GoNano Innovation and Co-Creation Workshop:
Nanotechnology for Energy

Information material

Date
7 March, 2019
10:00 – 17:00h
Media-TIC Building, level 5,
c/Roc Boronat, 117
08018 Barcelona, Spain

Organiser
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About the meeting

The GoNano Innovation and Co-Creation Workshop is part of a series of events and activities organised under the EU project GoNano, which aims to achieve better alignment between the multiple stakeholders involved in nanotechnology research and innovation.

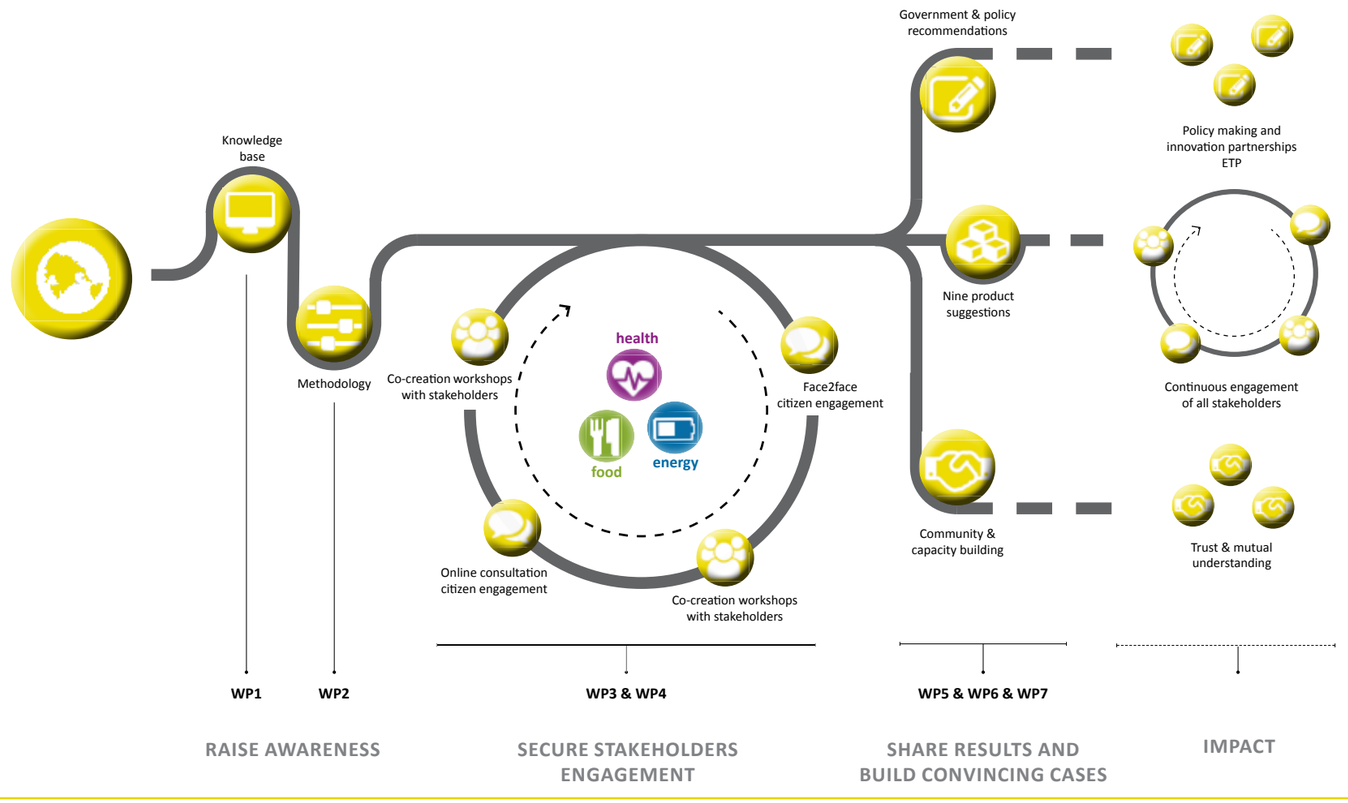
The workshops are a forum for bringing together the brightest minds from multiple sectors so they can create and cultivate new solutions for the biggest problems in society today.

About the GoNano project

GoNano is an EU-funded project that enables co-creation between citizens, civil society organizations,
industry, researchers, and policy makers across Europe to align future nanotechnologies with societal needs and concerns. GoNano aims to explore how researchers can work with citizens and professional stakeholders to create novel suggestions for future nanotechnology products. The GoNano project is built on the assumption that nanotechnologies are more likely to gain broad acceptance if they take public values and concerns into account at early stages of innovation. Therefore, a co-creation methodology has been designed, which will be conducted in three different thematic areas (Food, Health, and Energy). In this co-creation process, wishes, needs and product suggestions of both citizen and professional stakeholders are taken into account by means of a face-to-face citizen consultation, a stakeholder workshop, an online citizen consultation and a second stakeholder workshop (see Figure 1 for a visual representation). The aim of the co-creation process is to end up with nine products and/or research suggestions (three for every thematic area). This information brochure serves as input for the first stakeholder workshop in the area of energy.

