



**D6.1**

**Learning Materials**

## LEGAL DISCLAIMER



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## DOCUMENT INFORMATION

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## EXECUTIVE SUMMARY

This report includes the text contents and full documentation of the learning materials used in the Summer Courses celebrated in 2021 and 2022.

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**LIST OF ACRONYMS AND ABBREVIATIONS**

Acronym	Long text
EMP-E	Energy Modelling Platform for Europe
ECEMP	European Climate and Energy Modelling Forum

## 1. Introduction

The objective of this deliverable D6.1 Learning Materials is to present a full description of the text content and full documentation of the learning materials used in courses and conferences in 2021 and 2022.

## 2. Events

The Courses and Conferences took place in 2021 and 2022, as details are stated in the following table:

Dates	Event/Conference	Contents
2021, 27-28th, Oct	<b>EMP-E 2021: Re-Energising Sustainable Transitions in Europe</b>  -Assessment of regional differences of electrical load profiles  - Causal modeling of households investment decisions on the energy transition	<ul style="list-style-type: none"> <li>● <a href="#">Short Summary</a><sup>1</sup></li> <li>● <a href="#">Presentation</a><sup>2</sup>: De-Carbonising the Building Sector with a presentation: Assessment of regional differences of electrical load profiles</li> <li>● <a href="#">Presentation</a><sup>3</sup>: Social Behavioral Aspects: Promoting social fairness in the energy transition: Causal modeling of households investment decisions on the energy transition</li> <li>● <a href="#">WHY Skills Workshops Summary Report</a><sup>4</sup></li> </ul>
2022, 20-24th, June	<b>Deusto Summer School 22,</b> How to model human behaviour using artificial intelligence?	<ul style="list-style-type: none"> <li>● <a href="#">Syllabus</a><sup>5</sup></li> <li>● <a href="#">Moodle</a><sup>6</sup></li> <li>● <a href="#">Contents</a><sup>7</sup></li> </ul>
2022, 26th, Oct	<b>Workshop: Evolutionary for energy</b>	<ul style="list-style-type: none"> <li>● <a href="#">Website</a><sup>8</sup></li> </ul>
2022, 5-7th, Oct	<b>ECEMP 2022</b>	<ul style="list-style-type: none"> <li>● <a href="#">Summary</a><sup>9</sup></li> <li>● High Resolution time series processing               <ul style="list-style-type: none"> <li>○ <a href="#">Clustering electricity consumption patterns at household level</a><sup>10</sup></li> <li>○ <a href="#">Google COLAB</a><sup>11</sup></li> </ul> </li> </ul>

Table 1: Summer Courses table

<sup>1</sup> <https://www.why-h2020.eu/materials/past-events/skills-workshop-during-the-emp-e-conference>

<sup>2</sup> <https://prod5.assets-cdn.io/event/6546/assets/8364042718-5ba85b18e8.pdf>

<sup>3</sup> <https://prod5.assets-cdn.io/event/6546/assets/8364054768-40c23e51c8.pdf>

<sup>4</sup> [https://www.why-h2020.eu/fileadmin/Inhalte/Bilder/Content/WHY\\_Skills\\_Workshop\\_Summary\\_Report.pdf](https://www.why-h2020.eu/fileadmin/Inhalte/Bilder/Content/WHY_Skills_Workshop_Summary_Report.pdf)

<sup>5</sup> [https://docs.google.com/document/d/1Euc5\\_AV-e2aLElIdD49xexxIxbrr\\_s3lMBKbsl07wMs/edit#](https://docs.google.com/document/d/1Euc5_AV-e2aLElIdD49xexxIxbrr_s3lMBKbsl07wMs/edit#)

<sup>6</sup> [https://drive.google.com/file/d/1ChMKrM5qfqSXFy4ImKsqVubMG8vYYunL/view?usp=share\\_link](https://drive.google.com/file/d/1ChMKrM5qfqSXFy4ImKsqVubMG8vYYunL/view?usp=share_link)

<sup>7</sup> <https://drive.google.com/drive/u/0/folders/165ukdJDjewWrQ3Wf3ySSAiu58gR60d6q>

<sup>8</sup> <https://www.why-h2020.eu/materials/past-events/workshop-on-evolutionary-algorithm-for-energy-system-models>

<sup>9</sup> <https://www.why-h2020.eu/materials/past-events/ecemp-2022-why-sessions-and-workshops-at-the-conference>

<sup>10</sup> <https://zenodo.org/record/7568030>

<sup>11</sup> <https://colab.research.google.com/drive/1OPXHUtaJpPT3JaVrCjSm8ybv5GZoOt3p>

## 2.1. Event 2021

In 2021, during the Energy Modelling Platform for Europe event, 26th-28th October 2021 as an online event, <https://emp-e-2021.b2match.io/>. The event took place as contribution and skills workshop. The summary report can be found in Annex 1. The full report of the event can be downloaded from the WHY website: <https://www.why-h2020.eu/materials/past-events/skills-workshop-during-the-emp-e-conference>.

