>Policy Brief</b>	Transport Sector (tbd)	General public	TRT	M33 (01/19)
<b>Journal publication</b> Energy Policy or Energy Economics	Market design	Policy makers and Scientific community (higher education and research)	KIT	2019
<b>Journal publication</b> Energy Policy or Energy Economics	Trade-off between different flexibility options	Policy makers and Scientific community (higher education and research)	TUD	M36 (04/19)
<b>Journal publication</b> International Journal of Life Cycle Assessment or Cleaner Production	Challenges of combining environmental Life Cycle Assessment and Energy System models – the power sector	LCA community	KIT	M36 (04/19)
<b>Journal publication</b> Cleaner Production or Energy	Combining environmental Life Cycle Assessment to the European Energy System- the power heating and transport sector	Scientific community	KIT	M36 (04/19)
<b>Journal publication</b> Energy Policy	Social assessment of future energy systems	Scientific community	KTH	M36 (04/19)
<b>Journal publication</b> International Journal of Life Cycle Assessment	Methodology for social assessment of future energy systems coupled to energy systems models	LCA community	KTH	M36 (04/19)
<b>Journal publication</b> Energy Policy or Energy Economics	Overview of experience curves for energy technologies	Policy makers and Scientific community (higher education and research)	UU	M36 (04/19)
<b>Journal publication</b> Energy & Environmental Science or Energy Policy	Application of experience curves for assessment of prospective environmental impact of energy technologies	Policy makers and Scientific community (higher education and research)	UU	M36 (04/19)
<b>Book</b> Publisher tbd	Technological Learning in the Energy Sector (tbd)	Policy makers, industry and scientific community	UU	M36 (04/19)

\*date since available online

## 4.2 CONFERENCE PRESENTATIONS

Participation in conferences, symposia and trade fairs already was and will also continue to be a significant part of the project's work. In this way, contact to the international community and dissemination of scientific and technological results is ensured. Table 5 lists conferences and events where the REFLEX project presented ideas, methodical aspects and results in the form of presentations and posters as well as planned events.

**Table 5: Conference presentations and poster sessions related to REFLEX**

Event	Activities	Target audience	Lead partner	Project month
<b>Past Events</b>				
<b>IEWT 2017</b> Internationale Energiewirtschaftstagung	Paper presentation	Scientific and industry community (higher education and research)	KIT	M10 (02/17)
<b>New Energy World Conference 2017</b>	Paper presentation	Policy makers and regulators, industry and scientific community	TUD	M12 (04/17)
<b>EMP-E 2017</b> Energy Modelling Platform for Europe	Paper and Poster presentation	Policy makers and regulators, industry and scientific community	TRT	M13 (05/17)
<b>EEM 2017</b> European Energy Market Conference	Paper presentation	Scientific community (higher education and research)	KIT	M14 (06/17)
<b>EEM 2017</b> European Energy Market Conference	Paper presentation	Scientific community (higher education and research)	TUD	M14 (06/17)
<b>EEM 2017</b> European Energy Market Conference	Paper presentation	Scientific community (higher education and research)	ISI	M14 (06/17)
<b>IAEE European Conference 2017</b> International Association for Energy Economics	Oral and Poster presentation	Scientific community (higher education and research)	TUD	M17 (09/17)
<b>IEECB &amp; SC 2018</b> Improving Energy Efficiency in Commercial Buildings and Smart Communities	Paper presentation	Industry and scientific community	TEP	M23 (03/18)
<b>ESF 2018</b> E.ON Stipendienfonds Interdisciplinary Conference	Oral presentation	Scientific community (higher education and research)	TUD	M24 (04/18)
<b>SETAC Europe 2018</b> Society of Environmental Toxicology and Chemistry	Paper presentation	Scientific community (higher education and research)	KTH, ITAS	M25 (05/18)
<b>EEM 2018</b> European Energy Market Conference	Paper presentation	Integration of small-scale batteries into future electricity markets	ISI	M25 (05/18)