GoNano project

Governing Nanotechnologies through Societal Engagement



GoNano co-creation process

What do we expect from you?

During the workshop, stakeholders with varying backgrounds will discuss and explore possibilities for new product design in the health area and ways to include the needs and values expressed by citizens. Every stakeholder has its own perspective, knowledge and expertise, directly or indirectly linked to nanotechnology. By linking different perspectives and expertise, we aim to come up with new insights and specific suggestions for future development of health technologies.

What will happen after this meeting?

1. GoNano researchers will analyse the outcomes of this stakeholder meeting about requirements for designing future nanotechnologies for energy applications.
2. In Spring 2019, citizens across Europe will receive an invitation to evaluate the innovation ideas from the expert workshops.
3. In another round of stakeholder workshops, researchers, engineers, industry, civil society and policy representatives, will re-work the design suggestions.
4. GoNano researchers will present the results to EU policy-makers, and make the results available online, together with teaching material that show how people could work with citizens to develop innovative product designs.

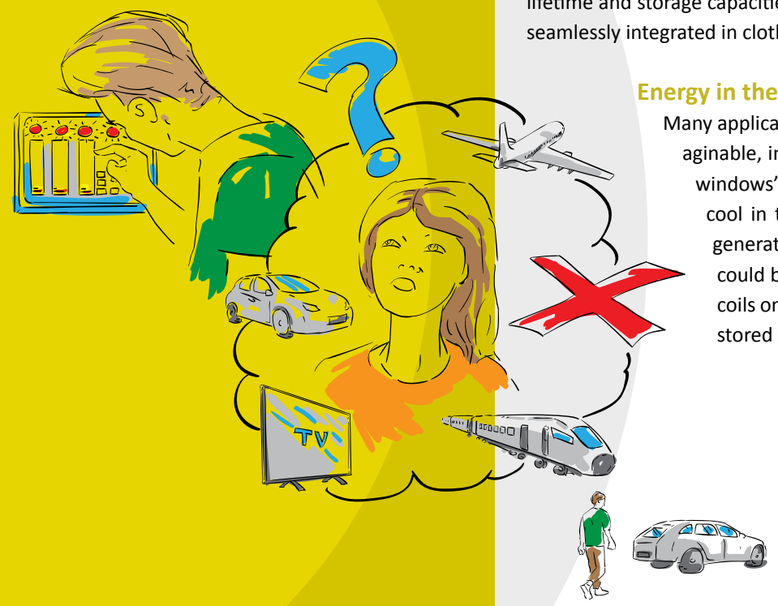
Organisation

The co-creation process in the energy area is led by RMIT Europe in Spain. Based on interviews with various stakeholders from all over Europe, three application areas of energy and nanotechnology were defined: green energy production, energy portable energy devices, and energy in the home. In October 2018, 21 citizens from Spain were asked to provide suggestions and ideas for the development of nanotechnology in these application areas (please see a summary of the results below). This stakeholder workshop builds on the outcomes of the citizen consultation, and explores how structured interactions between stakeholders can lead to specific design suggestions. This is the first of two workshops: the second workshop will be organised in October 2019.

Nanotechnologies and energy

Nanotechnology is the study, design, creation, manipulation and use of materials, devices or systems at extremely small scales of 1-100 nanometre (nm). By way of comparison, a human hair is approximately 80,000 - 100,000 nm wide.

At this scale, new and existing materials can be improved by altering their physical, chemical, electrical, mechanical, optical or magnetic properties. As an enabling technology, nanotechnology can potentially be applied in a wide range of areas, ranging from manufacturing to environmental remediation and from medicine to food production. In the area of energy, nanotechnologies are expected to provide solutions for energy production, heating and cooling, storage and transport. Key issues driving innovation in energy storage include the need for very quick charge, higher energy and power density as well as a longer life cycle and the possibility to recycle materials of storage systems. Nanomaterials such as carbon nanotubes, graphene, carbon nanofibers and carbon nanohorns could potentially lead to optimised batteries and supercapacitors (i.e. advanced capacitors that have higher energy storage capacity than conventional ones) by their high intrinsic conductivity and high energy intensity.



