ENERGY EFFICIENCY

FOR SMART BUILDINGS, ELECTRICAL MOBILITY AND INDUSTRIAL PROCESSES

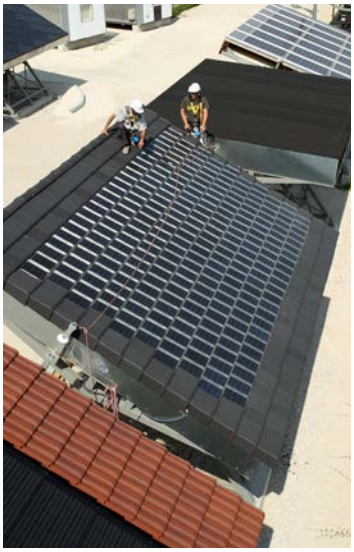
Building's stock in Europe accounts for 40 % of overall energy consumption and 36 % of CO_2 emissions. It is a challenge for research and development to bring solutions to increase drastically this low environmental efficacy to secure climate stability and global energy resources for the future. Building energy efficiency is usually improved with more environment-friendly thermal systems and envelope multiple functions with high-performance materials.

Electric mobility, thanks to reduced CO_2 emissions, has been growing very strongly in recent years. This transition will be a success if we can increase the autonomy of battery systems while maintaining a very high level of safety, minimise the environmental impact of batteries and fuel cells systems by offering efficient and low-cost recycling circuits, and finally take advantage of the mass storage offered by electric vehicles to support the grid and accompany the increase in electricity production by renewable energies.

Industry is involved for many years in reducing the energy consumption with two different objectives: improving production costs and reducing CO_2 emissions with fossil energies. To achieve this it is necessary to reduce waste heat with most efficient processes and to maximize heat recovery and reuse.

For further progress breakthroughs in these three fields will require several new disruptive technologies. For instance : numerical and cloud-based tools for demand/response control algorithm and grid connection; renewable energy sources integration at component, building or district scale; energy storage systems with various technologies as thermal, electrochemical or hydrogen generation; interoperability of various energy vectors (electricity, heat, hydrogen…); integration of various usage in an intelligent energy network (residential, commercial, industrial, transportation…). All these topics will contribute to build a safe future for citizens with wise energy and carbon use for human activities.

WHY A PHD RELATED TO ENERGY EFFICIENCY AT CEA TECH?



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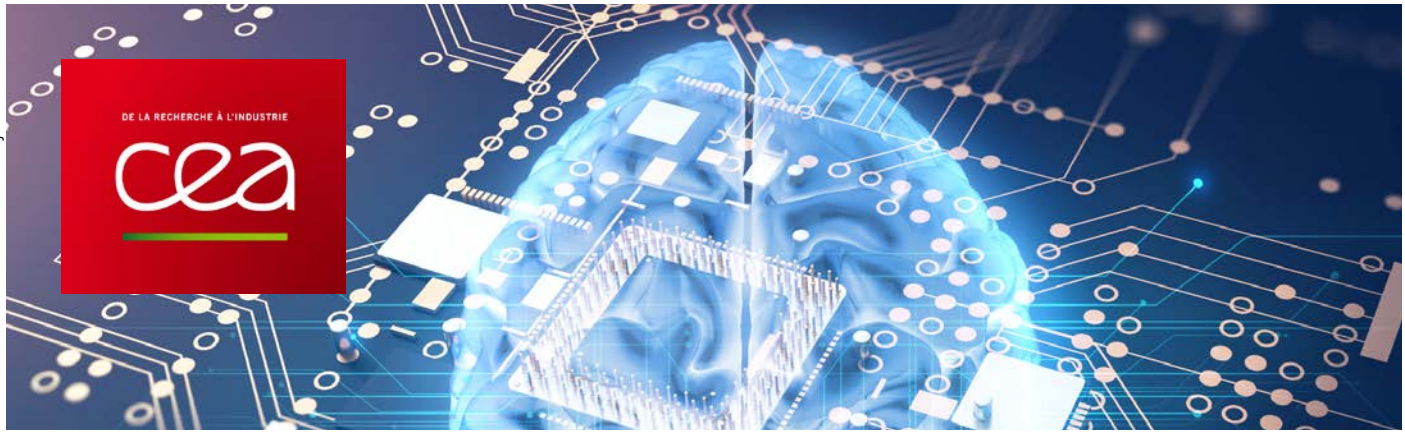
In order to tackle energy efficiency, CEA Tech set up differentiating experimental technology platforms fuelled by massive skills. Buildings energy efficiency shows a very high impact on energy and CO_2, with energy systems at various scale, high-efficiency active envelopes (roof, windows and façades) and global integration in district energy grids. The activity relies on an exceptional set of lab-scale structures and experimental loops, up to real-scale buildings and large industrial demonstrator. Multiscale simulation and interoperable software tools are either developed as internal codes or based on widely used numerical platforms. Beside buildings and industries, our innovative approaches include electrical mobility as a major player in the global and complex network of energy and service providers. From energy components (as battery cells) to integration (as a mobility service for persons and goods), CEA Tech offers great opportunities for research, connected to industrial major players on one side and to academics laboratories on the other side.

