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A review on existing sustainable indices on efficient energy.

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Abstract.

This paper reviews the set of existing sustainability indices which are related to energy efficiency a critical factor in the actual moment, unveiling the main differences between indices, focusing the attention on those indices more adequate to policy making, finding the most adequate sources for indicators to compose the indices from a European perspective, showing the inconsistencies and limitations of most indices and the need of a simple index based on several complementary indices.

Keywords

Energy Efficiency, Sustainable, Index, Indicators, Economic, Energy intensities, Policy making.

1. Introduction

Energy efficiency has taken a crucial importance in recent times due to the need for adapting generation capacity to consumption needs. The European Commission recommended in March 2007 to promote energy efficiency worldwide and to set the goal 20-20-20: 20% energy savings, 20% of energy generation from renewable sources, 20% reduction in carbon dioxide emissions, all for 2020[1]

Efficiency must be combined with sustainable resources and processes in order to avoid the creation of new unrealistic solutions to the existing energetic challenges. Unsustainability and undesired effects will be found otherwise according to Jevons paradox [2].

Sustainability has been defined as the level of human activity and consumption which can continue into the foreseeable future, so that the systems which provide goods and services could persist indefinitely [3].

The first attempt to achieve a complex quantitative sustainability macro analysis, after Malthus catastrophic forecasts two centuries before, was carried out by the Club of Rome in 1970 and as a result "The limits of growth" was published. This study analysed a group of variables: population, industrial and agricultural production, pollution and the known reserves of some minerals establishing the limits of growth for the planet in 2070 decade if trends continue in the future.[4] These limits have been reviewed repeatedly along last years by the authors[5], and they provide a guideline for predicting the future in terms of sustainability. However it is already under discussion when would be the limit of growth mainly due to the unpredictability of new energetic crisis.

Moreover, Hubbert forecast that the global oil extraction limit was going to be reached on 2000. This limit has moved to a point close to our days due to the new oil extraction techniques and to the discovery and exploitation of new oil fields. However since the current global oil extraction level is close to the limit higher levels of pressure are detected in protected zones such as polar and marine deposits.[6-8]

The Brundtland report [3], written under the UN umbrella, emphasised the need to set policies for a sustainable development. These guidelines have to be defined by means of the use of quantitative indices.

Sustainability models study different dimensions of sustainability. Usually more important are social,