<b>European Grid Service Markets Symposium 2018</b>	Oral presentation	Industry and scientific community	TEP	M27 (07/18)
<b>Planned Events</b>				
<b>EWGT 2018</b> European Working Group on Transportation	Paper presentation	Scientific community (higher education and research)	TRT	M29 (09/18)
<b>BRENET Seminar 2018</b>	Oral presentation	Policy makers and regulators, industry and scientific community	TEP	M29 (09/18)
<b>ESS 2018</b> Energy Scenarios – Construction, Assessment, and Impact Conference	Oral presentation	Scientific community (higher education and research)	ITAS	M29 (09/18)
<b>sLCA 2018</b> 6 <sup>th</sup> Social Life Cycle Assessment Conference	Paper or poster presentation	Industry or scientific community	KTH	M29 (09/18)
<b>EMP-E 2018</b> Energy Modelling Platform for Europe	Poster presentation	Policy makers and regulators, industry and scientific community	ITAS	M29 (09/18)
<b>EMP-E 2018</b> Energy Modelling Platform for Europe	Poster presentation	Policy makers and regulators, industry and scientific community	ESA2	M29 (09/18)
<b>EMP-E 2018</b> Energy Modelling Platform for Europe	Oral presentation	Policy makers and regulators, industry and scientific community	UU	M29 (09/18)
<b>EcoBalance 2018</b>	Oral presentation	Scientific community (higher education and research)	ITAS	M30 (10/18)
<b>YEEES 2018</b> Young Energy Economists & Engineers Seminar	Paper or Poster presentation	Scientific community (higher education and research)	TUD	M31 (11/18)
<b>ICTE 2019</b> 21 <sup>st</sup> International Conference on Transport and Environment	Paper presentation	Scientific community (higher education and research)	TRT	M33 (01/19)
<b>IEWT 2019</b> International Energiewirtschaftstagung	Paper or Poster presentation	Industry and scientific community	TUD	tbd
<b>IEWT 2019</b> International Energiewirtschaftstagung	Paper or Poster presentation	Industry and scientific community	ISI	tbd
<b>IAEE, EEM or YEEES 2019</b>	Paper or Poster presentation	Scientific community (higher education and research)	TUD	tbd

### 4.3 STAKEHOLDER AND EXPERT WORKSHOPS

Two types of workshops are organized in order to support communication and dissemination of results: stakeholder workshops and expert workshops.

The aim of the **stakeholder workshops** is mainly the communication with the European Commission (in particular DG ENER) and other stakeholders from policy and industry.

- The first stakeholder workshop took place in November 2016 (M7) in Brussels. It introduced the scenarios and main results of the project to representatives from policy, industry and science. At this event, the project as well as the scenarios assessed in REFLEX were presented and discussed. The REFLEX-related presentations were complemented by keynote speeches from representatives of the European Commission and industry. More information about this event is provided in Deliverable D7.2. Comments and amendments by the workshop participants were considered when updating the assumptions and scenario storylines.
- The second stakeholder workshop will be the closing event and will be organized at the end of the project in order to present and discuss the main results of REFLEX with the European Commission and interested stakeholders. This workshop will take place in Brussels as well, in order to reach a broad range of stakeholders from policy and industry.

The objective of the **expert workshops** is to strengthen discussions and exchange with the scientific community. During the project, existing approaches have been applied and further developed. These advancements as well as first results of WP3 to WP6 are discussed with internationally renowned experts in the respective research fields. Small 1-2-day workshops (max. 20 participants) have been and will be held for the topics experience curves (WP3), model-based analysis (WP4/5) and life cycle assessment (WP6) to foster the scientific exchange. The workshop about life cycle assessment (LCA) was combined with SETAC's annual meeting, an international conference, to facilitate the participation of a wide range of international researchers (Brussels, May 2017).

According to the proposal it was planned to organize two separate workshops about experience curves (WP3) and model-based analysis (WP4/5). However, based on the work status it was realized that synergies can be used by combining these two workshops. Therefore, one expert workshop was organized in November 2017 (M19) where both, current work and first results from WP3 as well as from WP4 and WP5 have been discussed.

