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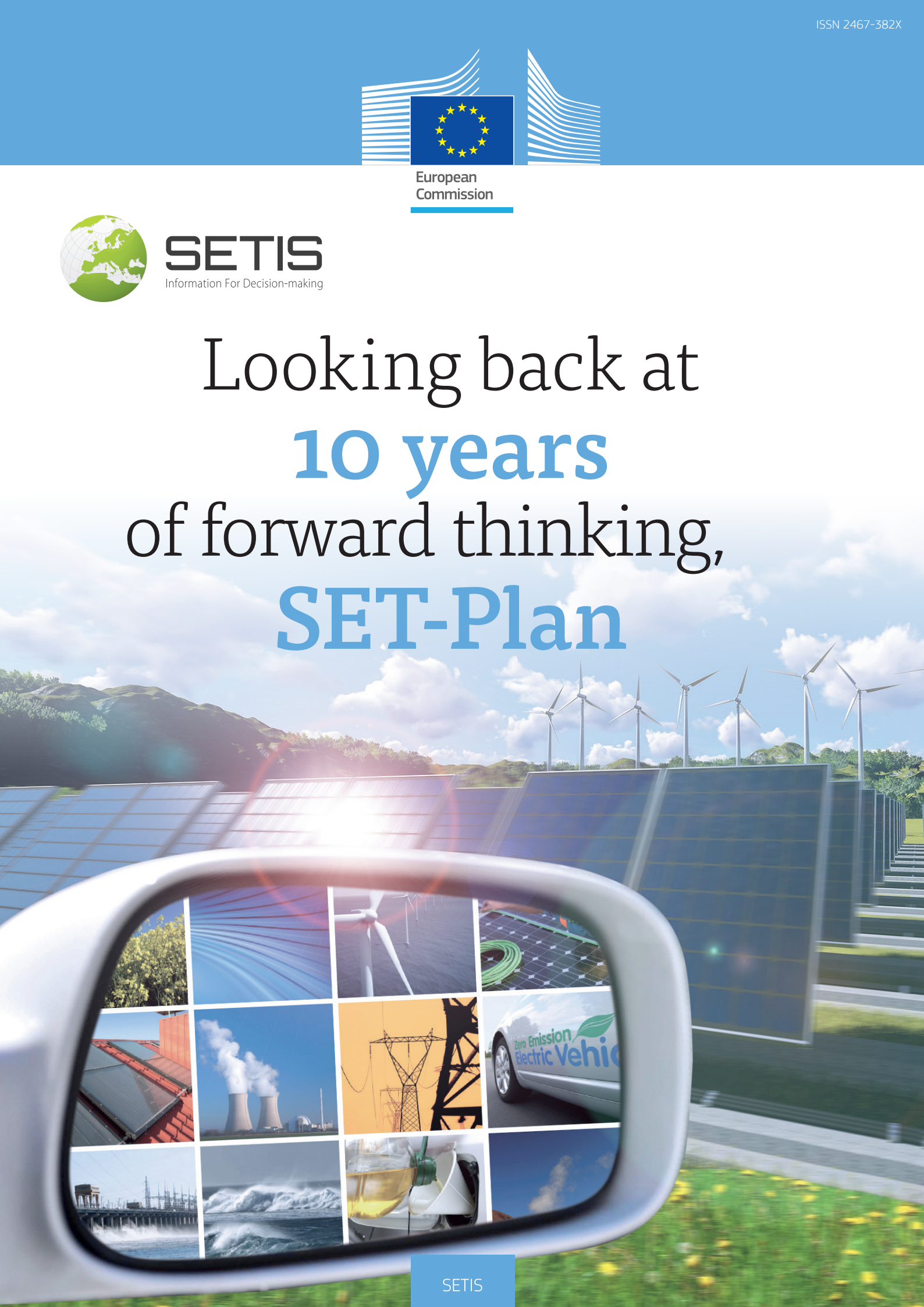
European Commission

SETIS
Information For Decision-making

Looking back at 10 years of forward thinking, SET-Plan



SETIS

Contents

1 **Introduction**
Gwennaël JOLIFF-BOTREL, HoU within DG RTD, Andreea STRACHINESCU, HoU within DG ENER, and Stathis D. PETEVES, HoU within the JRC

4 **Evangelos Tzimas**
Deputy Head of the 'Knowledge for the Energy Union' Unit within JRC

6 **Janez Potočnik**
Former Commissioner responsible for the environment and for science and research

8 **Andris Piebalgs**
Former Commissioner responsible for energy and for development

10 **Marie Donnelly**
Former Director of the European Commission in charge of renewables, research, innovation and energy efficiency within DG ENER

12 **Andras Siegler**
Former Director of the European Commission in charge of research and innovation in energy within DG RTD

14 **Iñigo Sabater**
Former Deputy HoU for technology and innovation within DG ENER

16 **Frederic Ravel and Pascal Newton**
Representative and Sherpa of the French Ministry of higher education, research and innovation in the SET-Plan steering group

18 **Nils A. Røkke**
Chairman of the European Energy Research Alliance (EERA)

20 **Ruggero Bertani**
Chairman of the Deep Geothermal European Technology and Innovation Platform (ETIP)

Energy is key to our society, and the competitiveness of the EU industry and the quality of life of European citizens are today inconceivable without affordable, and reliable energy. A radical transformation is underway in the way energy is produced and used to fulfil societal needs. Low-carbon technologies including clean renewables gradually replace fossil fuels. Wind turbines generate power onshore and offshore. The sunlight is converted into electricity and heat by increasingly efficient photovoltaic cells, and solar thermal energy technologies are capable of providing renewable heating and electricity when needed. Once deployment at commercial scale of ocean energy would be demonstrated it will kick-start market deployment and drive down costs. Furthermore, the high capacity factor and flexibility of geothermal energy make it an attractive option for the EU's energy mix along with biofuels that now can be produced from waste-to-energy valorification, supporting the circular economy as well.

Consumers, empowered by numerous innovations, start to influence our energy system and other measures such as increased energy storage capacity, strengthened interconnections and smart grids will provide cutting edge solutions that significantly increase the flexibility and resilience of the EU energy system and cities' overall energy and resource efficiency. The transformation of the energy system has substantial impacts on all economic activities, including the European industry. The future of European industry will depend on its ability to compete in a global environment, by continuously adapting and innovating through investments in new technologies and embracing changes brought on by increased digitisation and the transition to low-carbon and circular economy. Mobility and transport affect directly all European citizens. To this regard, the European Commission aims at promoting efficient, sustainable, safe, secure and environmentally friendly mobility, and making traffic safer, encourage fairer road charging, reduce CO2 emissions, air pollution and congestion. The long-term benefits of these measures will extend far beyond the transport sector by promoting jobs, growth and investment, strengthening social fairness, widening consumers' choices and firmly putting Europe on the path towards low-carbon energy system.

Ten years ago, the European Commission proposed an ambitious strategy to "Europeanise" energy policies across the EU; this gave birth to the Strategic Energy Technology (SET) Plan in 2007. In this special edition we have endeavoured to look back at 10 years of forward thinking of SET-Plan. We are very grateful to the contributors for taking time to give their perspectives and opinions of the 1st decade of the SET-Plan, and we look forward to the next 10 years.

Stathis D. PETEVES, JRC HoU for Knowledge for the Energy Union
Andreea STRACHINESCU, DG Energy, HoU for New energy technologies, innovation and clean coal
Gwennaël JOLIFF-BOTREL, DG Research & Innovation- Energy Directorate HoU for Strategy

Maroš Šefčovic,
European Commission's Vice-President
for the Energy Union at the
SET-Plan Conference 2016

SOURCE: CLEAN ENERGY MINISTERIAL

A concise history of SET-Plan and the role of SETIS

In 2006, recognising the need to transform the process of energy technology innovation in Europe to meet energy and climate challenges, the Commission introduced the concept of a European Strategic Energy Technology Plan (SET-Plan)[1]. It was further shaped and proposed as a Community objective in 2007[2]. The original aim of the SET-Plan was to put energy technology at the core of European energy policy, and to overhaul the way research and innovation was conducted in the EU, by matching the most appropriate policy instruments and funds at national, European and private levels to the needs of low-carbon technologies at various stages of development and deployment; in effect matching them to the needs of the energy system as a whole. The overall goal was the acceleration of cost reduction and the further development of low-carbon energy technologies to enable the effective decarbonisation of the energy system. To do this, the SET-Plan put forward a new model for research and innovation (R&I). It introduced: (i) technology-specific objectives and targets; (ii) a governing structure with Member States and Associated countries representation (the European Community Steering Group on Strategic Energy Technologies, or SET-Plan Steering Group for short); (iii) the SET-Plan Information System (SETIS), which was assigned to the JRC, to provide regular and reliable information and data to underpin effective strategic planning in the Steering Group; (iv) European Industrial Initiatives (EIIs) to engage industrial stakeholders in each technology addressed by the SET-Plan; (v) and the European Energy Research Alliance (EERA)[3] that brought together national research institutes in support of SET-Plan implementation. The European Council welcomed the SET-Plan in 2007[4] as a means of implementing the European energy policy[5], recognising the vital role of low-carbon energy technologies in transforming the energy system, and acknowledging the hitherto inadequate support given to research and innovation in this area.