## 2.2. Events 2022

In 2022, three events were executed:

### 2.2.1 Deusto Summer School 2022

The Deusto Summer School 2022 was celebrated from the 20<sup>th</sup> to the 24<sup>th</sup> June 2022 in Deusto University, Bilbao, entity coordinating the WHY project.

The syllabus can be found in Annex 2. The learning materials could be examined in their corresponding archives:

- [Moodle: https://drive.google.com/file/d/1ChMKrM5qfqsXFy4ImKsqVubMG8vYYunL/view](https://drive.google.com/file/d/1ChMKrM5qfqsXFy4ImKsqVubMG8vYYunL/view)

### 34114-how\_to\_model\_human\_behaviou... 15 items

Name	Last modified	File size
activities	-	112 KB
course	-	8 KB
files	-	29 MB
sections	-	8 KB
.ARCHIVE_INDEX	1 Jan 2013	24 KB
files.xml	13 Feb 2023	29 KB
grade_history.xml	13 Feb 2023	106 bytes
gradebook.xml	13 Feb 2023	2 KB
groups.xml	13 Feb 2023	86 bytes
moodle_backup.log	13 Feb 2023	-









- Contents:

<https://drive.google.com/drive/u/0/folders/165ukdJDjewWrQ3Wf3ySSAiu58gR60d6q>

... > Summer School organization > ALUD ▾

File type ▾ People ▾ Last modified ▾

Name ↑	Last modified ▾	File size
 1- Curso_ How to Model Human Behaviour Using Artificial Intelligence 22.pdf	13 Feb 2023 Cruz Enrique Bor...	134 KB
 2- Curso_ How to Model Human Behaviour Using Artificial Intelligence 22, Tema_ I...	13 Feb 2023 Cruz Enrique Bor...	272 KB
 3- Curso_ How to Model Human Behaviour Using Artificial Intelligence 22, Tema_ ...	13 Feb 2023 Cruz Enrique Bor...	109 KB
 4- Curso_ How to Model Human Behaviour Using Artificial Intelligence 22, Tema_ ...	13 Feb 2023 Cruz Enrique Bor...	83 KB
 5- Curso_ How to Model Human Behaviour Using Artificial Intelligence 22, Tema_ ...	13 Feb 2023 Cruz Enrique Bor...	199 KB
 6- Curso_ How to Model Human Behaviour Using Artificial Intelligence 22, Tema_ ...	13 Feb 2023 Cruz Enrique Bor...	64 KB

## 2.2.2 Workshop: Evolutionary for energy

The WHY - Workshop on Evolutionary Algorithm for Energy System Models. In this online workshop, which to place on the 26th July 2022, we presented an introduction to evolutionary algorithms focusing on best practices available and provided some tips to correctly engineer an evolutionary algorithm. Moreover, we showed two use cases from the Energy System Modelling community where Evolutionary Algorithms have played a role as a substitute of Integer Linear Programming techniques and discussed how to engineer an evolutionary algorithm for these use cases. Details of the event sessions can be found in Annex 3.

The recording are accessible through the WHY website, on the following link: <https://www.why-h2020.eu/materials/past-events/workshop-on-evolutionary-algorithm-for-energy-system-models>.



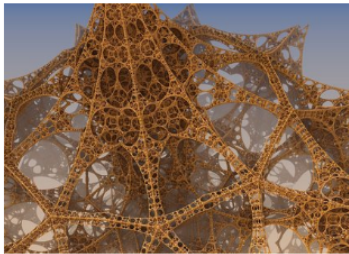
Climbing the causality ladder to understand and project the energy demand of the residential sector



Home News & Events - Our Solutions - Use Cases - Resources - Newsletters - About Us -

Home | Resources | Event Materials | Workshop on Evolutionary Algorithm for Energy System Models |

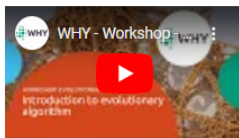
## WHY - Workshop on Evolutionary Algorithm for Energy System Models Event



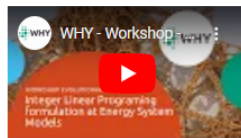
In this workshop from the 26th July we presented an introduction to evolutionary algorithms focusing on best practices available and provided some tips to correctly engineer an evolutionary algorithm. Moreover, we presented two use cases from the Energy System Modelling community where Evolutionary Algorithms have played a role as a substitute of Integer Linear Programming techniques and discussed how to engineer an evolutionary algorithm for these use cases.

