



Project Newsletter - March 2019 - N°1

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ENVISION FIRST NEWSLETTER

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Dear reader,

In front of you lies the first newsletter of the Horizon 2020 **“Energy harVesting by Invisible Solar IntegratiON in building skins”** consortium, with the acronym **ENVISION**. A clear title that indicates our aim, harvesting energy from building skins without it being visible.

Our ambition is to go towards energy positive buildings. This is theoretically very simple, as the sufficient solar energy reaches the building during a whole year. The challenge is however to convert and store this energy so that it can be efficiently used. We have chosen for an apartment flat building, as this is the most difficult in terms of surface area for harvesting energy compared to the energy demand of the building. The first questions we asked: **“What is the required amount of energy?”** and **“What type of energy do we need?”**.

Let us start with the easiest question, the latter, it is well known that about 60% of the energy needed in the Built Environment is for heating. Considering that going all electric will require a 60% increase of the energy demand on the electricity grid, Europe’s awareness that this requires major investment in the electricity grid is rapidly increasing. The conclusion is that this is not easily solved. Therefore solutions that focus on solving the heating demand, without the extensive use of electricity are needed.

Let us return to the first question, what would we need in terms of energy demand. This strongly depend on the insulation level of your buildings. This is why the ENVISION consortium first focusses on putting a insulation shell around the building. This reduces the energy use. In a typical row dwelling in the Netherlands the energy use after insulation is around 7 GJ for tap water and 7 GJ for heating. In addition we have calculated that a South facing façade in the Netherlands has a harvesting potential of almost 3 GJ/m². If we would have a 90% absorption. This would mean that 6 m² would be sufficient to supply all the heat needed. Unfortunately it is not that simple as storage is needed to match demand and supply. The storage can be reduced by increasing the surface area. The ENVISION consortium has found solutions to overcome this issues, with limited storage and sufficient storage area, which will be tested in two large scale demonstrations in Delft the Netherlands, and Genoa in Italy. In the first demonstration we will renovate an apartment flat, and in the second demonstration we will connect the heat harvesting panels with a heat pump to a heating grid.

In all a large challenge which we address by a step-by-step approach, by demonstrating the technologies at the BESTLab of Electricité de France (EDF) and The Netherlands Organization of Applied Scientific Research (TNO) at the solar energy application centre (SEAC).

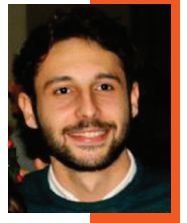
The project has started 1 of October 2017, and is now moving towards the large scale demonstration, a good moment to start communicating the progress. With these newsletter we wish to achieve just that, informing you on the progress of the project. This to show the value of the approach, but even more so to apply the approach to many other building projects in the future!

Happy reading,

Dr. Ir. Bart Erich

Coordinator of the ENVISION-project

1. MEET ENVISION PARTNERS!



Interview to Diego Rattazzi – University of Genoa

How did you come to know about the opportunity to join ENVISION Project's Consortium?

I was looking for some PhD opportunities and I saw that the University of Genoa was one of ENVISION Consortium's members. Then I've decided to understand deeply what concerns the project talking with other members already involved in the project.

Why did you decide to join ENVISION project's consortium?

Once that I've discovered the project goals and the role that the University of Genoa will have for reaching it, I've immediately thought that ENVISION could be a great opportunity to enlarge my knowledge in terms of energy harvesting thanks also to the collaboration with other important and experienced European partners. At the same time, the University of Genoa contribution in the project will enhance my skills about smart-grid management and its interaction with harvesting technologies

Is it the first time that you are working for a H2020 research project? If no, was your previous experience useful for the development of ENVISION? How?

No, I have already worked inside STORY project during my Master thesis experience. I was focused on one of the various case studies inside the project, building a model for a part of a District Heating Network (DHN) system. This experience could be helpful inside ENVISION project since it gave me skills on DHN behavior and its dynamics. This time the additional challenge will be facing with harvesting technologies as power generators.

What do you like the most about the fact of being part of an international partnership?

According to me the international partnership is a great opportunity to enlarge knowledge on various fields. Working close to other partners in a smart way could give to everyone the chance to enhance our approach to research and technical aspects. The General Assembly represent also an opportunity to explore our partners world and the environment where they work.