The SET-Plan concept has, since then, been further developed. In close cooperation with the participating countries and industrial and academic stakeholders, the Commission made a first attempt in 2009 to assess its financial needs. It produced Roadmaps for the implementation of each of the 7 EIIs, addressing wind, solar, electricity grids, bioenergy, CCS, nuclear fission and fuel cells & hydrogen[6], which were agreed by the European Council[7].

Following a review of SET-Plan implementation during the period 2010-2012 carried out by the JRC in 2013[8], the Commission widened the scope of SET-Plan to include energy efficiency, system flexibility and the urban environment, and called for an Integrated Roadmap addressing energy system and innovation integration[9]. The Integrated Roadmap, produced under the coordination of the JRC and in collaboration with DGs ENER and RTD along with more than 150 experts, proposed research and innovation actions designed to overcome the challenges of the European energy system while facilitating integration along the innovation chain[9].

In early 2015, the Energy Union Framework Strategy identified the SET-Plan as the new European approach for implementation of its fifth dimension on research, innovation and competitiveness. In response, the SET-Plan was updated in September 2015[10]. Its main features include: a more targeted focus on the Energy Union priorities of the fifth dimension; a system integration approach; and more efficient management. These are addressed by the new SET-Plan governance that facilitates strengthened cooperation between Member States and with the EU, designed to lead to more joint actions; transparency and the use of monitoring indicators in periodic reporting; and knowledge sharing. Moreover, 10 concrete actions and specific targets have been identified to accelerate the energy system transformation: on renewables; the energy system including solutions for consumers, smart cities and communities and the power grid; energy efficiency in buildings and the industry; sustainable mobility including batteries and alternatives fuels; carbon capture, storage and utilisation; and nuclear safety.

The SET-Plan is now transitioning from its traditional planning phase into the actual implementation phase. The focus is placed on the execution of Implementation Plans for achieving the agreed SET-Plan targets as well as implementation of the actions. To ensure ongoing success, and further build upon it, the SET-Plan maintains the current active involvement and intensive cooperation between Member States, Associated countries or SET-Plan countries, research organisations and industrial groups. Translating the plans into real and effective projects will require a strong commitment from all stakeholders and although public funding is certainly an important booster of R&I activities, the key player is, and will continue to be, the private sector. For example, the first three endorsed Implementation Plans on Concentrated Solar Power/Solar Thermal Electricity; Carbon Capture Storage and Use (CCUS); and Energy efficiency in industry could mobilise up to €7 billion until 2030 from both public and private sectors. The SET-Plan will continue to function as the cornerstone of the transformation of Europe's energy system to a low-carbon, sustainable, smarter energy system for the benefit of European society.

The role of SETIS

The JRC has been deeply involved in the development and implementation of the SET-Plan since its inception, in equal partnership with DGs ENER and RTD. The role of the JRC has been two-fold. Firstly, it has contributed to the conception, development and implementation of the SET-Plan, and participated in the decision-making process alongside DGs ENER and RTD. Secondly, it has managed and operated the SET-Plan Information System (SETIS) which, with robust scientific evidence, information and data, underpins the SET-Plan process in general and strategic orientation decisions made by the Steering Group in particular.

The importance of the role played by SETIS has been highlighted by both the Commission and the Council. The 2007 SET-Plan Communication[5] gave the JRC a mandate

to manage and operate SETIS. The 2013 Communication[10] called for a robust reporting system based on SETIS to monitor implementation of the SET-Plan and to report on progress, drawing on data supplied by the SET-Plan countries. The SET-Plan's impact on energy policy objectives could thus be accurately assessed and EU and national support better oriented. Furthermore, the 2015 Communication[11] states that the Commission will further strengthen SETIS to ensure a more diligent and intelligent use of available information, data and reporting practices by stakeholders, Member States and Associated countries. It also provides for the development and monitoring of key performance indicators to keep track of progress in the Energy Union's fifth dimension. In 2008, the Council invited the Commission "to establish as a matter of priority an open-access European energy technology information and knowledge management system"[5]; and in 2009 called on the Commission "to develop to its full capability the SET-Plan Information system (SETIS) in order to provide a robust technology-neutral planning tool, which reflects the current state of the art of the individual technologies and their anticipated technological development and market potential... in a transparent and objective way"[7].

SETIS has made the following concrete contributions to the SET-Plan:

- Prepared the analytical framework for impact assessments of all SET-Plan Communications
- Developed technical annexes to support these Communications, including the Technology Roadmaps for the development of low-carbon energy technologies in 2009.
- Coordinated and provided scientific evidence for the development of the Integrated Roadmap and its annexes.
- Produced biennial publications of the Technology Map, a concise overview of the status and prospects of technologies and their markets ; and annual publications of the Capacities Map, a systematic analysis of R&D investment at EU and national level and in the private sector, for each of the technologies addressed in the SET-Plan.
- Provides regular input to the State of the Energy Union Reports, and in particular through indicators that measure progress on the implementation of the fifth dimension on research, innovation and competitiveness.
- Operates the SETIS website[12], the main platform for disseminating information about implementation of the SET-Plan.
- Publishes reports assessing energy technologies of high importance to the transformation of the energy system (e.g. solar, wind, ocean, geothermal, storage).
- Organises and participates in high-level events, such as the annual SET-Plan Conferences and side events.

By providing the necessary robust scientific evidence, SETIS will continue to support the implementation and further development of the SET-Plan, enabling it to fulfil its role in the completion of the Energy Union.

Dr. Evangelos Tzimas

Deputy Head of the 'Knowledge for the Energy Union' Unit of the Energy, Transport and Climate Directorate of the European Commission's Joint Research Centre (JRC).

Through his work, Evangelos provides scientific support for the conception, development and assessment of impact of energy and research and innovation policies of the Union. He has been involved in the development and implementation of the SET-Plan from the very beginning and has led activities related to the management and operation of SETIS, the SET-Plan Information System.

1 Towards a European Strategic Energy Technology Plan, COM(2006)847.
2 A European Strategic Energy Technology Plan, COM(2007)723.
3 https://www.eera-set.eu/
4 Brussels European Council 8/9 March 2007, Presidency Conclusions 7224/07.
5 An Energy Policy for Europe, COM(2007)1.
6 Investing in the Development of Low Carbon technologies (SET-Plan), COM(2009)519.
7 Council Conclusions on the Commission Communication "Investing in the Development of Low Carbon technologies (SET-Plan)", 3001st Transport, Telecommunications and Energy Council Meeting, Brussels, 12 March 2009.
8 Review of the SET-Plan Implementation Mechanisms for the period 2010-2012, https://setis.ec.europa.eu/set-plan-process/set-plan-review-2010-2012
9 Energy Technologies and Innovation, COM(2013)253.
10 Towards an Integrated Roadmap: Research Innovation Challenges and Needs of the EU Energy System, JRC93056.
11 Towards an Integrated Strategic Energy Technology (SET) Plan: Accelerating the European Energy System Transformation, C(2015)6317.
12 https://setis.ec.europa.eu

SOURCE: EUROPEAN COMMISSION

Energy for a Changing World

Mr. Potočnik, in 2007, together with your fellow Commissioner, Mr. Piebalgs, you created the SET-Plan to meet the 2020 energy and climate targets and the 2050 vision by putting energy technology innovation at the heart of energy policy. What were the drivers that made you focus on technology innovation back then? What were your expectations of the SET-Plan?

