



# PhD on Innovation Pathways for TES

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## Innovative Pathways to Thermal Energy Storage: INPATH-TES project

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Bucharest, 22 November 2016



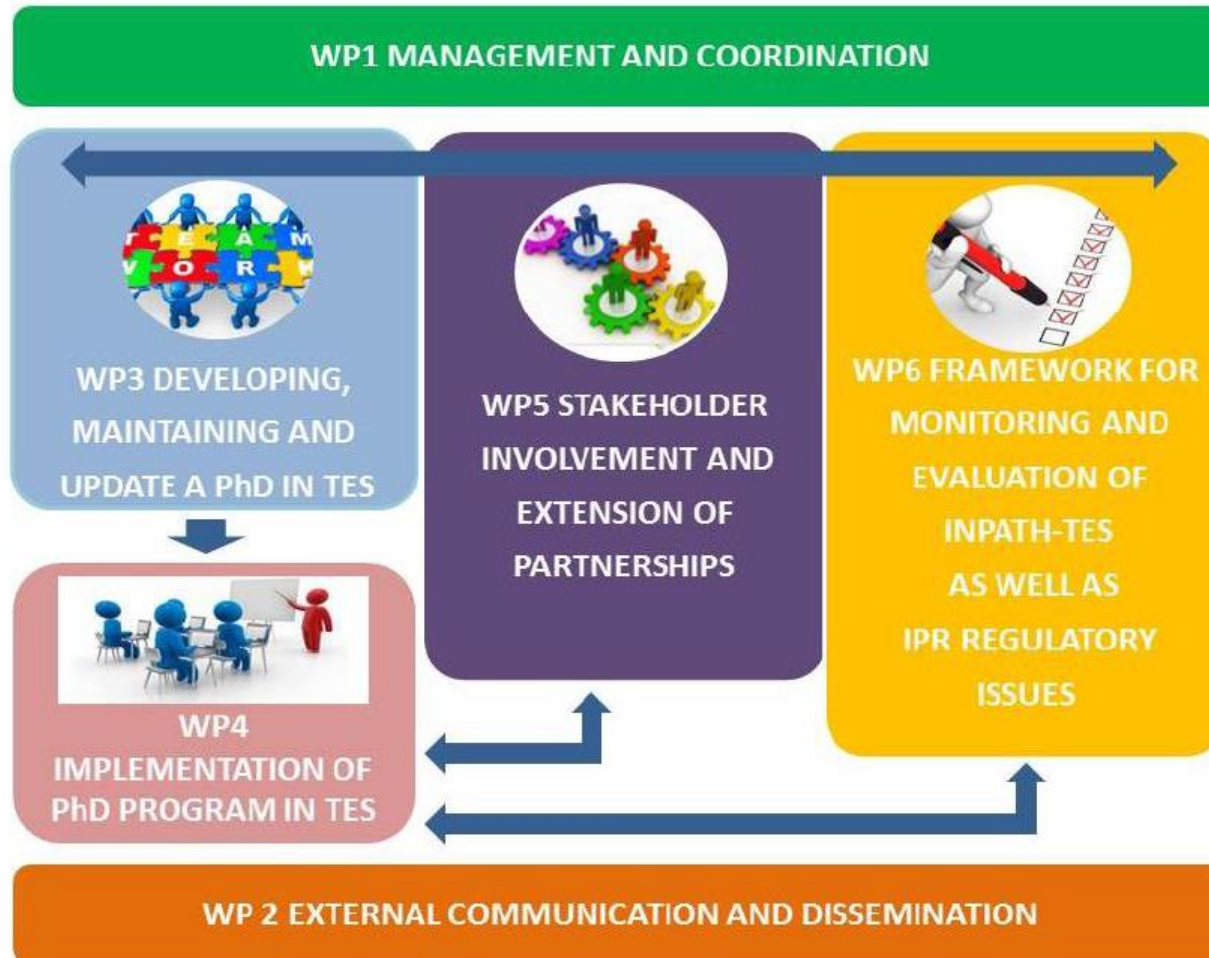
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- Introduction to INPATH-TES project
  - The PhD programme
  - Stakeholders and Target groups
  - Main events
  - Main challenges
  - Synergies with other initiatives

Issue	Description
Project Title	PhD on <b>In</b> novation <b>Path</b> ways for <b>TES</b> (INPATH-TES)
Starting date	1 May 2015
Duration	36 months
Coordinator	University of Lleida, Spain (Prof. Dr. Luisa F. Cabeza)
Call	H2020-LCE-2014-2: Competitive low-carbon energy
Type of Action	Coordination and Support Action
Main Pillar	Societal Challenges
Topic	LCE-20-2014: The human factor in the energy system
Website	<a href="http://www.inpathtes.eu">www.inpathtes.eu</a>

- Main goal:
  - To create a network of universities and research institutes to **implement a joint PhD programme on thermal energy storage (TES) technologies** at year 0+2 (2017)
- Specific objectives:
  - To develop **at least 20 ECTS of basic common training module**
  - To develop **four basic common technology PhD courses**
  - To establish **one annual joint workshop** for PhD students
  - To aim at **graduating at least 28 PhD students every year** at year 0+6 (2021)
  - **To exchange at least 14 PhD students every year** between industry and academia

