



European Commission



CONCLUSIONS

WORKSHOP ON ENERGY AND SPACE

15 JANUARY 2010

The European Space Agency (ESA) and the Directorate General for Energy and Transport of the European Commission organised on 15 January 2010 a workshop with experts on 'energy and space'. The workshop was hosted by ESA, in its Headquarter in Paris.

Sixty experts from industry and academia, and from national and international administrations, discussed opportunities, explored synergies and assessed the potential benefits of intensifying cooperation between the two sectors, energy and space. To do so, the workshop was articulated around four themes: use of space applications to support the enforcement of energy policy (e.g. legislation); use of space applications to support energy systems management; transfer of technology; and areas of common interest in long-term research. A report summarising the main findings is annexed to this conclusions.

There was broad consensus among the experts that space application and technologies can significantly contribute to improve security of supply and support the transition to a low carbon economy, while creating new opportunities for growth and jobs. Actually, there are already concrete but incipient examples that illustrate the potential benefits of this cooperation. For instance: the space surveillance of energy infrastructures; the space based assessment of renewable resources; the transfer of technology in sectors such as photovoltaics or hydrogen; or research on innovative motor fuels.

Space can be used not only to support policy formulation and enforcement but also for management of energy systems. Current Space technologies (Earth Observation-GMES, Space-based positioning – Galileo, and Satellite telecommunications) can provide services in support of energy system management (both in renewable energy sources and in traditional oil-carbon and nuclear sectors).

Services can support all the phases of energy production and supply, ranging from the Exploration phase, Production, Transport to Exploitation and distribution networks. They can be implemented in a short term, some already in 2010.

As an example, it could be mentioned the potential contribution of space assets to the management of future, complex energy grids with large components of renewable energy plants. An integrated (space and terrestrial) system could increase the reliability and the stability of wide complex grids.

Furthermore, satellite technologies could provide enormous opportunities to enhance the planning, design and long-term monitoring of energy systems (including pipelines) and critical energy infrastructure.

Technologies, existing and future, have a large record of success and a large potential to be transferred to the Earth environment and the space environment can support research on novel materials, fuels or technologies for the long-term evolution of our energy systems

A structured project in TT would help finding the right actors and passing the right information between sectors that do not know each other. It would help governments get the maximum from investments in R&D and even joint R&D could be envisaged

At the workshop it was made evident that energy and space stakeholders are different and have little tradition of working together. However the discussion proved useful in identifying potential areas for cooperation. Many participants underlined the value of giving continuity to these discussions in structured and systematic way. Existing networks (EC, ESA, Member States, Technology Platforms, IEA...) could be activated and brought together to better understand their detailed requirements, discuss what space can bring and translate all that into concrete actions.

In particular in long term research, given the large number of topics already identified for these two categories of research, it was stated that ESA research should build links with European Energy Research Alliance (EERA) and other research organisations in Europe. And detailed expert discussions should be promoted to define an R&D programme that could justifiably be sponsored by EC that could accept the inclusion of space as an enabling technology.

A POSSIBLE WAY FORWARD - AN EXPLORATORY PLAN ON ENERGY AND SPACE

Given that the cooperation between energy and space can be considered relevant and that it is multifaceted (policy vs research, short term vs long term), several actions of a different nature could be envisaged. These could take the form of an '*exploratory plan*' covering the most relevant actions stemming from the workshop.

Such an '*exploratory plan*' would allow to assess the merit of establishing a longer term cooperation between the two sectors (a Programme), to develop and put space technologies and application at the service of our energy policy objectives. This has already happened in other sectors, for instance in environment (GMES) and in transport (Galileo).

A possible target could be the next ESA Council at Ministerial level. There, ESA, with the EC support, may be in a position to propose a 'Space and energy programme' stemming from the results of this '*exploratory plan*'.

The '*exploratory plan*' could include:

1.- *Pilot actions* through which concepts can be tested and demonstrated - very closely linked to our policy objectives. Candidates are: energy efficiency in buildings; biofuels sustainability; CCS; infrastructures monitoring; and RES monitoring. Some projects can start very soon as they are mature enough. They include projects using directly space data and assets, and transfer of space technologies.

2.- *Exploratory studies* through which we could determine the value of certain actions. Candidates are space services for: legislation enforcement; management of energy services (grids and resources); exploration; and development of energy dedicated satellite services (e.g. Ener-SAT), long-term research in space and for space.

3.- Coordination actions for *outreach* purposes. Workshops and conferences to support the previous actions and engage key actors of the energy and space sectors, support to the dissemination of existing technologies already transferred (or ready to be) and of data from satellites for ground operators.

Annex: Priority areas suggested at the workshop

The splinter sessions have led to the identification of pilot actions and activities that will now be endorsed and further detailed by EC and ESA, with the support of our experts, in the frame of an “Exploratory Plan” (see main conclusions). Some indications are given here:

- Concerning policy enforcement, the following concrete actions are proposed:
 - Biofuels, where space is the only possibility to enforce policy
 - Energy efficiency, complementing local measurements
 - CO₂ storage
 - Monitoring of infrastructure projects
 - Applications in transport
- Concerning applications for energy system management, pilot actions should be:
 - Mapping of renewable energy resources at EU level with EO satellites
 - Carbon Capture & Storage
 - Smart Grids
- In the area of Technology Transfer, the following fields are favoured (details in the synthesis of the splinter sessions):
 - Robotics (for exploration and remote locations)
 - Materials (for vehicles, tanks, wind turbine or solar power)
 - Energy storage (+ efficiency, shielding, transport, consumption)
 - Monitoring and maintenance (+ mapping of resources and installations)
- Priorities in TT have been identified for:
 1. Energy storage for Renewable energy sources and vehicles
 2. Thermo control technologies
 3. Advanced materials
- For Long-term research, large areas of potential collaboration have been identified. There is still a learning process to be made between the two sectors. Collaboration should be envisaged (details in the synthesis of the splinter sessions):
 - For research in space
 - For research from space with energy applications or vice versa