Concerning ENVISION, what's your main role in the project?

ENVISION represents one of the main topic of my PhD. Inside the project I will be involved into design, installation, tests and monitoring control strategy of the system in order to evaluate the technologies performance and their reliability on a larger scale.

Interview to Loredana Magistri - University of Genoa



How did you come to know about the opportunity to join ENVISION Project's Consortium?

As part of a research group of the University of Genoa, I was involved in previous European projects and I has been contacted by a consortium partner.

Why did you decide to join ENVISION project's consortium?

Because the project deals with very interesting and promising technologies and the consortium is composed by distinguished and experienced research centers and industrial partners.

Is it the first time that you are working for a H2020 research project? If no, was your previous experience useful for the development of ENVISION? How?

I have been involved in European projects since 2001 and in particular in two H2020 projects since 2014. I have a good experience in the field of innovative energy systems, cogeneration, District heating management and experimental activities.

What do you like the most about the fact of being part of an international partnership?

Being part of an international partnership gives me the opportunity of exchanging experience and information and increasing knowledge on different realities.

Concerning ENVISION, what's your main role in the project?

The University of Genoa is responsible of the "Southern Europe Envision DEMO site" where innovative energy harvesting technologies will be tested and integrated into a University Campus.



Interview to Thierry Duforestel - EDF

How did you come to know about the opportunity to join ENVISION Project's Consortium?


EDF and TNO were working together in a H2020 project in the domain of energy storage. The first ideas concerning the potential construction of a new project aiming at renovating buildings with new technologies which are able to produce renewable energy through all the building walls have been discussed. EDF has been interested in this perspective and has decided to participate to a first brain storming meeting in Utrecht where the main lines of the future ENVISION project have been defined.

Why did you decide to join ENVISION project's consortium?

EDF is aware that the future of the overall energy system in Europe is uncertain. Many evolutions are expected. Nevertheless, nobody can determine what will be the long term configuration and what will be the path between the present situation and the long term configuration. It is clear for us that renewable energy production associated to energy efficiency measures are important elements of this path. ENVISION proposes to combine both actions integrated in an urban context. This is for us a real opportunity to explore, evaluate and discuss, with partners involved in various activities in various European countries, one the potential future evolutions.

Is it the first time that you are working for a H2020 research project? If no, was your previous experience useful for the development of ENVISION? How?

Before ENVISION, EDF has been involved in many European and H2020 projects in various domains. This experience has been useful for positioning the project main objectives regarding the proposed call and topic. The ambition of the topic was very high and the proposed funding was limited regarding the urban scale which had to be considered (especially for demonstration and replication). Scientific and technical approaches had to be defined considering these constraints. Exchanges between kernel partners and the mutual understanding of the topic objectives and constraints have been key points for converging toward the final and successful proposal.






What do you like the most about the fact of being part of an international partnership?

Involved in a research activity, EDF R&D is used to operate in an international context. An international vision expands the researchers' skills, especially in those building and energy domains where contexts can be so contrasted. A concept can be perfectly adapted to a Nordic context and can fail completely in an Italian configuration. This aspect is one of the most interesting challenges associated to a European partnership. Nevertheless, beyond the international vision, the multi-professional aspect is also a very motivating situation. Approaches and points of view are always challenged and discussed regarding the mutual interests of the various activities involved in the project.

Concerning ENVISION, what's your main role in the project?

Our main role is to produce models and simulations that can help in developing the ENVISION's technologies and concept, especially for energy management and energy storage considerations. Simulations will also be used to replicate the ENVISION concept in various European contexts, beyond the demosites which will be actually tested in the frame of the project. Given this specific task, we are responsible for the Work Package where the modelling actions have been included. Moreover EDF will test some of the ENVISION technologies in our test facility BESTLab.



