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The Energy and Value Letter brings together academics and practitioners worldwide to discuss timely valuation issues in the energy sector. It publishes news from the Centre for Energy and Value Issues (CEVI), its linked organizations and others (including calls for papers), columns on topical issues, practitioners' papers: short articles from institutions, firms, consultants, etcetera, as well as peer-reviewed academic papers: short articles on theoretical, qualitative or modeling issues, empirical results and the like. Specific topics will refer to energy economics and finance in a broad sense. The journal welcomes unsolicited contributions. Please e-mail to w.westerman@rug.nl (Wim Westerman), a copy of a news item, column or a completed paper. Include the affiliation, address, phone, and e-mail of each author with your contribution. A column or news item should not have more than 600 words and a paper should not exceed 5,000 words, albeit that occasionally larger pieces can be accepted.



CEVI in Corona times

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While we were all dreaming of a nice Spring (which it actually was weatherwise in the northern hemisphere) or a colourful Autumn (which most likely also came out in the southern hemisphere), the Corona virus started sweeping over the globe. It resulted in more than half a million confirmed deaths, over 10 million cases and billions of people suffering from temporary lockdowns as of the end of the semester. Many parts of the economy were hit directly or indirectly, with the energy sector being no exception. Dwindling sales, layoffs and asset cuts could not be evaded. Many firms saw their finances endangered.

Under such circumstances, it would be weird to organise conferences, compose books and offer trainings as if nothing has happened. And this is also what we do not do as CEVI. Of course we keep on dreaming, but we do shave-off our dreams somewhat. Take the ISINI conference. We do as CEVI contribute, even with more papers than ever. However, the format of the conference has to be changed much, now that it will be held online. The participants (with non-presenters being welcome!) will soon hear more, but do already please note down our CEVI day: Friday, September 25. You can forget about paying a fee.

The CEVI book series with Springer is continuing with the 8th volume, to be edited by André Dorsman, Kazim Atici, Mehmet Baha Karan and Aydin Ulucan. The provisional title is: Applied Operations Research and Financial Modelling in Energy. The amount of approved abstracts gives confidence in the success of the book. The CEVI books go in tandem with our conferences. We are happy to announce that the 7th CEVI conference will be held at UCL in Louvain-La-Neuve, Belgium, from 6-8 May, 2021. James Thewissen will be our host. The provisional Call for Papers is included in this issue of the EVL.

Our last opening paragraph is meant to introduce the two articles of this issue to you. We are very happy that both Erik van Leeuwen and Gijsbert Zwart were able to help us at last notice with their contributions on energy supply issues. Erik takes a practical approach. After working as a business strategy consultant for about a decade at the heat department of the large utility companies in the Netherlands, he started as an entrepreneur September 2018 with consulting services for the energy sector. On the other hand, Gijsbert takes a rather theoretical approach, with much relevance for practice. His PhD was on theoretical physics. He worked at various places in practice, but studies topics from a rather theoretical perspective at the University of Groningen nowadays.



CALL FOR PAPERS

The 8th MULTINATIONAL ENERGY AND VALUE CONFERENCE

You are cordially invited to submit your research papers for presentation consideration at the CEVI conference that will take place on **May 6th-8th, 2021 in Louvain-la-Neuve, Belgium**. This three-day conference, hosted by the LIDAM group of the Université catholique de Louvain, aims at bringing together academics and practitioners from all over the world to focus on timely energy finance and investments, financial performance, energy markets and valuation issues in the energy sector. Papers dealing with developed as well as developing countries are welcome. Specific topics must refer to energy issues and include, but are not limited to:

Financial Regulation; Financial Markets; Financial Risks; Asset Pricing; Value at Risk; Capital Structure; Sourcing Capital; Corporate (Re-) Structuring; Corporate Governance; Behavioral Finance; Financial Performance; Cost Control; Financial Accounting; Fiscal and Legal Issues.

