



# **D4.5 Minutes and recommendations of the expert workshop and follow-up stakeholder consultation process & stakeholder event allocated to work in WP4**

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# 1 Expert Workshop on electricity market design options in the 2020 framework

Venue: Aloft Brussels Schuman, Place Jean Rey 3, 1040 Brussels, BE

Date: 22.05.2015

Workshop organized jointly with WP5 workshop "Market based mechanisms to integrate high levels of renewables while assuring security of supply in the post-2020 period"

## 1.1 Invitation to the Workshop

### Objectives of the workshop

The Market4RES consortium is pleased to invite EU-28 Transmission System Operators, European regulators, policy makers, and other relevant stakeholders to our one-day event where we will:

- Validate the specifications of the studies about electricity market design options within the 2015-2020 period. Our analyses run on the [OPTIMATE](#) numerical simulation platform, and focus on the effects of RES support schemes and demand flexibility.
- Discuss the market based mechanisms to integrate high levels of renewables while assuring security of supply in the post 2020 period.

### About Market4RES

Market4RES is a collaborative Research and Demonstration project co-funded by the European Commission (DG Energy) under the 7th Framework Programme for Research and Technological Development. The project, coordinated by Sintef, aims at investigating the potential evolution of the EU Target Model in order to secure the European power system decarbonisation with large amounts of renewable energy sources (RES).

In this context, Market4RES WP4 activities aim to quantify the impacts of the studied market design options, assuming as an input the generation fleet expected for 2020. In the framework provided by the current European Target Model, the impacts of different RES support schemes as well as different demand flexibility levels will be assessed. The benefits of the studied options will be quantified and compared based on the developed methodology using the [OPTIMATE](#) prototype simulation platform, which allows for the analysis of various market design options within a model of the western European power market.

Financing the transition to a renewables based electricity mix through support mechanisms is not only unsustainable, but it also introduces severe market distortions and compromises the security of supply. An effective market design should provide sufficient investment signals to accommodate a high share of renewables while achieving the required level of security of supply. Which market design can be effective in achieving these two EU energy policy goals given a high RES energy mix and a market increasingly dominated by fixed costs? Work package 5 of the project will test current and innovative market design options and provide a first set of recommendations for achieving the post 2020 RES-e targets.

## Agenda

8.45 a.m.	Registration / Welcome coffee	
9.00	An overview of the Market4RES project	Peter AHCIN (Sintef)
9.10	Introduction to the workshop	Sophie Dourlens-Quaranta (Technofi) and Peter AHCIN (Sintef)
<b>Expert workshop: Electricity market design options in the 2020 framework</b>		
9.40	Introduction to the OPTIMATE numerical simulation platform	Adrien Atayi (RTE)
10.20	Methodology implemented by Market4RES to quantify and compare the impacts of different market design options	Tiziana Pagano (Technofi)
10.40	<i>Coffee break</i>	
11.00	Day-Ahead market design options to be studied	Sophie Dourlens-Quaranta (Technofi)
11.20	Scenarios to compare market design options	Sophie Dourlens-Quaranta (Technofi)
11.40	Q&A session	
12.00	<i>Lunch break</i>	
<b>Expert workshop : Electricity market design options in the post 2020 framework</b>		
See D5.4.		

## 1.2 Participants

Name	Organisation
AHCIN Peter	SINTEF Energi AS
Angelino Luca	European Geothermal Energy Council
Atayi Adrien	RTE
BIAL Marcel	European Solar Thermal Electricity Association (ESTELA)
Burgholzer Bettina	EEG
Carbonnelle Mathilde	European Commission
Cecchinato Mattia	EWEA
Charalampous George	BEUC
Ciaralli Fabrizio	European Commission – DG Competition
Claeys Gaëtan	EUGINE – European Engine Power Plants Association
Clarena Baron	EUTurbines
Coffinea Louise	College of Europe
D'alberti Federico	Enel S.p.A.
Dalle Vedove Mattia	Hitachi Ltd.

