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# Keynote Forum

## April 08, 2019

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# *Green Energy 2019*



2<sup>nd</sup> International Conference on

# Green Energy & Technology

April 08-09, 2019 | Zurich, Switzerland

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## *Per Ribbing*

*Uppsala University, Sweden*

### **Climate Change leadership – The case for Electrification**

Since the Swedish deregulation of the power market 1996 there has been an ongoing debate in many diverse arenas, in Sweden and elsewhere, concerning “Consumer Power” on the Power Market. This, because the Swedish chapter of IUCN: Swedish Society for Nature Conservation (SSNC) at the very same date (1996-01-01) released, to the market, their Ecolabelling of Electricity; Bra Miljöval EI (Good Environmental Choice Electricity). The idea was sprung from the then Vice Chair of SSNC, now professor at Chalmers Institute of Technology; Tomas Kåberger. I applaud such a visionary idea. Now, finally, after over 20 years of tiresome debate and ridicule, this tool for a sustainable transformation of the Swedish and Nordic Power System is ready to be heard, and used.

1. Arguments pro Consumer Power has been along the line: If everyone decides to choose to buy Green Power – then eventually everyone will have Green Power in their outlets (sockets).
2. Arguments against Green Power has been along the line: Since electricity is mixed on the grid you don't get what you buy. Hence, marketing and sales of Green Power is a hoax.

### **Negative labelling – more efficient than Eco labelling**

To label e.g. bananas with a sign “sprayed with cancerous chemicals” would, from a ‘Consumer Power’ perspective, be more efficient than today’s Eco labelling of organic bananas. Or, using a “Child Slave Labour”-label on e.g. footballs would be more efficient than today’s FairTrade-labelling of e.g. footballs. In this article I argue that ‘Coal’ carries the same negative values as ‘Cancerous chemicals’ and ‘Child slaves’. At least in Sweden, Switzerland and other “green”, rich and developed countries. I argue that the possibility of choosing not to have coal power in your outlet will direct large amounts of money into investments in new renewable power and energy efficiency. When consumers start choosing to not buy coal power the interesting question arises: What electric power production will replace the fossil power no longer produced? Since there’s no longer anyone paying for it to be produced, production of fossil power will cease to exist. Fossil power will be no more. This article will briefly describe 6 possible alternative, renewable solutions, as answers to that question. Nuclear power is another non-fossil option but recent studies show that new traditional nuclear power (fission) are significantly more expensive than new wind- and solar PV power. See e.g. Lazard LCOE 2017.

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## Regulation and Balancing of the Power Grid

Since an increased dependency on intermittent power, mainly wind and solar, increases the demand on the power system's ability to regulate large variations in power production this thesis will also describe some possible solutions for this engineering task; short-term and long-term regulation and balancing of the Nordic power system (or any power system). There are more possible technical solutions than the ones I choose to name here, and probably more new solutions will be invented. Engineers love to solve problems. Here is my A to  $\Omega$  of possible technologies to balance intermittent solar, wave and wind: The dynamic functionality of

the market economy will choose what solutions are most efficient from a market point of view. This is a fundamental principle of the market economy.

## Speaker Biography

Per Ribbing completed his Master's Degree in Engineering Physics at Linköping University, Sweden in 1989. He later entered into the area of Sustainable Development after a close encounter with oil wars. He was the Energy Advisor for the Swedish Society for Nature Conservation 1997-98 and worked with energy matters at the Nordic Ecolabel 2004-2010. He also runs his owned company; Perpetuum Energy & Environment where he is a Public Speaker, Consultant and Educator. At present he is a PhD student at Uppsala University writing his thesis on Climate Change Leadership: the case for electrification. He has arranged monthly speaker pubs (ENVIRONMENTALE) for the NGO Swedish Engineers for Sustainable Development since 1996.