This conference is organized in collaboration with the Center for Energy and Value Issues (Amsterdam, Netherlands) and the Energy Markets Research and Application Center of Hacettepe University (Ankara, Turkey).

Keynote speaker

Mr. Philippe Henry Vice-President of the Walloon Government and Walloon Minister of Climate, Infrastructure, Energy and Mobility.



Best Paper Award

Among the papers selected for the conference, the program chairs will recognize one paper with the highest potential. The winner will receive an honorary prize of 500€.

Program

The first day of the conference includes practitioner presentations on topics such as; energy strategy, regulation, law and energy security. Senior business and government leaders from different countries share energy-related business opportunities in their markets. The second day is dedicated to the discussion of academic papers. On the third day, the conference participants are invited to visit the First World War site in Ypres and the discovery of the medieval city of Bruges.

Submission

Please submit your papers (completed or nearly completed) or participation interest via e-mail to: James Thewissen (ceviconference@gmail.com), by January 15th, 2021. Authors will be notified regarding the acceptance of their papers after reviewing. Final acceptance of full papers will be notified by January 30th, 2021.

Conference Fee

The conference fee is 100€. Further information regarding conference accommodation, travel arrangements and activities will be published on the conference website.

CEVI Book

Papers selected for this conference may be submitted for possible publication in a CEVI book, dedicated to this conference by Springer Verlag, or inclusion in CEVI's Energy and Value Letter (EVL). All submitted papers will be subject to a blind peer review process. Further information regarding conference organization and accommodation, travel arrangements, fees and activities will be published on the conference website in due course. For any inquiry regarding the submission process and registration at the conference please contact Prof. James Thewissen at: ceviconference@gmail.com



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District Heating As an Alternative for Gas in the Dutch Heat Transition

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In 1959 the Groningen gas field was discovered in the Netherlands and this was the start of the gas-based energy infrastructure in the Netherlands. It became the Dutch clean energy alternative to coal and oil. However, sixty years later, that same gas is no longer regarded as clean but as a cause of global warming. In 2015, like many other countries, the Netherlands signed the Paris Agreement which aims to reduce the emission of gases that contribute to global warming. In 2019, in the national climate agreement of the Netherlands, it was decided that in 2030 carbon emission has to be reduced by 49% compared to 1990 and in 2050 all houses and buildings will no longer make use of gas as a means for heating and warm water.

Without gas, how will the citizens in the Netherlands heat their houses? How can the heat transition be achieved? One of the options is district heating. Even before the Groningen gas field was discovered, there was district heating. However, despite the energetical advantages of using power plants' waste heat for heating houses and the advantage of less pollution locally, district heating in the Netherlands has not been without resistance. This primarily has to do with two aspects: costs, and the changing public opinion regarding sustainability.

Until 2009, there was no regulation for the consumer price of district heating. The industry had adopted a methodology "no more than else" also known as gas-parity. However, heat customers still complained about the costs and for not having the opportunity to choose a supplier of their choice. Unlike gas and electricity, with district heating the customer is bound to one supplier which usually is also the grid owner. To protect the heat customers against excessive pricing, in 2009 the first Heat Law came into force, which stated that the heat price for a consumer is not allowed to be higher than the alternative, which is gas. However, now the Netherlands is moving away from gas, in the near future gas-parity no longer makes sense as a price reference. In the latest revision of the heat law, this issue is addressed by a cost-based pricing methodology.

The district heating grid is rather indifferent to sources, as long as there is hot water it can work. This means that district heating has the potential to reduce the amount of global warming gasses, but only with sustainable sources. Public opinion about sustainability has changed in recent decades. Waste heat from coal-powered plants, is no longer regarded as an acceptable source for district heating. Waste heat from gas-powered plants is still used today but heat suppliers are looking for alternative sources as well; for example geothermal energy, heat from biomass, and heat from waste processing factories. In 2013 the first heat from the waste processing factory AVR, reached the city of Rotterdam.