Application areas

Based on the outcomes of interviews with stakeholders across all over Europe conducted as part of the GoNano project, three important application areas of nanotechnology in energy were selected and discussed with citizens in the citizen consultation: green energy production, portable energy devices, and energy in the home.

Green energy production

In the field of photovoltaics, nanotechnology could help produce solar energy harvesting systems with higher energy conversion efficiency, for instance by tailoring the properties of the active photovoltaic layer to better match the solar spectrum. In the development of novel active layers, nanotechnology can allow a secondary lower/higher bandgap or partially recuperate higher-than-bandgap energies of photons before they thermalize to the bottom of the energy band.

A second field which shows much promise is wind energy, where weight reduction is one of the most important goals. The development of cost effective, new lightweight materials on the basis of nanocomposites, with excellent stiffness/weight ratio, will enable larger sized blades, thus allowing increasing the power and the energy produced at low/medium speeds. An example could be new bio-based materials for sandwich panels that can be used as core materials for blades.

Portable energy devices

Nanotechnology could also enable energy production from wearable devices, for instance by harvesting human kinetic energy through nanofibers integrated in clothing. Nanotechnology could also enhance the efficiency, lifetime and storage capacities of batteries to the extent that they can be seamlessly integrated in clothing.

Energy in the home

Many applications of nanotechnology in the home are imaginable, in addition to the use of solar panels. 'Smart windows' with a nano-coating would keep your house cool in the summer and warm in the winter – and generate electricity at the same time. This energy could be stored in the building, in wireless charging coils on the floor or in the furniture. It could even be stored for wireless charging of electronic devices.

Outcomes of the citizen workshop

On 26 October 2018, citizens from around Barcelona gathered at RMIT University's European office to discuss the future of nanotechnology in energy. The workshop was divided in three rounds: during the first round, citizens gave their views on the use of nanotech¬nologies in energy applications by discussing future scenarios based on the themes of green energy production, portable energy devices, and energy in the home. Subsequently, citizens designed their own ideal energy products and scenarios. In the final round, citizens wrote specific messages to stakeholders.

Based on the citizens' outputs from each of these sessions, various overarching concepts were deduced and are expressed below as social values and needs. The original citizens' outputs and a description of the workshop and methodologies can be found in the full briefing report, available at www.gonano-project.eu/

Social values

i.e. a universal idea of what is right (or wrong) and important to society:

- Respect the environment
- Practice sustainable development
- Promote sustainable development
- Promote research into new technologies
- High standards of health and safety
- Reduced energy use
- Increased energy efficiency
- More autonomy and control over personal energy use
- More energy from renewable sources
- Inclusive/accessible to all (practical language)
- Inclusive/accessible to all (reasonable cost)
- Better quality of life
- More co-creation, more engagement with citizens

Social needs

i.e. a specific societal problem that requires a particular response:

- Legislative support of green policies
- Public investment in new technologies
- Private investment in new technologies
- Educate the public on nanotechnology
- Educate the public on green energy
- Implement better recycling plans and sustainable product life cycles
- Eradicate or minimise the use of materials that cause or support conflicts
- Introduce simpler pricing formats for energy use
- More transparency in research and innovation activities

During the stakeholder workshop, you will be asked to add your own needs and values to those above, and to select the ones you think are most important for the development of nanotechnologies for energy applications – in general and in your own professional activities.

When given the freedom to create their own ideal energy products, citizens converged on a number of application areas where they think advances in nanotechnology can play a role. These application areas should therefore be of particular interest to technology developers because they have already achieved high levels of public awareness and acceptance.

1. Capturing and converting energy (solar and kinetic) to electrical energy for storage and use
2. Different ways of adapting structures around the home to make use of renewable energy. E.g. building Integrated photovoltaics
3. Home climate systems that control the atmosphere around the home and also inform inhabitants of usage in simple terms
4. Smart home appliances and operating systems

Technologies or products that are more sustainable and do not adversely affect health or the environment

Programme

09:30 – 10:00	Welcome breakfast
Introductions	This part serves to welcome the participants, help them to get settled and familiarised with the event and with each other.
Exploration	This session consists of a discussion round where the participants will explore and evaluate the needs and values of the different stakeholder groups involved in nanotechnology/energy.
	Break
Ideation	In this session, participants formulate ideas and suggestions for activities, research lines and product suggestions related to the application of nanotechnology in the energy sector.
	Lunch break
Prototyping	In this session, participants generate their visions of how their ideas will be used, researched, developed, and/or manufactured.
Reflection	In this session, participants present their visions then reflect on the questions and feedback they receive.
16:30 – 17:30	Closing remarks and networking drinks

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GoNano is a Coordination and Support Action funded by the European Union under the NMBP Programme of Horizon 2020, Grant Agreement n° 768622.