

# DSM Spotlight

The Newsletter of the International Energy Agency Demand-Side Management Programme



## Task 24 *A Beautiful Behaviour Collaboration is Taking Place in the IEA*

The IEA Secretariat recently introduced the Operating Agents of [IEA DSM Task 24](#) (Dr Sea Rotmann) and [IEA Energy in Buildings and Communities \(EBC\) Annex 66](#) (Professors Da Yan and Tianzhen Hong) to each other. DSM Task 24 and EBC Annex 66 are the [IEA Low Carbon Technology Platform](#)'s only research collaborations focused purely on behaviour. The two research projects have some striking similarities, but they are using very different approaches. So, a truly beautiful collaboration opportunity was borne.

First, to our similarities. Both projects focus on human behaviour – DSM Task 24 on all forms of energy-using behaviours with specific focus on the transport, building

retrofit, smart technology and small to medium enterprise domains; EBC Annex 66 is more specific, focusing on commercial and residential occupant behaviours. Both projects look at behavioural models – Task 24 takes a helicopter overview of different behavioural science approaches, where Annex 66 builds on more engineering and economics focused models, albeit with a solid input from the social sciences. Both projects are trying to establish better monitoring and evaluation protocols for behavioural interventions. Both projects have a vast, and only slightly overlapping expert network of over 200 global experts collaborating in each. Both projects use open information sharing and shared learning approaches, which differentiates them from many IEA

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## Note from the Chairman

The IEA's *Energy Technology Perspectives 2016* was recently released. I had the pleasure of participating in the launching webinar of this IEA flagship publication, and one can only admire the detail and precision by which analyses are made and measures are formulated for this report. One also has to applaud the pure evidence-based conclusions that avoid the formulated policy opinions.

Listening to one smart person after another I noticed that I was getting frustrated beyond belief. It took me some time to figure out why. As the feeling of incompetence and frustration might happen to you as well, I would like to share the source of my feelings.

For some years now the IEA has been working with the 2, 4 and 6 degree scenarios. Where 4 is “not good” and 6 is “will be killing us all in the long run”.

Now imagine, we are not talking about degrees, but about meters of water. We have a business as usual scenario where we will end up living 6

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Technology Collaboration Programs. And both know that their work involves the most complex of factors – human habits, choices and (ir)rationalities.

Then there are our distinct differences: DSM Task 24 models are more qualitative and high-level explanations of how humans behave and theories of how this behaviour can be changed; whereas EBC Annex 66 models and simulations can be used to ‘quantify’ occupant behaviours. Task 24 is highly creative, using storytelling, cartoons, films and other means of ‘translating’ complex social science questions to practitioners. Annex 66 uses more conventional science methodologies, such as literature reviews, databases, surveys and modeling. Task 24’s main audience are the so-called ‘Behaviour Changers’ in research, government, industry, the third sector and middle actors; whereas Annex 66 has a more traditional academic audience. Task 24 Operating Agents are paid by participating countries, whereas Annex 66 engages entirely in ‘task sharing’, which means it has many more formally participating countries than Task 24.

Despite these significant differences we believe that we can meet in the middle, at the heart of the issue, and that our work has great value to each other.

DSM Task 24 Operating Agent Dr. Sea Rotmann attended the recent EBC Annex 66 workshop in Vienna, on April 1, 2016. She came away deeply impressed with the wealth of knowledge and expertise that was present in the room, and

the quality of presentations and work undertaken for Annex 66. Particular highlights were the book on occupant behaviour models, currently being co-written by Annex 66 experts, and modeled simulations of occupant behaviour. Despite the strong quality of the work, Dr. Rotmann still felt that Task 24 also had important viewpoints to impart: for example, on the large variety of sociological models and theories of change including their real-life applications as studied in Task 24’s Subtask 1 ‘Monster’ report. Or, the Task’s different approach to developing a standardised tool to measure ‘beyond kWh’ in Subtask 9, which may help inform the Annex 66 evaluation guidelines. The use of [narratives and storytelling](#) (Subtask 8) also found a great response from Professor Khee Po Lam, who would like to use the Task 24 approach in Annex 66’s Subtask on applications in building design and operations.