A list of already conducted and planned workshops is shown in Table 6.



**Table 6: REFLEX stakeholder and expert workshops**

Workshop	Activities	Target audience	Lead partner	Project month
<b>Past Workshops</b>				
<b>LCE-21 Workshop</b> Brussels, Belgium	Exchange with other projects funded under the LCE-call	Other projects	TUD	M2 (06/16)
<b>Stakeholder Workshop</b> Brussels, Belgium	Energy Decarbonisation and Flexibility Needs How can high shares of intermittent renewable energies efficiently be balanced?	European Commission, industry, Scientific community (higher education and research)	TUD	M7 (11/16)
<b>Expert Workshop</b> Brussels, Belgium	Workshop to discuss LCA-based framework, including social and environmental aspects In the frame of the SETAC annual conference	European Commission, policy makers, practitioners, scientific community (higher education and research)	KTH	M13 (05/17)
<b>Expert Workshop</b> Karlsruhe, Germany	Technological Learning in the Energy Sector	Scientific community (higher education and research)	UU	M19 (11/17)
<b>LCE-21 - Energy system modelling clustering event</b> Brussel, Belgium	Exchange with other projects funded under the LCE-call	Other projects	TUD	M19 (11/17)
<b>Brokerage event on the H2020 Energy Work Programme 2018-2020</b> Brussel, Belgium	Dissemination/promotion of the generated expertise and developed tools to make it available to stakeholders and further projects	Scientific community (higher education and research), industry	Organized by: DG ETIP and DHC+	M19 (11/17)
<b>INEA - Decarbonisation Project Networking Workshop</b> Brussels, Belgium	Exchange with other EU-funded projects with focus on decarbonisation pathways	Other projects	TUD	M22 (02/18)
<b>Planned Workshops</b>				
<b>EMP-E Parallel Session and Follow-Up of Expert Workshop on "Technological Learning in the Energy Sector"</b> Brussels, Belgium	Exchange with other projects funded under the LCE-call and the scientific community from EU on energy system modelling	European Commission, policy makers, practitioners, scientific community (higher education and research)	UU	M29 (09/18)
<b>Final Event</b> tbd	tbd	European Commission, policy makers, practitioners, scientific community (higher education and research)	TUD	M36 (04/19)
<b>Stakeholder Workshop</b> Brussels, Belgium	Presentation of main project results	European Commission, industry, Scientific community (higher education and research)	TUD	M36 (04/19)



#### 4.4 EXTERNAL ADVISORY BOARD

An External Advisory Board (EAB) provides independent advice to REFLEX. It includes 10 experts from industry, policy and academia from different European countries.

A major benefit from interaction with the EAB is the active communication and direct feedback from its members. The EAB members collaborate in joint workshops to facilitate scientific exchange, they foster discussions on challenges in the European Energy System and discuss fundamental aspects of the project work, e.g. the REFLEX scenario storylines and assumptions as well as the results of the project. Further, the EAB will be invited to the REFLEX final event to discuss the projects outcomes and the consequential policy recommendations.

Moreover, the EAB members are informed continuously about project progress and first results via e-mail and in personal talks. In this context, project coordinator Prof. Dr. Dominik Möst already had two personal meetings with a representative from the State Chancellery of Saxony, where he presented project information and interim results. Other group members are also in close exchange with EAB members (e.g. TRT with the EAB member of the European Association for Battery, Hybrid and Fuel Cell Electric Vehicles and TEP the EAB member of the Swiss Federal Office of Energy, amongst others).

#### 4.5 ENGAGEMENT WITH OTHER PROJECTS

REFLEX is part of the LCE21-2015 project family and has close interaction with the projects [SET-Nav](#) (Navigating the Roadmap for Clean, Secure and Efficient Energy Innovation), [REEEM](#) (Energy Systems Modelling Project) and [MEDEAS](#) (Modelling the Renewable Energy Transition in Europe).

