

IAEE European PhD-students Day

Program

9 September 2012

Campus of San Giobbe - Room 10A

2:00 p.m. – 5:45 p.m.

The jury is composed by: Prof. De Almeida (IAEE, Vice President for Academic Affairs),
Prof. Bollino (IAEE, Vice President AIEE (Italy))
and Prof. Perez (YEEES, European University Institute, Supélec)

2:00 p.m. – 2:45 p.m.

POOL STRATEGY OF A PRICE-MAKER WIND POWER PRODUCER

Marco Zugno, Technical University of Denmark, DTU Informatics

Abstract :

Modeling the optimal bid of wind power producers as price-makers is paramount for understanding the effect of their large-scale participation in electricity markets. We consider the problem of a wind power producer being a price-taker in the day-ahead market, but a price-maker in the balancing market, who aims at optimizing the expected revenues from these market floors. The problem is formulated as a stochastic Mathematical Program with Equilibrium Constraints (MPEC) and cast as a Mixed-Integer Linear Program (MILP), which can be solved employing off-the-shelf optimization software. The optimal bid is shown to deliver significantly improved performance compared to traditional bids such as the median of wind power distribution. Finally, sensitivity analyses are carried out to assess the impact on the offering strategy of the producer's penetration in the market and of the correlation between wind power production and residual system deviation.

2:45 p.m. – 3:30 p.m.

THE COST OF WIND INTEGRATION

Lion Herth, Vattenfall Europe AG

Abstract :

Three inherent properties of wind and solar power make them different from dispatchable electricity generators: Variability, uncertainty, and locational specificity. From an investor perspective, these characteristics affect (usually reduce) the market value of wind and solar power; from a social planner or system perspective, they induce costs, sometimes labeled "integration costs". This paper proposes a valuation framework that accounts explicitly for variability, uncertainty, and locational specificity and aims to bridge the gap between the market and the cost-based literature.

3:30 p.m. – 4:15 p.m.

INTRODUCING A CO2 PRICE FLOOR IN A TWO-COUNTRY ELECTRICITY MARKET

Joern C. Richstein, Delft University of Technology

Abstract :

The recent low of CO2 prices in the European Union Emission Trading Scheme have triggered a renewed discussion, whether the introduction of a CO2 price floor would lower investor uncertainty and thus trigger more investment in low-carbon electricity generation. We compare the effects of a CO2 price floor on the dynamic investment pathway of an interlinked two country electricity system with a common CO2 emission trading scheme using a long-term focused agent-based model. Four cases are distinguished: No CO2 price floor, a CO2 price floor unilaterally levied as a complimentary variable tax on production in only one country and a common CO2 price floor in two countries. Preliminary results indicate that while a national price floor reduces price variance in the introducing country, the overall CO2 price variance increases. A common price floor was found to decrease overall price variance.

4:15 p.m – 5:00 p.m.

UNCERTAINTY AND THE INTERACTION BETWEEN CLIMATE AND RENEWABLE ENERGY POLICIES

Oskar Lecuyer: CIRED and EDF R&D - EFESÉ

Abstract :

This article brings a new contribution to the analysis of overlapping instruments to cover the same emission sources. Using both an analytical and a numerical model, we show that taking into account the risk that the CO2 price drops to zero and the political unavailability of a CO2 tax (at least in the European Union), it can be socially optimal to implement an additional instrument encouraging the reduction of emissions, for instance a renewable energy subsidy. Our analysis has both a practical and a theoretical purpose. It aims at giving economic insight to policymakers in a context of increased uncertainty concerning the future stringency of the European Emission Trading Scheme. It also gives another rationale for the use of several instruments to cover the same emission sources, and shows the importance of accounting for corner solutions in the definition of the optimal policy mix.

5:00 p.m. – 5:45 p.m.

NO GREEN FUEL-TAX PARADOX AFTER ALL?

Florian Habermacher, SLAW – University of St. Gallen,

Abstract :

The present contribution is based on a calibrated numeric dynamic equilibrium model, used to examine the effect of different carbon taxes on the carbon emission path. It is the first study on the issue of the Green Paradox to fully account for supply cost curves of different fuels, a crucial element that has been missing in previous theoretical studies. The main finding is that the Green Paradox is unlikely to materialize on the real fuel markets; for virtually every plausible calibration, the carbon tax reduces the present discounted long-term carbon emissions. Besides the comparison of the scenario with and without the rapidly increasing carbon tax, we analyze the implications of the impossibility of long-term policy commitments in a game-theoretic extension, which shows that in reality, the introduction of the current tax is even more desirable than one would conclude by omitting this additional political constraint, confirming to some extent Hoel's conclusion from his theoretical two-period model.