DSM Task 24 has since stayed in touch with many of the experts that Dr. Rotmann met at the Vienna workshop and contributed to the EBC Annex 66 work in a variety of ways. The two projects will also link to each others’ research work on the respective websites, share each others’ expert member lists and are looking to organise a joint IEA workshop on our behaviour (change) work in China in 2017. Task 24 is co-editing a special edition on [storytelling and narratives](#) in energy and climate change for the Journal of Energy Research and Social Science, the call of which was shared with Annex 66 experts. Abstracts for this call are due June 30.

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For any more information, please contact DSM Task 24 Operating Agent [drsea@orcon.net.nz](mailto:drsea@orcon.net.nz) or EBC Annex 66 Co-Operating Agent [yanda@tsinghua.edu.cn](mailto:yanda@tsinghua.edu.cn).



To support the new collaboration, IEA DSM Task 24 project manager Sea Rottmann, joined an EBC Annex 66 workshop on April 1, 2016 in Vienna, Austria.





DSM University is a web-based platform hosted by Leonardo Energy for the IEA DSM Technology Collaboration Programme to share its work. The webinar series is hosted by Leonardo ENERGY. Every month a new webinar is held and you're invited to participate!

To help focus people's interests, the webinars are grouped into six theme areas:

- 1) THE LOGIC OF DSM
- 2) GOVERNANCE
- 3) ENERGY EFFICIENCY
- 4) FLEXIBILITY
- 5) INTEGRATION
- 6) BUSINESS MODELS

To receive emails about upcoming webinars register at [www.dsmu.org](http://www.dsmu.org). Once you're registered not only will you be notified of upcoming webinars, but you can also view past webinars and find suggested reading materials.

## 2016 Webinars to Date

All these can be watched on [YouTube](#) – just click on the titles below that interest you.

### [Energy Efficiency: A strategy at the heart of the G20](#)

**Benoit Lebot and Zoe Lagarde**    JUNE 16    LOGIC

### [Energy efficiency: a profit center for companies! A strategic and financial discussion of the multiple benefits of energy efficiency](#)

**Catherine Cooremans**    MAY 17    BUSINESS MODELS

### [Energy savings and greenhouse gas emissions: international standards & harmonised savings calculations in practise](#)

**Harry Vreuls**    APRIL 20    GOVERNANCE

### [Highlights of the ACEEE National Conference on Energy Efficiency as a Resource](#)

**Martin Kushier**    MARCH 17    GOVERNANCE

### [Involving people in smart energy: a toolkit for utilities, project managers, energy agencies and city developers](#)

**Ludwig Karg**    FEBRUARY 18    GOVERNANCE

### [A brief history of energy efficiency labelling](#)

**Benoit Lebot**    JANUARY 14    GOVERNANCE

# South Korea

*Energy Paradigm Shift Means a Bright Future for the Economy and the Environment*

Following the adoption of the Paris Agreement and the new climate regime in 2015, the world shifted from the Kyoto Protocol system to the New Climate Regime. Now actions to cut back emissions are requested of all countries including industrialized countries. After the establishment of this new climate regime, Korea submitted a plan to reduce GHG emissions by 37% of the BAU (business-as-usual) level by 2030. This is significantly higher than the previous targets, which ranged from 15% to 30%, and will require the dramatic innovation of the country's domestic industries.

Based on advanced Information and Communication Technology (ICT), Korea has pursued a policy focused on supporting energy demand management over the past few years. This management system, based on ICT, systemically allows the users to save energy themselves. The policy doesn't track the expanding energy supply, but rather responds to the simultaneous management of energy supply and demand. The supply-oriented energy policy has evolved to encompass both the supply and demand. Through the innovation of specific energy sector measures to increase energy efficiency and to reduce greenhouse gasses, Korea is fulfilling the framework of a "New Energy Industry".

