Smart Energy Grids aim at integrating a high level of Renewable Energy Sources for decarbonizing the energy system while ensuring supply security (stability and flexibility) and keeping reasonable cost efficiency for users. Many challenges condition their deployment as energy grids are getting more complex with increasing share of intermittent production, with integrating both centralized and decentralized production and consumption and with continuous demand-response adaptation requirement. New strategies of management and control are thus necessary with new data exchange and communication protocols. Research in Smart Energy Grids combine very different modelling and simulation activities of various components such as energy generation systems (solar, wind…), energy storage systems (batteries, hydrogen, thermal…) as well as energy conversion systems (fuel cells, power to gas, heat to power…). In addition, it requires developing reliable forecasting software for matching energy production and demand together with relevant management and big data treatment. Finally, tackling interoperability of distributed grids is a positive paradigm shift that relies on the development of advanced solutions for intelligent integrated energy systems.

CEA Tech is one of the few institutes able to carry competitively this type of R & D requiring multidisciplinary teams and know-hows, hard and soft research tools, internally and with forefront partners.

WHY A PHD RELATED TO SMART ENERGY GRIDS AT CEA TECH?

CEA Tech research program on Smart energy Grids combines technological and numerical approaches to tackle the development, management and optimal operation of such complex systems. PhD students will find at CEA Tech one of the largest public energy technology R&D infrastructure worldwide thanks to complementary technological facilities: Solar Energy, Energy Storage, Hydrogen Energy, … They will have the possibility to work with world class teams on the management of smart grid, thermic system, and energy system components and to combine different energy vectors (electricity, gas and heat).

PhD students will also find at CEA Tech differentiating software platforms for smart energy systems simulations, fueled by recognized skills and strong industrial partnerships.

CEA-Liten Institute in Grenoble Alpes
10 ongoing PhD projects