- Expected Impacts:
  - A unique joint PhD Programme on TES that will enable the qualification of professionals for the European research and industry institutions, placing on the market 28 PhDs each year
  - Knowledge sharing, technology transfer between academia and industry, knowledge dissemination inside and outside the network created

- Overall structure of the work plan:



- Management structure:
  - General Board
  - Management Board
  - Stakeholder Advisory Board
  - Training Advisory Board

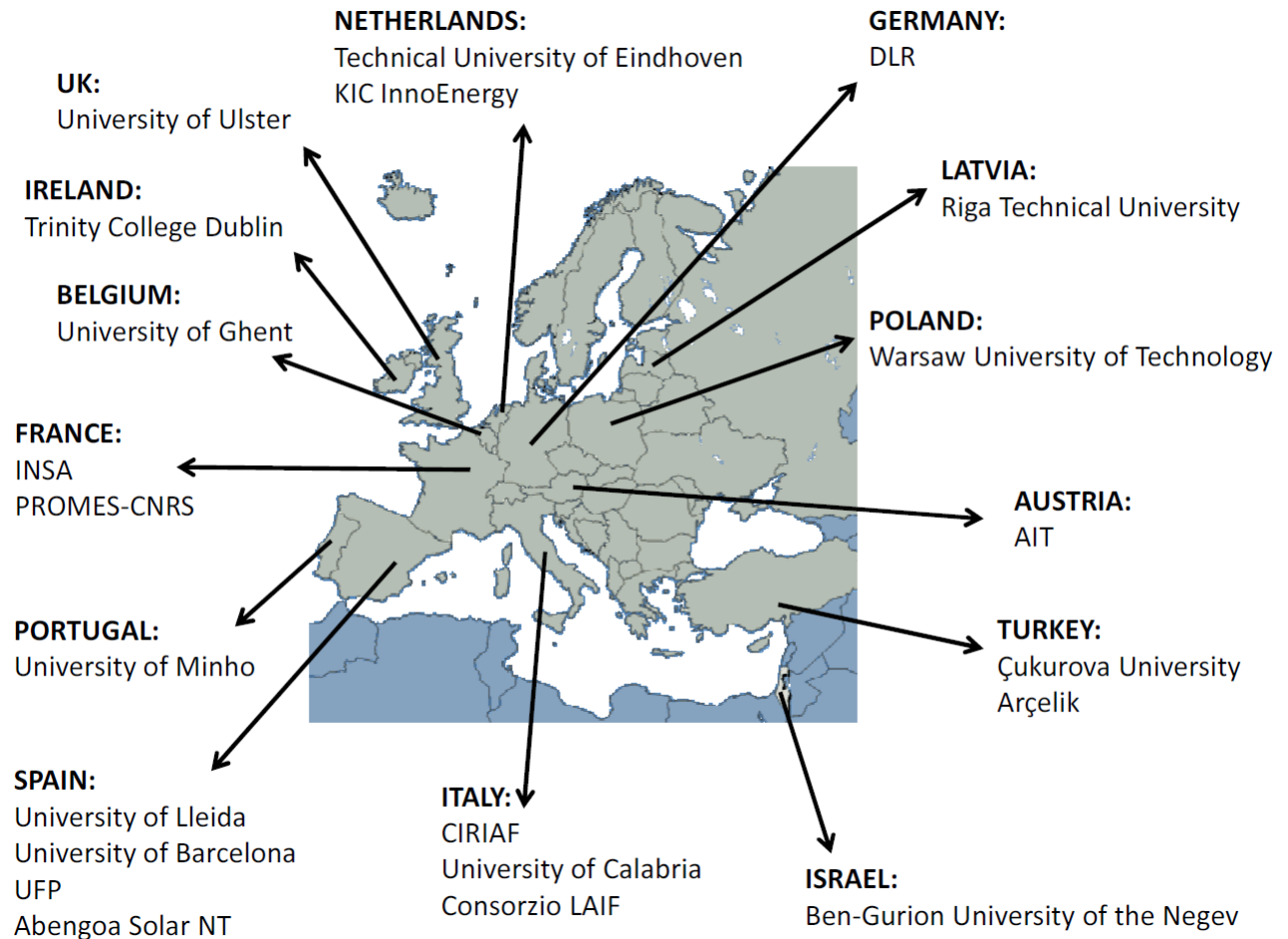
- INPATH-TES consortium: 22 partners, 14 countries

*Academia:* 14

*Research Institutes:* 3

*Industry:* 3

*SME:* 2





- A total of 14 courses are being developed by the consortium
- The EIT/InnoEnergy pedagogical methodology is being implemented within an online platform



[Learning Resources](#) / INPATH-TES

INPATH-TES



#### Courses

- 01 - Research and PhD Courses
- 02 - Introduction to TES Courses
- 03 - Thermal energy storage materials Courses
- 04 - Testing and characterisation of energy storage materials Courses
- 05 - Heat and mass transfer and sizing of energy storage devices Courses
- 06 - Intellectual property and patenting ideas Courses
- 07 - Idea to product development Courses
- 08 - Dissemination of research results Courses
- 09 - Funding of research: writing proposals Courses
- 10 - Management and entrepreneurship Courses
- 11 - Thermal energy storage applications for buildings Courses
- 12 - Demand side management concepts and energy storage Courses
- 13 - Large scale energy storage Courses
- 14 - Energy policy and market development Courses

Search in INPATH-TES...