De Jong Gerda	Tennet TSO B.V.
Del Olmo Carlos	Abengoa
Dourlens-Quaranta Sophie	Technofi
Dufour Elena	European Solar Thermal Electricity Association (ESTELA)
Faure Aurélie	Ifri
Fontaine Aurèle	RTE
Franken Marcus	E.ON SE
Frischemeier Sven	E.ON SE
Gazzoletti Francesco	Erg spa
Hall Siobhan	Platts
Harz Willi	ENBW AG
Hickel Tanja	European Energy Exchange
Hu Jing	Utrecht University
Huertas Hernando Daniel	ENTSO-E
Kaim Uli Daniel	IBERDROLA
Keski-Nirva Kiira	Aula Europe
Langer Yves	APX
Liesner Michael	Energcon GmbH
Navarrete Marta	FOSG
Olmos Luis	IIT-Comillas
Orlandi Sinead	Becquerel Institute
Pagano Tiziana	Technofi
Rega Nicola	Confederation of European Paper Industries
Rekinger Manoel	European Photovoltaic Industry Association
Saout Claire	ADEME - BRGM
Schumacher Hannes	EnBW Energie Baden-Württemberg AG
Thies Frauke	EPIA
Tomofte Natalia	Power Engineering Institute of ASM
Villa Andrea	Enel S.p.A.
Wilczek Paul	European Wind Energy Association
Wokke Sharon	European Wind Energy Association
Wolfgang Ove	SINTEF Energy Research
Wright Howard	APX Group
Zagrandi Roberto	EDSO for Smart Grids
Zegnal Judit	Bruxinfo – Hungarian news agency
Zeni Diletta	European Wind Energy Association
Oyvind Vessia	DG Energy
Hasier Larretxea	Eneco B.V.

## EXCUSED

Name	Organisation
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Bial Marcel	European Solar Thermal Electricity Association (ESTELA)
Carbannelle Mathilde	European Commission
Clarena Baron	EUTurbines
Coffinea Louise	College of Europe
D'alberti Federico	Enel S.p.A.
Del Olmo Carlos	Abengoa
Dufour Elena	European Solar Thermal Electricity Association (ESTELA)
Franken Marcus	E.ON SE
Frischemeier Sven	E.ON SE
Gazzoletti Francesco	Erg spa
Harz Willi	ENBW AG
Hickel Tanja	European Energy Exchange
Huertas Hernando Daniel	ENTSO-E
Keski-Nirva Kiira	Aula Europe
Orlandi Sinead	Becquerel Institute
Rega Nicola	Confederation of European Paper Industries

### 1.3 Discussion about the electricity market design options in the 2020 framework

The purpose of the workshop was the presentation of and dialogue about the specifications of the studies to quantify the impacts of market design options in the framework provided by the current European Target Model (2020 horizon).

The following main questions were raised by participants during the presentations and the dedicated Q&A session. The answers brought by the Market4RES team are also reported.

#### Regarding the OPTIMATE prototype simulation tool and its utilization within Market4RES

- **Question:** *Is it possible to enlarge the geographical scope of the OPTIMATE studies by including Eastern Europe?*
  - **Answer:** In theory any country can be included in the geographical scope as long as the relevant data (such as data on clusters, installed generation capacities, etc.) are provided.
- **Question:** *What is the added-value of the Market4RES WP4 studies in the light of the fact that only the Day-Ahead processes will be activated in the OPTIMATE prototype simulator? Moreover the reply to some questions addressed on demand flexibility and RES support schemes are already known*
  - **Answer:** Indeed, due to the prototype nature of the simulator, only the Day-Ahead processes will be activated for the Market4RES studies. Although this is a limitation of the studies to be taken into account when interpreting their results, their main added-value lies in the quantification of the expected impacts of the studied market design changes based on quantitative indicators relying upon the three pillars of the EU energy policy. Moreover, although absolute results may change when the other processes (i.e. Intra-Day and Real-Time) are taken into account, the studies performed within Market4RES will still give global trends on the possible impacts of a short-term electricity market design change. This aims at stimulating a rational dialogue (i.e.

based on quantified results) among policy makers and key stakeholders of the electricity value-chain.

