

ENDORSE PUBLISHABLE SUMMARY – YEAR 2012

The exploitation of renewable energies is one of the identified routes to move away from fossil-based fuels and decrease the detrimental impacts of the production and use of energy on our environment and societies. The potential of the Sun, rivers, the sea or wind, geothermal and biomass energy are presently being exploited in small shares in the European Union. Increasing those shares through more profitable commercialization of these resources will ultimately lead to better environmental management and will contribute to economic growth.

However, as renewable energies can, by their very nature, be rather prone to climatic conditions and often organized in distributed generation units, their effective exploitation requires careful analysis. The evaluation of resources for investment planning as well as the monitoring of energy production management may significantly reduce the cost of planning and deploying renewable energy systems and can be paramount for the integration of the variable energy sources into the main energy system.

Recent surveys and outcomes of projects funded by the European Commission or the European Space Agency, among others, have shown that there is a need for services, tailored to the specific needs in renewable energies, able to respond reliably and affordably to the expanding needs of end-users such as expert companies, industrial users (engineering bureaus, energy producers, investors, plant managers etc.), public authorities and other organizations including European policy makers.

The ENDORSE project (<http://www.endorse-fp7.eu>) covers all of the above (analysis, evaluation, assessment) and aims at developing new, and enhancing existing user-driven downstream services. By reducing the risks involved in the investment on renewable energy systems it promotes their exploitation for a better future in respect to both the environment and our well-being.

It is presently known that renewable energies (RE) can benefit significantly from Earth Observation (EO) data. Therefore, ENDORSE not only makes use of GMES Core Services and other EO/in situ data and modeling but is also taking them a step further by developing new leading services that provide energy components for GMES and GEOSS and by exploiting the most advanced and accurate EO data. In this way, it permits and promotes further innovation as well as advances in the modeling of the geophysical fields. ENDORSE puts emphasis on extending the development of information technologies in, for example, geography and interoperability, used as tools for more accurate evaluations of resources which are greatly needed for predicting the outcome of investments so as to facilitate the expansion of shares towards the finance of installations.

ENDORSE has identified ten services following the requests of local users – both public and private – focusing on solar, wind and biomass energy, electricity management and daylighting in buildings. These services have a market potential belonging to what is called ‘pre-market services’. These services show to the wider community the potential benefits to their daily work and decision making processes. ENDORSE offers services to different market sectors of renewable energies which are distinguished by the technologies used that define different active market players. As the consortium focuses on local downstream services, these market players are typically small or medium-size companies active in their respective geographically limited markets. Therefore, the consortium will develop the service in close cooperation with a dedicated prime user representative of a large number of users in other European regions. Once there is a concrete service example, this information will be disseminated via workshops, trade fairs, conferences, publications, etc., to other

potential service users/service operators for raising the number of service providers and the service coverage for more regions/users.

ENDORSE has established an efficient workflow for the best achievement of the project. The requirements of a limited number of well-defined users (WP2) will drive the development of the products (WP4) resulting from the research activity (WP3). As well, these requirements will contribute to the key elements for the design of the pre-market services (WP6). The interactions with an extended panel of users (WP5) will enable a refinement in the services development. Thematic workshops will demonstrate products and services to users and service industry and feedback on them will be collected (WP7). This feedback will feed the assessment of the sustainability of pre-market services (WP8). The management of ENDORSE (WP1) as well as the activities of dissemination of the scientific results (WP9) will be carried on during the three years of the project.

The project objectives for this second period (year 2012) were *i)* the tests of products by the so-called prime-users leading to further refinements, *ii)* the specifications of services by the prime-users, and definition of the protocol to assess the services, *iii)* advances in environmental modeling to support the development of products and services, and *iv)* the extension of the panel of users and the holding of workshops for users and service industry to demonstrate the products.