Climate change is one of the main challenges faced by humanity in this century. Addressing it from all possible angles is a necessity. As you know, ten years ago I was responsible for science and research. I have always seen technology and innovation as indispensable ingredients in the fight against climate change. I was also very happy that along with Andris (Piebalgs), we submitted a successful joint proposal. The silo approach was always a reality in the European Commission, as it is in all governments, and an active policy against it in our interconnected and complex reality is an important way to contribute to the solutions needed.

Finding the best options for energy technologies in the transition to a carbon-free energy sector was, and still is, quite a challenge. Joining forces at European level was, from my side, the best option for delivering solutions more quickly and with a higher possibility of success. This was also seen as the best option to secure potential leadership and competitiveness in the not so easy economic times we were facing a decade ago.

This year marks the 10th anniversary of the SET-Plan. Looking back, can you share with us your opinion on progress made?

After science and research, I was made responsible for the environment. The SET-Plan ceased to be one of my direct concerns and responsibilities, and I have not followed it closely enough to be able to judge the progress made.

Based on your long-lasting engagement with European policy affairs, what is your view of the commitment of SET-Plan countries to the implementation of a joint research and innovation agenda, as foreseen in the Energy Union? In your view, what is the next major challenge that the SET-Plan should address to help the European Union to meet its energy and climate goals?

As mentioned, I'm not aware of the level of commitment of SET-Plan countries to the implementation of a research and innovation agenda as foreseen in the Energy Union. The higher it is, and the deeper the level of cooperation, the better the chance of success. We know that we are not yet there when it comes to energy technology solutions. It

is important that other resources (materials, land, water), and not only carbon, should be integrated into analysis of technology options, to provide long-term feasibility and sustainability in energy production.

Energy technologies are not the only solution, but they are certainly an important part of the solution to meet the energy and climate goals.

I'm currently a partner in SYSTEMIQ, a company with one aim, to help foster and scale the changes needed in our economic system to make it sustainable – economically, socially and environmentally. One of our recent activities was also related to the Energy Transition Commission (ETC), which resulted in an interesting report addressing energy transition questions.

SOURCE: ISTOCK

Dr. Janez Potočnik

Former Commissioner responsible for the environment and for science and research.

Dr Janez Potočnik (1958) graduated from the Faculty of Economics at the University of Ljubljana, Slovenia (Ph.D. degree 1993). He was awarded the honorary degree of Doctor of Science by London Imperial College and by Ghent University in 2008 and 2009 respectively, and Doctor of Science in Economics and Business Administration by Finland Aalto University in 2016. After a successful career starting in 1989 in Slovenia as a researcher at the Institute of Economic Research, Director of the Institute of Macroeconomic Analysis and Development (1994). He was appointed Head of Negotiating Team for Accession of Slovenia to the EU (1998). He was also Director of Government Office for European Affairs (2000), Minister Councillor at the Office of the Prime Minister (2001) and Minister responsible for European Affairs (2002). In 2004 he joined the European Commission, first as "shadow Commissioner for Enlargement and then as Commissioner responsible for Science and Research. In 2010 Dr Potočnik became Commissioner for Environment. His term ended on November the 1st 2014. In November 2014 he was appointed for a three-year term as a member and Co-Chair of International resource Panel hosted by United Nations Environment Programme. In the same month he was also appointed as a Chairman of The Forum for the Future of Agriculture and RISE Foundation and a Member of the European Policy Centre's AdvisoryCouncil.

SOURCE: ISTOCK

Europe should lead the way in new energy technologies

Mr. Piebalgs in 2007 together with your fellow Commissioner Mr. Potočnik, you created the SET-Plan initiative putting thus energy technology innovation also at centre stage of energy policy for meeting the 2020 energy and climate targets, and the 2050 vision for a low carbon economy. Why did you fell this was necessary from an energy policy perspective? What were your expectations from the SET-Plan?

Energy research was a high level priority for me from the start of my mandate as Energy Commissioner. I was convinced that Europe was vulnerable from the security of supply point of view. With decreasing domestic fossil fuel reserves, we became more exposed to the supply of a few key producers. As a response to the oil supply shocks of the 1970s and 80s, the EU developed the strategic oil reserves mechanism, but it was clear that existing gas storage capacity and infrastructure was not sufficient to deal with a crisis. In fact, during the oil crisis there was a popular saying - "We don't have oil but we have ideas". In addition to all the measures to restrict demand, there have been substantial investments in energy research. Unfortunately, with the abundance of cheap oil and the creation of oil stocks, interest in energy research has decreased substantially. Also, existing utilities who held a quasi-monopoly had very limited interest in research investment. The objective to fight climate change and substantially decrease greenhouse gas emissions from the energy sector gave a new and more shared understanding across the European Union that Europe needs to invest in research to develop zero carbon technologies. Europe should lead the world in new energy technologies for increasing the security of supply in a sustainable manner. Development of competitive renewable electricity systems, sustainable second generation biofuels, energy storage, energy-efficient appliances and climate-friendly vehicles have become frontiers of research. The strength and weakness of publicly funded European research is that the funds are decentralised, which means the researchers themselves have a substantial impact on research priorities. Limited competition in the European energy market didn't promise a substantial investment of private funds. This showed a clear need for strategic European research planning while maintaining decentralised research funding. Hence the creation of the SET-Plan. We needed concrete results, mobilising all stakeholders. Strategic guidance was to be accompanied by more effective implementation of the results of successful research through Industrial Initiatives. There were expectations that this strategic approach could increase funding. An ambition to be the best was accompanied by a willingness to share knowledge with other nations of the world with an openness to the pooling of funds for achieving faster technological breakthroughs. There has been a lot of debate about how to measure the results of the SET-Plan. We finally came to the conclusion that the results will reflect the level of success of implementation of the 20-20-20 by 2020 strategy. It was clear that Europe could only achieve the goals of this strategy with substantially accelerated efforts in energy research.

This year marks the 10th anniversary of the SET-Plan. Looking back, can you share with us your opinion on the progress made by the SET-Plan?

I believe that on the 10th anniversary of the SET-Plan, the best way to analyse progress made is to reflect on changes in the energy sector. The EU is well on track to keeping its commitment to decrease greenhouse gas emissions by 20% by 2020. Investments in renewables such as solar and onshore wind energy are cost competitive and represent a

substantial proportion of investment in power generation. In addition to this, there have been substantial developments in offshore wind generation. European electricity systems manage to integrate huge renewable energy flows. There are days when in some parts of Europe, all households and industries are powered exclusively by renewable energy sources. These investments have created hundreds of thousands of new, high quality jobs in Europe. Furthermore, renewable energy is the fastest growing energy sector internationally. At the same time we should recognise that a lot still needs to be done. In 2016, the EU showed only a slight decrease in greenhouse gas emissions as compared with 2015. The current policies are clearly not sufficient to achieve the 2030 goals, let alone the 2050 goals. Changes in the building sector have been slow while emissions from the transport sector have actually increased. The EU needs to beef up its climate policies and support instruments, including the SET-Plan. Still, I see fundamental changes in research in the energy sector. I am happy about European Investment Bank activities that provide financing to public and private energy research projects. Recent examples include a support of nearly one billion Euros for strategic investments in energy and science in Poland, and a €110 million loan to SENER, a Spanish company designing cutting-edge services for the renewable energy sector. I was happy to learn about Europe's most advanced and largest lithium-ion battery factory in Sweden that will start to supply European customers in 2020. The UK is launching a fund to boost the development and manufacture of electric batteries. Germany has opened two new hydrogen refuelling stations, which have the capacity to serve 40 fuel cell vehicles every day. And I could continue with similar stories. That means that the SET-Plan has managed to achieve the most important objective - to turn attention to energy research and practical solutions in achieving a low carbon economy in the EU and globally.

Based on your long lasting engagement with the European policy affairs, what is your view on the commitment of the SET-Plan countries for the implementation of a joint research and innovation agenda, as foreseen in the Energy Union? To your view, what is the next major challenge that the SET-Plan should address to help the European Union meet its energy and climate goals?

Each EU country has its own ambitious national climate and energy targets. Each country tries to increase its competitiveness and create new, high quality jobs. And that is understandable. Still, we need to take into account the global shift in interest towards investing in green technologies. China, US, India, Russia and even Saudi Arabia would like to be leaders in these new technologies. And the role of research and development in the green transition is crucial. A certain critical mass is needed to get the intended results; there is an increased need in Europe for coordinated focus on specific areas to optimise research through synergies. The SET-Plan tries to do it at a European scale, but there is clearly a limit to what is achievable on such a large scale. It seems that European experience in regional cooperation could deliver fresh impetus. This strategy was and is used successfully for integrating Europe's electricity and gas markets. Good examples come from Nordic countries, where there is serious debate on strengthening Nordic energy research and developing a regional agenda. Among the proposals discussed are common visions for cooperation in energy research, regional research and demonstration programmes, and common PhD programmes in energy and green export strategies. I believe that the Nordic experience could be replicated in other parts of Europe. To give it more coherence it would be good if this regional cooperation could compliment the SET-Plan.

I strongly believe that the European Commission was right to make energy research and innovation one of the five pillars of the Energy Union. Today this pillar is perhaps less visible, but seeing global commitment in moving towards a low carbon economy, we can anticipate its growing importance. And the SET-Plan is a proven tool that served and continues to serve us well in strengthening this pillar.

Dr. Andris Piebalgs
Former Commissioner responsible for energy and for development

Andris Piebalgs is an experienced Latvian politician and diplomat, who has occupied key positions in both national and European levels. He is the leader of the Unity party.
He has been Latvia's minister of Finance and of Education. He served also as a chairman of the Budget and Finance Committee of the Parliament.
He was the Latvian Ambassador to the EU.
He served as a European Commissioner for Energy from 2004 to 2010 and as a European Commissioner for Development from 2010 to 2014.
He is a Senior Fellow at the Florence School of Regulation and the Chairman of the Board of Appeal of the Agency for the Cooperation of Energy Regulators.

Important challenges still remain

With the all-inclusive and future oriented Clean Energy for All Europeans, our journey to decarbonisation has taken a giant step forward - tapping into energy savings that are positive for consumers and the economy; setting the right conditions for clean renewable energies to thrive; and improving market integration and competition, whilst reinforcing investment signals and empowering consumers in electricity markets.

As the transition to a clean and sustainable energy system becomes a real economic option due to the falling costs of renewables, and as heating and transport move towards electricity as the energy vector, electricity markets are being challenged by the need to decarbonise...quickly. The starting point for an electricity market dominated by variable renewables and adaptable demand is to reward flexibility, bringing tangible benefits to EU consumers by allowing active, remunerated participation in generation and demand-response and building on integrated short-term markets as well as EU-wide intraday and cross-border balancing markets.

To achieve this it is essential to remove roadblocks to innovation in order to enable the entrepreneurial development of new energy services for consumers and industry and to open the door to non-traditional actors to the market with new business models.

To be successful, this transition must be all embracing, transparent and mobilise all actors, including consumers, cooperatives, investors, businesses, academia, as well as cities and regions. The new governance framework for 2030 underpins the relationships between these actors and supports the achievement of renewable energy, energy efficiency and carbon reduction objectives. Within this the National Energy and Climate Plan encapsulates the move to an integrated approach to all energy services, to longer-term planning and the routine assessment of progress.

The SET-Plan is in many ways the forerunner of this governance process. Already the Steering Group has established an integrated approach to the energy system, within which priorities have been identified and targets to accelerate the energy transformation have been set. This has been successfully achieved through a transparent and wide reaching participation of industry and academia and consumers. This experience is invaluable as all Member States move forward with their national plans and it is essential that the research community share this experience within their Member State.

However, there are still important challenges remaining.

The impact of technological interventions on individual people, communities and the environment needs to be inherent in research. Equally the social consequences of the technological applications or dissemination of innovative services needs to be considered as an integral part of the innovation process.

Public mistrust of science and fear of technology exists today making it incumbent on the research community to reflect on communication at local level in terms that are pertinent to people's everyday lives. In this respect, the research community has an important outreach obligation.

The challenges of the energy transition can be solved only by taking long-term, large-scale and integrated approach to the energy system. Our research and innovation needs to be more multidisciplinary and its practitioners need to continue to promote cooperation and integration between the social and natural sciences. A holistic approach also demands that science draw on the contributions of local knowledge, micro systems, economic and cost parameters as well as the wide variety of cultural values that exist in Europe.

Hence the shareholders in SET-Plan – steering group, European Technology and Innovation Platforms and the European Energy Research Alliance have a collective responsibility to explain to the public and policy makers alike what the value of their innovation means, how it enhances people's lives and the economy, what the costs are (financial social and environmental) and perhaps most importantly, why new technologies can deliver gains for society.

The success of the decarbonisation agenda and the achievement of the goals for 2030, can only come about with such a multi-layer governance, based on full transparency and participation as a pre-condition to build a large societal consensus around climate change and the energy transition.

Marie C. Donnelly B.Sc. Pharm., M.P.S.I., M.B.A.

Former Director of the European Commission in charge of renewables, research, innovation and energy efficiency within DG ENER

Throughout her thirty year career in the European Commission, Marie has been a leading advocate of future oriented policies and strategies – most recently to accelerate the energy transition.

As the Director for Renewables, Energy Efficiency and Innovation, at DG Energy in the European Commission, she formulated key elements of the 'Clean Energy for All Europeans' package designed to put energy efficiency first, achieve global leadership in renewable energies and provide a fair deal for consumers.

Earlier roles involved framing an overarching policy for the Pharmaceutical industry including Good Clinical Practice and the establishment of the European Medicines Agency, currently located in London; and policy responses particularly for business and employee adaptation to change stemming from globalisation and technological innovation.

Marie is currently a member of the Governance Committee of MaREI, the marine and renewable energy research, development and innovation Centre supported by Science Foundation Ireland and coordinated by the Environmental Research Institute (ERI) at University College Cork. She is also serving on the Steering Committee of the International Energy Research Centre (IERC), a state of the art facility established to implement new science in the energy space and hosted at the Tyndall Institute.

As a European Advisory Board Member of the Hawthorn Club, the only International Network for professional women in the energy industry, Marie advances the appointment of women to senior positions and mainstreams gender equality, with an emphasis that equality is for both women and men.

Major progress has been achieved over the past decade

It has been clear for several decades that the energy systems and technological advancements currently available worldwide are not sufficient to free the planet from the greenhouse gases emitted by our energy resources. An ever widening range of new technologies aims to solve this problem by maximising the benefits of the energy system as a whole, including energy production, transformation, transportation, distribution and consumption. This work has been intensifying over the past decade, at both macro and micro level.

Since 2007, Europe has taken a strategic approach to energy technologies, identifying research and innovation priorities delivered through the Strategic Energy Technology Plan (SET-Plan), in order to speed up the energy transition. The SET-Plan seeks to transform the production and use of energy in the EU, aiming for worldwide leadership in the field, and for a reduction in the costs of marketable energy technology solutions, to enable us to achieve European targets for climate change mitigation.

A number of Commission Communications between 2006 and 2013 introduced the SET-Plan concept, launched the plan, determined its financial requirements and reinforced the modalities of the implementation. Ever since, the SET-Plan has become the overarching umbrella for energy research and innovation (R&I) all over Europe and in the EU R&I Framework Programme. The 2015 Communication on the Integrated SET-Plan, a core initiative under the R&I pillar of the Energy Union strategy, positions the transformation of the European energy system as the major prerequisite to achieving a competitive low-carbon economy with consumers at its centre.

The enhanced and integrated SET-Plan is targeted in its focus, with ten action lines to boost key technologies along an Integrated Roadmap, structured around the Energy Union's six R&I policy priorities: (1) To be world leader in developing the next generation of low-carbon technologies; (2) Consumer participation and progress towards a smart energy system; (3) Developing energy efficient systems; (4) Strengthening options for sustainable transport; (5) Driving ambition in carbon capture and storage; (6) Increasing safety in the use of nuclear energy.

The renewed SET-Plan places greater emphasis on the electricity grid and smart integration of energy sources. We need system integration at a higher level. We need technological integration via smart control of the electricity grid – that's a key issue. The development of grid-based technologies has recently become particularly fast-moving. The goal for the electricity grid pillar under the original SET-Plan was to be able to integrate up to 35 per cent of renewable electricity seamlessly in the grid, and to operate a smart grid by 2020 capable of matching supply and demand. This is also about energy security. That is a reason in itself for an integrated grid and the two-directional flow of energy.