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## Matthew Williams

*Faraday Grid Ltd, UK*

### Future-Proofing the Grid

The electricity system is the biggest and one of the most complex machines ever built. In recent decades, this machine has begun to undergo a radical transition, with both the way we generate and use electricity evolving. In the midst of this, however, the power grid has not been able to keep up pace. This is a problem, because the grid was not designed for power flows of modern electricity use and generation. These changes are rapidly driving its architecture close to a breaking-point, already manifesting in reliability issues, such as power disturbances or even blackouts, and ever increasing electricity costs. The primary approach to address this so far has been to compensate for the grid's weaknesses by adding external mitigating technologies; an approach unsustainable in the face of the fundamental energy transition we are experiencing. The electricity system needs a revolution, and it needs it now.

So what would a future-proof energy system look like? First, control of balancing supply and demand should be moved from the endpoints of the system – generation and consumption – to the grid itself. This will allow for a more robust grid to balance highly variable power flows. To rule out the fragility of

relying on a central control point, a truly robust energy system will utilize autonomous decentralized control principles within its architecture. A single platform connecting a plethora of technologies adding value directly will allow for a boost in innovation to the likes of the Internet – as such will make a true Internet of Things structure possible. To deduce how this system can be realized, Founder and Chief Technology Officer of Faraday Grid, Matthew Williams will explain the thought process that led to Faraday's ground breaking solution to the Energy Trilemma emerge.

#### Speaker Biography

Matthew Williams is Founder, Director, and Chief Technology Officer of Faraday Grid Ltd. He is a Systems architect, mechatronic engineer, design leader and facilitator. He is the author of Faraday Grid's technology patents. In fulfilling Faraday's ambition to unlock sustainable prosperity through electricity, he provides a conduit of understanding between complex interdependent dynamic systems and the world; managing strategic direction and technology development. Previously, he led a systems engineering company and was responsible for technical, client, and project management of multi-million dollar projects in Australia, China, and the US, delivering mission-critical logistics, automation, business and safety systems across the power and process sectors. Using the company's proprietary Design by Rationalised Constraints methodology, He and Faraday Grid are designing the energy ecosystem of the future.

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## *Per Ribbing*

*Uppsala University, Sweden*

**The new paradigm on Electric Power; Fossil Power does not mix with Green Power on the grid**

**N**egative Labelling is far more efficient than Ecolabelling in attracting people to make an active choice. Since the misunderstanding that “all power mixes on the grid” is still dominant, not even Ecolabels themselves write criteria demanding Green Power. E.g. the Nordic Ecolabel has no criteria on what power their licensees consume. The Nordic Ecolabel is stuck in the old paradigm where this view is true: Since electricity is mixed on the grid you don’t get what you buy. Hence, we cannot demand our licensees to buy something they do not receive. But in my article; On the Analogy between the Electric Grid and Our Banking System: Investigating “Consumer Power” in Deregulated Power Markets the above statement is explained a misconception. Obviously, companies having a Nordic Ecolabel license for one or more of their products should NOT be allowed to buy Coal Power or any fossil electricity when in fact:

Consumers can choose not to have coal power in their outlets. They can say NO to coal. There are at present about 2000 companies with a Nordic Ecolabel license. They range from small restaurants to giant paper and pulp mills, from producers of lawn mowers to Supermarkets. Just imagine the push-and-

pull effect on the power market that would arise if 2000 companies suddenly decided to demand Green Power: the push for new investments in wind and solar PV, and the pull away from investments in fossil energy. Also, this sudden rise in Consumer Power should be beneficial also to investments in Energy Efficiency. The NWh is still the most efficient way to reduce (CO<sub>2</sub>) emissions. When consumers start choosing to not buy coal power, production of fossil electricity will cease to exist. Fossil power will be no more.

‘Consumer Power’ has the power to end the fossil era.

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Per Ribbing completed his Master’s Degree in Engineering Physics at Linköping University, Sweden in 1989. He later entered into the area of Sustainable Development after a close encounter with oil wars. He was the Energy Advisor for the Swedish Society for Nature Conservation 1997-98 and worked with energy matters at the Nordic Ecolabel 2004-2010. He also runs his owned company; Perpetuum Energy & Environment where he is a Public Speaker, Consultant and Educator. At present he is a PhD student at Uppsala University writing his thesis on Climate Change Leadership: the case for electrification. He has arranged monthly speaker pubs (ENVIRONMENTALE) for the NGO Swedish Engineers for Sustainable Development since 1996.

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