Based on the Korea's advanced ICT industry and manufacturing technology, the industries responding to climate change and market changes are creating new opportunities. In April

2015, the Korean Government held a "New Energy Industry Forum" chaired by the President, it was at this event that a declaration of an innovative action on six major business sectors with a full-scale supporting policy for the promotion of a Energy Industry was made. Also in April 2015, at the Meeting of the Economic Ministers, the existing six New Energy Industry sectors were expanded to eight sectors and an implementation and promotion plan was established, which reconfirmed the government's commitment to this initiative. In November 2015, through the "New Energy Industry Forum" the strategy for a long-term vision and the expansion of Korea's future energy society to 2030 was re-established.

The practical steps to promote innovation in the energy sector divides the Korean society into four energy categories – residential, power, transport and industrial.

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## SECTORIAL LOOK AT FUTURE ENERGY



### South Korea Residential

- Eco-Friendly energy town, Zero-Energy building
- Self-Generation by renewable energy, ESS
- Smart energy management of public housing units
- Dissemination of AMI
- Implementation of microgrid
- Many energy prosumers appear



### South Korea Transport

- Activation of electricity vehicle
- Electric vehicles charging infra
- Private electric vehicles charging infra
- Unmanned driving car
- Car sharing culture spread
- Connected with smartphone, telematics



### South Korea Power

- Activation of renewable energy
- Expansion of power industry by IT Company
- Grid upgrade, Ultra super critical, High-Efficiency gas turbine
- GHG reduction by CCS



### South Korea Industrial

- Eco-friendly manufacturing process
- Smart factories, Energy-Efficiency of manufacturing
- Business using waste heat from thermal power plants
- Energy-Efficiency of manufacturing, industrial complex

There are eight business models for the New Energy Industry plans that rely on innovative and diverse programs based on ICT. They are:

- 1. Demand Response.** Implement energy saving systems in buildings and plants, collect unused power for profitable sale in the energy market. “Negawatt Market” opening in 2014 was to secure the demand resources of 2.4 million kW in 2015. This is the amount that corresponds to 5 power plants, market creation is equivalent to 100 billion Korean Won.
- 2. Integrated ESS Business.** Build ESS (Energy Storage Systems), EMS (Energy Management Systems), and LED systems by combining finance and energy management technology, and provide maintenance services. The Government is offering various incentives, including tax breaks and low-interest loans for the dissemination of ESS..
- 3. Independent Micro-Grid Business.** On islands with a high unit price for power generation, replace diesel generators with a hybrid micro-grids that combines new and renewable energy with ESS. Promoting demonstration project on Ulleungdo Island, according to the plan, 30% of the diesel power generation will be replaced by renewable energy in 2017, and to zero in 2021.
- 4. Electric Vehicles Service and Charging Business.** Install systems and provide charging for electric car service providers, including electric taxi service providers. By 2030, Korea plans to replace all vehicles on Jeju Island with EVs, making it a leading example of large-scale EV implementation.
- 5. Business Using Waste Heat From Thermal Power Plants.** Make use of the massive waste heat from thermal power plants on adjacent farms.
- 6. PV Rental Business.** Rent PV systems, such as water purifiers to households, to generate profit through energy savings.
- 7. Zero-Energy Building.** Require no energy from outside sources, a zero-energy building maximizes thermal insulation performance, minimizes energy use, and meets energy independence requirements using new & renewable energy, such as solar power and geothermal heating. Zero-energy building policy will be implemented gradually as mandatory for all newly constructed building by 2030.
- 8. Eco-Friendly Energy Town.** Through a combination of unwanted public facility and revenue model, such as energy independence, culture and tourism support facilities, improve the income of local residents and community-based projects that support improved living conditions.