- The PhD programme is built according to the following structure:
  - Course
    - Topics
      - Lessons
        - » Learning activities: recorded videos, e-books, presentations, animations, diagrams, pictures and texts, assessment questions, access to remote lab exercises, interactive simulations, filmed study visits and online literatures

- Basic common PhD courses
  - Research and PhD
  - Introduction to thermal energy storage
  - Thermal energy storage materials
  - Testing and characterisation of energy storage materials
  - Heat and mass transfer and sizing of energy storage devices

- Common technology specialisation courses
  - Thermal energy storage applications for buildings
  - Demand side management concepts and energy storage
  - Large scale and industrial energy storage
  - Energy policy and market development

- Research management, dissemination, and communication courses (“soft skills”)
  - Intellectual property and patenting ideas
  - Idea to product development
  - Dissemination of research results
  - Funding of research: writing proposals
  - Management and entrepreneurship

- The following stakeholders and target groups have been identified:
  - Stakeholders to engage: policy makers, industry, SMEs, academics, NGOs
  - Target groups for the PhD programme: students, academics, policy makers (scholarships)

## Consortium meetings every 4 months



Kick-off meeting,  
Brussels 16-17 June 2015



1st GB meeting,  
Perugia 19-20 October 2015



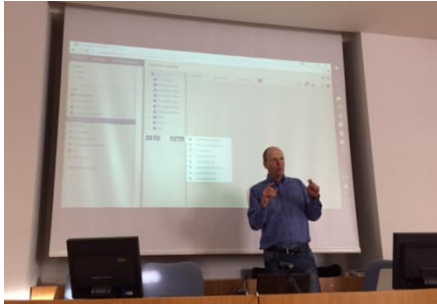
2nd GB meeting,  
Beer-Sheva 14-15 February 2016



3rd GB meeting,  
Ghent 13-14 June 2016



4th GB meeting,  
Lleida 27-28 October 2016



Instructional workshop for all intended educational providers



1<sup>st</sup> SHAB meeting



1<sup>st</sup> TAB meeting



1<sup>st</sup> Breakfast meeting



Conference for stakeholders



- Development of the programme
  - The contents should fill the needs and gaps identified by the SET-Plan and meet the needs of industry
  - Successfully adapt and implement the innovative EIT pedagogical methodology
  - Development of the e-learning platform for on-line learning and assessment

- The implementation of the programme in each country/institution
  - Differences in the regulatory framework for the establishment of a joint PhD programme
  - It is very difficult to achieve a joint PhD agreement between all participating universities
  - Joint supervision PhD strategy has being been adopted by the consortium

- Two levels of work: PhD programme and Master of Science (MSc) programme
  - From the courses developed within INPATH-TES, an international MSc programme in TES may emerge

- Ensure the continuity of the programme after EU funding ends
  - How to provide the necessary funding required by the learning platform
  - How to ensure that the knowledge material/lessons are continuously monitored and updated
  - How to enlarge the initial network created

- With other European projects
  - UNI-SET
  - BioEnergy Train
  - MERITS
  - INNOSTORAGE
  - REWASTEE
  - COMTES
  - SOTHERCO

- At the kick-off meeting we were recommended to established contact with the FP7 UNI-SET project
  - The outcomes of the ‘UNI-SET Employers Survey’ may provide valuable input to INPATH-TES
  - Further synergies between INPATH-TES and UNI-SET projects will be explored
- Next meeting: 28 November in Brussels
  - UNI-SET, INPATH-TES, BioEnergy Train, and representatives of the DG RTD and INEA; DG EAC; JRC; KIC InnoEnergy; EERA

- With international networks and organisations
  - IEA ECES International Agreement
  - IEA SHC Programme
  - IEA SolarPACES Programme
  - ISES
- ECES IA of the International Energy Agency (IEA)
  - The chair is Prof. Dr. Halime Paksoy (Çukurova University), member of INPATH-TES

- With other European platforms
  - EERA (European Energy Research Alliance)
  - EUA-EPUE (European Platform of Universities in Research & Education)
  - EASE (European Association for Storage of Energy)
  - EPSRC Centre for Doctoral Training in Energy Storage and its Applications



# Thank you for your attention!



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This project has received funding from the *European Union's Horizon 2020 research and innovation programme* under grant agreement No 657466 (INPATH-TES).

# Acknowledgements

- The authors of this presentation would like to thank the Catalan Government (2014 SGR 123), the Spanish government (ENE2015-64117-C5-1-R (MINECO/FEDER)), and the European Commission (FP/2007-2013 N°PIRSES-GA-2013-610692 INNOSTORAGE, Horizon 2020 N°657466 INPATH-TES).

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