



CHAIRE EUROPEAN
ELECTRICITY MARKETS
Fondation Paris-Dauphine

ACTIVITY REPORT 2017



DAUPHINE
UNIVERSITÉ PARIS

RESEARCH CHAIR SUPPORTED BY



edf EPEX**SPOT**



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"Each year, the rapid evolution of European electricity markets brings its share of new developments requiring creativity and reactivity from the whole CEEM team.

We gladly accept this permanent challenge as it signals continuing social demand for discussions and high-level research in our field."

Jan Horst Keppler
Scientific Director, CEEM

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INTRODUCTION

FROM THE SCIENTIFIC DIRECTOR



Dear Friends of the Chaire European Electricity Markets (CEEM),

Each year, the rapid evolution of European electricity markets brings its share of new developments requiring creativity and reactivity from the whole CEEM team.

We gladly accept this permanent challenge as it signals continuing social demand for discussions and high-level research in our field.

In keeping with this dynamic context, 2017 was marked by strong growth of new developments and major changes.

In 2017, the CEEM thus celebrated its five years of existence as well as the renewal of the Partnership Convention between Paris-Dauphine University, the Paris-Dauphine Foundation and partners, the French TSO Réseau de Transport d'Électricité (RTE), Électricité de France (EDF), EPEX Spot and CELEST. We would specifically like to welcome our new partner, CELEST, the second

largest non-historical electricity producer in France as well as the fourth largest producer overall. The CEEM's *Scientific Project* for the period 2017–2020 focuses on the *market design* of European electricity markets to ensure the decarbonation of electricity production and the sustainability of long-term investment. This principal theme is complemented by research on flexibility, decentralisation and the harmonisation of local developments and the supply-demand balance at the national and the European level. The latter area of research will be directed by Patrice Geoffron, Professor of Economics at Paris-Dauphine University.

Regarding its internal functioning, the CEEM is happy to welcome Fabien Roques, Associate Professor of Economics at Paris-Dauphine University and Associate Researcher at the Electricity Policy Research Group (EPRG) of Cambridge University, as Scientific Advisor. He takes over from

Dominique Finon (CNRS-CIRED), whose work as Scientific Advisor for the CEEM during five intellectually intense and highly productive years came to an end due to his retirement. We would like to transmit him our most sincere thanks for his invaluable contribution to the development of the CEEM. We would also like to offer our sincere gratitude to Anna Creti, Professor of Economics, at Paris-Dauphine University, who directed the Econometrics axis of the CEEM at the highest scientific level. Her future work will focus primarily on gas and climate change.

Throughout the year 2017, the CEEM continued to organize a number of successful, well-attended, scientific events including 4 international conferences, 1 internal research seminar and 4 PSL seminars on Energy Economy. Regarding scientific publications, 8 *Working Papers* were accepted by the CEEM Publication Review Board and added to the CEEM website which has become a valuable resource in its own right. In 2017, 5 articles were published in top-ranking refereed journals in our field including *Energy Journal* and *Energy Policy*. Although the first beneficiaries

of the CEEM incentive programme to support scientific publications are the authors themselves, including several promising young CEEM researchers who published their first journal papers, it also greatly enhances the visibility of Paris-Dauphine University together with the CEEM and its partners. In the area of research, one must also mention the defense of the PhD thesis of Manuel Villavicencio and the research undertaken by Alexis Paskoff and Amaury de Balincourt from the École des Mines de Paris. The latter completed their internships with the CEEM, in the framework of a PSL partnership between Paris-Dauphine University and the École des Mines de Paris. In addition, several new PhD students, overseen by different CEEM researchers, have either recently started or are continuing their research.

In 2018, in our constant quest for developing formats which correspond best to the advancement and dissemination of knowledge, the CEEM will also introduce a new format of research seminars aimed exclusively at its partners and university researchers. The first of these seminars will deal with the value of flexibility and the

second with the complementarity of nuclear energy and renewable energy sources. Another axis of development is the strong involvement of the CEEM in the European Project OSMOSE, which started on 1st January 2018. It concerns the potential for electricity storage to contribute to market development and ensure the security of supply in a sector more than ever shaped by the variability of renewable production.

