

Feasibility study for new eco-labels within the product group:

Photovoltaic Products and Plants

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Summary

This expert opinion examines the suitability and the possibilities of a realisation of an eco-label for photovoltaic products (PV-products) and PV-plants. Hence, it also deals with the question of how concrete criteria to develop an eco-label in this product field could be specified. The analysis was conducted according to the principles as laid down by ISO 14024 (Environmental labels and declarations – Type I environmental labelling – Principles and procedures).

Within the field of photovoltaic products there is already an existing environmental label (RAL-UZ 47) covering solar substitutes of products which are traditionally powered by batteries. Within the scope of this study it was examined in how far the development of a second environmental label for solar-powered products using storage media such as accumulators would make sense. Furthermore, as far as solar plants generating electric power are concerned, the particular plant types and components were analysed from an ecological perspective which is relevant for the development of criteria for an environmental label. In all cases, the ecological focus should lay upon pollutant problems.

The study began with a comprehensive market analysis in which important product areas were investigated in order to identify possible products and plant(s) (-components) for which an eco-label would make sense. The group of products was selected according to homogeneous requirements which were further specified in the course of the analysis. In the main body of the study, the environmental relevance of the chosen products and plant(s) (-components) was analysed in a deeper way. On the basis of this analysis, it was possible to

derive a number of criteria, which were presented and discussed in an expert talk joined by various company representatives and experts in this field. The results of this expert talk and of the whole investigation process were used to formulate recommendations and criteria requirements for potential eco-labels for photovoltaic products and main plant components.

In the course of the investigation and especially during the expert talk, several fundamental problems of determining criteria for an eco-label in the field of photovoltaic products and plants, emerged. An essential difficulty of an eco-label in the sector of photovoltaic (-plants) is due to the fact that the actual level of comparison is the energy generation; therefore a comparison of different ways of energy generation was demanded or regarded as desirable by many experts. Ergo, an eco-label for photovoltaic components must be judged as in how far it promotes photovoltaic technology on the one hand – i.e. by not demanding too strict criteria – on the other hand as in how far it contributes to an improvement of the quality of the products.

An eco-label for solar products with storage media can lead to a useful contribution as far as the technological improvement of the products is concerned, which had also been affirmed by the experts within the course of the expert talk. This is an important aspect because it seems to be necessary in this area to ensure a minimum quality, in order to prevent a negative image of photovoltaic technology. By demanding computer-based simulations as a means of proving the functional reliability, a new indicator has been proposed, which has to be regarded as appropriate (and necessary) to improve product quality in the future, but not as safe however. The requirements for the simulation have been formulated on the one hand in a strict way regarding some data-input, on the other hand in a moderate way (for instance with regard to the free choice of the software programme or the manufacturers' possibility to conduct the simulation by themselves), so that the potentially eligible companies which are usually rather small, are not faced by too high obstacles and costs. Beside the requirements regarding the functional reliability the exclusion of batteries containing cadmium as well as further pollutants in other product components is very important. In addition requirements are formulated regarding the exchangeability of batteries, warranty regarding the described functions, proof of the protection of the battery (discharge and recharge) as well as information about the disposal. Regarding the facts mentioned above we recommend as a suitable transcription for an eco-label for photovoltaic products with storage media the term "eco-label ... because solar-powered and low-pollutant".

As far as the eco-label for solar inverters is concerned, there was also a high degree of agreement, with the requirements presented in the expert talk being judged as useful and achievable. Limitations with regard to problems of measurement of the efficiency factor can be reduced by taking use of the criteria created by the new norm IEC 61683. The energy efficiency of the appliance - the efficiency factor, stand-by and night consumption, feed-in performance - takes the main focus of the requirements. Beside this the construction of the appliance must be suitable for recycling in accordance with VDI-directive 2243, repair (concerning the availability of spare parts) and product safety must be ensured, an above average warranty must be given and some criteria about pollutants must be considered. Regarding this we recommend the following transcription for an eco-label for PV-inverters: "... because of energy efficiency and suitability for recycling".