Evolutionary algorithms are a class of optimization techniques that follows some natural selection principles to search for global optimum. These algorithms work iteratively by defining a set of potential candidates (individuals) and transforming them using a set of rules (operators). The most promising solutions according to a predefined quality score (fitness function) are usually fostered somehow on the next iteration (generation). The key advantages of these algorithms are their simplicity (the entire implementation could take just a bunch of computer lines) and their universality (basically they should work over any function that could be easily computable and is

not flat). Moreover, they are embarrassingly easy to parallelize. Nevertheless, they also have a large set of disadvantages starting by being a heuristics technique that cannot guarantee convergence or the quality of the solution acquired. Moreover, they have a large set of hyperparameters to be tuned reaching the point that the evolutionary algorithm has to be engineered to the problem at hand.



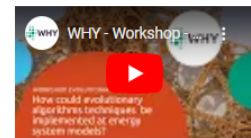
Introduction to evolutionary algorithm



Integer Linear Programming formulation at Energy System Models



Evolutionary Algorithms at Load Profile Generator



How could evolutionary algorithms techniques be implemented at energy

### 2.2.3 ECEMP 2022

The European Climate and Energy Modelling Forum took place as an online event during the 5<sup>th</sup> to the 7<sup>th</sup> of October 2022.

The programme can be found in Annex 4.

The actual recording and presentations of the event can be download from the WHY website in the following link: <https://www.why-h2020.eu/materials/past-events/ecemp-2022-why-sessions-and-workshops-at-the-conference>.

## ECEMP 2022 - Acting on the ambitions to a net-zero EU: roadblocks, challenges, and opportunities

### The WHY Session contributions and Skills Workshops

The event featured a balanced mix of high-level panel discussions and interactive workshop sessions to enable a peer-reviewed digest of models and policy insights for the transformation of the European energy system. The ECEMP 2022 conference was a platform for exchange among researchers and modelling teams from across Europe; from H2020 projects, representatives of the European Commission as well as partners from industry and civil society. In agreement with the European Commission, the former EMP-E Conference has adopted a new name, **“European Climate and Energy Modelling Platform (ECEMP)”**, to consider the increasing role of climate policies and climate change and their impact on energy demand and supply planning.

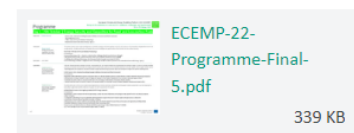
This year’s conference was an online event, due to uncertainties regarding the possibility of physical meetings. Possibilities for interaction were, as last year, set up to ensure an engaging, policy-oriented and enjoyable conference experience. This year, the overarching topic was: **Acting on the ambitions to a net-zero EU: roadblocks, challenges and opportunities**. All ECEMP 2022 presenters were invited to submit their papers to a special issue in Energy Strategy Review and Open Research Europe.

#### Days and themes

- Day 1: Energy security and geopolitics for fossil and low-carbon fuels
- Day 2: Innovation, societal and technical changes for Net Zero
- Day 3: The latest IPCC findings and implications for national and short term policies



Download the Programme



CLICK FOR THE RECORDINGS AND PRESENTATIONS

Download our Poster

Social impact of the energy transition on young people



The learning materials can be found in the following repositories:

- **Zenodo:**  
<https://zenodo.org/record/7568030#.ZFPDcHbP02w>



January 25, 2023

[Presentation](#) [Open Access](#)

# Clustering electricity consumption patterns at household level

 Quesada, Carlos;  Borges, Cruz E.

## This repository contains:

- A **notebook in R language** presenting a methodology, in line with the Data Science process, for clustering electricity consumption patterns at the household level.
- **Sixty files** selected from the GoiEner dataset to illustrate the methodology.