The cooperation includes joint activities and participation in events organized by the other projects. Exemplary engagements are:

- All four projects decided to organize the **EMP-E conference** in Brussels September 25<sup>th</sup>-26<sup>th</sup>, 2018. The head of organisation holds the coordinator of SET-Nav (TU Vienna). This year the conference has the title “Modelling Clean Energy Pathways” and will include three plenary sessions, poster sneak peek sessions and three times three parallel sessions with workshop character. More information is available at the EMP-E website: <http://www.energymodellingplatform.eu/home-emp-e-2018.html>. On behalf of REFLEX a plenary session regarding “Innovation in the energy transition” is organized. The keynote speaker Prof. Dr. Martin Junginger (Universiteit Utrecht), Dr. Tobias Fleiter (Fraunhofer ISI) and Dr. Paul Durrant (IRENA) will hold a speech about technological learning, innovation technologies in industry processes, systemic innovations and technological breakthroughs in the energy transition. The parallel session organized by the REFLEX partner from Utrecht University is about technological learning and serves as a follow-up event of the last expert workshop in Karlsruhe, November 2017.
- REFLEX participated together with the other three LCE21-projects in the **INEA Decarbonisation Project Networking Workshop** in Brussels, February 2018. In the

workshop roundtable discussions were organized, where the LCE21-projects exchanged project experience with other EU projects with the content of energy transition and decarbonisation pathways. Topics as transparency of models, methods and tools or how to improve stakeholder engagement were discussed.

- Another joint event was the **LCE21 Energy System Modelling Clustering Event** in Brussels, November 2017. In this workshop REFLEX presented its interim results and recent dissemination activities.
- The REEEM-project organized the **EMP-E conference** taking place in Brussels, May 2017. One representative of REFLEX participated at this workshop, gave a presentation about REFLEX and presented the project poster.
- The first **LCE21 Energy System Modelling Workshop**, where REFLEX participated together with SET-Nav, REEEM and MEDEAS was in Brussels in June 2016. At this event the modelling approach of REFLEX was presented and the envisaged dissemination activities.
- Prof. Dr. Dominik Möst (TUD), REFLEX project coordinator, at the same time is a **member** of the **External Advisory Board** of the **SET-Nav** project.