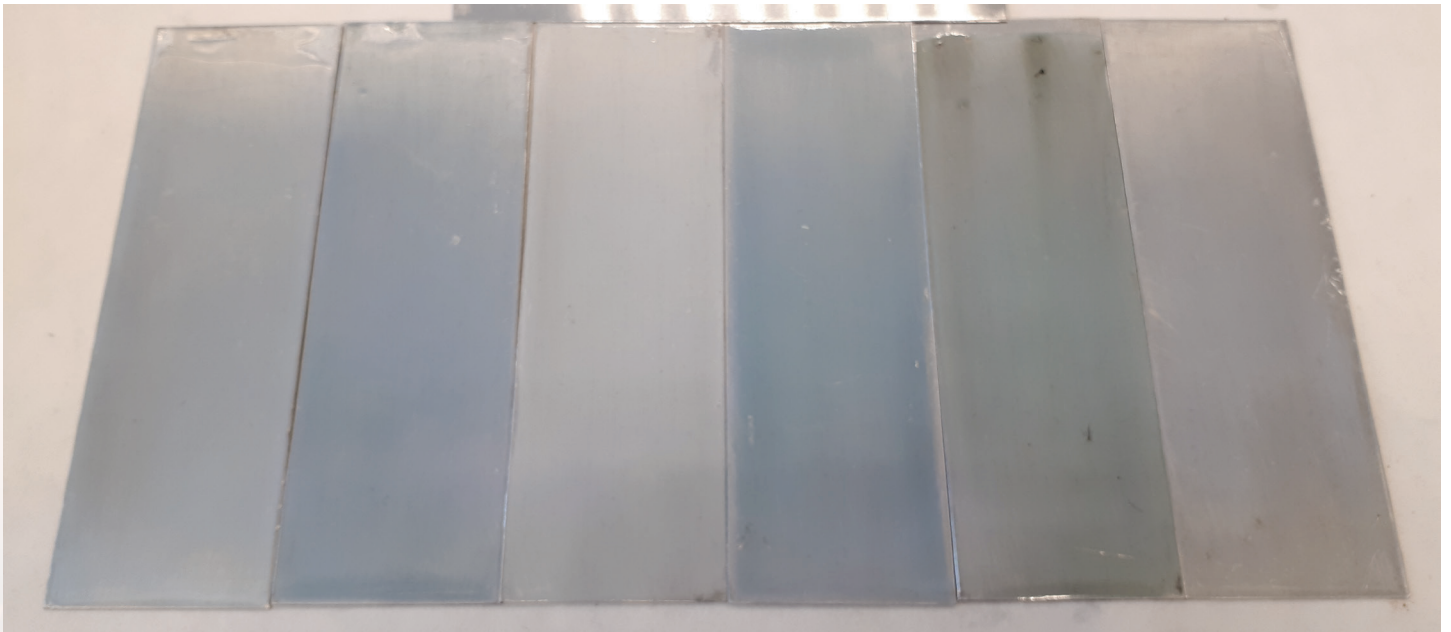
2. PILLS OF ENVISION TECHNOLOGIES – PART 1

NIR absorbing coloured coatings for uncovered solar heat collectors

The goal of this project is to create paints which are able to absorb near-infrared light (NIR) for energy harvesting, while preserving colour and aesthetic appearance.

Although NIR is invisible to the human eye, it comprises of almost 50% of the energy in the solar spectrum and, in order to accomplish this effect, NIR absorbing pigments have been selected to find the ideal of combination of cost, efficiency and safety.

ENVISION partners TNO and AknoNobel have already integrated a selection of pigments in paint systems as showed in the following picture:



This innovative technology will be tested in combination with SEAC (SolarBeat).

What is the benefit for the EU community?

The main advantages of the new near-infrared light (NIR) for energy harvesting will be:

- Freedom of paint colour choice
- Higher energy harvesting capabilities

3. SAVE THE DATE!



“Sustainable PolyEnergy generation and HaRvesting – SUPEHR 2019” Conference

ENVISION team is glad to invite you to the “Sustainable PolyEnergy generation and HaRvesting – SUPEHR 2019” Conference that will take place on 4th - 6th September 2019, in Savona (Italy).

The Conference will bring together industry, academia, and research world to exchange experiences, ideas and technical results on future technologies for sustainable energy generation, encompassing the whole range from large power plants to small energy harvesters.

The three days of the conference will be dedicated to three different themes:

- 4th September - Sustainable Power Plants
- 5th September - Thermal and Electrical Hybrid Systems
- 6th September - Energy micropolygeneration and harvesting

*Visit the official website of the event
to learn more and meet us in Savona!:*

www.tpg.unige.it/TPG/SUPEHR19

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement number 767180