

The future of energy: leading the change

***A scientific program in support of
a successful energy transition***

Call for proposals 2015

Synopsis

This Call for proposals addresses topics in the fields of energy, urban planning, and mobility. It is open to the academic research community as well as to other actors in the domain (consultancies, NGOs,). Project duration is expected to be of the order of (several) months and funding requests should not exceed 50.000 Euros.

**Deadline for submission – ~~November 30, 2015~~
January 15, 2016**

1. BACKGROUND – ABOUT THE *FONDATION TUCK*

The *Fondation Tuck* (www.fondation-tuck.fr) is dedicated to the promotion of education, research and future studies in the field of energy and sustainable development. Actions in the domain of education are focused on granting student scholarships and research chairs at IFP School, a French public higher education institution offering applied graduate programs open to students from all over the world with the aim of providing highly qualified professionals to industry and society in the fields of energy, oil and its substitutes, gas, petrochemicals and power trains. Actions in the domain of research and future studies are focused on funding projects through competitive calls for proposals, as for example The Future of energy program.

The actions of the foundation are made possible thanks to non-endowed expendable donations received, in particular, from industry.

2. CONTEXT AND SCOPE OF THE PROGRAM

The multi-year scientific program "The Future of energy" is rooted in our profound conviction that the energy sector, including the transportation and building sectors, will undergo very significant changes during the coming decades. However, the pace, form and characteristics of these changes remain highly uncertain. Reducing the uncertainty level is of prime importance for both, public and industrial investors, in order to anticipate future evolutions, support most desirable orientations and avoid sudden disruptions.

From year to year, different topics will be proposed to the research community through competitive calls for proposals. These topics and the associated findings will be the building blocks of a global, multi-sector, multi-disciplinary, systemic vision of the future of energy.

The proposals will be subject to an assessment procedure involving a review by experts and the final selection will be made by a dedicated selection committee. The selected projects will be funded by the foundation.

More information on the program is available at www.fondation-tuck.fr.

3. GENERIC RULES FOR PROPOSALS AND DELIVERABLES

The topics (see section 5 below) are generally formulated in such a way that quite different project proposals can be made. The proponents thus need to clearly motivate and explain their specific choices.

Innovative and systemic approaches (from a technical but also social standpoint) will be favoured and out of the box thinking and solutions are particularly encouraged. Still, the practical feasibility is considered as an important criterion, social and environmental constraints should be appraised, and sustainability and symbiosis with the environment will be taken into account. Thus, for instance, a biomimetic approach can be of specific, although not exclusive, interest. A critical view on well-spread concepts is welcomed, if based upon a rigorous analysis.

A typical work program could include several parts such as:

- Current state of the art (eventually including main historical advents);
- Possible evolution paths or scenarios, based upon available literature and/or personal information;
- Original proposals / solutions
- Future outlook: Expert's view on most likely evolutions, long term benefits and threats.

It is not expected that any extensive specific research work will be performed during the project., The priority is clearly assigned to synthetic analysis and expert's views. The proposals should include clear objectives and a detailed presentation of the strategy and methodology applied to reach them.

The deliverables of the projects will be twofold: one written report, and the participation in a physical meeting close to Paris, France, in order to discuss the findings of the projects with experts and peers. Both the report and the meeting will be open to the public.

4. BUDGET AND FUNDING

It is expected that the overall budget for a given project corresponds to two to five person months and that it includes the necessary travel expenses, including those related to the Paris meeting. It is not expected that significant other costs arise for the projects.

The projects may request funding from the *Fondation Tuck*. The level of funding (percentage of project budget) requested needs to be explained. If other funding sources will be used, they have to be mentioned. The *Fondation Tuck* welcomes projects that are co-funded from one or several funding sources, as long as this does not impact the public nature of the deliverables.

5. TOPICS FOR CALL 2015

The call 2015 of the “The Future of Energy” program focuses on topics related to the sustainable development of cities. The chosen topics aim at going beyond currently evaluated issues:

- Local energy integration of urban areas
- Distributed generation, storage and use of energy in urban areas
- Energy efficient and user friendly multi-modal mobility in urban areas

For all topics, proposals are not expected to cover all possible city configurations. Thus proposals may focus on any given regional or local case (mega-city in developing countries, mid-size European city, sprawling North American city, or any other context).

Topic 1 – Local energy integration of urban areas

Improved energy efficiency is one of the main drivers for innovation in the building and renovation industries. While important progress is being achieved at the scale of individual houses and buildings, local (neighborhood) integration may yield additional gains. Integrating “more of the same”, e.g. individual houses within a (small) neighborhood, is certainly a promising pathway, the integration of residential and office/tertiary buildings in urban or sub-urban settings may yield additional levers since their energy (electricity, heat and cold) generation and consumption patterns are quite different.