Overall, the year 2017 was an important step to adjust and consolidate the structure and functioning of the CEEM. With the indispensable support of Fatoumata Diallo, the CEEM Project Manager, we will be able to address the year 2018 and its forthcoming challenges in a confident manner. The CEEM, together with our colleagues in the Dauphine ecosystem of research on energy, carbon and electricity, will continue to be at the core of the discussions and the research that will accompany the ongoing transitions in our field.

Sincerely yours

Jan Horst Keppler

Scientific Director, CEEM



THE CEEM 2017 IN FIGURES



THE CEEM IN SHORT



The CEEM Objectives

The Chaire European Electricity Markets (CEEM) is an economic research chair at Paris-Dauphine University. It is supported by four partner companies, the French TSO Réseau de Transport d'Électricité (RTE), Électricité de France (EDF), EPEX Spot and CELEST, which is part of an ecosystem of institutions at Paris-Dauphine working on energy matters, including the Centre of Geopolitics of Energy and Raw Materials (LEDa-CGEMP), the Master programme in Energy, Finance and Carbon and its students, as well as the Paris-Dauphine Chairs for Climate Economics and Finance & Sustainable Development. In this context, the CEEM pursues three objectives:

- Realising an ambitious and internationally recognised research programme on European electricity market issues;
- Providing a forum where academic researchers, industry representatives

and stakeholders can exchange independently on European electricity market issues;

- Contributing to the education of the future experts and managers of the companies and institutions active in the electricity sector.

Mission of the CEEM

The core activity of the CEEM is to produce scientific research on the economics of the production, transport and distribution of electricity in European electricity markets. These markets are currently undergoing a period of rapid change. In order to reflect these changes, the CEEM will in the period 2017-2020 concentrate on a number of specific issues such as capacity mechanisms, the remuneration of flexibility and network regulation. This will allow to both broaden and deepen its research activities as well as to stay relevant in a fast-evolving public discussion.

THE TEAM



Jan Horst Keppler,

Scientific Director of the CEEM and Professor of Economics at Paris-Dauphine University, is in charge of the organization of the Chaire as a whole, together with its research activities.



Fabien Roques,

Associate Professor of Economics at Paris-Dauphine University and Associate Researcher of the Electricity Policy Research Group of the University of Cambridge, is the Scientific Advisor of the CEEM.



Patrice Geoffron,

Professor of Economics at Paris-Dauphine University, is in charge of the field *"Decentralization and Harmonization of the links between local actors and the supply-demand balance at national and European levels"*.



Fatoumata Diallo,

Project Manager of the CEEM.

THE CEEM RESEARCHERS



Amaury de Balincourt, Research Assistant

Marie Bessec, Researcher

Régis Bourbonnais, Researcher

Mauricio Cepeda, Junior Researcher

Cédric Clastres, Researcher

Alexandre Coquentin, Junior Researcher

Anna Creti, Researcher

Michel Cruciani, Researcher

Guillaume Dezobry, Researcher

Dominique Finon, Researcher

Patricia Van Horn Florin, Researcher

Julien Fouquau, Researcher

Patrice Geoffron, In Charge of the CEEM
"Decentralization" field

Frédéric Gonand, Researcher

Stéphane Goutte, Researcher

Morwenna Guichoux, Junior Researcher

Jan Horst Keppler, Scientific Director
of the CEEM

Seungman Lee, PhD at the CEEM

Yannick Le Pen, Researcher

Yuanjing Li, Junior Researcher

William Meunier, Junior Researcher

Alexis Paskoff, Research Assistant

Marie Petitet, Junior Researcher

Thao Pham, Junior Researcher

Sébastien Phan, Junior Researcher

Fabien Roques, Scientific Advisor
of the CEEM

María-Eugenia Sanin, Researcher

Charlotte Scouflaire, PhD at the CEEM

Antoine Verrier, PhD at the CEEM

Manuel Villavicencio, PhD at the CEEM

Julie Hyun Jin Yu, Junior Researcher

GOVERNANCE



1. Steering Committee

The Steering Committee is the governing body of the CEEM. It defines the CEEM strategic orientations and research programme, approves its provisional annual budget and controls spending, and validates the annual report on the progress of the Chaire's work established under the responsibility of the Scientific Director. Regulated by the Partnership Convention, its members include representatives of partnerships, the Scientific Director of the CEEM, a second Teacher-Researcher from Paris-Dauphine University, a representative of the Paris-Dauphine Foundation, the Scientific Advisor of the CEEM and two external qualified personalities.

The Steering Committee meets twice a year.