The original SET-Plan included six industrial initiatives in the fields of wind, solar, bioenergy, carbon capture and storage, the electricity grid, nuclear fission, fuel cells and hydrogen as well as a smart cities initiative – each with designated milestones and investment targets. Most of the envisaged spending was dedicated to stand-alone technology initiatives which undercut the effectiveness of the programme. It became clear that the link between new energy technologies and the distribution and use of energy needed to be stronger. Energy technology policy needed to embrace a holistic view and to make a strong link between technology push and the development of relevant policies and demand-side measures.

Energy storage technologies, for example, are now among the top priorities in the revisited SET-Plan. The reason is clear: renewable energies such as wind and solar flow into the electricity grid in spurts, depending on the amount of sun or wind on any given day. Peak flows of renewable energy are currently wasted because the electricity grid across most of Europe is not capable of storing the energy. Without storage, an integrated energy system is not possible.

The SET-Plan envisages a reinforced partnership between the Commission and SET-Plan countries and, in particular, between these countries, leading to more joint actions and better coordination. The ten priority action lines are the result of a substantial participatory process that included national governments, industry and research actors all over Europe.

The selected low-carbon energy technologies are those which contribute most to the decarbonisation of the European energy sector and promise the highest increase in energy efficiency. The SET-Plan also addresses the technologies that will best facilitate the integration of low-carbon technologies into the European energy system. This will help the EU to achieve its ambitious 2020 and 2030 energy and climate goals. The R&I actions will contribute towards maintaining or regaining the EU's global industrial leadership in low-carbon technologies and energy efficiency, by strengthening partnerships among national governments, industry and research actors.

In 2016, the ten actions formed the basis of discussions with SET-Plan countries and stakeholders (industry and research actors) on the prioritisation of activities to be implemented under each action line. The next phase, still in progress, includes the development of Implementation Plans. Progress on the ten key actions forms part of the State of the Energy Union annual report to the European Parliament and the Council. This report is centred around Key Performance Indicators, such as the level of investment in R&I, assessing progress on performance and cost-reduction in each priority area.

I take this opportunity to note that the SET-Plan is not a funding instrument, but a strategic planning and programming framework that contributes to the EU's energy policy agenda. It aims for better alignment of public and private as well as European and national R&I agendas in the field of low-carbon energy. Its priority actions are implemented via European programmes (6% of the total energy R&I investment), mainly by the EU Research Framework Programmes (currently by Horizon 2020) and by the New Entrance Reserve (NER 300) Programmes. However, most of the funds come from national sources (28%) and in particular from industrial sources (66%).

Horizon 2020 has been integrating the new priorities. In a break with the past, Horizon 2020 calls now define energy-related challenges faced by industry and society, inviting bids to solve them. It is moving away from calls to develop a specific technology, and encourages competition among technologies to solve clearly defined problems. We wanted to define the challenge set out in the Energy calls of H2020 in such a way that it was a problem-solving exercise. Researchers can come up with different technology solutions. We did not want to be narrowly prescriptive – they can use existing technologies or new ones. The SET-Plan is thus better implemented and disruptive innovation is boosted.

This short review would not be complete without highlighting the primary role of the SET-Plan's governance and implementation mechanisms: the European Technology and Innovation Platforms (ETIPs) and the European Energy Research Alliance (EERA) which, under the oversight of the SET-Plan Steering Group (SG) of member countries, are the core actors of the SET-Plan community.

I have always considered the EERA to be the engine for European scientific energy research, performed by dedicated research entities and by universities, bringing energy technologies to the required level of maturity so that they can trigger industry-driven research. Much R&D capacity is still anchored only at national level. This leads to inefficiencies and duplications. That's why we have created a truly European research and innovation ecosystem that builds on national capacities.

The main responsibility of the Steering Group is to ensure the best alignment between the various national energy R&I programmes and similar EU-level actions via the selection and implementation of SET-Plan priorities. Acting in partnership with industry and research stakeholders, the Steering Group has been instrumental in delivering the SET-Plan's great achievements in the recent years. The ownership taken by SET-Plan countries of the portfolio of actions was demonstrated by their active participation in setting the technology and cost performance targets, and has allowed us to reach the implementation phase by identifying and prioritising specific R&I actions at national and EU level in order to reach the agreed targets.

I am very much looking forward to the 2017 Bratislava Conference celebrating the 10th anniversary of the SET-Plan. Major progress has been achieved over the past decade in the transition to a low carbon, innovative energy future, and as the technology pillar of EU's energy research and innovation policy, the SET-Plan has played a key role.

Dr. Eng. András Siegler

Former Director of the European Commission in charge of research and innovation in energy within DG RTD

Until recently András Siegler has been director in DG RTD of the European Commission in charge of research and innovation policies and programmes in non-nuclear energy and under EURATOM (2013-17). In this capacity he represented the Commission in the SET-Plan Steering Group as well as chaired the various Programme Committees in charge of the energy portfolio of FP7 and HORIZON2020. Before that he was director for transport (2006-2012) and international cooperation (2005-2006).

Dr. Siegler graduated in control engineering from the Budapest Technical University. He holds a doctoral degree in mechanical engineering, a postgraduate degree in economics as well as an MBA from the US.

He started his career as a research engineer in mechatronics and computer aided design in the Computer and Automation Research Institute of the Hungarian Academy of Sciences. Between 1991-1996 he was vice director of the same institute.

Between 1996-2004, he was holding various senior management positions at the level of state undersecretary in the Hungarian state administration. During this period, he was in charge of national policy, legislation and fund management of research and technological innovation including national participation in European R&I programmes, the use of structural funds for boosting innovation and international science and technology cooperation. Before joining the Commission in 2005, he represented Hungary in the research policy bodies of the EU, NATO, OECD and CERN.

SOURCE: ISTOCK

SET-Plan is needed as much today as it was ten years ago

Back in 2006, as a Commission staff member of DG ENER together with your colleagues S. Peteves (JRC) and G. Evans (DG RTD), you worked out the details of a new chapter of the European Union's energy policy, aimed at strengthening the role of technology innovation for meeting the European Union's energy and climate goals; hence the creation of the SET-Plan. Given the pace of the energy transition, the establishment of the Energy Union and related policy developments since then, if you were able to redesign the SET-Plan concept, what would you have done differently?

The S of SET-Plan stands for Strategic. Above all, it was the result of applying common sense to the energy research policy, meaning the Framework Programme for Research. At the time, the EU was spreading energy research funding thinly across many small projects, involving many partners and pursuing multiple technologies, with no priorities or targets and without monitoring results (SETIS). At the same time, the EU was preparing to adopt renewable energy targets to open up the electricity market and its supporting infrastructures (Trans-European Networks).

There was a clear disconnect between the urgency imposed by climate change, security of energy supply in EU policy (targets, targets, targets) and the spreading of EU research monies in all directions. It was a matter of common sense to take the risk, and focus the research and innovation efforts on those industrial initiatives that seemed to have the highest likelihood of contributing to our energy and climate targets. And, to do that hand in hand with the industry and with the research community.

The aim of the SET-Plan was to bridge EU policy and EU research, and I think the objective was accomplished.

10 years have passed since the establishment of the SET-Plan and in the meantime you have joined the energy industry. Have you followed the evolution of the SET-Plan? What do you consider to be its greatest achievement? Has it delivered in line with your original vision and with the evolving needs of society?

Working in the private sector I have been very far away from the SET-Plan and from the activities of the European Commission in general. But, what I see in today's global market is that there is no cheaper way to produce electricity than from renewable energy sources: wind and solar in particular.

These two, wind and solar, were certainly two key initiatives of the SET-Plan, which aimed to reduce the levelised cost of energy through technological and industrial improvements, which is exactly what has happened. If I look at wind (how can I avoid it working for Vestas) when the SET-Plan was adopted in 2006-7, the usual rotor diameter of a wind turbine generator in the market was 80 to 90 meters. Today, Vestas is selling machines with rotors beyond 150-160 meters' diameter, which has, in consequence, more than halved the cost of energy.

The SET-Plan also included a smart grid industrial initiative. The proposed smart grid would accommodate greater amounts of variable renewable energy sources, incorporate storage and support demand management. Today, many of the features of intelligent metering that enable demand-side management have been implemented. Electric cars and utility-scale storage with batteries are making their way onto the market. Utilities are rethinking their roles in the new electricity market and have tilted their investment portfolios towards renewables.

Establishing a direct causality between policies/programmes/plans and results is always challenging but what is clear to me is that the SET-Plan was aiming in the right direction and has made a great contribution.

