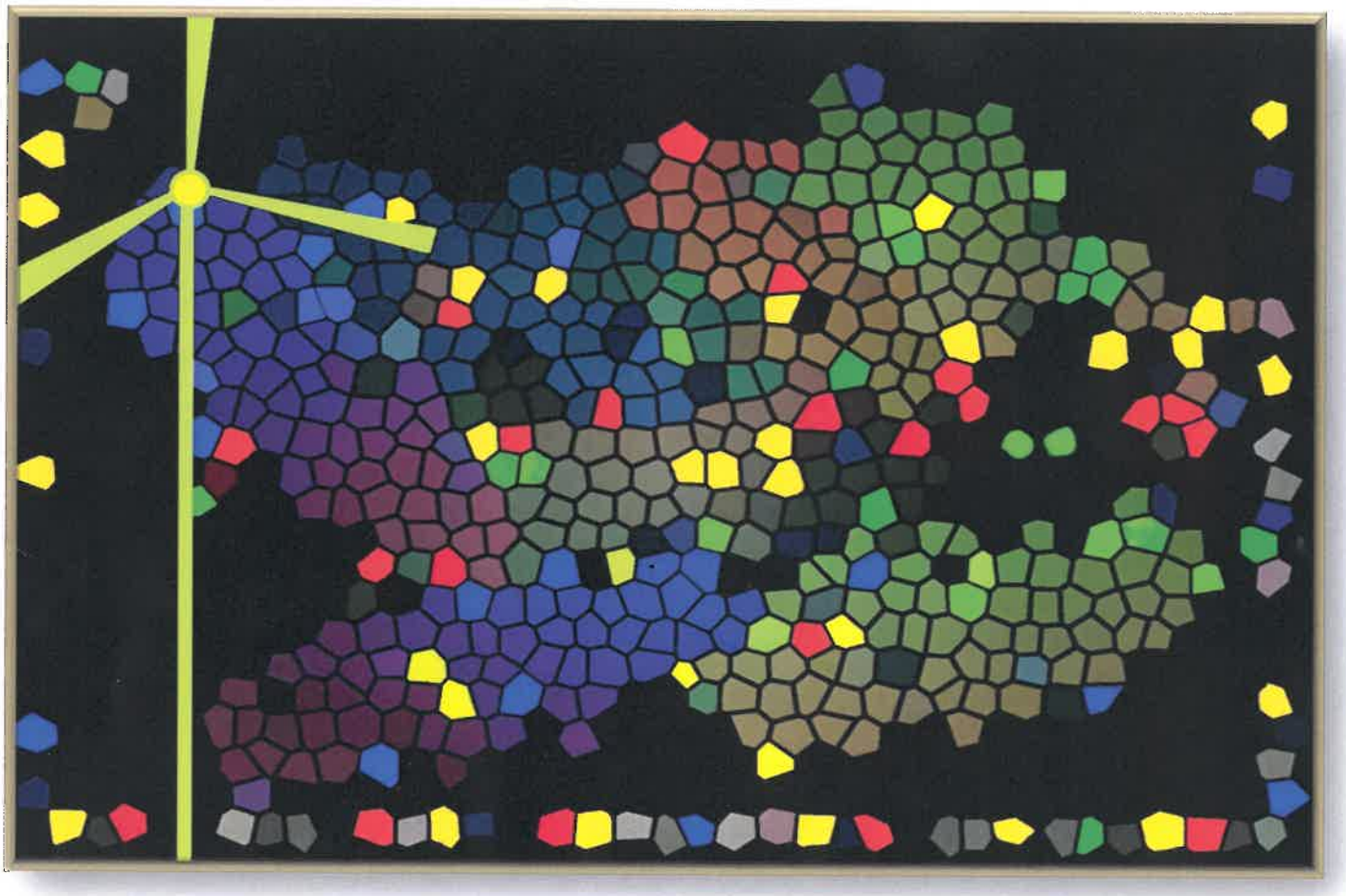
Workshop on Assessment Methodologies

Energy, mobility and other real world applications



Book of Abstracts

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DATA ENVELOPMENT ANALYSIS

ECO-EFFICIENCY ASSESSMENT OF WORLD-CLASS MINING COMPANIES

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Abstract

Assessing the Eco-efficiency of companies is important to ensure they succeed in creating value for all stakeholders whilst meeting the global demands for products without compromising the needs of future generations. The concept of Eco-efficiency is usually expressed as the ratio of economic achievements to the environmental liabilities associated with wealth generation. This work aims to extend the Eco-efficiency concept in order to incorporate in the assessment new features related to environmental assets, corresponding to the use of eco-friendly resources, such as energy from renewable sources or water recycled. This concept is operationalised at the firm level using of a DEA model specified with a Directional Distance Function. Four categories of variables are considered in the model: i) desirable outputs, ii) undesirable outputs, iii) conventional inputs and iv) desirable inputs. Variables from groups i) and iv) should be maximized, as they reflect economic value-added and environmental assets, while variables from groups ii) and iii) should be minimized, as they represent environmental liabilities (e.g., solid wastes produced and emissions of pollutants) and the use of non-renewable natural resources. At the end, we present an application of the model to world-class mining companies. The results obtained and their managerial implications are discussed.

MEASURING TECHNICAL EFFICIENCY OF EUROPEAN COUNTRIES USING DATA ENVELOPMENT ANALYSIS

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Abstract

This study proposes a Data Envelopment Analysis (DEA) framework to assess the technical efficiency of 26 European countries in the last five years, under the ongoing 2020 energy policy. DEA is used to estimate efficiency which is complemented by bootstrapping to obtain statistical inferences. Further, we explore the relationship between the targets regarding energy efficiency, renewable energy share and the greenhouse gas emissions and, in addition, the electricity prices derived from the energy system on the efficiency levels of European countries through a panel data truncated regression with bootstrapping. It is observed that the bias-corrected efficiency of the economies increased approximately 13%, on average, since 2009. Therefore, the efforts regarding the energy policies developed in each country, to follow 20-20-20 targets, have not threatened the improvement of their efficiency.

PERFORMANCE EVALUATION OF BRAZILIAN WATER SECTOR

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Abstract

Water services, traditionally seen as monopolies, are characterized by reduced incentives towards efficiency and innovation. To face this problem, Brazil developed diverse legal reforms in the past years and imposed the creation of regulators dedicated to the water sector. This study aim at evaluate the productivity/efficiency of the water regional companies in Brazil and also capture the influence of regulation on the sector. For this purpose, data related to the period between 2000 and 2013 was used.

Different approaches of Malmquist indexes were applied and different techniques in order to determine the Total Factor Productivity (TFP) were considered. These methods led to similar values concerning TFP global values but not with regard to efficiency decomposition. Moreover, concerning the efficiency analysis, the Data Envelopment Analysis (DEA) and more robust techniques (like bootstrap and order-m approaches) will also be considered. The models' orientation was chosen towards inputs minimization. As the sector is little competitive, more importance was assigned to the maintenance of the level of service and to the minimization of the necessary resources.