## 5. DISSEMINATION OF RESEARCH DATA

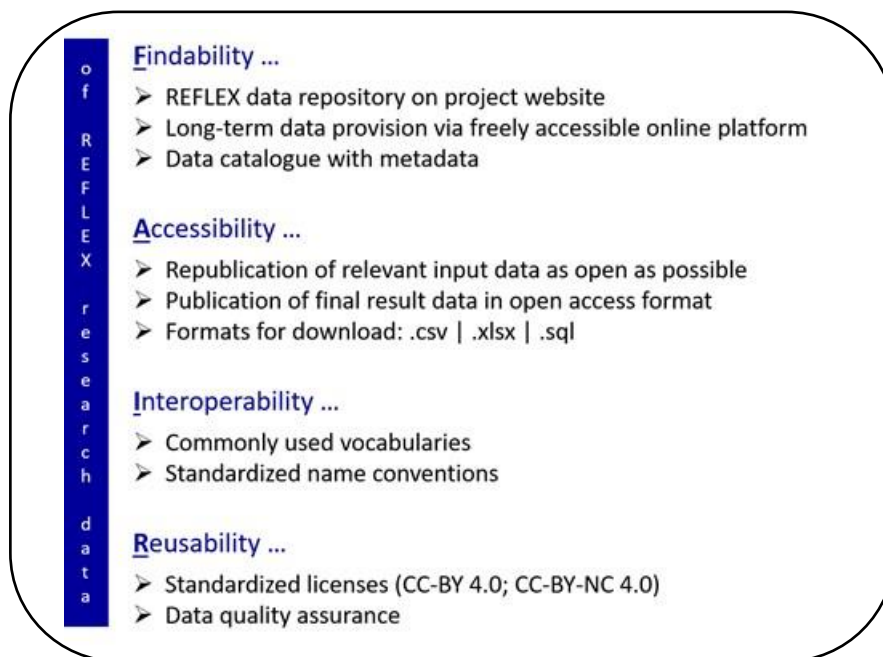
### 5.1 OBJECTIVES AND PRINCIPLES

At the core of the REFLEX project is the development of the comprehensive “Energy Models System” (EMS), coupling different models and tools from the REFLEX project partners. All models applied within the project have already been used as stand-alone applications and have their own databases with already existing data. Moreover, during the lifetime of the project, a lot of new high-quality research data has been collected and generated. Within REFLEX, four groups of data are distinguished: existing model input data, collected and generated new model input data, generated intermediate model output data for exchange between the models during the iteration process, and generated final result data of the EMS.

On the one hand, these data are necessary to meet the objectives of the project and to answer the research questions, i.e. to investigate how the current and future energy technologies and policies interfere and which portfolio of flexibility options can address the challenges associated to an increasing penetration of intermittent RES. On the other hand, most of the collected and generated data will be useful for further research by the project partners themselves or by third parties, as well as for stakeholders in the energy industry and for policy makers. In the course of the project, therefore, a common REFLEX database with common scenario storylines has been developed, and data management plays a key role.

Publication of data and access to data will be implemented as outlined in the Updated Data Management Plan (see Deliverable D2.4). According to the Guidelines on FAIR Data Management in Horizon 2020 ([EC, 2016](#), Version 3.0) and on the Guidelines on Open Access to Scientific Publications and Research Data in Horizon 2020 ([EC, 2016b](#), Version 2.1), research data shall be findable, accessible, interoperable and reusable. We, therefore, aim to re-publish relevant project-external modelling input data as open as possible, in order to support a transparent research environment that allows third parties to validate results presented. Additionally, we aim to publish final model results in a format that makes it possible for third parties to reuse (i.e. access, mine and exploit) the data.

Figure 6: FAIR principles for REFLEX research data



Before publication of any data, the possibility for protection of generated results is examined and three different possibilities for data dissemination are considered:

- Open access data publication:* In this case, data owners grant a royalty-free access of a meaningful selection of generated results to other participants and to the public, possibly restricted by appropriate embargo periods and/or respecting restrictions from editors of scientific journals and organizers of conferences.
- Commercial data exploitation:* In this case, data suitable for commercial exploitation (e.g. for a commercial re-use by consulting companies) will be managed by the project partner ESA<sup>2</sup>.
- Indirect data publication:* In this case, parts of the generated data are disseminated only indirectly as part of intermediate or final results of models and/or as qualitative outcome based on post-analysis of results.

## 5.2 REFLEX OPEN RESEARCH DATA

Both, input data collected from publicly available sources (existing and new model input data) as well as data generated via the project partners' application of the different simulation models are made available as open data as far as possible according to the guidelines of the EU. Thereby, any legal conflicts have to be avoided. The same holds for generated final results of the EMS.

In the course of REFLEX an extensive survey on DSM parameters for Demand Side Management in the tertiary sector has been conducted in order to fill gaps in pre-existing data related to the potential of this important source of flexibility and to generate needed parameters for modelling. The project partners are in discussion to make the different DSM-datasets openly available for research purposes with added value for society. However, for a commercial use by third parties shall be subject to explicit permission and an adequate royalty payment.

A similar discussion is taken for data on experience curves. The required data for technological learning curves have been collected by means of interviewing industry experts, conducting specific survey methods and analysing detailed statistics (e. g. construction, production and consumer price indices as well as installed capacities and cost developments in the electricity, heat and mobility sectors).

Model input data purchased by the project partners, in contrast, cannot be re-published as open data. Finally, the same holds for confidential data on fuel price developments provided by the European Commission, for which non-disclosure agreements have been signed.