As a member of one of the leading, innovative, key technology providers for enabling the Energy Union and the global climate mitigation goals, how could/ should the SET-Plan continue to contribute to the European Union's efforts to accelerate energy transition in the coming years? Do you see the need for more focus or for other changes that will make the SET-Plan more effective?

My role in Vestas is fully focussed on the commercial area, with global responsibility for business development, so I am not involved in policy-making, or in research and technological development.

Having said that, in my opinion, the SET-Plan is needed as much today as it was ten years ago. Climate change and energy security are just as much of a challenge as they were. Huge progress has been made in the right direction but we are not even half way to where we need to be.

Carbon-free generation technologies need to continue to improve. In the case of renewables, we should maintain the downwards trends of generation costs and to render these technologies more grid-friendly, overcoming the variability challenge (e.g. Vestas hybrid project in Australia, Kennedy Energy Park). The grid and the market need to evolve as well. They need to adapt their rules and the infrastructure to the cheapest and cleanest energy sources (in my opinion renewable energy sources) to make the overall system sustainable. The SET-Plan should embrace these challenges and apply common sense to deliver the most with EU citizens' monies.

Iñigo Sabater

Former Deputy Head of unit for technology and innovation within DG ENER

Iñigo Sabater is Vice President, Head of Global Business Development for Vestas, a global leader in sustainable energy solutions. He has also been Vice President of the European Wind Energy Association (EWEA), and of the Spanish Wind Industrial Association (AEE). He was also the Director of the Master on Renewable Energy from the School for Industrial Organisation (EOI) in Spain.
Prior to joining Vestas, Iñigo worked at the European Commission in Brussels for 11 years, managing European Programmes for research and technological development in the fields of transport and energy, including projects such: GALILEO, the Single European Sky, ERTMS, the European Recovery Plan for CCS and Off-Shore Wind, the International Partnership for The Hydrogen Economy, the European Demonstration Programme for Alternative Transport Fuels, among others. Iñigo also led the development of the European Strategic Energy Technology Plan (SET-Plan), part of the European Energy Policy.

He holds a degree in Aeronautical Engineering from the 'Universidad Politécnica de Madrid'.

We need a place now more than ever for concrete collaboration between countries

Much has been done since the launch of the SET-Plan in 2008. In 2013 it was decided that the updated technology roadmaps of the SET-Plan should be consolidated into a single document in order to tackle the silo approach to energy technologies and to create an overview of an integrated European energy system. "Towards an integrated roadmap", published in 2014[1], was the result of an extensive consultation process, and identified a portfolio of around 450 research and innovation (R&I) actions for the transition to a low carbon energy system. It was then time to set priorities and to choose joint actions to be implemented together with stakeholders, member states and associated countries (MS/ACs), along with the European Commission (EC). Work has been ongoing since the beginning of 2015 to define common agreed targets in the form of declarations of intent, and R&I actions in implementation plans.

Establishing priorities and implementing joint actions requires a strengthening of dialogue between MSs and ACs and between MS/ACs and the EC. To this end, The Bureau and the Joint Actions Working Group (JAWG) were set up at the end of 2013, and each has played a key role in the achievements of the SET-Plan. The Bureau brings together around 10 rotating MS/AC representatives, chosen by their peers in the Steering Group, and supports the group in driving the delivery of the SET-Plan. The Bureau reinforces dialogue with the Commission and develops suggestions for the forward agenda of meetings. It also ensures that MS/ACs' views, ideas, issues and concerns are brought forward for discussion. The Bureau is essential for the preparation of each SET-Plan Steering Group meeting, acting as the main contact for the European Commission. The JAWG constitutes a working group, open to all interested MS/ACs, of the SET-Plan Steering Group, with the EC participating as an observer and providing support. The JAWG currently provides a forum for around twenty MS/ACs to discuss joint actions, and crucially allows for informal discussion between countries, within a less formal framework than that of the Steering Group and with less intense scheduling. So far, it has concentrated on coordinating the preparation of ERA-NETs[2]. Ten ERA-NETs have been launched since the beginning of Horizon 2020, on themes including Bioenergy, Carbon capture and storage, Geothermal, Ocean, Offshore wind, Photovoltaic and Concentrated solar power, Smart grids, Smart cities and communities. These ERA-NETs support collaboration and cooperation between MS/AC R&I programmes and represent about €180 million of MS/AC national budget funding, supported by €87 million of

SOURCE: ISTOCK

top-up EU budget funding. This is hopefully just the start, and other types of joint actions are expected to be considered; leading to more coordinated actions between MS/ACs.

Although energy mix is the responsibility of each state, and the differences between European countries are clear to see, it is important to show that collaboration at European level makes sense. Because demonstration is a mandatory step in the field of energy, and these demonstrators are at a pre-industrial scale, national collaborations are all the more attractive as costs can be shared. That's what we have tried to build with ERA-NETs. That does not mean, of course, that we can forget about supporting basic research, as a consistent and efficient preparation of the future of energy union, and we believe that links with EERA need to be strengthened.

The JAWG and Bureau have acted as important landmarks in the landscape of European energy research, which has been changing in recent years. We built 13 themes for the Integrated Road Map in 2013-2014, and addressed the 4 core priorities of Energy Union in 2015, followed by 10 key actions in the SET-Plan Implementation phase. Discussions in JAWG helped all of us to understand these changes, to keep our ideas clear and our enthusiasm intact.
We have done a great deal of work in common over the last two years, building the SET-Plan together: the first step was to define common targets together with stakeholders, MS/ACs and the EC – not easy, but essential – and then to align policies and build efficient collaborations. The publication of the Declarations of Intent[3] at the end of 2016 would not have been possible without the efficiency created by the JAWG and Bureau. And we must say that these common targets are also very useful at a national level: firstly to identify our own efforts to reach the targets, to measure what we have left to do, and to build strategic plans in coherence with those targets; secondly to show that Energy Union does exist. The Implementation Plans are on schedule to be endorsed by the SET-Plan Steering Group in the coming months, defining the R&I actions required, including when and by whom they must be carried out.

In conclusion, we can say that we are entering a crucial phase of the SET-Plan: its implementation. We need a place now more than ever for discourse and concrete collaboration between countries. So much collective effort has been put into the SET-Plan framework, through the JAWG and Bureau, giving impetus to each country to achieve common goals that we would love to see enhanced visibility for the SET-Plan through institutional strengthening.

1 https://setis.ec.europa.eu/set-plan-process/integrated-roadmap-and-action-plan
2 The ERA-NET instrument under Horizon 2020 is designed to support public-public partnerships in their preparation, establishment of networking structures, design, implementation and coordination of joint activities as well as topping up of single joint calls and of actions of a transnational nature.
3 https://setis.ec.europa.eu/actions-towards-implementing-integrated-set-plan.

Dr. Frederic Ravel

Representative of the French Ministry of higher education, research and innovation in the SET-Plan steering group

Dr. Frederic Ravel is the representative of the French Ministry of higher education, research and innovation in the SET-Plan steering group since 2014. Currently scientific director for energy, sustainable development, chemistry and process engineering, he joined the Ministry in 2011, after more than twenty years in national laboratories dedicated to material science. His sector in the French Ministry deals with research connected to low carbon energies, smart cities and mobility, energy efficiency and waste management. Member of several boards of research organizations, he is also the French representative for Innovation Challenge #6 (materials) in Mission Innovation framework.

Dr. Pascal Newton

Sherpa of representative of the French Ministry of higher education, research and innovation in the SET-Plan steering group

Chemist and physicist by training, Dr. Pascal Newton is currently the Sherpa of representative of the French Ministry of higher education, research and innovation in the SET-Plan steering group since 2013. For Horizon 2020, the European R&I framework programme, Pascal is also the French representative in the Horizon 2020 Energy Programme Committee and one of the French Energy NCPs. He works also on the issue of synergies of funds, mainly of ERDF with Horizon 2020. Before that he worked during seven years in a research organism and dealt with regional authorities for the purpose of implementing territorial research projects.

SET-Plan allows Europe to mould its energy system for the future

EERA (European Energy Research Alliance) has been a key stakeholder since the early days of the SET-Plan. It filled a gap in the EU's energy research and innovation ecosystem, bringing national research efforts on board; a vital component in fulfilling the SET-Plan vision and objectives. How do you see the evolution of EERA over the last decade? What are the main challenges it has faced in aligning and consolidating national research activities in support of the SET-Plan priorities?

