■ TD-05

Tuesday, 14:30-16:00 - A003

Spatial Multiple Criteria Analysis of Urban and Environmental Qualities

Stream: Decision Analysis
Invited session
Chair: Giovanna Fancello
Chair: Alexis Tsoukias

1 - Contribution to subjective welfare measurement.
Giovanna Fancello, Alexis Tsoukias

Measuring welfare is a crucial aspect for any policy design activity. We propose a framework for measuring welfare which takes into account both the multidimensional nature of welfare as well as the subjective aspects related to "welfare perception" and individual abilities. For this purpose we use Capability Theory and we explore how this can turn to an operational tool. We use examples from poverty measurement and urban quality measurement.

2 - The Value of Urban Quality: a proposal for a hybrid approach
Alessandra Oppio, Marta DellOvo, Federico Dell'Anna, Marta Bottero, Laura Gabrielli

The quality of the built environment is a multidimensional notion, as it deals with the land use patterns and mixes, the spatial and temporal distribution of activities, the accessibility to services, the open spaces and green areas, the air quality, the arrangement and appearance of the physical elements of urban design. Although several studies have listed the environmental, social and economic benefits of good urban design for many stakeholders, there is a small body of literature on their monetary value. Most of the scholars focus on the impact of open spaces, urban parks, and amenities on residential property values, without providing a real monetary estimation of the quality of public goods and services. The present paper focuses on the contribution of urban quality on real estate value. Given the spatial nature of the problem and the multifaceted aspects to be considered, a hybrid evaluation approach has been defined by combining Spatial Multicriteria Analysis with Hedonic Price Method. In order to explore the impact of urban quality improvements on real estate value, the proposed evaluation approach has been applied to three urban districts in the city of Milan (Italy), with different location features.

3 - Evaluate adaptation options considering vulnerability and decision-makers preferences: a decision support approach
Giulia Lucertini, Denis Maragno

Adaptation to climate change is certainly a task that affects all levels of government and a great variety of actors worldwide. However, climate change effects and impacts are very often place-specific and local authorities are in the front line of the adaptation problems. At the same time, local authorities are often unprepared to deal with such challenges, which can depend on poor understanding of the problem (also resulting from lack of quality information) and on the lack of suitable tools to take proper decisions. To overcame this situation we propose a spatial decision support approach based on local climate vulnerability and a set of common and shared indicators to assess partners adaptation options. The approach, that is created and tested both in Italian and Croatian territories, is build in order to support local administration during the Adaptation plan development. This approach is the main output of iDEAL project (INTERREG IT/HR), that involved five administration into the Adriatic territory. It helps in evaluation and visualization of the results of different adaptation option involving the relative stakeholders and decision-makers from the early stage of planning.

4 - The value of a Rolling tree in a flexible context: an agriculture case
Elbio Avanzini, Alejandro Mac Cawley, Jorge Vera, LluisM Pla, Sergio Maturana

Flexibility has been recognized as a mechanism for handling uncertainty. However, evaluating its value when different sources are present, it's a difficult task. Literature indicates that operational and resources flexibility is often used. The manager also considers the features of the decisions processes, so the value of the system is a combination of both sources of flexibility. In our belief, the balance among resources and decisions flexibilities has not been studied in depth. In this work, we will use the grapevine harvesting case to study the value and sources of flexibility. Rain occurrence generates uncertainty in the maturation process and deteriorates the quality of the product and its market price. The goal of the manager is to maximize the profit of the harvesting and to do so he/she decides about labor quantity and blocks allocation. However, rainfall also decreases the productivity of labor. We propose a decision process consisting of an algorithm based on multi-stage stochastic programming for short term decisions and an expected value model for the rest of the harvest window. We aim to value the contribution of the decision process itself when specific labor flexibility is present and to understand the effects of the structure of the rolling tree in this value.

■ TD-06

Tuesday, 14:30-16:00 - A004

Modelling approaches for policy planning and evaluation

Stream: Modelling & Analytics for Energy Economics I
Invited session
Chair: Eglantine Künle

1 - Grid-scale life cycle greenhouse gas implications of electricity storage and carbon pricing options
Sarah Jordaan, Qingyu Xu, Ben Hobbs

Models that characterize life cycle greenhouse gases from electricity generation are limited in their capability to estimate emissions changes at scales that capture the grid-scale benefits of technologies and policies that enhance renewable systems integration. When quantifying the life cycle emissions of an electricity grid, national assumptions about the generation mixes are often applied at annual time steps, neglecting to account for the regionalized differences in power systems that can result in variable emissions results. We develop a grid-scale life cycle model that incorporates details of transmission and generation planning, which allows a geographically textured and thus more realistic assessment of life cycle greenhouse gas impact of storage and policy options. Results from a co-optimized model of generation, transmission and operations, entitled the Johns Hopkins Stochastic Multistage Integrated Network Expansion Model (JHSMINE), will provide a detailed characterization of storage scenarios. The analysis will focus on the western interconnection comprising the western geographic area of North America where the grid is synchronously operated. Scenarios will include effects of carbon prices, the addition of 1200 MW of Pumped Hydro and the addition of 1200 MW of Compressed Air Energy Storage with new wind capacity. Our approach will capture life cycle emissions associated with different planning outcomes, from fuel extraction through electricity generation.

2 - A new approach for measuring the data aggregation quality in power systems optimization.
Lucas Condeixa, Fabricio Oliveira, Afzal Siddiqui

Due to more stringent clean-energy policies and, consequently, deeper renewable-energy penetration, optimizing decisions in energy systems planning involves handling uncertainty effectively. This allied with