## Links:

- The notebook hosted here is also available on [Google Colab](#).
- The *GoiEner smart meter data* can be found [here](#).
- A 90-minute video of a detailed presentation of the notebook, with precise explanations for its follow-up, can be viewed on [YouTube](#) (Carlos Quesada, *ECEMP 2022 Conference*).
- A scientific paper with more information is **being prepared** and will be linked here when published.

and

- **Google COLAB: Clustering of electricity consumption patterns at household level**  
<https://colab.research.google.com/drive/1OPXHUtaJpPT3JaVrCism8ybv5GZoOt3p>



 Clustering of electricity consumption patterns at household level.ipynb ☆

File Edit View Insert Runtime Tools Help [Changes will not be saved](#)



+ Code + Text  Copy to Drive










## Clustering of electricity consumption patterns at household level



Notebook created in the framework of the [European H2020 Project WHY](#) by



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-  Scholar: [Carlos Quesada](#)
-  LinkedIn: [quesadagranja](#)
-  GitHub: [quesadagranja](#)
-  Twitter: [quesadagranja](#)

## ANNEX 1

The 2021 EMP-E Conference was coordinated by the SENTINEL project and took place from Tuesday, October 26 - Thursday, October 28, as a virtual conference of energy modellers in Europe. The EMP-E Conference’s theme, “Re-energising Sustainable Transitions in Europe: Energy System Modelling, Methods & Results to support the European Green Deal” aimed for a deep exchange of research and practice, with discussions around energy system modelling, methods, approaches and experiences of the European energy modelling community.

The 2021 EMP-E served as a forum for exchange among researchers across Europe from H2020 projects and European Commission representatives, as well as industry and civil society partners. Each day of the conference revolved around different themes.

- Day 1 was “Policies and Targets” for 2030, 2050, environmental policies and post-COVID recovery.
- Day 2 focused on “Linking Sectors and Technologies” to integrate the building sector, smart technology, digitalisation input and technological diffusion. Finally,
- Day 3 tackled “Modelling specific issues” such as promoting transparency, collaboration, and capturing social and behavioural change in models.

Nine skills workshops were developed for the EMP-E to provide further interactive expertise to participants. Divided into the three tracks: “Introduction to ESMs”, “Advanced modelling techniques”, and “Quality aspects”, the skill workshops ranged from technical skills like programming energy system models, business model development, to scenario design, social engagement and behavioural outcomes. These 90-minute skills workshops complemented the EMP-E’s 2021 programme, occurring after the opening day sessions and kicking off the morning sessions on the second and third days, see below table.

Day	Session	Presenters
1	1. Energy System Models: Basic Principles and Concepts	Panagiotis Fragkos of E3 Modelling & Amanda Schibline and Andrzej Ceglaz of Renewables Grid Initiative
	2. High Resolution times series processing	Carlos Quesada and Cruz Borges of Deusto University & Leire Astigarraga and Chris Merveille from GoiEner
	3. What Energy System Modellers should know about open data and software licenses	Robbie Morrison of openmod
2	4. How to set up a scenario for energy system modelling	Francesco Dalla Longa and Larissa P. Nogueira of TNO Energy Transition
	5. Technical possibilities vs. Economic Feasibility: The issue of viable business models for innovative technologies – a modeller’s approach	Thomas Nacht of 4ward Energy
	6. Communicate and inspire: How to convince with a pitch	Eva Suba and Masha Tarle of Climate Alliance

3	7. Hands-on session with the Calliope ESM Framework	Bryn Pickering of ETH Zurich and Stefan Pfenninger of TU Delft
	8. How to model citizens' behaviour	Armando Aguayo and Diego Casado-Mansilla of Deusto University
	9. EnerMaps: Open-access Energy Data and Calculation Modules	Giulia Conforto, Marcus Hummel, Bernhard Mayr of e-think & Alessia Bardi, Gina Pavone of OpenAire & Eric Wilczynski of Eurac Research

*Table a-1. Skills workshops*

To find more information visit the online report *WHY Skills Workshops Summary Report*<sup>12</sup>.

<sup>12</sup> [https://www.why-h2020.eu/fileadmin/Inhalte/Bilder/Content/WHY\\_Skills\\_Workshop\\_Summary\\_Report.pdf](https://www.why-h2020.eu/fileadmin/Inhalte/Bilder/Content/WHY_Skills_Workshop_Summary_Report.pdf)

## ANNEX 2

### Summer Course 2022. Course: How to model human behaviour using artificial intelligence?

**Introduction.** The challenges associated with the twin digital and green transition require not only technological development but also social development. Up to now, in many sectors, this social development has not received enough attention, with the result that some products or policies have failed. One way to tackle this issue is by developing behaviour models to study social development. This methodology allows us to study the key points that explain behaviour and decision-making and include them in mathematical models. The objective of this course is to train students in different behaviour modeling methodologies so that they can autonomously develop such models.