Tests of products. First versions of the products were available in December 2011. They have been tested by the prime-users between January and May 2012, which assess their compliance with the benchmark defined in WP2 (Task 2001) and provide feedback for refinement. The ultimate goal is to fully check, address and incorporate the users' requirements before the final implementation of products. Besides compliance, the assessment exercise also aimed at *i)* strengthening the interactions between ENDORSE and users, *ii)* getting feedback for further improvements of products, and *iii)* assessing the impacts of the developed products on the organization of work and the perceived value added versus the currently adopted solutions. Overall, all the consulted prime users expressed a very favorable assessment of the developed ENDORSE products. The defined benchmarks for product properties have been satisfactorily met, with only minor exceptions and deviations. This can be considered as an achieved milestone within ENDORSE, as the presence of the requested parameters and the compliance with the requirements are the basic condition for acceptance. Quality control has been a common practice in the assessment of the ENDORSE products. The procedures for assessing the quality of methods, models and references have been extensively applied and no major weaknesses have been detected. The level of satisfaction recorded for the various ENDORSE products is fairly high, so is the level of improvement that the users expect in comparison with the previously adopted methods. Consistently with the assessment expressed on the single aspects, the overall evaluation is equally very satisfactory.

Specifications of services. As recommended by the reviewer in December 2011, the specifications of services in collaboration with the prime-users, and the definition of the protocol to assess the services, have received a lot of attention from the ENDORSE Consortium. The consortium beneficiaries who are responsible for the development of the single pre-market services, approached the prime users in order to update, check and complete the information already collected in Task 2001 and to gather the missing pieces of information. This was done firstly by identifying and collecting users' and service industry's requirements as regard: infrastructures, hardware, type of interface to be developed, information (GMES Core Services data, other EO data, other data from other providers, formats), operations (such as workflow, data provisioning, methods, monitoring, reporting, delivery) and quality specifications that should be assembled in order to generate a product in an operational way. Attention was also given to the identification of the expected benefits

and value added. The users were also consulted about the market issues (barriers, competition, legal or regulatory constraints) that may affect the acceptance of these services if they are to become operational on a larger scale. The task was successfully completed with the finalization of deliverable D2.2 “Prime Users’ Requirements for Pre-market Services and Assessment Protocol”. This deliverable provides also valuable inputs to technology and commercial aspects in the development and implementation of service. The results of this Task 2002 confirm that the 1st version of products are already well in line with users expectations. By and large, few changes and integrations are expected as for the technical features, including properties, data, functionalities, expected outputs and performances. The quality controls and the validation processes have been also confirmed and no major request for change was raised in this respect.

Advances in environmental modeling. Research activities brought solutions supporting development and improvement of products and services. These activities were a major part of the ENDORSE activities. Many results were attained and several methods were developed and validated. Several results deserve publication in peer-reviewed journals.

Recent updates of the GMES preparatory project MACC have been studied for their application within products and services of ENDORSE. This includes especially the new MACC-AER subproject results on aerosol modeling, cloud physical parameters and snow cover derived as an intermediate product in the Heliosat-4 radiation service chain within the MACC-RAD subproject and the new clear-sky model: McClear, whose validation was made in Spring 2012 by the MACC-RAD subproject. Several methods were proposed and validated against ground measurements. A first method was proposed to correct the MACC-legacy HelioClim-3 data set in case of snow cover condition. A second method takes advantage of the MACC aerosol data set and the McClear clear-sky model to improve assessment of global and direct irradiances from the MACC-legacy HelioClim-3 and SOLEMI data sets. New transposition models have been proposed to estimate the diffuse component and/or direct component from the prediction of the sole global radiation. A worldwide database containing direct irradiance on normal incidence has been created.

Several data fusion methods have been developed that combine two or more data sets in order to obtain a unique data set having the best of the properties of the original data sets. The work done here has explored several paths for associating estimates of solar irradiation, made on information supports of different sizes: pinpoint to 100 km or so. No major result was achieved. Intermediate results were attained that may pave the way for the development of more accurate, efficient and reliable methods. Associating such different data sets is of strong interest in different fields in solar energy and deserves intellectual investment. A side-result is concerned by the observed poor performances of several well-known meteorological re-analyses in assessing solar irradiation.

