

# NEWSLETTER 01

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## MEDEAS PROJECT OBJECTIVES

**MEDEAS "Modelling the Energy Development under Environmental And Socioeconomic constraints" aims to create a new computational model that will define the future of the energy system in Europe, taking into account physical as well as social constraints. MEDEAS will develop an advanced modelling tool to create, modify and test new and existing policies which could support the transition to a more sustainable European Energy system, based on renewable energy sources.**

The transition to a low carbon economy needs to satisfy multiple (often competing) objectives including: socio-economic competitiveness, protection of the environment, creation of quality jobs, and social welfare. Policy-makers and other key stakeholders require more holistic tools which do not just focus on the energy sector, but consider the implications of policies on other domains including the economy, society and the environment. Currently, many tools lack sufficient integration of these important areas despite being tightly connected to the energy sector. Furthermore, current modelling tools often lack sufficient documentation,

transparency and have been predominately developed for a specialised audience, which makes validation and comparison of results as well as independent review more challenging. The MEDEAS project aims to solve the current challenges of integration and transparency by developing a leading-edge policy-modeling tool.

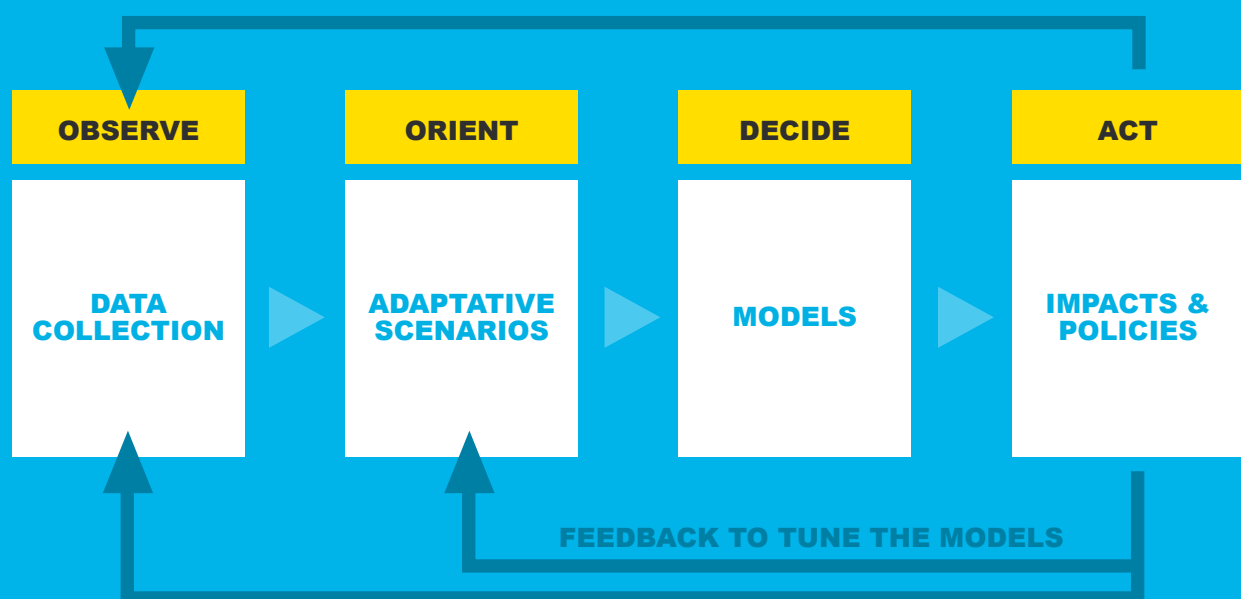
The MEDEAS model will be based on WoLiM, will consider TIMES and LEAP models and will incorporate Input-Output Analysis, which supports the accounting of environmental, social and economic impacts. The modular design of the tool will provide it with the necessary flexibility to deal with different levels and interests of stakeholders, with a high sectorial, temporal and spatial resolution. Finally, transparency will be achieved through an open access freeware distribution of the model based on the open access programming language (Python), providing a detailed user manual, addressed to a wider non-specialist audience, and including free internet courses and learning materials.

# WHAT WILL THE MEDEAS TOOL OFFER?

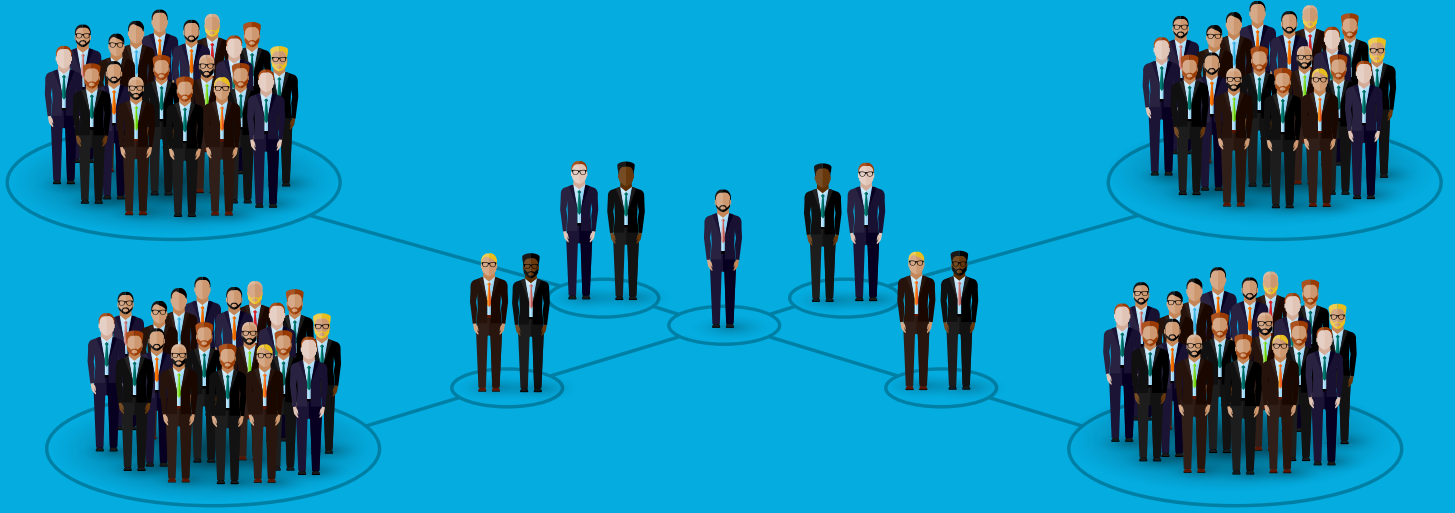
**MEDEAS project is designing and implementing a system dynamics based model. This model will consider resources and materials limitations for the energy production.**

The MEDEAS model will produce scenarios and forecasts to explore the Renewable Energy Transition in Europe and support policymakers with useful information. In specific, it will allow to assess impacts of the Renewable Energy Transition and to design future policies accordingly. The MEDEAS model will be user-friendly and flexible, able to be adapted to a wide range of interested users (from academia to policy-makers). The modularity of the model will provide a tool to be used at different levels of complexity. The Python open-source programming

language used and the free availability of the model will give it the power of all open-source, community based software applications. In this context, MEDEAS will offer policy makers and stakeholders a tool to better assess the impacts and limitations of the EU energy production/consumption system in the pathway for the transition to a low-carbon sustainable socio-economy.







## MEET MEDEAS

# STAKEHOLDERS' INVOLVEMENT

The MEDEAS project aims at developing an open-source tool that can and will be used by a wide range of stakeholders as well as the wider public. The involvement of stakeholders and their interaction with the project development as early as possible will enhance this process through the provision of guidance and insight on all major decisions that need to be taken.

Specifically, the Board of Stakeholders' role will be twofold: first of all, they will support the project by reviewing the major project outcomes at different times and phases of the project and second they will form an external opinion and assistance in policy issues for planning the next project actions.

The Board of Stakeholders will consist of a well-balanced mix of experts in the different fields associated with the project:

- **Model development:** Stakeholders that origin from a scientific/research background
- **Policy making:** Individuals with an expertise in decision making, policy analysis and consultancy
- **Model customization:** Stakeholders experienced in adapting scientific tools to the actual requirements and constraints of the system modelled.

Three meetings are planned with the Board of Stakeholders and they will take place either physically or virtually depending on the available resources, the stakeholders' availability and preferences. Moreover, information on the project will be disseminated regularly to the Board of Stakeholders to keep them updated about the project development and support their uninterrupted participation.

The stakeholders involved will have the opportunity to contribute their thoughts to a field very relevant to their expertise and therefore have their voices heard. Bringing together stakeholders of related or even different backgrounds will also provide an opportunity to meet and network with others who share common interests. The MEDEAS project welcomes this idea greatly, as it creates the grounds for developing new insights and learning.



# INCEPTION OF MEDEAS PROJECT

**The MEDEAS project officially started on the 1st January 2016. The first meeting (Kick-off meeting) of MEDEAS took place in Barcelona on the 18th and 19th February 2016.**

The meeting included a scientific discussion on the project models, data requirements and preliminary issues on scenarios, as well as project management issues. During the first day, the main objectives of MEDEAS were outlined in short presentations of the 8 work-packages of MEDEAS and the logo and webpage layouts were approved.

The second day of the meeting was dedicated to scientific discussions on the main models used to construct MEDEAS, the strategies that should be

followed in the construction, the variables to consider for modelling purposes and possible scenarios to be addressed.

Interesting points of view were raised: what are the main variables and parameters necessary to be analysed? How will these variables be studied and integrated? What references (IPCC, IEA) the MEDEAS model should take to design the scenarios and pathways? Such interesting discussions have been a very good starting point to produce the first year results in the MEDEAS consortium.