CEA-Liten Institute in Grenoble Alpes

15 ongoing PhD projects



CEATECH SCIENTIFIC AND TECHNOGICAL CHALLENGES

CEA Tech tackles the three key and ongoing transitions of the 21st century: numeric, energy and medical ones. For each, CEA Tech research teams innovates within a vibrant network of academic and industrial partnerships, to develop the technologies of the future.
CEA Tech, one of the four CEA research divisions, relies on three large research Institutes, two in Grenoble, Leti and Liten and one in Saclay, List, and a network of technology transfer facilities in Bordeaux, Nantes, Toulouse, Metz, Cadarache and Lille.
Close to 500 young researchers, prepare their PhD in CEA Tech Labs, with a major contribution to the research teams. They share the successes of the CEA, embodied in leading publications, patents, technology transfers to industry, business and start up creation. For years, Reuters ranks CEA as one of the top three most innovative research organizations in the world (1st, 2nd or 3rd).

WHY A PHD AT CEA TECH?

Regardless of the field of research you are looking for, willing to explore prospective ideas or to further advanced technologie, you will likely find among CEA Tech doctoral positions the one that meets your expectations.
Then you can join either Leti (1800 p.) and focus on micro and nanotechnologies, embedded electronics, communications, components for the Internet of Things (IOT), cybersecurity, medical devices and healthcare outpatients (at Clinatec) - or Liten (950 p.) to face the challenges of non-CO2 emitting energies (solar, batteries, hydrogen, biomass or smart grids) - or List (750 p.) to innovate in terms of data intelligence, cybersecurity and IOT software, manufacturing (4.0 industries), radiotherapy, health data processing - or a research team located in one of the technology transfer facilities (Bordeaux, Nantes, Toulouse, Metz, Cadarache and Lille).
Whatever the topic you select, whatever the career path you envision, joining CEA Tech for your PhD has a deep meaning. On the one hand, you will be dealing with one major societal challenge, deeply rooted in science and technology. On the other hand, your PhD will be at the heart of highly innovative ecosystems, each offering unique opportunities in research and career paths.
Indeed, CEA Tech offers a highly efficient mix of digital and hardware skills, world-class facilities such as state-of-the-art 300 mm clean rooms, and integration facilities for hydrogen and battery technologies, and many others. CEA Tech's teams form active partnerships with other research organizations and universities, as well as active cooperation with more than 500 industrial partners in France, Europe, North America and Asia.
We will do our best to accompany your success.

CEA-List Institute in Paris Saclay or CEA-Leti Institute in Grenoble Alpes or CEA-Liten Institute in Grenoble Alpes

500 ongoing PhD projects