Extension of the panel of users – Workshops. One of the reviewer comments from December 2011 was “During and after the Project, a strategy to involve new users and stakeholders should be done. ENDORSE is working in this area with limited, but high quality, results by the moment.” The ENDORSE consortium has tackled this issue of involvement of users very seriously. The strategy in period 2 was based on the *i)* exploitation of the feedback from the prime-users, *ii)* extent of the panel of users, *iii)* holding of workshops for users and service industry to demonstrate the products, show test-cases and best practices, raise awareness, test sustainability and collect feedback, and *iv)* preliminary steps in the analysis of market, competition and barriers in order to ensure a way to the market for the developed services. Achievements in this period are limited but real. Several potential users of each service have been identified; they were approached on several

occasions and many of them agreed on testing the services in Spring 2013. A few workshops have been held. Steps have been taken for further demonstration of products and services to several targeted audiences. A consistent approach has been developed that may apply throughout all the ten ENDORSE service, bearing in mind their characteristics, to collect the necessary information to understand and express the strategic value and the market potential for the services. This approach has been presented, discussed and refined in face-to-face meetings with members of the Advisory Board.

The ENDORSE Web site aims at increasing the awareness of possible end-users and stakeholders and at disseminating the results of the project to a broad audience. ENDORSE has been presented to the GEO IX Assembly and in various conferences and fora, such as the FP7-Space Conference. Promotional material has been prepared for these presentations. Scientific articles have been published for disseminating advances in environmental modeling and other are in preparation.

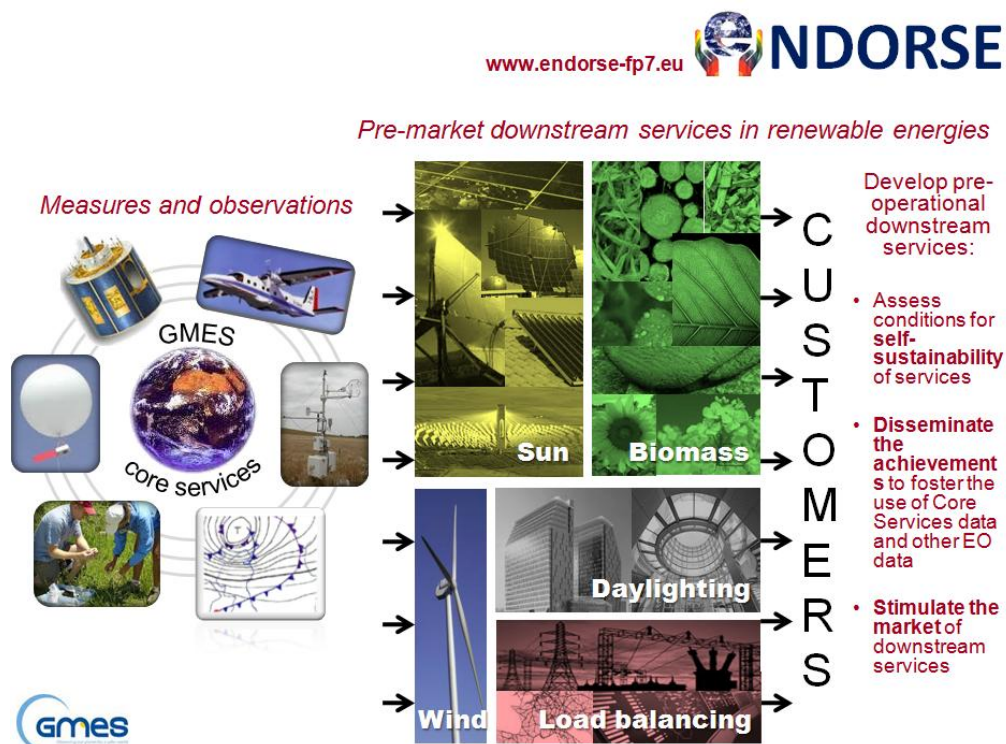


Figure illustrating the objectives and work to be done in the ENDORSE project, from the Web site www.endorse-fp7.eu.

List of partners:

ARMINES
DLR - Deutsches Zentrum fuer Luft- und
Raumfahrt
iCons
Transvalor Innovation
Flyby
Hochschule Ulm
University of Genova
Ecole Nationale des Travaux Publics de
l'Etat
3E
Joint Research Center