In 2017, the two meetings of the Steering Committee took place on 22nd May and 11th December. Debates focused on the renewal of the Partnership Convention

and the *Scientific Project* for the period 2017-2020.

2. Associate Researchers

The CEEM is presently associated with approximately thirty researchers working on different levels of European electricity markets. On 4th October 2017, a CEEM Research meeting took place during which the latest news and current activities of the CEEM, and particularly the renewal of the CEEM Partnership Convention, were discussed.

The status of an Associate Researcher notably implies to some extent, collaborating in the events scheduled by the CEEM and participating in the CEEM Copyrights Policy for the *Working Papers* and publications in peer-reviewed journals. This system has proved its worth and will be maintained for the next period.

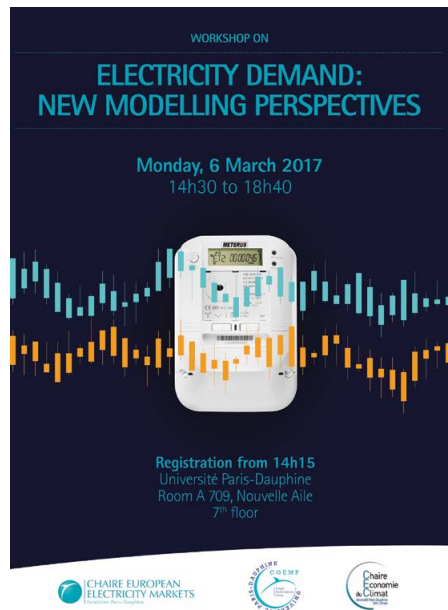
Members of the Steering Committee:

- **Jan Horst Keppler**, Scientific Director of the CEEM and President of the Steering Committee
- **Thomas Veyrenc**, Director of Markets and Regulatory Affairs, RTE
- **Cédric Léonard**, Head, Economic Studies Hub, Markets Department, RTE
- **Yannick Jacquemart**, Director of R&D-Innovation, RTE
- **Patrice Bruel**, Director of Regulation, EDF
- **Fabienne Salaün**, Officer-in-Charge, Regulations Direction, EDF
- **Jean-François Conil-Lacoste**, Chairman of the Board, EPEX Spot
- **Philippe Vassilopoulos**, Head of Product Design, EPEX Spot
- **Antonio Haya**, Chairman, CELEST
- **Patrice Geoffron**, Professor of Economics, Paris-Dauphine University
- **Sandra Bouscal**, Director of the Paris-Dauphine Foundation
- **Jean-Arnold Vinois**, Honorary Director of the European Commission,
Special Advisor to the Commissioner (without voting rights)
- **Alfred Voss**, President of the CEEM Scientific Council, IER,
University of Stuttgart (without voting rights)
- **Fabien Roques**, Scientific Advisor of the CEEM (Observer)

3. The Publication Review Board

The CEEM Publication Review Board decides on the acceptance of *Working Papers*, as well as the scientific articles which had not previously been the object of a *Working Paper*, prepared by the CEEM researchers in the framework of the CEEM research incentive programme. Each "*candidate paper*" is submitted to the members of the Publication Review Board for a first appraisal, and, after due revision, is submitted a second time, for endorsement. The Publication Review Board is electronically informed each time a new scientific production is submitted. Every partner of the CEEM appoints at least one representative to participate in the work of the Publication Review Board. Every publication bears the mention of the CEEM and its partners' support and thus, contributes to the growing international recognition of Paris-Dauphine University in the sector

of energy research. In 2017, The Publication Review Board endorsed 8 *Working Papers* and 5 publications in peer-reviewed journals including the *Energy Journal* and *Energy Policy*.



Members of the Publication Review Board:

- **Jan Horst Keppler**, Scientific Director of the CEEM
- **Fabien Roques**, Scientific Advisor of the CEEM
- **Thomas Veyrenc**, Director of Markets and Regulatory Affairs, RTE
- **Cédric Léonard**, Head, Economic Studies Hub, Markets Department, RTE
- **Patrice Bruel**, Director of Regulation, EDF
- **Philippe Vassilopoulos**, Head of Product Design, EPEX Spot
- **Antonio Haya**, Chairman, CELEST
- **Arnaud Vuillefroy**, CELEST
- **Patrice Geoffron**, Professor of Economics, Paris-Dauphine University
- **Yannick Le Pen**, Head Lecturer, Paris-Dauphine University



THE CEEM NEWS FOR 2017



Introduction

The main activity of the CEEM has been research into decarbonation of electricity production, and sustainability of long-term investment in the context of French and European energy transitions.

In rapid evolution of European electricity markets, this research entails the study on *market designs*, the evolution of electricity prices, transport and distribution infrastructures, and even *business models* in the electricity sector of tomorrow. Specific attention is required for the key issues of the flexibility of the electricity system, and decision-making organization at local level, together with a balance between national and European levels.

The CEEM scientific research includes an additional programme of scientific conferences and seminars which targets discussions and disseminates research results, trains PhD students and young researchers, as well as its Copyrights

Policy for the *Working Papers* and publications in peer-reviewed journals.

In the three fields of research, training and dissemination, the CEEM seeks to establish contact and exchange with other Research chairs at Paris-Dauphine and capitalizes on its important international network with its particularly close contacts with Florence School of Regulation (European University Institute), the University of Leuven Energy Institute, the Electricity Policy Research Group (Cambridge University), the Institute for Energy Economics and the Rational Use of Energy (University of Stuttgart) and the Centre for Energy and Environmental Policy Research (MIT). The latter action will free synergies, improve the quality and visibility of the CEEM research and contribute to the emergence of a new generation of researchers in the Economics of electricity systems.

I. SCIENTIFIC RESEARCH



A. Doctoral Theses

In 2017, the CEEM funded solely the following 2 doctoral theses:

- **Manuel Villavicencio**, *"Analyzing the Optimal Development of Electricity Storage in Electricity Markets with High Variable Renewable Energy Shares"* (Supervisor: Jan Horst Keppler). Thesis Defense on Thursday 14th December 2017, at Paris-Dauphine University.
- **Charlotte Scouflaire**, *"Capacity Remuneration Mechanisms: Analytical Assessment of Current Experiences and Lessons Learned for Future Market Designs"* (Supervisor: Jan Horst Keppler).

Furthermore, the CEEM also oversees the following doctoral theses:

- **Antoine Verrier**, *"Assessment of the Economic Potential for Demand Response Considering Consumers' Preferences: A Quantification of the French Power System"* (Supervisor: Jan Horst Keppler).
- **Seungman Lee**, *"The American and European Lessons of Demand-side Management and its Market Design for Asian Countries"* (Supervisor: Jan Horst Keppler).

The synergy between the CEEM and several doctoral theses overseen by researchers of the CEEM is well-established.

B. Research Assistance – Collaboration of the École des Mines de Paris

The CEEM remains very committed to maintaining and strengthening its collaboration with the École des Mines de Paris. For the moment, recruiting the students from this school as research assistants of the CEEM via internship contracts or fixed-term contracts works very well.

In 2017, the CEEM recruited the following 2 research assistants:

- **Alexis Paskoff**, Civil Engineering student at the École des Mines de Paris, Internship from 1st September 2016 to 1st March 2017.

Research Mission: Calculating the annuities of electricity producers according to their mode of allocation for carbon quotas.

- **Amaury de Balincourt**, Civil engineering student at the École des Mines de Paris, Undertook vacations at Paris-Dauphine: from 4th September 2017 to 3rd March 2018.

Research Mission: Preparing a quantitative analysis of the value of flexibility using methods developed by CEEM researchers and market data from EPEX Spot.

Objective: To develop a scientific report likely to be the foundation for a scientific publication.

II. SCIENTIFIC PRODUCTION



In 2017, the CEEM accounted for 8 *Working Papers* and 5 publications in peer-reviewed journals (*Energy Journal* and *Energy Policy*). All the CEEM publications are available and downloadable on its website at:

<http://www.ceem-dauphine.org/working.en>.