- **Question:** *Does OPTIMATE model investment decisions thereby allowing assessing their impact in the long-term?*
  - **Answer:** OPTIMATE is focused on short-term issues. It could be, however, possible to make a multiple year assessment by considering one year at a time. But the modelling of investment decisions will rather be considered in WP5 thanks to dedicated tools.
- **Question:** *Is storage taken into account?*
  - **Answer:** In the current prototype version of the OPTIMATE simulator only hydro storage is modelled. RTE is in the process of adding other types of storage in the industrial version of the tool since it is a major aspect for RES integration.
- **Question:** *What is the purpose of the learning by doing module in OPTIMATE?*
  - **Answer:** The ex-post learning module enables commercial actors to improve the quality of their price forecasts by assessing the offset between raw forecasts and realized data.
- **Question:** *Do you plan to compare the outputs of the simulations with real current values?*
  - **Answer:** Partially we do. As a matter of fact, OPTIMATE was run over the year 2013 in order to perform a “reality check” on the generation mix. However, this “reality check” cannot be performed for other variables, such as prices, since there will always be a gap between actual prices and “OPTIMATE” prices due to the modelling assumptions of the tool (for instance, the bidding strategies as modeled within OPTIMATE).
- **Question:** *Will you take into account the impact of modeling assumptions made in Optimate on the results of the studies?*
  - **Answer:** Indeed, in one of the scenarios used in Market4RES studies some key parameters will be altered for sensitivity analysis purposes. However, due to time constraints, the number of scenarios considered has to remain reasonable.
- **Question:** *When will the Intra-Day (ID) module of OPTIMATE be available?*
  - **Answer:** The ID processes are currently being refactored in the framework of the industrialization phase of the Optimate tool.

### Regarding the study about RES support schemes

- **Question:** *Why modelling Feed-in-Tariffs for renewable sources, since following the recent EC communication they will be prohibited as for 2016?*
  - **Answer:** Current contracts under Feed-in-Tariffs (FIT) will continue running for several years: only the new installations will be impacted by policy changes. In addition, regarding PV generation, the EC communication foresees that FiT will still be applicable for the smallest installations (for instance in the residential sector).
- **Question:** *How will wind and PV support schemes be assessed for the 2020 horizon? In particular, how will price premium values be assessed?*
  - **Answer:** It is the purpose of the public consultation to gather advice about this assessment. It may be considered to use technology costs assessments at 2020



(which may be provided by EPIA and EWEA) and to calculate the price premium as the difference between the average market price and these costs, also considering an acceptable profit for RES generators.

### Regarding the study about demand flexibility

- **Question:** *Does OPTIMATE take into account demand shifting from peak to off-peak load?*
  - **Answer:** The current version of the prototype includes a simplified modelling of demand response (price elasticity) and does not take into account demand shifting. However, the industrial version will include a more realistic modelling of demand response.
- **Question:** *Modelling different levels of load flexibility (and not only a “high” level and a “low” level as foreseen) would really be useful, because the parameters of load flexibility are expected to have a high impact on the market outcomes.*
  - **Answer:** If the project constraints allow studying more options for demand flexibility than what is currently foreseen, it will be done.

### Regarding the scenarios supporting the studies

- **Question:** *It is important to take into account also other types of RES in the scenarios, in particular geothermal and biogas generation units. These units will be useful flexibility providers.*
  - **Answer:** The installed capacities of CHP units, biomass and biogas are taken into account within OPTIMATE, but not on a unit by unit manner. Their flexibility can therefore not be changed. For future studies, such units may be modelled as thermal generation units (as coal, gas and oil units are modelled).
- **Question:** *Can the flexibility level of power plants be changed? For example, in the future nuclear power plants may become more flexible than they are today.*
  - **Answer:** Indeed, one scenario considered for the Market4RES studies addresses this issue by taking into account different levels of power plants' flexibility compared to the reference scenario. In this scenario, it is foreseen to model a higher flexibility for coal and gas units based on estimations provided by the literature. However, if a reliable source is found about how to configure the flexibility parameters for nuclear power plants too, it will be considered.
- **Question:** *Within the 2020 RES+ scenario, several parameters will be changed compared to the 2020 standard scenario. Will it be possible to assess the impact of the change of each parameter individually?*
  - **Answer:** In theory indeed, it would be better to have a range of scenarios between the current 2020 standard and 2020 RES+, each corresponding to the change on one single parameter. However, due to the project constraints and the time needed for each OPTIMATE study, only a limited number of scenarios can be considered.