District heating in the Netherlands has evolved and continues to do so. It is a system with a history of about a century and with potential for the future. However, district heating is not a solution for every area. It is one of the ways to make the heat transition in the Netherlands and elsewhere possible.



Real options in energy network regulation

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The transition to a greener energy system requires large investments, not only on the part of energy producers and consumers - think wind parks, electric vehicles - but also for the providers of network infrastructure. These regulated firms face requirements for capacity expansion to accommodate electricity demand for cars, or invest in smart networks to balance a power system in which consumers also generate electricity, with solar panels, at their homes.

In analysing energy network investments, it is worthwhile to take the real-option view: such investments are large and irreversible, and take place in an environment with large uncertainties on future costs and benefits. As is well known from the real-options literature, the flexibility in, for instance, the timing of investments has a value that is not unlike the value of a financial option. In this view, investing amounts to exercising an option. This option is valuable, and exercising, rather than postponing investment to learn more, comes with an opportunity cost. Optimal investment timing then means waiting a bit longer than called for under a traditional Net Present Value analysis.

While this is well understood for investment by private, profit-maximizing firms, incorporating real options in network regulation poses additional challenges. In a new paper, I look at a theoretical framework for including real-option analysis in the theory of optimal regulation. I adopt the principal-agent theoretical framework of regulation: firms act as agents for a regulator, the principal. These firms have better information on costs or benefits of investment than the regulator, but they have different objectives: the regulator aims for optimal total welfare, while the firm chooses its actions to maximize its own profits. The question is then how to design regulation to align incentives in the presence of such asymmetric information.

To see how this might play out in a real-option investment context, consider the following simplistic set up. A firm can invest in network expansion if demand grows high enough. A regulator that is fully informed on the firm's investment costs can do the real-option analysis to figure out the welfare-optimal investment timing, instruct the firm to make the investment at that moment and allow it to set tariffs so as to recover the costs. Of course, the higher the costs are, the higher demand needs to grow before making the investment.

If the regulator cannot observe investment costs, under such a regulatory scheme the firm would benefit from overstating its costs, and earn additional rents from higher allowed tariffs as a result. There are two welfare consequences of such behaviour. Firstly, investment would occur too late, since the regulator would set timing according to the inflated cost level. Secondly, tariffs are too high.



The regulator can improve its regulation by allowing firms higher tariffs even if they report low costs. In that case, errors in timing can be avoided: low-cost firms will be instructed to invest early, in accordance with their low cost levels. More subtly, the necessary tariff increase can be kept in check by at the same time excessively delaying investment by firms with high reported costs. The benefit is that this delay makes it less attractive for low-cost firms to overstate their costs: it would lead to rents earned later, which due to discounting is less valuable to them. Optimal regulation balances the distortions in investment timing for high-cost firms with the adverse consequences of high tariffs for low-cost firms.

In Zwart (2020), I analyse a more involved variation on this problem, featuring gradual network capacity expansion over time. Moreover, I look at optimal regulation when choices need to be made over the type of technology to be used - should the network firm invest in an innovative, but potentially more expensive, smart grid, or might a traditional technology suffice? It is typically the network firm itself that is best informed on this trade off, but how can the regulator incentivize the firm to make the welfare-maximizing choice? Such optimal regulatory schemes can find a place in real-world regulation, involving price caps based on a regulatory asset base, by suitable adaptation of current tariff regulation.

The article is forthcoming in a special issue of the *Journal of Economic Dynamics and Control*, on “Investment, energy and the green economy”. This issue is devoted more generally to applications of real-option analysis to investments in green energy systems. In view of the large requirements for investments from all players involved - governments, firms, households - the modern investment view, including real-options analysis, appears a valuable addition to “green deal” policy analysis.

References

G.T.J. Zwart (2020), “Optimal regulation of energy network expansion when costs are stochastic.” *Journal of Economic Dynamics and Control*, forthcoming.