The projects could address the following questions and propose original answers/solutions (non-exclusive list):

- What are the time-dependent (from a few minutes to a seasonal scale) energy needs of housing versus tertiary buildings?
- How are these needs expected to evolve over the next decades? What are the main drivers for these evolutions?
- Is there a potential for improved energy efficiency by local integration? Is housing/office integration (energy balancing) a “bad good idea”? Do data processing and storage facilities play a role?
- What determines the spatial scale for “local” integration?
- Are there technological solutions for local integration?
- Is there a role to play for the “smart grid” concept at a local / district level?
- What are the best integration schemes for positive energy buildings?
- What kind of integration is required between different energy vectors (electricity, heat cold, hydrogen, others...) ?

- Who are the main stakeholders and which governance policies will be required to steer such an integrated system?

Topic 2 – Distributed generation, storage and use of energy in urban environments

Most electricity generation technologies tend to be developed at scales incompatible with urban (inner city) environments, for example energy efficient fossil fuels power plants (such as cogeneration plants) or renewables like wind and solar power. The same applies to energy storage technologies. Since cities are major energy users, local, small scale generation and storage could significantly increase the resilience of urban energy systems while simultaneously reducing the need for building large scale energy transport infrastructures. Installations at the scale of a neighbourhood could be of particular interest and applicable for retrofitting or complementing existing systems. Installations for individual houses/buildings are out of the scope of this topic.

The projects could address the following questions and propose original answers/solutions (non-exclusive list):

- Can electricity generation technologies be downscaled (10^2 – 10^4 kW) to city environments?
- How can distributed infrastructures contribute to the energy autonomy of urban areas? Can distributed data processing and storage facilities play a role?
- What is the technical potential for small scale generators? What is the potential for societal uptake? Are they economic?
- What is the future outlook for positive energy buildings?
- Which energy storage technologies can be downscaled or adapted to urban environments? Have building heights or foundation depths a role to play?
- To what type of cities (size, location) can the distributed energy concept be applied?
- Is there a role to play for the transport sector?
- Who are the main stakeholders and which governance policies will be required to steer a highly distributed energy generation and storage system?

Topic 3 – Energy efficient and user friendly multi-modal mobility in urban areas

Citizens of urban and sub-urban areas have increasing needs for mobility, both for constrained and chosen travel trajectories. The choice of the mobility vector (own car or bike, taxi, public transportation) mainly depends upon a compromise between personal wellbeing (related to time spent for the trajectory and travel environment) and economic constraints. In order to lower the energy consumption of the mobility sector, in particular in sub-urban settings, new mobility schemes that maximize personal wellbeing while being cost and energy efficient need to be designed and developed. In particular, in a door-to-door, sub-urban perspective, multi-modal transportation using individual, shared or public transportation means is expected to provide such mobility schemes, in replacement of previous ones using individual, user-owned cars.

The projects could address the following questions and propose original answers/solutions (non-exclusive list):

- Is multi-modal transportation user friendly? What is the impact of mode-change / connection time?
- How to optimize a multi-modal trajectory? Which infrastructures are required to minimize mode-change time, in particular between individual and public transportation?
- How an increased vehicle autonomy might change a future multi-modal system?
- What future outlook for (semi-)individual public transportation in a multi-modal system?

- What are the key success factors for a multi-modal transportation system?

6. PROJECT SUBMISSION AND TIMELINE

Project proposals based on the template presented in Appendix A are to be submitted in PDF format by e-mail to andreas.ehinger@ifpen.fr.

Deadline for submission – November 30, 2015

The evaluation procedure will in particular involve a review of proposals by experts mandated by the program and the selection will be done by a dedicated selection committee.

The *Fondation Tuck* may contact the proposing party in order to obtain additional information or revisions of the proposal. The funding decisions will be taken within two months after the deadline and projects are expected to start soon thereafter.

The funding contracts will be established between the *Fondation Tuck* and the organisations of the selected projects.

APPENDIX A – Project proposal

This project proposal must not contain any confidential information. It will be evaluated by the program's scientific committee and possibly by external evaluators.

Identification

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| Call topic addressed: | |
| Project title: | |
| Name of organisation | |
| First name, Name of Principal Investigator | |
| Current position | |
| Contact details (address, e-mail, phone, mobile) | |

Project description

Describe methodology used, programme of work, timeline, contributors, collaborations, (2 to 5 pages),

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Qualification

Explain why you or your group / organisation are qualified for this work, provide bibliographic references (1 to 2 pages)

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Project budget and funding request

Explain project budget (breakdown personal cost, overhead cost, other costs), funding request, co-funding organisations, (1 to 2 pages)

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Additional information

Provide additional information that you consider relevant for your proposal (limited to 5 pages)

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