



# A methodology for validating the renewable energy data in EU

Haris Doukas<sup>b,\*</sup>, Wilhelm Mannsbart<sup>a</sup>, Konstantinos D. Patlitzianas<sup>b</sup>, John Psarras<sup>b</sup>, Mario Ragwitz<sup>a</sup>, Barbara Schlomann<sup>a</sup>

<sup>a</sup>*Fraunhofer Institute for Systems and Innovation Research, Breslauer Strasse 48, 76139 Karlsruhe, Germany*

<sup>b</sup>*National Technical University of Athens, School of Electrical and Computer Engineering, Decision Support Systems Lab (EPU-NTUA), 9, Iroon Polytechniou str., 15773 Athens, Greece*

Received 31 August 2006; accepted 15 October 2006

Available online 8 December 2006

---

## Abstract

The multidimensional character of renewable energy sources (RES) necessitates the collection of a number of related data in order to support EU policy needs. Apart from the technology and techno-physical data also socioeconomic (e.g. employment, turnover) data and R&D expenditures are of critical relevance. The monitoring of the above RES data with respect to the existing targets for RES is of significant importance. In addition to this, even though significant data gathering efforts have been implemented, a lot of fragmented data and deduced findings are currently available, which sometimes lack consistency and verification. As a result, RES data validation and completion capacity is needed in the framework of the European Union (EU) energy policy. In addition to this, agreed and validated RES data can help energy policy makers and relevant stakeholders answering to pressing energy socio-economics' and sustainability issues. In this context, the main aim of the paper is to present a reference methodology for validating the RES Data in the EU. The development of the methodology is mainly based on the review of existing methods and ends up with recommendations for improvements in RES data aggregation and statistical interpretation, taking into consideration the related analysis of statisticians, energy technology experts and energy socio-economists.

© 2006 Elsevier Ltd. All rights reserved.

*Keywords:* Renewable energy sources data; Validation; EU

---

\*Corresponding author. Tel.: +30 210 7723583/2084; fax: +30 210 7723550.

E-mail address: [h\\_doukas@epu.ntua.gr](mailto:h_doukas@epu.ntua.gr) (H. Doukas).

## 1. Introduction

The energy policy in the European Union (EU) is strongly driven by the twin objectives of sustainability (including environmental aspects) and security of supply. Implementation of environmentally friendly energy options, such as renewable energy sources (RES) is key means of satisfying these objectives [1]. According to the available data by various providers, even though RES have increased their contribution to the energy production in EU, they have not yet achieved a satisfactory introduction to the energy market, in contrary to their significant perspectives. In particular, for both EU-15 and the 10 new Member States the renewable energies share in the primary energy consumption is estimated at 5.6%, with an average share of the 10 new Member States amounting to 4.9%, while for the “old” EU-15 their share reached 5.7% in 2004. The accession of the 10 new Member States did not change the fact that the biomass is by far the leading RES used in the EU, with a share in the primary energy production from renewable sectors of 65% [2]. In addition to this, photovoltaics in on-grid applications achieved high growth rates of more than 30% over the last 3 years, while solar thermal electricity is in the phase of demonstrating its potential on an operational scale of 100 MW and more [3]. Moreover, the EU has installed wind energy capacity equivalent to 50 coal fired power stations in 2005, with the costs being halved in the past 15 years [4]. Concerning Research and Development (R&D), in most EU countries, the R&D for RES is funded with 20–40% of the total energy research budget [5]. The EU’s market has an annual turnover of €15 billion (half the world market), employs some 300,000 people, and is a major exporter [4]. Furthermore, a study has forecasted that employment in this energy sector could reach over 900,000 in Europe by 2020, with the majority of jobs created in bio-energy technologies together with biomass fuel provision [6].

Based on the abovementioned, the multidimensional character of RES necessitates the collection of a number of related data, apart from the technology and techno-physical data also socioeconomic (e.g. employment, turnover) data and R&D expenditures are of critical relevance. In this context, policy-makers as well as individuals in the democratic society will be able to trigger specific answers to urgent questions taking into consideration not only the economic feasibility of the examined options but their social and environmental acceptability as well. In addition to this, the monitoring of the RES data with respect to existing target setting is of significant importance. Significant data validation and data completion capacity is needed in the framework of the EU sustainability policy. Already the White Paper [7] demanded a constant monitoring of activities in order to follow closely the progress achieved in terms of RES penetration. Moreover, the importance of improved co-ordination of programmes and policies of the Community and the Member States so as a unified acceptable system of statistics to be developed, was underlined. The Directive of the European Parliament and the Council [8] on the promotion of electricity produced from RES in the internal electricity market specified targets for each Member State. Furthermore, the Commission’s Green Paper [9] pointed out the crucial need for improved RES and the important role of (data) monitoring systems. In the most recent Green Paper [4] it is clearly stated the need for monitoring progress and identifying new challenges and responses on all aspects of EU energy policy and supply patterns on EU energy markets.

In addition to this, even though significant data gathering efforts have been implemented, a lot of fragmented data and deduced findings are currently available,

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات