LNMB

Nederlands
Genootschap voor
Besliskunde

Netherlands Society for
Operations Research

Leiden, november 2007

Betreft: NGB/LNMB Seminar Lunteren, 17 januari 2008

Bijgaand treft u de aankondiging en het aanmeldingsformulier aan voor het 10-de "Lunteren Seminar", georganiseerd door het Nederlands Genootschap Besliskunde (NGB) in samenwerking met het Landelijk Netwerk Mathematische Besliskunde (LNMB). Het thema is dit jaar:

"OPERATIONS RESEARCH AND ENERGY"

Diverse deskundigen, met uiteenlopende specialiteiten, zullen dit onderwerp nader toelichten. De bijeenkomst zal worden voorgezeten door dr. Ton Hoff, directievoorzitter van Energieonderzoek Centrum Nederland. Wij hopen en verwachten dat dit onderwerp en het aangeboden programma uw interesse hebben.

Tevens biedt deze bijeenkomst u de gelegenheid om contacten te leggen en te hernieuwen, niet alleen met de 'professionals', maar ook met personen uit de academische wereld.

Indien u aanwezig wilt zijn, dan ontvangen wij uw aanmeldingsformulier graag zo spoedig mogelijk; de inschrijving sluit op **7 januari 2008**.
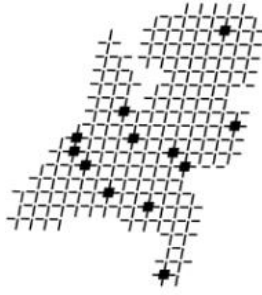
Met vriendelijke groet en in de hoop u in Lunteren te mogen verwelkomen,

Namens het NGB,   Namens het LNMB,

Leo Piet   Lodewijk Kallenberg
John Poppelaars
Stan van Hoesel

LNMB

"OPERATIONS RESEARCH AND ENERGY"

Jointly organized by the Landelijk Netwerk Mathematische Besliskunde (LNMB) and the Nederlands Genootschap Besliskunde (NGB), Conference Center "De Werelt", Lunteren, January 17, 2008.

The Nederlands Genootschap voor Besliskunde (NGB) and the Landelijk Netwerk Mathematische Besliskunde (LNMB) jointly organize the one-day seminar "Operations Research and Energy", in Conference Center 'De Werelt', Lunteren, on January 17, 2008. The seminar is chaired by dr. Ton Hoff, president of the Energy Research Centre of the Netherlands.

The seminar is the 10th annual seminar, following the previous successful seminars:
Operations Research & Enterprise Resource Planning (1999)
*Operations Research in Financial Management (*2000)
E-Commerce & Operations Research (2001)
Capacity Management - How Operations Research models support decision makers (2002)
New developments in Operations Research software (2003)
On-line methods: Challenges for OR in a real-time world (2004)
Mathematical Models for Financial Optimization (2005)
Operations Research and Health Care (2006)
Operations Research and Public Transportation (2007).

The Dutch OR Society and the Dutch Network of Operations Research proudly present a collection of presentations which will take the audience through various planning activities that cannot be achieved without OR in the energy world.

The demand for energy keeps on growing explosively. Nevertheless, we take for granted that it is always there when we need it, in the quantities that we need. That is why we start our seminar with the production and transportation issues the electricity producing companies are faced with. Nuon (Middelkamp) and KEMA (ir. Bouwman) will discuss the decision making process of where and how to build electricity generating plants. Meesters (ORTEC) discusses the question: is it beneficial to accept extra costs in the short term planning to avoid possible higher costs in the long term in these peak periods?

The electricity transportation network is the responsibility of the government institution Tennet. This institute is concerned with the problem of determining how much capacity the network should be able to handle at peak times, and whether the network is capable to cope with requests to transport energy from foreign countries. It also deals with reliability questions such as network failures. The talk of prof. Kling (Tennet) will discuss the latter subject. Like the public transportation market in the Netherlands, also the electricity market has been split into two parts. Tennet maintains the physical network.
Companies that produce electricity or buy it, can make use of this network. This construction has been introduced some years ago to encourage competition among the electricity selling companies. The market for trading electricity has become a vivid one, with many (nonproducing) newcomers. This makes the market also interesting for financial institutions. The structure of the trading mechanism will be discussed by prof. La Poutré (CWI & TU/e).

The pricing problem of electricity will be the subject dr. van den Berg from Sitmo will discuss. The fossil fuels to produce energy are not only rapidly increasing in price, the world inventory is also limited. Moreover, pollution of ground, water and air are increasing. Especially, the increase of the CO_2-level in the atmosphere induces a major change in climate. This makes the need for energy consumption reduction clear. But more realistically a lot of effort is put into new ways of producing energy, such as windmills, solar energy bio-energy and water energy. This involves often the location and planning of these fields of energy, also including new production technology. Dr. de Jong (Maycroft Consulting & EUR) considers a method which can incorporate realistic gas price dynamics and complex physical constraints.

SEMINAR PROGRAM:

09.30 – 10.00   Registration and Coffee
10.00 – 10.10   Welcome and introduction by the chairman Ton Hoff
10.10 – 10.50   Casper Middelkamp: *Optimisation of a Dutch power plant portfolio (Nuon)*
11.00 – 11.40   Sonja Bouwman: *A survey of OR models and techniques for electrical grid companies*
11.50 – 12.30   Janneke Meesters: *Cost effective Product Replenishment in the Oil & Gas Industry*
12.30 – 14.00   Lunch
14.00 – 14.40   Wil Kling: *Long-term and short-term decision making on the structure of the Dutch electricity network (Tennet)*
14.50 – 15.30   Han La Poutré: *Market-mechanisms for decentralized control and allocation of energy.*
15.40 – 16.20   Thijs van den Berg. *Wind Energy: Valuation and Risk Management.*
16.30 – 17.10   Cyriel de Jong: *Gas Storage Valuation and Optimization*
17.10 – 18.00   Drinks

The conference language is English. To participate at the seminar, please fill in the attached registration form and return it **before January 7, 2008**.
The conference fee is € 75 Euro for LNMB and NGB members, and € 125 for others. You will receive an invoice after your registration form has been received. The conference fee covers lunch, coffee, tea, and drinks.

This seminar is organized during the last day of a three days conference on Operations Research. The topics of first two days are more on theory and methods and are mathematically oriented. For information see also www.lnmb.nl/conferences/lunteren2008.

ADDRESS SEMINAR:
Conference Center `De Werelt'
Westhofflaan 2
Lunteren
The Netherlands
Tel: 0318 - 484641
For more information, e.g. 'how to reach' see: www.congrescentrum.com

SHORT BIO's

Thijs van den Berg (Sitmo)
Thijs van den Berg is the founder of Sitmo financial engineering a software and consultancy firms that designs and implement mathematical models for financial institutes and industries throughout Europe. The modeling activities focus on financial aspects of projects and contracts; these include valuation, optimization, risk management, hedging and structuring. Before Sitmo, Thijs has been a derivative trader (market maker) at the EOE/AEX, a derivatives risk management sotware engineer, and head of applied research and technology / modeling of a large energy company.

Sonja Bouwman (KEMA, Arnhem)
Sonja Bouwman received the M.Sc. degree in applied mathematics in 1999 from the University of Twente, Enschede, The Netherlands. After her studies she worked for B-SIM in Enschede (a company who makes logistic simulations) and she did an extra practical training period in financial mathematics at INA, in Rome, Italy. She is currently working as a consultant at KEMA. KEMA is an international company that is closely involved in the way power is supplied the future of and how energy is used around the world. Its clients are major utilities, heavy industries and regulators and governments, as well as electrical and electronic manufacturing companies. At KEMA Sonja Bouwman is involved in projects in the field of: forecasting, statistics, data analysis, (replacement and maintenance) optimization, operations research and decision-making theory.

Cyriel de Jong (Maycroft Consulting, Erasmus University Rotterdam)
Dr Cyriel de Jong is partner at Maycroft Consulting and affiliated to Erasmus University Rotterdam. He studied econometrics and completed a Ph.D. thesis on financial derivatives. Since 2002 he has worked on a great number of projects related to energy derivative valuation, risk management, and investment analysis (primarily involving real options). He is particularly active in the application of energy simulation methodologies to value energy assets, contracts and tradable products.

Wil Kling (Tennet)
Prof. Wil Kling received his M.Sc. degree in electrical engineering from the Technical University of Eindhoven, The Netherlands, in 1978. Since 1993, he is a part-time Professor at the Electric Power Systems Laboratory, Delft University of Technology, Delft, The Netherlands and since 2000, also at the Eindhoven University of Technology.
Furthermore he is with TenneT, the Dutch Transmission System Operator, in the Asset Management Department responsible for network strategy. His experience is in the area of planning and operation of power systems. Prof. Kling is involved in scientific organizations such as Cigré and IEEE. He is the Dutch Representative in the Cigré Study Committee C6 Dispersed Generation and Distribution Systems and the Eurelectric/UCTE WG SYSTINT.

Han La Poutré (CWI, Eindhoven University of Technology)
Han La Poutré is research group leader at CWI, for the research group "Computational Intelligence and Multi-agent Games (SEN4)". He is also full professor at Eindhoven University of Technology. His research group has been rated excellent both in 1999 and 2005, in the six-yearly evaluations of the CWI by NWO. Han La Poutré is member of several editorial boards (ACM Transactions on Internet Technology, Computational Management Science, Netnomics) and chair of the IEEE Computational Finance and Economics Technical Committee.
His research group has research lines for both fundamental and applied research, in multi-agent games (including auctions, negotations, and market simulations), computational intelligence, and multi-agent systems. The design of market mechanisms en simulations, as well as corresponding software agents belong to the core research areas of his group. The application of the research activities into real-world problems is an important activity of the group, in cooperation with industry and government.

Janneke Meesters (ORTEC Consultants, Gouda)
Janneke Meesters studied Econometrics and Operations Research at the University of Maastricht. She works as Senior Consultant for ORTEC. She is project manager of many projects in the Oil&Gas industry (with large customers, such as BP and SHV Gas), where optimisation of logistics processes are her main task.

Casper Middelkamp (Nuon)
Casper Middelkamp studied Applied Mathematics at the University of Twente from 1999 to 2005. From early 2006 on he has worked at Nuon as a Risk Analyst. Long-term dispatch of power plants is his main task, but he has also been involved in other energy market related quantitative subjects.

ABSTRACTS

Thijs van den Berg (SITMO)
Wind Energy: Valuation and Risk Management

Wind energy is the fastest growing renewable source of energy, however good valuation models and risk management tools are hardly ever used. The reason for this is that a wide variety of new models are needed that go beyond the classical models used in finance and risk management. In this talk I will discuss a variety of models that can be used when dealing with wind energy. These models include: short- and long-term forecast for wind speed and electricity production, methods on how to value expected future production against forward curves, spot markets, as well as methods on how to manage the related risks.

Sonja Bouwman (KEMA, Arnhem)
A survey of OR models and techniques for electrical grid companies

In this presentation, an overview will be given of projects for the electricity sector that are strongly OR related. The main goal of this presentation is to show how we used OR techniques in the electricity sector and the way our clients have benefited from this approach. Some examples are:
- Optimization model for replacement and maintenance strategies of transformers (in cooperation with the University of Twente)
- Determination of optimal locations for "Distribution Automation"
- Determining worst-case scenario's of production locations for power supply network operators
- Demand forecasting

Cyriel de Jong (Maycroft Consulting, Erasmus University Rotterdam)
Gas Storage Valuation and Optimization

Developed countries increasingly rely on gas storage for security of supply. Widespread deregulation has created markets that help assign an objective value to existing and new to build storages. Storage valuation is nevertheless a challenging task if we consider both the financial and physical aspects of storage. In this paper we develop a Monte Carlo valuation method, which can incorporate realistic gas price dynamics and complex physical constraints. In particular, we extend the Least Squares Monte Carlo method for American options to storage valuation. We include numerical results on different markets and discuss how market-based storage valuation can be included in overall portfolio management.