Most doubts of the suitability of an eco-label within the field of photovoltaic technology have been arising from the formulation of criteria regarding the “heart” of the plants, the solar module. The vivid discussion on the minimum requirements for the efficiency, a discussion which had already appeared in the context of the eco-label for solar-collectors (RAL-UZ 73), made this problem explicitly clear. Indeed, the efficiency factor is not the sole essential parameter which can be used to determine the energy yield and the ecological relevance of solar plants – in this context, the plant as a whole, the installation service, the conditions of the production process etc. (and last but not least economic considerations) are more essential ecological factors. For these reasons, the emphasis on the efficiency factor as the central indicator can not be recommended; to keep this requirement as a subordinated auxiliary condition is not regarded as useful neither. Therefore, requirements concerning a minimum efficiency factors should be renounced. Requirements with regard to the stating of the module efficiency at different radiation conditions should be maintained however.

When renouncing on the original main criteria “efficiency factor”, the specifications of the catalogue of requirements shifts; hence the provided reason for the eco-label has to be termed differently. Criteria regulating the taking back and requirements for material and quality still remain existent. Because of the technologically due exemption (given to Fluor polymers used for the back foils), the requirements for the material should not be emphasised as “low-pollutant”. The aspect of the taking back supports the build-up of so far non-existent structures for recycling. The effect of this initiative can be regarded as an aspect worth emphasising. A such catchword which can be mentioned in the bottom-line of the eco-label already exists in the case of the eco-label RAL-UZ 86 (Cassettes with taking back and recycling). The quality requirements are primarily referred to the tolerance range, a parameter, which is an essential information for both the customers and the installing mechanics, but also influences the energy yield because it serves as an indication of the volatility range of the module’s actual performance. For that reason, it is recommended that the transcription on the eco-label for photovoltaic-modules should be termed “ ... because of taking back and low tolerance range” (Maybe the term tolerance of (nominal) power can be replaced by a more colloquial term.).

A such eco-label would hence be focussed on the idea of recycling and the quality of the modules, which are both ecologically relevant aspects and (strongly) need to be improved. One also has to emphasise however, that although some useful aspects could be improved or initiated by such a design of the requirements, an unusually high quota of eligible firms for the certification according to the eco-label (in relation to eco-labels in other areas) might result due to the criteria chosen; because of the ecological advantages resulting from photovoltaic technology, such a high number could also be justified. It still remains a task of the certificating institution, to examine whether an introduction of such an eco-label corresponds to its original intuition. If an eco-label for photovoltaic modules would not be introduced, the eco-label for inverters would also become questionable, because a one-sided introduction would lead to irritations within the market segment of solar technology and for the customers.

This aspect again refers to the fundamental problem of assessing the single plant components (modules and inverters) because normally the whole plant should be an object of the assessment. Many problems arising from the formulation of the criteria for single components can be traced back to the fact, that the aspect of the plant as a whole could not be taken into account. In order to assess the quality (and the environmental friendliness) of the

entire plant one would have to take a view on the installation service. By doing so, the indicators would rather be orientated at the plant as a whole and the effect than at the single components. Such a concept of assessing the installation service had not been the object of this examination – it had been excluded, knowing that there were too many problems of possible ways of assessment within the scope of an eco-label. At this point, difficulties of measurement, comparison and definition with regard to the plant efficiency factor or the annual yield of solar plants for instance should be pointed at. However, several indications of a differentiation such as warranties on the annual yield guaranteed by several installation companies, have been recently observed within the market for solar technology.

In connection with this context a development or initiative has to be mentioned: the so-called "PV GAP" (Global Approval Programme for Photovoltaics). In order to ensure the quality and reliability of solar products, this initiative seeks to develop quality standards and procedures of approval with regard the performance capacity of photovoltaic components and systems. Beside the requirements for products, the criteria and the controls for which GAP is striving for also refer to the conditions of production and therefore even exceeds the criteria which can be formulated within the scope of eco-labels. At the moment this initiative is still in the process of becoming established and tailored to the needs; if it is institutionalised as it is pursued, one will have to consider, whether maybe an instrument substituting the intuitions of the eco-label (with regard to quality control and product improvements) or which is more efficient even, is emerging.

Concluding, an introduction of an eco-label for photovoltaic products with storage batteries can be recommended; this recommendation however only applies to the field of photovoltaic modules and inverters in a limited way, in the sense of the above argumentation. An eco-label for inverters should not be introduced when the introduction of an eco-label for modules is renounced. The eco-label's focus on taking back should be additionally supported by the promotion of taking back and recycling activities by the government or by the build-up of network structures in this field. Moreover, in the case of an introduction of an eco-label for modules, the recent developments in the field of thin-film cells should be analysed parallel, in order to create criteria for the products which will arrive on the market in a few months/years, so that a quick complementation and extension of the scope of an eco-label in this field becomes possible.