A. Working Papers

- "*SiSTEM, a Model for the Simulation of Short-Term Electricity Markets*", Marie Petitet (EDF R&D and CEEM Researcher), Marie Perrot and Yannick Phulpin from EDF R&D (France), and Sébastien Mathieu and Damien Ernst from University of Liège (Belgium);
- "Assessing Cross-Border Integration of Capacity Mechanisms in Coupled Electricity Markets", Mauricio Cepeda;
- "*The Value of Electric Energy Storage in Electricity Systems with High Shares of Wind and Solar PV*", Manuel Villavicencio;
- "*A Prospective Economic Assessment of Residential PV Self-Consumption with Batteries and Its Systemic Effects*", Hyun Jin Julie Yu;
- "*The Value of Flexibility in Power Markets*", Stéphane Goutte and Philippe Vassilopoulos;
- "*A Capacity Expansion Model Dealing with Balancing Requirements, Short-Term Operations and Long-Run Dynamics*", Manuel Villavicencio;
- "*Determining Optimal Interconnection Capacity on the basis of Hourly Demand and Supply Functions of Electricity*", Jan-Horst Keppler, William Meunier and Alexandre Coquentin;
- "*Hybrid Electricity Markets with Long-Term Risk-Sharing Arrangements: Adapting Market Design to Security*", Fabien Roques and Dominique Finon.

B. The CEEM Researchers Peer-reviewed Publications

1. Energy Journal

- *"Determining Optimal Interconnection Capacity on the basis of Hourly Demand and Supply Functions of Electricity",*

Jan Horst Keppler and William Meunier;

- *"Market Integration and Wind Generation: An Empirical Analysis of the Impact of Wind Generation on Power Prices Cross-Border",* Sébastien Phan and Fabien Roques.

2. Energy Policy

- *"Capacity Adequacy in Power Markets Facing Energy Transition: A Comparison of Scarcity Pricing and Capacity Mechanism",* Marie Petitet, Dominique Finon and Tanguy Janssen;

- *"Adapting Electricity Markets to Decarbonisation and Security of Supply Objectives: Toward a Hybrid Regime?",* Fabien Roques and Dominique Finon;

- *"A Prospective Economic Assessment of Residential PV Self-Consumption with Batteries and Its Systemic Effects: The French Case in 2030",* Hyun Jin Julie Yu.



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Université Paris-Dauphine

Chaire de recherche associée par



III. SCIENTIFIC EVENTS



Since 2012, thanks to its programme of scientific conferences and seminars, the CEEM has firmly established itself in the French landscape as a renowned centre for research and exchange on the issues relating to the electricity markets. It is also benchmarked internationally, in part as a result of the regular participation of its PhD students in international conferences and symposia. In the medium term, the CEEM thus aims at becoming a reference at the European level and to be able to influence debates on European energy policy.

All the presentations of the CEEM public scientific events are available and downloadable on its website at:

<http://www.ceem-dauphine.org/agenda/en> .

A. Scientific Conferences

In 2017, 4 scientific conferences were organized.

- 24-11-2017, Conference on *"Public Intervention in the Energy Transition: A Legal and Economic Perspective on State Aid Policy"*;
- 23-10-2017, Conference on *"The First Capacity Markets in Europe – Feedbacks and Evolutions"*;
- 27-09-2017, Conference on *"The Future of Utilities: From Bankruptcy Risk to New Business Models"* and Ceremony for the Renewal of the CEEM Partnership Convention;
- 06-03-2017, Workshop on *"Electricity Demand: New Modelling Perspectives"*.

B. Internal Research Seminars

In the framework of its activities, the CEEM has been organizing research seminars initially intended for the work of young researchers, doctoral

and postdoctoral students affiliated to the Chaire. The latter public has been researching very specific topics related to electricity markets and their work has been challenged with the work of external professionals working on the same topics and using their competences to debate internal work and to promote progress.

Since 2015, the seminars series has left its original purpose of encouraging internal debates and has branched out to very specific issues that require complex formalised methods. These seminars were met with genuine interest among the community of electricity market experts from both industrial companies and consultants, while also providing a forum for dialogue for academics. These seminars contribute to the consolidation of the reputation of the Chaire, the competences on specific issues addressed, while also favouring the consolidation of certain internal works.

30th January 2017, the CEEM organized a seminar on: *"European Electricity Market Integration after the Winter Package: New Impulse or Business as Usual?"*