EERA[1] started in 2008, one year after the SET-Plan launch, and we have supported the SET-Plan roadmap and activities since the very beginning. Our mission is "Co-ordinating energy research for a low carbon Europe". This captures very well what we are committed to achieving: joint programming for low carbon energy research in Europe. Our association is a unique partnership, bringing together more than 55,000 people working in research. We have grown from 10 founding organisations in 2008 to over 175 energy research institutions active in 27 European countries, developing and consolidating a community which is unique in its kind. I am not aware of any organisation with a similar critical mass and depth that focuses on low carbon energy R&D on a global scale. Our 17 Joint Programmes (JPs) bring together the best researchers across energy fields in Europe, sharing knowledge and enjoying the "open science" approach by cross-fertilisation. This is a success in itself, enabled by the SET-Plan.

Much of the R&D performed at national level is of a pre-competitive nature and can be shared through our networks. EERA contributes to this flow of knowledge concretely through its JPs, thus adding value, to mobilise resources towards joint results. This is complex: over the course of our journey we have developed a framework which enables us to work more efficiently by establishing the legal entity EERA AISBL (in French: "Association Internationale Sans but Lucratif", i.e. International Non-Profit Organisation). The AISBLE is headed by a Secretary General and has dedicated staff. During this process we had valuable support from the European Commission, both through our strategic communication and interaction, and through the opportunity to foster European mobilisation of energy research. Activities supported by the European Common Research and Innovation Agendas (ECRIAs) and Integrated Research Programme (IRP) projects in Horizon 2020 and FP7 have been key. This kind of support gives national efforts sizeable leverage and provides added European value.

Despite the progress achieved in pursuing the EERA mission, many are still sceptical about its achievements and its contribution to the progress of the SET-Plan. Would the SET-Plan have achieved much without EERA?

It is very difficult to draw conclusions based on scenarios which have not happened. I think the SET-Plan is instrumental in enabling Europe to reach its targets, i.e. to provide affordable clean energy to all citizens. As Europe's energy systems are quite heterogeneous, the SET-Plan allows Europe to mould its energy system for the future.

As the research pillar of the SET-Plan, EERA has worked with industry, decision-makers and other stakeholders to

defragment research and innovation (R&I) in Europe, gathering world class expertise and resources in energy. Our JPs have also supported bottom-up alignment of R&I priorities, coordinating the agendas and activities of members across Europe. For example, the Joint Programme Nuclear Materials has developed a labelling process as a key priority of the research community and industry, avoiding the submission of multiple competing proposals to EU funding agencies. This allows the research community to work on activities that represent a real convergence and alignment of national programmes, based on industry needs and in line with SET-Plan objectives.

The EERA community has also contributed to lowering the cost of renewables - through national and EU projects - and has supported the SET-Plan roadmap throughout.

Over recent months, our Joint Programmes have made instrumental contributions to the SET-Plan Temporary Working Groups[2], covering all ten SET-Plan key actions.

Our work focuses on research and we have been working with companies, European Technology and Innovation Platforms (ETIPs) and other industry organisations to support R&I along the value chain. A good example of our cooperation with industry is the recent Energy Storage Technology Development Roadmap, released jointly by the EERA Joint Programme on Energy Storage and EASE (the European Association for Storage of Energy), which identifies priorities and actions to support the energy storage sector in Europe. This is very useful in times when the importance of battery capabilities is much debated.

The SET-Plan is entering its most important phase now – executing the implementation of its 10 Actions. What challenges do you see, and how can EERA contribute not only to its execution, but also to forging the required cooperation across and throughout the SET-Plan community?

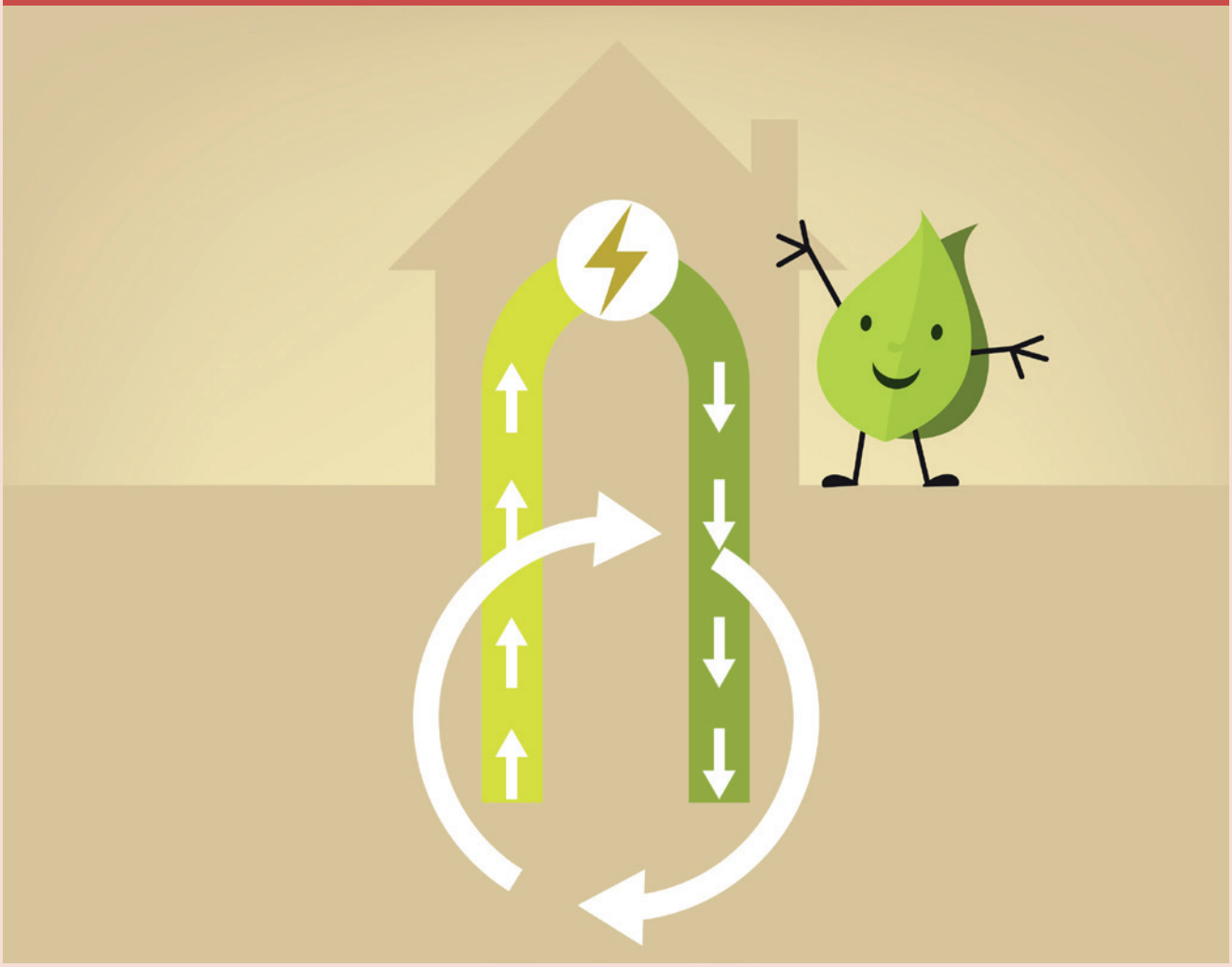
This is a huge task: trying to achieve so much with limited control and resources at hand. EERA can contribute to the implementation of the SET-Plan by gathering European players to address R&I actions, through a variable geometry of national teams and funds topped up by EU funding through Horizon 2020 and the next EU Framework Programme. This can be achieved through the support of dedicated concerted actions such as can be seen with European Common Research and Innovation Agendas (ECRIA) and Integrated Research Programmes (IRP). This can help to consolidate the existing activities of JPs and to develop new ones, for example on technology transfer, mobility, international cooperation and open data. However, for these to be successful, it is essential that we work together with governments, industry and the wider research community. In this respect, we strongly encourage our Joint Programmes to support SET-Plan implementation through the Temporary Working Groups, together with industry and under the lead of national governments. We are also campaigning for the establishment of European Centres of Excellence in energy research, based on national centres or clusters, with added value created by the framework programmes. This will provide strong leverage and will help to promote key European assets in energy, now and in the future. For instance, why not create a European Centre of Excellence on energy storage to support national initiatives through coordinated action at European level? This is one example of how additional contributions can have huge multiplier effects. EERA is in itself an excellent example of such an effort in energy research, guided by the SET-Plan.