## 5.3 REFLEX DATA REPOSITORY

A data catalogue – the so-called REFLEX data repository – has been developed and is currently implemented on the REFLEX project website ([www.reflex-project.eu](http://www.reflex-project.eu)) with a simplified preliminary frontend version. The consortium will continue to provide the data via the REFLEX project website for a limited period of time after the end of the REFLEX project. The project website will be maintained during this period for ensuring online accessibility. After this period, an appropriate reference/link to the final data repository will be integrated in the REFLEX website, which is no longer being maintained after that. For long-term data provision it is envisaged that the data remain in the DWH of the project partner ESA<sup>2</sup> and the data provision is transferred to the website of the ESA<sup>2</sup> Company ([www.esa2.eu](http://www.esa2.eu)). If the data are published in the “[OpenEnergy Platform](#)”. This platform is still under development and aims to expand the existing “OpenMod” online presence by, amongst others, offering a place to store and exchange data (raw data and processed data), which are needed for modelling works.

The REFLEX data catalogue as displayed on <http://reflex-project.eu/public/data-publication/> has a format similar to Table 7 below. The catalogue thus gives a comprehensive overview on all datasets available in the data repository and at the same time allows users to access metadata sheets with detailed information on the content and scope of a specific dataset

directly. Moreover, a short-link for downloading the individual dataset in a user-friendly format is provided.

**Table 7: Data catalogue in the REFLEX data repository**

Dataset	ID	Version	Description	Download
[dataset name and <a href="#">link to metadata sheet</a> ]	[dataset identifier]	[version number, i.e. year_month_day]	[brief description]	[direct <a href="#">link for download</a> ]
Electricity Prices	pr_el_av_REF_IT1	10.04.2018	yearly average of electricity prices by country (EUR / MWh <sub>el</sub> ) in REFLEX reference scenario ( <b>Mod-RES</b> )	<a href="#">DOWNLOAD</a> csv delimiter “,” decimal delimiter “.”
Electricity Prices P2G	pr_el_av_p2g_REF_IT1	10.04.2018	average of electricity prices (EUR / MWh <sub>el</sub> ) in hours, in which power-to-gas applications (electrolyser) are operating, in REFLEX reference scenario ( <b>Mod-RES</b> )	<a href="#">DOWNLOAD</a> csv delimiter “,” decimal delimiter “.”
<b>Upcoming Datasets (not conclusive)</b>				
Electricity Prices	pr_el_av_REF_IT2 pr_el_av_POL-D_IT2 pr_el_av_POL-C_IT2	tbd	yearly average of electricity prices by country (EUR / MWh <sub>el</sub> ) in REFLEX reference scenario ( <b>Mod-RES</b> ) and policy scenarios ( <b>High-RES Decentralized + Centralized</b> )	tbd
Electricity Prices P2G	pr_el_av_p2g_REF_IT2 pr_el_av_p2g_POL-D_IT2 pr_el_av_p2g_POL-C_IT2	tbd	average of electricity prices (EUR / MWh <sub>el</sub> ) in hours, in which power-to-gas applications (electrolyser) are operating, in REFLEX reference scenario ( <b>Mod-RES</b> ) and policy scenarios ( <b>High-RES Decentralized + Centralized</b> )	tbd
Power Plant Portfolio	cap_new_REF_IT2 cap_new_POL-D_IT2 cap_new_POL-C_IT2	tbd	installed and added power plant capacity (MW <sub>el</sub> ) yearly technology aggregated per country, in REFLEX reference scenario ( <b>Mod-RES</b> ) and policy scenarios ( <b>High-RES Decentralized + Centralized</b> )	tbd
Electricity Generation	el_gen_REF_IT2 el_gen_POL-D_IT2 el_gen_POL-C_IT2	tbd	Electricity generation yearly by country, fuel and technology [TWh] in REFLEX reference scenario ( <b>Mod-RES</b> ) and policy scenarios ( <b>High-RES Decentralized + Centralized</b> )	tbd