SEMINAR ON

**EUROPEAN ELECTRICITY MARKET INTEGRATION
AFTER THE WINTER PACKAGE:
NEW IMPULSE OR BUSINESS AS USUAL?**

Monday, 30 January 2017
14h30 to 19h00

Registration from 14h00
Université Paris-Dauphine
Salle Raymond Aron
2nd floor

Chaire de recherche électrique sur

CHAIRE EUROPEAN ELECTRICITY MARKETS
Electricité de France

RTE EDF EPEXSPOT

GRUPEP
GAS

C. Research Seminar on Energy Economics at Paris-Sciences-Lettres

The Paris-Sciences-Lettres Research Seminar on Energy Economics is jointly organized by PSL members CERNA (MINES PARIS TECH), CGEMP (Paris-Dauphine University), the Chaire European Electricity Markets (Paris-Dauphine University), and i3 (Interdisciplinary Innovation Institute). It is driven by François Lévêque (MINES PARIS TECH), Dominique Finon (CEEM and CNRS-CIRED) and Patrice Geoffron (Director of CGEMP, Paris-Dauphine University). This monthly seminar aims at maintaining and reinforcing the academic excellency of French research in energy economics. Through the latest economic analysis, the seminar seeks to shed light on energy policy issues and long-term decisions. It brings together professors, researchers, PhD students and professional economists interested in theoretical or applied energy issues. It indiscriminately deals with the entire scope of energy sources and their respective markets. It is open

to all methodological approaches and economic disciplines.



CONFÉRENCE SUR

LES PREMIERS MARCHÉS DE CAPACITÉ EN EUROPE

RETOURS D'EXPÉRIENCE ET ÉVOLUTIONS

Lundi
23 Octobre 2017
16h00 à 19h00

Accueil dès 15h30
Université Paris-Dauphine
Salle Raymond Aron
2ème étage

Chaire de recherche soutenue par

 CHAIRE EUROPEAN ELECTRICITY MARKETS
 RTE  EDF  EPEXSPOT  CELEST

In 2017, the CEEM took part in 4 sessions of this PSL Research Seminar.

38th Session 13 – 12 – 2017

"Towards an Electric Decentralisation Economy"

37th Session 09 – 10 – 2017

"Assessing National Determined Contributions (NDC) of the Signatory Countries of the Paris Agreement"

36th Session 31 – 05 – 2017

"The Economy of Electric Vehicles in Electricity and Transport Systems"

35th Session 15 – 03 – 2017

"The Political Economy of the EU–Russia Gas Exchanges"

ADDITIONAL INFORMATION ON THE CEEM

CEEM Website

<http://www.ceem-dauphine.org/home/en> .

It enables the diffusion and coordination of the CEEM activities and the different CEEM research projects. Secure access "Members" contains several research works and internal presentations of the CEEM research seminars. Several *Working Papers* are online in a unique CEEM model:

<http://www.ceem-dauphine.org/working/en>.

All the slides of scientific events are online and downloadable.

Social networks

Find the CEEM on LinkedIn:

<http://fr.linkedin.com/pub/ceem-universit%C3%A9-paris-dauphine/87/10b/554> .

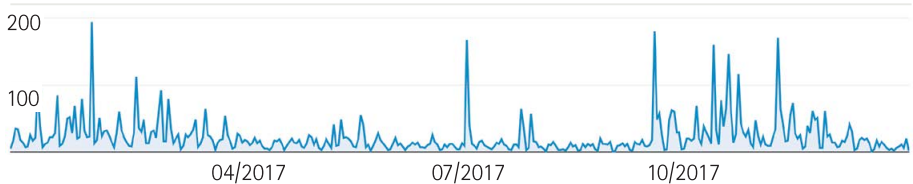


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Usage Statistics of the Website

Visits
from January 2017
to December 2017



Sessions

8 958

Pages/session

2,13

Users

5 738

Bounce rate

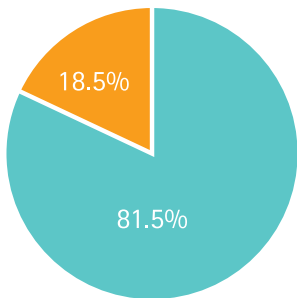
66,87%

Pageviews

19 038

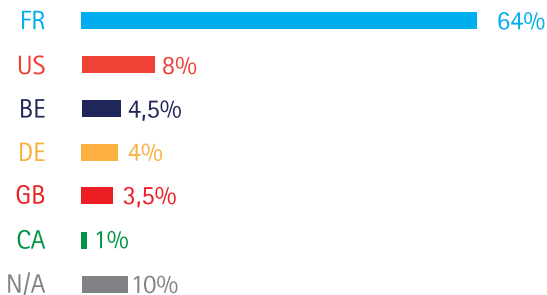
New sessions

81,5%



■ New visitors

■ Returning visitors



Source : Google analytics

THE CEEM CONTACT



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ELECTRICITY MARKETS

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