Dr. Nils A. Røkke
Chairman of the European Energy Research Alliance (EERA)

Executive Vice President Sustainability in SINTEF, Scandinavia's largest R&D Institute. Member of the management board of SINTEF. PhD in combustion from NTH (NTNU). Since May 2017 Chairman of EERA- the European Energy Research Alliance.

Gas Turbine Design and Development Manager in Rolls Royce Marine before returning to SINTEF in 2002 as Vice President Gas Technologies and Director of the Gas Technology Centre NTNU-SINTEF. Member of the European ZEP (zero emission power) Advisory Council, Co-chair of the Executive Committee of ZEP and member of the Divisional Board (Energy, Resources and Environment) of the Norwegian Research Council (RCN). Board member of the Norwegian Climate Foundation. Chair of ECCSEL (European CCS Labs) an energy ESFRI lab.

[1] https://www.eera-set.eu/
[1] https://setis.ec.europa.eu/actions-towards-implementing-integrated-set-plan



SOURCE: ISTOCK

Main challenge is the coordination of private and public funding

European Technology Platforms (ETPs) were an important actor in the constellation of the SET-Plan community. Since 2015, ETIPs (European Technology Innovation Platforms) have been part of the SET-Plan governance. How was this change perceived by the European industry? What were the benefits of this transformation, and how was it facilitated?

The new SET-Plan governance[1] has notably opened the ETIPs to new energy technologies such as geothermal. The ETIP on deep geothermal was launched in July 2016. It was an important step forward, covering one of the major renewable energy sources such as the deep geothermal in the SET-Plan strategic view.

This change happened at the same time as the launch of the Energy Union by the European Commission. These initiatives led to an improved approach to the energy sector, coupling electricity, heating and cooling, along with the transport sectors.

The geothermal industry recognises the importance of the work conducted by the EC along with member states to prepare the SET-Plan Integrated Roadmap, and the Declaration of Intent for our sector.

In your opinion, what were the greatest achievements of the SET-Plan in the past decade? How have ETPs and/or ETIPS contributed to these achievements?

The SET-Plan has made it possible to fix priorities in terms of research and development in the energy sector, and also in terms of innovation. Although it began with just some energy production technologies, it subsequently opened up to heating and cooling technologies and to the next generation of technologies such as geothermal.

ETIPs have been key for presenting common research priorities shared by science and industry.

ETIPs have also been instrumental, together with EU and National funding, in the implementation of technology roadmaps through private funding.

Moreover, ETIPs are active in the shaping of strategic documents such as Vision and Road Maps, which are extremely important in the definition of EU directives and calls for applications.

The SET-Plan is currently moving to the implementation phase. What are the main challenges it will face in the near future and how can they be overcome, from the industrial sector's point of view?

One main challenge is the coordination of private and public funding for implementing the technological roadmaps.

The establishment of an ERANET-geothermal is seen very positively for the coordination of EU and National R&D programmes and financial envelopes.

But in order to implement the roadmaps, the level of spending on RD&I must be increased, especially for the next generation of energy technologies, which have thus far been insufficiently funded.

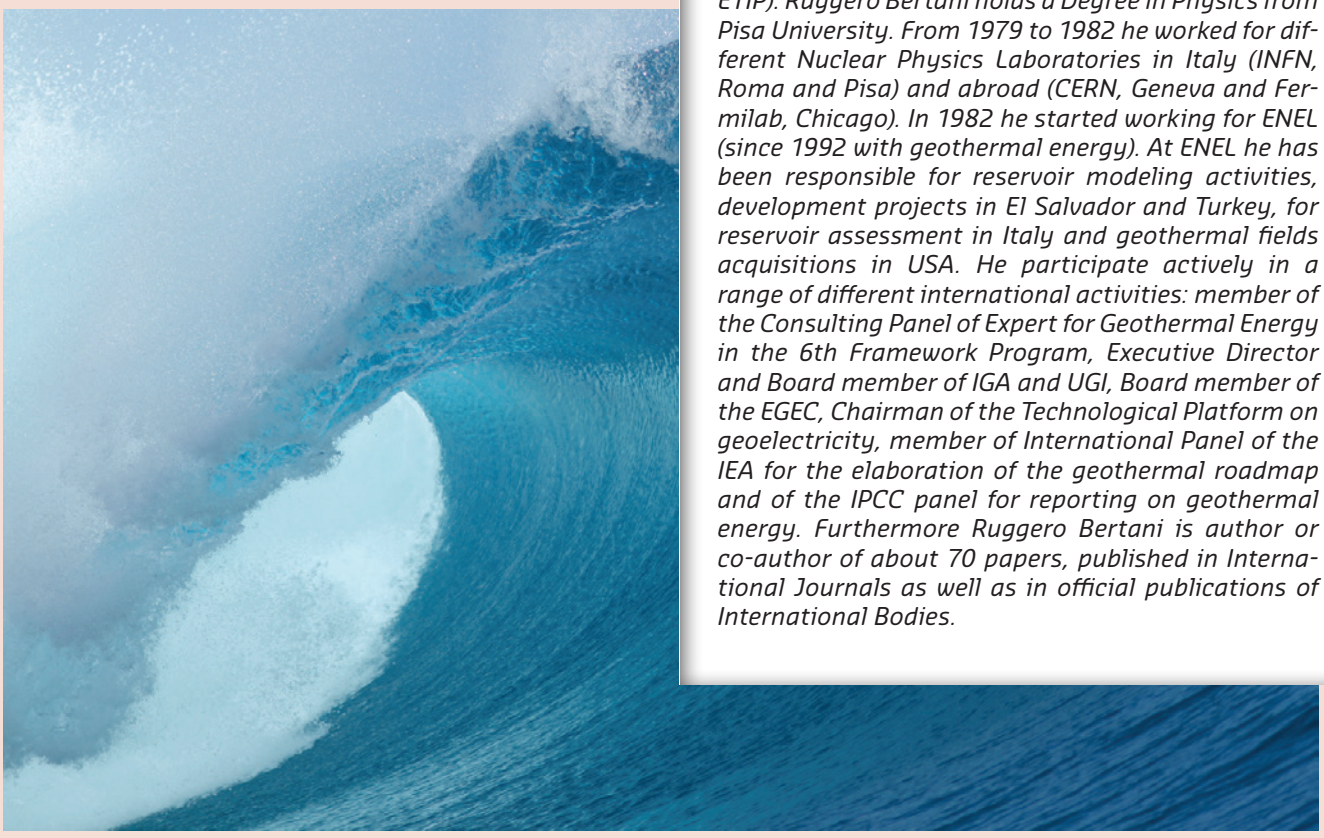
In future, EU funding will be leveraged by other sources of financing, such as national programmes, grants, private equities and so on. ETIPs can play an important role in addressing industries and other players through its appropriate funding instrument.

[1] https://setis.ec.europa.eu/about-setis/community

Ruggero Bertani

Chairman of the Deep Geothermal European Technology and Innovation Platform (ETIP)

Ruggero Bertani is Manager of innovation Geothermal Business Opportunities in Innovation and Sustainability Division of ENEL GREEN POWER S.p.A in Italy and also President of the European Geothermal Council (EGEC) and of the Deep Geothermal European Technological Innovative Platform (DG ETIP). Ruggero Bertani holds a Degree in Physics from Pisa University. From 1979 to 1982 he worked for different Nuclear Physics Laboratories in Italy (INFN, Roma and Pisa) and abroad (CERN, Geneva and Fermilab, Chicago). In 1982 he started working for ENEL (since 1992 with geothermal energy). At ENEL he has been responsible for reservoir modeling activities, development projects in El Salvador and Turkey, for reservoir assessment in Italy and geothermal fields acquisitions in USA. He participate actively in a range of different international activities: member of the Consulting Panel of Expert for Geothermal Energy in the 6th Framework Program, Executive Director and Board member of IGA and UGI, Board member of the EGEC, Chairman of the Technological Platform on geoelectricity, member of International Panel of the IEA for the elaboration of the geothermal roadmap and of the IPCC panel for reporting on geothermal energy. Furthermore Ruggero Bertani is author or co-author of about 70 papers, published in International Journals as well as in official publications of International Bodies.



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