Reliable Clean Energy Future Achievable for Minnesota

Boulder, CO [07/31/2018] – A new report published by Vibrant Clean Energy, LLC (VCE) shows that Minnesota can transition to a low-cost, low-emission economy by 2050. The report, which was commissioned by The McKnight Foundation and managed by GridLab, details numerous pathways for the Minnesotan economy to achieve a clean-power future. This transition was shown to decrease average household energy bills by up to $1,200 per year.

The detailed report tested ten different low-emission scenarios and found all of them to be robust and achievable for Minnesota. All scenarios retired the coal-fired power plants in Minnesota by 2030, replacing them with a portfolio of lower-cost, cleaner alternatives – including wind, solar, storage, demand-side flexibility, and transmission. The modeling demonstrated that the new system can reliably provide power for all parts of economy at 5-minute, 3-km resolution.

The low-emission pathways described in the report would allow Minnesota to achieve its target of reducing economy-wide greenhouse gas emissions by 80% by 2050. Meeting the 80% by 2050 goal also removes other harmful pollutants that will lead to improved air quality; lowering the instances of pollution-related illnesses.

"***What we found was that by increasing electricity demand via electrification the WIS:dom model could find combinations of low-cost, low-emission resources to provide power without fail.***" Said Dr Christopher Clack, CEO of VCE. He further notes that "***the combinations reduced local and global emissions, while providing jobs and reliable power at costs lower than today. In fact, due to electrification and decarbonization Minnesota would save a cumulative $51 billion in energy by 2050 compared with business as usual.***"

The study also included the electrification of transportation and heating. The model solved for all these new demands based on a least-cost approach. The addition of these new demands brings more control to the consumer-side, which allows the system to operate with greater flexibility and removes emissions from the electrified sectors.

The new low-cost, low-emission economy would bring substantial job growth to Minnesota. The modeling showed that electricity sector jobs would increase by 300% by 2050. The jobs would bolster the Minnesotan economy providing taxes, income, and GDP growth.

Under scenarios where emissions were not constrained more natural gas plants were built. This leads to the Minnesota economy being exposed to the price of natural gas, which is volatile. For example, in 2017, the national average price ranged from $2 to $7 per million BTUs. These price fluctuations could increase Minnesota's cost of energy by a cumulative $16 billion by 2050. The decarbonization pathways are more resilient to future fuel price hikes, because they are less dependent on natural gas.

One of the modeled scenarios electrified and decarbonized the Eastern Interconnection along with Minnesota. In this scenario, competition for resources resulted in Minnesota changing its pathway to align with the needs of the wider grid. The primary changes were more wind power, less solar power, and building additional nuclear. The whole Eastern Interconnection became more integrated and shared resources more frequently.

The executive summary can be downloaded from:
https://www.mcknight.org/wp-content/uploads/MinnessotasSmarterGrid_online.pdf
The full report can be downloaded from:
https://www.mcknight.org/wp-content/uploads/MNSmarterGrid-VCE-FinalVersion-LR-1.pdf

What are other experts saying about the report?

"***According to this new study, Minnesota can achieve a more affordable and highly reliable energy system as it cuts carbon pollution very deeply. This promising analysis documents the viability of a future where fossil fuel emissions are nearly eliminated from the power supply, and transportation and buildings are switched over to clean electricity***." – Michael Noble, Executive Director, Fresh Energy.

"***This report illustrates the practical potential to decarbonize a growing Midwestern economy, while saving money for Minnesota consumers and preserving grid reliability. The study demonstrates the importance of electrification, demand flexibility, and coordinated investment in renewable energy in meeting the State's existing goals, and charts a path forward for utilities, other businesses, and policymakers to capture this opportunity.***" Stated Mark Dyson, Principal, Rocky Mountain Institute (RMI).

"***The study provides a valuable set of scenarios to access deep decarbonization in a historically fossil-fuel, Midwestern state.***" *Said* Diane Munns, Senior Director, External Affairs, Environmental Defense Fund (EDF). "***Using a rigorous, cutting-edge modeling approach that incorporates the electric and transportation sectors, the study concludes that decarbonization is not only achievable, but smart for Minnesotans and the state economy***."

As noted by Rachel Fakhry, policy analyst for the Natural Resources Defense Council (NRDC), "**This is yet another comprehensive study confirming that *we can achieve deep decarbonization of our economy with existing tools and technologies. And that we can do it at modest costs. States and utilities thus have no reason to delay tackling climate change and delivering large public health and economic benefits in the process.***"

According to Charlie Smith, the Executive Director of the Energy Systems Integration Group (ESIG), "***This ground-breaking study is another clear indication that achieving society's future clean energy goals is a process involving multiple energy systems, with the electricity system at the heart of it. Minnesota has been a leader in the integration of clean energy into the electric system, and now into the entire economy. ESIG looks forward to continuing its work with Minnesota, Xcel Energy, and Vibrant Clean Energy in this critical effort.***"

About Vibrant Clean Energy: A nationally recognized energy grid modeling firm based in Colorado. VCE creates computer optimization software to study pathways for energy systems futures. It also performs studies using WIS:dom to provide expertise in new arenas of electrification, decarbonization and variable resources. The mission of VCE is to help facilitate universal, sustainable, and cheap energy for everyone.

About the McKnight Foundation: A Minnesota-based family foundation, seeks to improve the quality of life for present and future generations. Program interests include regional economic and community development, Minnesota's arts and artists, education equity, youth engagement, Midwest climate and energy, Mississippi River water quality, neuroscience research, international crop research, and rural livelihoods. Founded in 1953 and independently endowed by William and Maude McKnight, the Foundation has assets of approximately $2.3 billion and grants about $90 million a year.

About GridLab: A national non-profit that provides comprehensive and credible technical expertise on the design, operation, and attributes of a flexible and dynamic grid to assist policy makers, advocates, and other energy decision makers in navigating the energy transformation.

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