



Horizon 2020 in action – projects funded by Horizon 2020

Going further with nanopharmaceuticals

Nanotechnology applied to medicine (nanomedicine) promises more effective and better targeted drugs, with reduced side effects for patients, but these nanopharmaceuticals are still at a very early stage of development. The aim of the NanoPilot project is to establish a flexible and adaptable pilot plant for nanopharmaceuticals. It will provide specific tools and services to SMEs and researchers to validate their technologies and to be able to produce nanopharmaceuticals of sufficient quantity and quality to enter clinical testing.

Three different applications show the flexibility of the planned facility: the treatment of dry eye syndrome, a HIV nanovaccine and a drug for the treatment of painful bladder syndrome. The pilot line will be validated in the project and will continue its certified services after the project, for further drugs and diseases. The consortium includes the operator of the pilot line, an SME, two university institutes which develop the nanopharmaceuticals, and a specialist institute on nanosafety.

Reducing cyclist and pedestrian casualties

Even though road safety has improved in recent years, accidents remain a serious problem on European roads, where, on average, 75 people lose their lives every day and 750 are seriously injured. Vulnerable road users such as pedestrians, cyclists, and motorbike and moped riders represent a particularly serious safety concern, since they account for a disproportionately high percentage of the total number of road fatalities and serious injuries. The PROSPECT project aims to develop, test and demonstrate innovative in-vehicle active safety systems that better protect vulnerable road users in Europe, such as pedestrians and cyclists.

Greening European aeronautics

For almost ten years Clean Sky is the largest European research programme developing innovative, cutting-edge technology aimed at reducing CO₂, gas emissions and noise levels produced by aircraft. Equally funded by the EU research and innovation framework programmes (FP7 and then Horizon 2020) and industry, Clean Sky contributes to strengthening European aero-industry collaboration, global leadership and competitiveness. In 2017 the first Clean Sky programme is being finalised: some 20 large Demonstrators have been completed by 600 participants in 24 EU countries, bringing together thousands of experts from leading companies, universities, SMEs and research centres. Thousands of components used in current

aircraft and helicopters have been reviewed to identify the areas that can be significantly improved in order to reduce CO₂ emissions and noise by 2020. Clean Sky 2 is larger in scope than the first Clean Sky Programme with a total budget of nearly EUR 4 billion.

Producing bioethanol from steelmaking process emissions

The project STEELANOL demonstrates the production of bioethanol from emissions of the steelmaking process which has the potential to significantly reduce greenhouse gas emissions compared to oil-derived fuels. A demonstration plant of approximately 25,000 tons/ethanol per year will be built in Belgium; the first of its kind in Europe, and the largest facility built to date utilizing this technology globally. This high-risk/high-impact project is expected to contribute to achieving the targets of the Paris Agreement on climate and advancing the circular economy.

Converting sewage treatment plants into power production facilities

The objective of the POWERSTEP project is to convert sewage treatment plants into power production facilities. For this, the partners will design and demonstrate energy positive wastewater treatment plants with available technologies in six full-scale case studies located in four European countries. The estimated benefits are energy savings: EUR 1.7 billion per year; CO₂ – equivalent emission savings: 5.9 million tons; and global market value: EUR 30 billion per year.

Reacting quickly to the outbreaks of Ebola and Zika

The outbreak of Ebola in West Africa was one of the international health emergencies of the past few years. EUR 24.4 million from Horizon 2020 were urgently mobilised. In parallel, the IMI-Ebola+ public-private partnership call was launched in record time. This Horizon 2020 research response, very significant in scale, with a total of EUR 140 million, in turn, leveraged a further EUR 101 million from the pharmaceutical industry.

These efforts are already delivering, with trials on the ground in West Africa underway and with the first indication of results. Europe has also taken the lead in establishing the Global Research Collaboration for Infectious Disease Preparedness (GLOPID-r) that links together research funders, the scientific community, industry, patient groups and public health actors. Its goal is to mount an effective research response within 48 hours of an outbreak. It was tested with the Zika outbreak in Latin America in 2015, when the Horizon 2020 Work Programme was updated to include in emergency a call on Zika research.

Supporting the development of priority research infrastructures

The ELIXIR-EXCELERATE project aims to accelerate the implementation and early operation of ELIXIR, the European life science Infrastructure for Biological Information, identified as one of the Europe's three priority research infrastructures. With 41

partners in 17 countries this project coordinates and enhances existing resources into a world-leading data service for academia and industry, grow bioinformatics capacity and competence across Europe, and complete the management processes needed for a large distributed infrastructure. Four use cases: rare diseases, human data, plant genotype-phenotype and marine metagenomics, will help best tuning the services.

Sharing expertise to support the transition to renewable and sustainable energy in Poland

The transition from fossil fuels to renewable and sustainable energy sources has become the European Union's top developmental priority, with low-performing countries in central Europe facing the most urgent need. As the region's largest country, Poland's continuing economic progress has not come without significant environmental costs. While Polish research now has expertise in many of the technologies needed for energy transition, it lacks critical knowledge in modelling, planning, integrating, and managing large scale renewable energy systems in a flexible and effective manner.

The SUPREME project twins one of Poland's best energy research centres, the Instytut Maszyn Przeplywowych Im Roberta Szewalskiego Polskiej Akademii Nauk with required expertise in Denmark, the Netherlands, and Austria. Focusing on needed knowledge transfer in integrating energy technologies, the project's mix of extended staff exchanges, joint work, summer schools, and other events is expected to create a long-lasting and effective partnership with a significant impact on Poland's energy systems infrastructure.

Detecting and responding to disease outbreaks

When the nature of a disease is unknown, it is difficult to be prepared. With the COMPARE project a team of multi-disciplinary researchers hope to stay one step ahead with a new platform for detecting and analysing outbreaks among humans and animals worldwide through the use of new genome technology. It sets out to integrate state-of-the-art strategies, tools, technologies and methods for collecting, processing and analysing data, for the generation of actionable information to relevant authorities and other users in the human health, animal health and food safety domains. Less than one year into the project, the team has already defined sampling strategies and protocols, while some tools are already online, with 1,000 users daily. The tools will stay in place after the project ends in 2019, becoming part of the European Molecular Biology Laboratory's European Nucleotide Archive.

Looking at the interaction between innovation and employment

The QUINNE project investigates how job quality and innovation mutually impact each other at the organisation level, and what employment outcomes result from this interaction i.e. how more and better jobs are created. The employment outcomes are

then tracked in terms of their impact on social inclusion and inequality. QUINNE will produce evidence-based advice on how to boost innovation and economic and employment growth in the EU, along with an awareness of ensuing impacts on social inclusion and inequality.

Improving responses to expected and unexpected crises

The DARWIN project is helping to improve responses to expected and unexpected crises affecting critical societal structures during deliberate man-made disasters (e.g. cyber-attacks) and natural events (e.g. earthquakes). Partners are developing European Resilience Management Guidelines, which will support the ability of crisis management experts and those responsible for public safety to anticipate, monitor, respond, adapt, learn and evolve, to operate efficiently in the face of crises. Furthermore, the project is exploring innovative tools such as serious gaming and training packages to facilitate the adoption of these guidelines.