**Objectives.** The course aims to develop generic and specific competences:

- Generic:
  - Participation in multidisciplinary activities
  - Development of group activities in general and especially in online group activities.
  - Oral and written communication of scientific results
- Specific:
  - Using quantitative modeling techniques to segment behaviours
  - Use of qualitative modeling techniques to explain behaviours
  - Development of analysis skills that allow evidence-based decision making

### Contents

- 1) Methods to extract behaviour patterns from electricity consumption time series
  - a) Introduction to machine learning
  - b) Data visualization: get familiar with the information contained in the datasets
  - c) Data cleaning imputation, outlier removal, etc.
  - d) Feature extraction: one set fits for all vs tailored features
  - e) Data segmentation: clusterization following different algorithms
  - f) Quantitative assessment (validation) of the model
  - g) Qualitative results assessment: taxonomy creation
  - h) Knowledge extraction: household personae
- 2) Causal models for behaviour modeling
  - a) Introduction to Causal Models
  - b) Writing a causal diagram
  - c) Adjusting a model using Do-Why (selecting a potential outcome)
  - d) Measuring the causal effect
  - e) Refuting an estimation
- 3) Qualitative methods
  - a) Introduction to qualitative methods
  - b) How to set up the intrinsic and extrinsic variables in your model?
  - c) How to build from scratch a causal diagram?

Teaching team:

- *Cruz Enrique Borges Hernandez*

<https://deustotech.deusto.es/member/cruz-enrique-borges/>

- *Diego Casado Mansilla*

<https://estudiantes.deusto.es/cs/Satellite/estudiantes/en/students-1/academic-information/teaching-staff-1/12242/profesor>

- *Armando Aguayo Mendoza*

<https://deustotech.deusto.es/member/aguayo/>

- *Carlos Quesada Granja*

<https://estudiantes.deusto.es/cs/Satellite/estudiantes/en/students-1/academic-information/teaching-staff-1/28623/profesor>

Presentations at Sessions

Monday 20/06/2022	Tuesday 21/06/2022	Wednesday 22/06/2022	Thursday 23/06/2022	Friday 24/06/2022
<b>Introduction</b>	<b>Time Series Modeling</b>	<b>End User Model</b>	<b>Causal Model</b>	<b>Wrap-up session</b>
<ul style="list-style-type: none"> <li>● Introduction to the summer course</li> <li>● <a href="#">Introduction to ESM</a><sup>13</sup></li> <li>● <a href="#">The Human Factor in Energy Policy Making</a><sup>14</sup></li> </ul>	<ul style="list-style-type: none"> <li>● Data cleaning and visualization</li> <li>● Feature extraction</li> <li>● Clustering and validation</li> </ul>	<ul style="list-style-type: none"> <li>● Theoretical Framework</li> <li>● Brainstorming of Determinants</li> <li>● Sorting determinants in TTM</li> </ul>	<ul style="list-style-type: none"> <li>● Definition of the DAG</li> <li>● Data generation</li> <li>● SCM generation</li> <li>● Impact assessment</li> </ul>	<ul style="list-style-type: none"> <li>● Presentation of results</li> <li>● Joint discussion</li> </ul>
Write a paragraph about the importance of considering behavior aspects on ESM	Write a household persona of a cluster	Describe the determinants of the persona and sort them in the stage of change	Given a causal model, estimate the average impact making an intervention	

<sup>13</sup> <https://www.youtube.com/watch?v=QG73VHjJFQ>

<sup>14</sup> <https://www.youtube.com/watch?v=t0zO6x9iHG8>



## ANNEX 3

In this workshop on the 26th July 2022, we presented an introduction to evolutionary algorithms focusing on best practices available and provided some tips to correctly engineer an evolutionary algorithm. Moreover, we presented two use cases from the Energy System Modelling community where Evolutionary Algorithms have played a role as a substitute of Integer Linear Programming techniques and discussed how to engineer an evolutionary algorithm for these use cases.