DSM Survey Data	tbd	tbd	survey data from DSM study on tertiary potentials	tbd
CO <sub>2</sub> -Emissions	co2_em_REF_IT2 co2_em_POL-D_IT2 co2_em_POL-C_IT2	tbd	country and technology specific CO <sub>2</sub> -emissions (tCO <sub>2</sub> ), in REFLEX reference scenario ( <b>Mod-RES</b> ) and policy scenarios ( <b>High-RES Decentralized + Centralized</b> )	tbd
Climate Change Impact	CCI_REF_IT2 CCI_POL-D_IT2 CCI_POL-C_IT2	tbd	climate change impact of electricity mix (tCO <sub>2</sub> eq/MWh) in REFLEX reference scenario_2015_2030_2050 ( <b>Mod-RES</b> ) and policy scenarios_2015_2030_2050 ( <b>High-RES Decentralized + Centralized</b> )	tbd
Particulate Matter Formation	PMF_REF_IT2 PMF_POL-D_IT2 PMF_POL-C_IT2	tbd	particulate matter formation of electricity mix (kg PM10 eq/MWh) in REFLEX reference scenario_2015_2030_2050 ( <b>Mod-RES</b> ) and policy scenarios_2015_2030_2050 ( <b>High-RES Decentralized + Centralized</b> )	tbd
Metal Depletion	MD_REF_IT2 MD_POL-D_IT2 MD_POL-C_IT2	tbd	metal depletion of electricity mix (kg Fe eq/MWh) in REFLEX reference scenario_2015_2030_2050 ( <b>Mod-RES</b> ) and policy scenarios_2015_2030_2050 ( <b>High-RES Decentralized + Centralized</b> )	tbd

## 6. EXPLOITATION OF PROJECT RESULTS

REFLEX will generate a wide variety of results in different forms, specifically in terms of collected and generated data, knowledge, insights, reuse of DIE in further projects, etc. Whether or not results are exploited depends on their nature. The following high-level exploitable results of REFLEX have been identified at the proposal stage (see Table 8). Apart from the exploitation for policy and industry, REFLEX will provide ample opportunity for academic and educational exploitation. A comprehensive exploitation strategy for REFLEX is drafted and described in the following. During the project lifetime the Exploitation Plan will be continuously developed and updated.

**Table 8: List of main exploitable project results**

Targeted results	Description of main exploitable outcomes	Target users
<b>Data Interface Engine (DIE)</b>	<p>The DIE developed and used in REFLEX is a smart tool for implementing complex energy model systems (EMS). Its flexible structure and functions allow it to be used for further projects in order to enable data exchange between individual stand-alone models and thus to couple them to a comprehensive analysis tool.</p> <p>The DIE is already reused for model coupling in the national research project AVerS (Analysis of supply security in Southern Germany), funded by the German Federal Ministry for Economic Affairs and Energy. Further applications in the near future are planned within the public funded research projects MethQuest (Use of EE-methane in transport) and MODEX-EnSAves (Model experiments - development paths for new power applications and their effects on critical supply situations). The project-proposals are already submitted and currently in the 2nd of 2 decision stages. Both projects are scheduled to start at the end of 2018. The DIE is provided free of charge in these non-commercial projects and will be reused also by institutions, which are not involved in REFLEX.</p>	Scientific community
<b>REFLEX EMS - Model based decision support tool for different actors in the energy system</b>	The EMS developed and applied in REFLEX provides a smart and innovative model-based decision support tool, which promotes the implementation of the SET-Plan by strengthening the knowledge base for decision-making concerning feasibility, effectiveness, costs and impacts of related measures and options.	Scientific community and policy makers
<b>REFLEX database</b>	In the field of energy system modelling various models and databases exist, which are in most cases not publicly available. As a result, it is difficult to compare different model results. Therefore, the data collected and a selection of data generated in REFLEX and stored in the project's database will be published open source. In this way the collected data may be re-used in other research projects.	Scientific community, policy makers, industry, general public



