The evolution of smart grid offers possibilities to take back your power

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Common financial measures used in financial portfolio management are suitable for measuring market risk in smart grid projects, according to research from the University of Vaasa, Finland.

Rayko Toshev's doctoral thesis in Industrial Management "Risks and Prospects of Smart Electric Grids Systems measured with Real Options" analyses electricity price risk levels and evaluates smart grid R&D projects and technology opportunities, using real option pricing method.

"My work analyses Nord Pool Spot electricity prices for Finland, Sweden Norway and Estonia and computes market risk level using standard financial measures, such as Volatility and Value at Risk", says Toshev.

By using the risk metrics he outlines future scenarios for smart grid development and calculates real option values of technology projects.

Selling electricity back to the grid

With dynamic pricing, provided from the power market and smart meters, installed by utility companies it is now possible for consumers to sell electricity back to the grid and trade it like a typical commodity.

"Such new environment combined with advances in additive manufacturing creates lavish opportunities for technological

innovations", he says.

Toshev's work also aims to offer a better understanding of the present and future development of smart-grid technologies. He ponders the future scenarios of the market and discusses strategic planning.

Combining financial risk models with corporate strategies

In his research Toshev used data collected from surveys, questionnaires and action research case studies to examine factors influencing companies' strategies.

"Electricity price risk analysis showed decreasing volatility due to the establishment of Nord Pool Market and strong correlation among interconnected regions", he explains.

According to Toshev, the process consists of performing historic and Monte Carlo simulations using Nord Pool Spot market price data and calculating the quantile of the distribution of profit and loss over a target horizon.

Strategic analysis showed increased demand for flexibility in resource allocation. Toshev's work highlights the practicality of combining financial risk models with corporate strategies for market investors and company management.

"Such combined framework helps mitigate the risk of new technology development projects", he says.

According to Toshev, it also assists to formulate responses to likely and unlikely scenarios with multi-factor decision parameters. It also provides

tools to achieve coherency among diverse strategies between smart grid stakeholders.

Provided by University of Vaasa