## 2 Responses to the public consultation about D4.1 “Specifications of the most adequate options for flexibility markets and RES support schemes to be studied in a cross-border context”

Immediately after the expert workshop held on 22 May 2015, Deliverable D4.1 was published and stakeholders were invited to comment it through a written consultation process. The consultation was pushed by EWEA using the Targeted Mailing List of the project.

Comments about the following aspects were expected:

- The three scenarios chosen (regarding their qualitative description, the choice of key parameters, the choice of the sources of data, etc.);
- How the market architecture options to be studied are combined with the three scenarios;
- Proposals about the configuration of the RES support schemes to be applied in 2020, notably about the value of the price premium applied to new wind and solar installed capacities (see details in slides 38 and 41 of the [presentation about the different scenarios](#)).

Other comments were also welcome.

Stakeholders were invited to submit their comments by 22 June 2015.

Three contributions were received:

- From **Borzen**, the power market operator in Slovenia:
  - They remarked that only two options regarding possible RES support were considered (FITs and market premium). They suggested, for the sake of completeness, to include a third: EU-wide quota-based tradable certificate scheme. Still, this is not feasible in the framework of the current OPTIMATE prototype which allows modelling only FIT and price premium.
  - They also suggested expanding scenarios such as to include the evaluation of the interplay between RES support systems and demand flexibility, since demand flexibility may alleviate some of the negative effects of RES SS (e.g. negative prices). If the project constraints allow studying more options for demand flexibility than what is currently foreseen, it will be done.
- From the **European Commission**:
  - Following up a remark expressed during the workshop, they suggested to take into account the possible improvements in the flexibility nuclear units, as explained in a report of the Nuclear Energy Agency ([“Can the flexibility level of power plants be changed?”](#), 2011). In line with this suggestion, the parameters of the 2020 RES+ scenario have been changed to model an increased flexibility of nuclear plants (see [deliverable D4.2](#), page 20).
- From **LaCaleta**, a German consultancy company:
  - They provided general comments about the energy system, actually not directly targeted to the work in Market4RES.

### 3 Stakeholder event about the preliminary results of the studies on RES support schemes and demand flexibility in the 2020 framework

This event was organized on the 27<sup>th</sup> of November, on the same day than an Advisory Board meeting. Initially, a physical meeting in Brussels was planned; but extraordinary security reasons in Brussels during that week have not allowed holding the physical meeting as initially planned. Rather, a webinar took place on the very same day, with a reduced duration.

#### 3.1 Invitation to the event

##### Initial invitation

*Invitation to Market4RES event  
27 November 2015 – 15:00 to 17:00  
Brussels (Aloft Brussels Schuman, Place Jean Rey)*

#### **Modelling short-term electricity markets and quantifying the expected impacts of the evolution of RES support schemes**

The European Commission's environmental and energy State Aid Guidelines aim at better integrating renewables into the internal electricity market, through the gradual introduction of market-based mechanisms, reflecting the increasing maturity of RES technologies. Hence, the guidelines envisage:

- the gradual move from Feed-in-Tariffs to Price Premium scheme,
- exposing RES generators to standard balancing responsibilities,
- measures to be put in place in order to ensure that RES producers have no incentive to generate electricity under negative prices.

Therefore, several questions could be raised:

- What will be the impacts on the electricity market outcomes of the gradual move from Feed-in-Tariffs to Price Premium schemes?
- How will this move impact the revenues of the different types of electricity generators?
- Will this move have an impact on cross-border exchanges?
- How will demand flexibility impact the short-term market outcomes with high levels of renewable production (2020 objectives and beyond)?

Thanks to the state-of-the-art market simulator OPTIMATE, the Market4RES project is studying these impacts and is proposing a quantification of these according to five families of indicators: generation mix, costs and profits, market prices, sustainability, and cross-border market integration.

Specifications and intermediate results of these studies will be presented and discussed at this event.

New functionalities of the OPTIMATE tool will also be unveiled.

### Invitation to the webinar

The stakeholders registered at the event received on the 24<sup>th</sup> of November an updated invitation, informing them that the event would take place in the form of a webinar, with a reduced duration.