<b>DSM survey data</b>	A survey on a representative number of companies will be conducted to quantify the potentials for DSM and to identify promising tertiary sub-sectors and energy services for the implementation of DSM measures. These data will be partly available for download on the REFLEX-website.	Scientific community, policy makers, industry, general public
<b>Experience curves</b>	The experience curve deduced in REFLEX will be published to facilitate other researchers the use of these tools in their models and for their research.	Scientific community
<b>Reports on interdependencies between competitive low-carbon technologies and flexibility options</b>	<p>Different reports will be published to display the interdependencies between several low-carbon technologies and flexibility options in one sector as well as between different sectors. The findings will help several actors in the energy system to detect trends at an early stage and thus to support the scientific underpinning of the SET-Plan.</p> <ul style="list-style-type: none"> <li>· <b>D3.2</b> Comprehensive report on experience curves</li> <li>· <b>D4.3</b> Report on cost optimal energy technology portfolios for system flexibility in the sectors heat, electricity and mobility</li> <li>· <b>D5.2</b> Report on investments in flexibility options considering different market designs</li> <li>· <b>D6.3</b> Social, environmental and external cost assessment of future energy technologies and future energy systems</li> </ul>	Scientific community, policy makers, industry, general public
<b>Recommendations for policy measures</b>	One result of REFLEX are recommendations for effective strategies for a transition of the European energy system to a low-carbon system. Policy makers at EU level as well as at regional level can use these findings when developing policy measures. Respective representatives will be involved during the project life-time to facilitate close cooperation and fruitful discussions.	Policy makers (especially European Commission DG ENER)
<b>Framework methodology for LCA implementation and communication for high-level energy policy assessment of future energy scenarios</b>	REFLEX will develop a framework methodology for applying sLCA and eLCA to future energy systems scenarios. It will be used directly in the REFLEX assessments and will also form a basis for implementing and communicating results from LCA methods for energy systems scenarios in general. Therefore, it will support multiple EU objectives, e.g. to apply life-cycle based methods for all policy proposals. It will also support detailed policy assessment in light of the EU's energy policy goals of competitiveness, sustainability (in a broad sense) and security.	Scientific community and policy makers

<p><b>Book</b> about technological learning</p>	<p>Based on the work performed in WP3, a book will be published presenting the outcomes of this work package. The book will be published at a leading scientific publisher and distributed via email among 1) the participants of the expert workshop on experience curves that was hosted by the REFLEX consortium in Karlsruhe, 2) the participants of the EMP-E workshop focus group on technological learning, 3) authors and co-authors of the current book and the book which it aims to update (Technological Learning in the Energy Sector by Junginger et al. (eds.)). Furthermore, it will actively be promoted by the publisher through their communication channels (online advertising, leaflets, at conferences, etc.), and through social media by the editors and co-authors after publication. Additionally, a workshop will be organized at the end of the REFLEX project aiming to disseminate the contents of the book (REFLEX results) as well as promote the book to a wider audience. Aside from these groups of contacts, partners within the REFLEX consortium will be asked to disseminate the book among their contacts in science, policy and business. Thus, it is expected that it will have lasting impact for several years after the end of the project.</p>	<p>Scientific community, policy makers <i>and</i> participants of the expert workshop in Karlsruhe, participants of the EMP-E workshop 2018, authors and co-authors of the current book and the book before, general public</p>
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In REFLEX, continuous analysis of transfer opportunities to adjust the exploitation strategies will take place. All consortium partners develop their own exploitation plans throughout the project.

The Exploitation and Innovation Manager (EIM) is in close contact and regularly informs about the exploitation plans of the partners. Additionally, the EIM:

- regularly advises the consortium and individual partners about possible strategies
- uses synergies to ensure the best and suitable use and exploitation of results

Exploitation activities focus on spreading the REFLEX results to European and national policy makers, professionals from research institutes and universities as well as from industry and non-profit organisations.

In addition, the results of REFLEX will be exploited also for education. Several partners of the consortium are higher education institutes. Thus, selected results of REFLEX will be integrated in lectures and seminars at the respective institutes. Furthermore, REFLEX supports the education of PhD-students, because most of the tasks will be prepared by them.