W. L. Kling (Tennet)
Long-term and short-term decision making on the structure of the Dutch electricity network

The abstract becomes available at **www.lnmb.nl/conferences/lunteren2008**

Han La Poutre (CWI, Eindhoven University of Technology)
Market-mechanisms for decentralized control and allocation of energy

Market-mechanisms are important techniques for the decentralized control and allocation of resources. This area of research has its roots in economics, and has recently received substantial attention in computer science. Focus areas are the design of appropriate market mechanisms, simulation of markets, and the design of software agents to act automatically in these markets.
Market-based techniques also play an important role for energy and emission issues, like for the decentralized production and consumption of electricity, or the reduction of CO_2 emission.
We present results on the reduction of CO_2 emission by intelligent truck usage, as part of the Dutch research program Energy, Ecology, and Technology. We describe market-based, automated techniques for cargo allocation, and we present agent-based models and interactive simulation systems. We model the players by agents and design bidding strategies.

We also describe market mechanisms and simulations for decentralized electricity production and consumption. We describe market-based techniques for controlling the electricity supply and demand, and we model the various parties involved as agents. Furthermore, we design market strategies for several agents and present a simulation system for these markets.

Janneke Meesters (ORTEC Consultants, Gouda)
Cost effective Product Replenishment in the Oil & Gas Industry

For companies in the Oil & Gas industry a scheduler is responsible for the keeping fuel stations and wholesale customers stocked at all times. When customers do not call in orders it is up to the scheduler to determine when to supply each station from the available refineries, terminals and stock depots. He/she does this by calculating expected demand (per product/tank) for weeks into the future for each customer. With this information he/she can then determine on which day the safety stock will be reached, and thus when this customer needs to be delivered latest. The safety stock is a buffer volume against stock-outs, usually around 15% of the maximum tank capacity.

Delivery orders are created just before each customer reaches the safety stock and these orders are used for route optimization. In other words the scheduler minimizes his/her distribution costs by minimizing the number of visits, i.e. a delivery is planned close to the time a tank will reach his safety stock.

As demand in the Oil & Gas business is extremely volatile it may be beneficial to plan a delivery before the due date as this would limit the risk of stock-outs in periods of peak demand. This requires a more long term approach in which expected future delivery volumes are taken into account. The main question though is: is it beneficial to accept extra costs in the short term planning to avoid possible higher costs in the long term in these peak periods?

Casper Middelkamp (Nuon)
Optimisation of a Dutch power plant portfolio (Nuon)

Casper Middelkamp studied Applied Mathematics at the University of Twente from 1999 to 2005. From early 2006 on he has worked at Nuon as a Risk Analyst. Long-term dispatch of power plants is his main task, but he has also been involved in other energy market related quantitative subjects.

REGISTRATION FORM

I hereby register for the LNBM/NGB seminar "**Operations Research and Energy**"*, which will be held in Conference Center "De Werelt", Lunteren, January 17, 2008.

Family name: ……………………………………………………………………………

First name: ………………………………………………………………………………

Title: ………………………………………   Male / Female

Company/Institute: ……………………………………………………………………….

Address: ………………………………………………………………………………….

Postal Code: ……………………….   City: ……………………………………
…

Telephone number: ………………...   E-mail: …………………………………
…

Date: …………………………….   Signature: ………………………………
…

Below, please tick the appropriate box:

I am:

LNMB/NGB member (Registration fee € 75):   ☐

Other (Registration fee € 125):   ☐

FEE PAYMENT INSTRUCTIONS WILL BE SENT TO YOU AFTER REGISTRATION

Send the registration form before January 7, 2008 by regular mail or e-mail or by fax to

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