## SYNERGIES WITH ENERGY SYSTEM MODELLING PROJECTS

On the 30th June 2016, INEA organized a workshop on Energy System Modelling with the objective to bring together the four H2020 projects funded under the topic "LCE 21 – 2015: Modelling and analysing the energy system, its transformation and impacts":

The workshop's objective was the identification of possible synergies and/or overlaps among the projects. Apart from MEDEAS representatives, the workshop was attended by representatives from INEA, DG ENER, DG RTD and JRC, as well as participants in the H2020 projects [REEEM](#), [REFLEX](#) and [SET-Nav](#).



HORIZON 2020

## PUBLICATION OF MEDEAS PROJECT RESULTS

In November 2016, MEDEAS partners from [INSTM](#) have published a scientific article in the *International Journal of Heat and Technology*, entitled:

*"The Sower's Way: A Strategy to Attain the Energy Transition".*

The energy transition from fossil fuels toward renewable energy resources can be seen as a process similar to the challenge faced by ancient

farmers who had to save some of their harvests as seed for the next harvest: we need to save and invest part of the energy produced by fossil fuels in order to build their own replacement in the form of renewable energy plants. This strategy is called here "the Sower's Way".

The calculations to quantify the allocation of the energy necessary today to attain the transition



indicate that a considerable increase in renewable energy installations and plants is required to reach the goal and that it is essential to invest, as soon as possible, in their implementation.

The complete article can be found at:  
[http://www.iieta.org/sites/default/files/Journals/HTECH/IJHT.34.S2\\_11.pdf](http://www.iieta.org/sites/default/files/Journals/HTECH/IJHT.34.S2_11.pdf)

**In November 2016, MEDEAS partners from CIRCE have published a scientific article in the MDPI Resources Journal, entitled:**

*"Decreasing Ore Grades in Global Metallic Mining: A Theoretical Issue or a Global Reality?"*

The demand for the main metals that modern society needs to produce goods has increased dramatically over the past few decades, thereby increasing the extraction to meet this demand. Approximately between 8% and 10% of the total world energy consumption is consumed by the extraction of minerals, making the mining industry one of the most energy-intensive industrial sectors. This energy is used to extract and process the resources, including a variety of concentration and refining processes. Several geological factors can influence this energy consumption and the most critical one is the concentration of the minerals in the rock.

This paper analyses several energy intensity factors in different mines from all over the world and it quantifies the relationship between the mineral concentration and the total energy used (in GJ per tonne of mineral extracted). Showing that, for instance, while the average concentration of copper is slowly decreasing over time (25% from 2000 to 2013 for the Chilean mines analysed), the total energy consumption has increased (46%). Additionally, an exponential relationship can be observed between the two factors - concentration and energy consumption - i.e. while the concentration decreases the energy needed increases exponentially.

Therefore, the current pattern of extraction and its increasing energy consumption puts great pressure on the environment, and as mining is still going to be one of the main ways to meet the world's resource requirements, along with recycling, more comprehensive studies should be carried out considering the scarcity of raw materials to improve resource management and to promote the sustainable use of natural resources.

The complete article can be found at:  
<http://www.mdpi.com/2079-9276/5/4/36/html>

Publications



Project Results







## THE MEDEAS PROJECT LEADERS MEETING IN BARCELONA

**On the 3rd November 2016, the MEDEAS project leaders met in Barcelona to discuss the challenges and future data needs considering the preliminary analysis of the initial results for the MEDEAS database and model design.**

Prof. Ugo Bardi (Dept. of Chemistry, University of Florence, Italy) comments on the first results of MEDEAS:

“The MEDEAS models are still being refined, but the main results are already robust. It was clear that business as usual (BAU) is not taking us where we want to go, that is to attain the GHG emission targets of the Paris agreement (COP 21).

Only drastic policy measures can reduce GHG emissions and preserve the planet from irreversible

Climate Change. And the longer we wait, the harder it will be.

Since 1972, the "Limits to Growth" report alerted about the fact that relying on non-renewable resources would have brought the human civilization to a crisis that could be expected for somewhere during the first 2-3 decades of the 21st century. Today, the models tell us that the crisis is here. 40 years ago, we could have acted decisively and with little pain to avoid the present crisis.

Today, it is extremely difficult, although not yet impossible, but it takes pain and effort. But we can't wait much longer before taking drastic measures to boost renewable energy and phase out fossil fuels.”



## NEXT MEETING OF MEDEAS PROJECT TEAM

**The General Assembly will take place on the 15th-17th February 2017 in Brno, Czech Republic.**

The main objectives of the meeting will be the progress of data collection and model development, assessment of the project's achievements (milestones) and a plan for the next year. Side meetings will be held by the Masaryk University on the 14th of February by working groups.

In this first General Assembly it will be the first time that stakeholders will be invited to participate in the discussions of MEDEAS.

The meeting will also provide a friendly atmosphere for informal activities and strengthening of the relationships among the institutions and universities involved. National and social media will cover the event.