### Agenda of the webinar

14:00	Introduction to the Market4RES project	Andrei Morch (SINTEF)
14:10	Purpose of the workshop	Sophie Dourlens-Quaranta (Technofi)
14:15	Presentation of the OPTIMATE numerical simulation platform including recent updates	Adrien Atayi (RTE)
14:35	Use of OPTIMATE within the Market4RES project <ul style="list-style-type: none"><li>• Impact of RES support schemes on electricity market outcomes</li><li>• Next steps: study about the impacts of demand flexibility</li><li>• Questions and answers</li></ul>	Sophie Dourlens-Quaranta (Technofi)
15:20	Conclusions	Sophie Dourlens-Quaranta (Technofi)
15:30	End of webinar	

### 3.2 Registered participants

Name	Organisation
Peter Ahcin	SINTEF
Adrien Atayi	RTE
Juan Bogas	OMIE
Bettina Burgholzer	EEG
Victor Charbonnier	EWEA
Giacomo Ciapponi	REF-E
Patrick De Leener	CORESO
Andreas Dietrich	UDE
Thomas Doering	SOLAR POWER EUROPE
Sophie Dourlens-Quaranta	TECHNOFI
Stefan Dunjic	JOULE ASSETS
Jean-François Fiévez	EC
Aurore Flament	3E
Daniel Fraile	EWEA
Hugo Gil	FSR
Pierre Girardeau	ARTELYS
Arjan Goemé	LNE
Maria Johnsson	JOULE ASSETS
Pierre Loaec	EC
Thomas Meister	TENNET

Andrei Morch	SINTEF
Matthias Namgalies	ABENGOA SOLAR
Yvann Nzengue	TECHNOFI
Irina Oleinikova	EDI
Luis Olmos	COMILLAS
Christian Redl	AGORA ENERGIEWENDE
Manoel Rekinger	ELIA
Kostis Sakellaris	EC
Marco Schudel	RTE
Serban Scriciu	EC
Alan Ben Seralvo	REF-E
Vladimiros Sykaminidis	ADMIE
Diletta Zeni	EWEA

### 3.3 Summary of the webinar

TECHNOFI and RTE provided an update of their studies in Market4RES WP4.

On the one hand, the functionalities of the OPTIMATE tool were presented and recent developments unveiled. The OPTIMATE prototype used within Market4RES allows for modelling the day-ahead markets' outcomes and compare the impacts of different market design options. OPTIMATE last release will also allow the user to perform studies related to intraday trading and balancing markets. For instance, the impacts of using explicit or implicit orders in the balancing market, or changing TSOs operational time frame for balancing, can be assessed.

The following questions were raised:

- **Question:** *On average 66% of electricity is traded in the OTC markets. How to model this?*
  - Answer: It is right. Still, we assume that the spot market is representative enough of the market in general.
- **Question:** *Does the day-ahead module in OPTIMATE correspond to the PCR (Price Coupling of Regions) features?*
  - Answer: Within the day-ahead modules, a market coupling module (running Flow-based and ATC) has been developed. Different types of orders are modelled within OPTIMATE (fill or kill, blocks, fully divisible orders, volume flexible orders...). However, it would be impossible to model in every detail all functionalities of the real markets, because of increased computation time. The hypotheses chosen within OPTIMATE are deemed realistic enough.

On the other hand, the methodology implemented within Market4RES was presented, in particular with regards to the assessment of RES support schemes at 2020 as presented in Market4RES Deliverable D4.2. Proposals for configuring demand flexibility parameters were also discussed in view of the study carried out by TECHNOFI about demand-response impacts on short-term markets. The results of this study will be gathered in the report D4.3 to come.

The following remarks and questions were raised:

- **Remark:** *The global costs of RES support schemes should not be compared to running costs of thermal plants. Thermal producers also receive some kind of subsidies or capacity payments.*
  - **Answer:** Point taken.
- **Question:** *Are negative prices related to the features of the scenarios, or to the RES support schemes?*
  - **Answer:** Within our modelling, the main reason for negative prices are the RES support schemes; but the (lack of) flexibility of thermal power plants can also generate such prices, especially with high RES penetration.
- **Question:** *Regarding load shedding, how will you model demand shifts to off-peak hours?*
  - **Answer:** We are currently designing a method based on the residual load. It will be detailed in the upcoming deliverable D4.3.