Evolutionary algorithms are a class of optimization techniques that follows some natural selection principles to search for global optimum. These algorithms work iteratively by defining a set of potential candidates (individuals) and transforming them using a set of rules (operators). The most promising solutions according to a predefined quality score (fitness function) are usually fostered somehow on the next iteration (generation). The key advantages of these algorithms are their simplicity (the entire implementation could take just a bunch of computer lines) and their universality (basically, they should work over any function that could be easily computable and is not flat). Moreover, they are embarrassingly easy to parallelize. Nevertheless, they also have a large set of disadvantages starting by being a heuristics technique that cannot guarantee convergence or the quality of the solution acquired. Moreover, they have a large set of hyperparameters to be tuned reaching the point that the evolutionary algorithm has to be engineered to the problem at hand.

### Agenda.

Time	Session	Presenters
11:00-11:05	Welcome and participation rules	Cruz E. Borges / Axel Veitengruber
11:05-11:50	Introduction to evolutionary algorithm <sup>15</sup>	Cruz E. Borges (DEUSTO)
11:50-12:00	Coffee break	
12:00-12:15	Integer Linear Programming formulation at Energy System Models <sup>16</sup>	Johanna Ganglbauer (4ER)
12:15-12:30	Evolutionary Algorithms at Load Profile Generator <sup>17</sup>	Noah Pflugradt (FZJ)
12:30-14:00	Open discussion: how evolutionary algorithms techniques could be implemented at energy system models <sup>18</sup>	

<sup>15</sup> <https://www.youtube.com/watch?v=OfAlObZDBTQ&t=1s>

<sup>16</sup> <https://www.youtube.com/watch?v=Z9Q6IeNAUxE&t=2s>

<sup>17</sup> <https://www.youtube.com/watch?v=DRpqGAnEPUA>

<sup>18</sup> [https://www.youtube.com/watch?v=TnIGSCEq0\\_8](https://www.youtube.com/watch?v=TnIGSCEq0_8)

## ANNEX 4

### ECEMP 2022 - Acting on the ambitions to a net-zero EU: roadblocks, challenges, and opportunities

October 5-7, 2022

The annual ECEMP conference brings together Europe’s climate and energy modelling community over a three-day period in a forum for deep exchange of research and modelling practice and varied discussions. The event will feature a balanced mix of high-level panel discussions and interactive workshop sessions to enable a peer-reviewed digest of models and policy insights for the transformation of the European energy system. The ECEMP 2022 conference will be a platform for exchange among researchers and modelling teams from across Europe; from H2020 projects, representatives of the European Commission as well as partners from industry and civil society.

#### Days and themes

- Day 1: Energy security and geopolitics for fossil and low-carbon fuels
- Day 2: Innovation, societal and technical changes for Net Zero
- Day 3: The latest IPCC findings and implications for national and short term policies

#### The WHY Session contributions and Skills Workshops

The event featured a balanced mix of high-level panel discussions and interactive workshop sessions to enable a peer-reviewed digest of models and policy insights for the transformation of the European energy system. The ECEMP 2022 conference was a platform for exchange among researchers and modelling teams from across Europe; from H2020 projects, representatives of the European Commission as well as partners from industry and civil society. In agreement with the European Commission, the former EMP-E Conference has adopted a new name, “European Climate and Energy Modelling Platform (ECEMP)”, to consider the increasing role of climate policies and climate change and their impact on energy demand and supply planning.

#### Presentations at Sessions

Day	Session	Presenters
2	Nudge-based interventions to promote energy conservation and demand response among customers of an electricity retailer following the change of the electricity tariff in Spain	Cruz Enrique Borges Hernandez, University of Deusto
	What are the most relevant factors that affect households’ investment decisions on the energy transition?	Diego Casado Mansilla, University of Deusto
3	System-level Effects of Increased Energy Efficiency in Global Low-carbon Scenarios	Panagiotis Fragkos, E3 Modelling

**Skills Workshops**

Day	Session	Organized by
1	High Resolution time series processing: This session is designed for data scientists in the energy field. The objective is to present a methodology to assess high-resolution time series from smart meters. Participants will gain a general understanding of the basic steps to process big datasets and signify different behaviours of household electricity consumption.	Carlos Quesada Granja (University of Deusto)
3	This session is open to researchers, experts and students who have an interest in stakeholder engagement. Involving external stakeholders in the scenario building and modelling processes is essential to increasing the impact of the modelling work, guarantee transparency and legitimacy, collect differentiated perspectives and confirm the data.	Andrzej Ceglaz and Amanda Schibline (Renewables Grid Initiative)

To find out more visit the link below:

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