New Energy Industry's major achievements by sector	
Sector	Key Performance
Electric vehicles	Establishing Korea's first battery lease business, private paid charging business
Demand Response (Negawatt market)	Market creation of total 100 billion Won, opened in 1 year (worth 5 power plants)
Energy Independence Island	Energy independent island, Ulleungdo Island, pursuing 5 additional island projects
ESS (Energy Storage System)	Constructing 200MW ESS frequency matching device (market creation of 160 billion Won)
Eco-Friendly Energy Towns	Completing Hongcheon Green Energy Town, specifying 10 new business locations
Zero Energy Building	Building low and high types of zero energy buildings
Business Using Waste Heat from Thermal Power Plants	Recognized as a renewable energy source, promoting greenhouse business in Dangjin including 3 business locations
PV Rental Business	Exceeding 10,000 households of solar rentals (2014-2015)

To reduce greenhouse gas emissions and create jobs through innovation in the energy industry, the government began focusing in 2014 on a major new industrial energy sector that has been working to establish a framework for market creation through policy support. To reduce the cost of power for electric vehicle charging and ESS, special discounts on the charge fees have been launched. Since ESS was recognized as ancillary equipment for improving conditions of grid-connected renewable energy, discharge amounts of stored power of the ESS in conjunction with wind was given more Renewable Energy Certificates (RECs). In addition, to support the shift of the energy paradigm to demand side management, the government created a new market structure. In the past, the electricity market was only granted to bidders of power generation resources. Now, resources created by reduced power can open the market to bid. Based on this institutional framework, promoting eco-friendly energy towns, independent micro-grid businesses in major projects, such as requiring large-scale investment projects, EV battery leasing pilot projects, and ESS supply businesses have been promoted with government finances.

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The 'Energy Prosumer Market,' which is important for Korea's DSM program, will be opened in 2017. Customers will be able to sell the energy that was produced or saved through renewable energy, ESS, and Electric Vehicles. Through this market, consumers who paid high electric costs due to the progressive tax will be able to save money. By buying neighbors' electricity, they will not have to pay expensive charges caused by the progressive tax. Depending on the reduced renewable energy costs and smart grid, the energy prosumer market is expected to operate more actively. And, the government will continue to explore and expand customized business models to extend the energy prosumer market, which will scale up to 12.8% of total electricity generation in 2030.

Korea is not only implementing a sophisticated energy demand management policy through the New Energy Industry, but also is advocating a new growth engine for the country that will create new markets worth 100 trillion Won, employ 50,000 people, and reduce greenhouse gas emissions by 55 million tons by 2030.

*For more information or questions, please feel free to contact the South Korea IEA DSM Executive Committee member, Su Hyeon Jung, [Suhyeonco@energy.or.kr](mailto:Suhyeonco@energy.or.kr).*

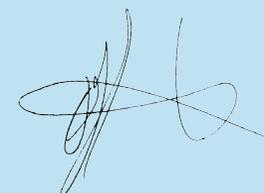
meters under water, but using a good water management we can improve this so instead can live with only 4 or maybe even 2 meters of water above us.

If this were the case then everybody would demand a 1,5 or lower scenario.

But we're not talking about meters of water; we're talking about temperature. In a completely incomprehensible way we are having a serious discussion about 4 or 6-degree scenarios. The impact of the higher temperatures might not be as direct as an amount of water > 2m, but in the long run they both will cause comparable damage.

So I would like to call upon the IEA to stop debating and presenting any scenario above 1,5 degree in the next *Energy Technology Perspectives*. Of course one or two graphs

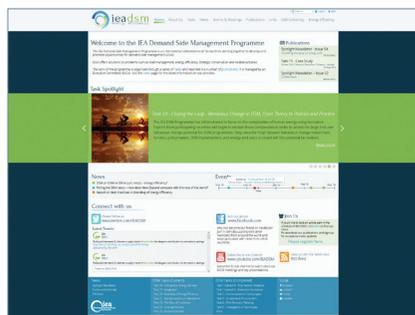
that show the business as usual predictions could be useful, but otherwise I ask you to allocate the intellectual power of the IEA only to the scenarios that offer mankind a change in the course of our survival. The rest is futile. A number of the webinar presenters were quite clear in their messages that options to achieve all these scenarios are available. So let's start talking the real talk. It's time.



Rob Kool  
IEA DSM Chairman

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