

## COLORADO LEADERS LAY OUT THEIR VISION FOR A CLEAN ENERGY FUTURE

Colorado is becoming a global leader in a new energy revolution – integrating sources of renewable power to meet the growing demands of the region's booming economy. But despite outstanding progress made towards emission-free power generation, important steps must be taken to more fully realize a clean energy future.

Increasing the availability and use of renewable energy will depend on more than additional wind turbines and solar panels. Utility executives will need to resolve a series of complex technical and operational issues. Several of these decision-makers participated in a recent roundtable discussion on the integration of renewable power generation as an overall percentage of our energy portfolio.

Husch Blackwell and the law firm's Energy and Natural Resources group hosted the roundtable discussion, which was moderated by Denver Business Journal.



**Left to Right:** Drake Bartlett, Xcel Energy; Brian Parsons, Western Grid Group; Dr. Michael Milligan, NREL; Matthew Burt, RES Americas; Cedric Ireland, Husch Blackwell; Not pictured: Steven Johnson, Western Area Power Administration

**DBJ:** What excites you the most as more renewable energy comes online? And what is your greatest concern about renewable energy integration?

**Steve Johnson, Western Area Power Administration:** What's exciting to me is you're seeing strategic partnerships and people getting together in ways we have never historically done in the utility industry. The greatest concern is that we have to fly this plane while we're building it. As long as we can stay ahead of some critical issues we'll be OK.

**DBJ:** Do those issues include building in additional flexibility for dispatching renewable energy across the power grid?

**Drake Bartlett, Xcel Energy:** The reason renewable generation requires additional flexibility is, number one, it's inherently variable depending upon the weather, you know, the wind or the sun. Secondly, as you increase the generation and penetration of these renewable sources, you displace the generation of some fossil fuel, which has historically provided virtually all of the system flexibility.

**Dr. Michael Milligan, NREL:** New renewable generators introduce additional variability, but early indications are that proper planning and policymaking can make wind and solar generators reliable during disturbances. This means thinking a little harder about some of the controls and building out the system to maintain this capability.

**Brian Parsons, Western Grid Group:** Flexibility has always been important in the power system. It is certainly being teed up as very important with renewable energy integration. Creative solutions, with existing resources and future system additions, will help with economic integration.

**DBJ:** I'd like to next turn to the topic of curtailments, which happen when the wind is blowing but the systems can't take that much renewable power. What's to be done to avoid curtailments?

**Bartlett:** We need to start looking at curtailments in relative terms, not absolute terms. Currently about 3% of our total potential wind generation in Colorado is curtailed on an annual basis. If you add a new wind farm and you're getting 97% of that generation as emission free generation that dramatically overwhelms the 3% lost resource.

We compared on a straight up economic basis how wind generation compares with gas fired generation and other opportunities, and we selected to add wind, even considering increasing levels of curtailment. Our selection of new wind farms was not driven by regulatory compliance. It was an economic choice.

**Matthew Burt, RES Americas:** From a wind developer point of view, the economics are very tight. There's a very large investment up-front to build these facilities. Quite often they are heavily financed. You have commitments to pay all the partners back. Curtailments in regions where there is no compensation or low compensation for what you're actually losing can be disastrous to the economics.

What we have seen in the wind industry in the last 5-6 years is a decrease in the energy costs. Utilities factor that into their economic decisions and tell the developer to expect 3% or however much curtailment. This means that the PPA (power purchase agreement) price will account for the expected loss.

**Johnson:** One thing we haven't really touched on is the issue with transmission. While we are moving forward with technology to improve transmission reliability and load ability, we still face the issue that many renewable resources are not near the load centers. Transmission availability is key in this scenario and does impact the balancing of traditional and renewable energy resources.

**Parsons:** The rest of the retail energy mix is likely to be changing. There are institutional and contractual factors that can be addressed to increase opportunities to join the larger energy market and for grid operators to acquire more flexible resources as some of the less flexible generation retires.

**Bartlett:** Having a larger, organized market really allows you to integrate variable renewable generation a lot more efficiently.

**DBJ:** Is a new joint balancing authority needed, or is there a better way to get at that cooperation?

**Bartlett:** It gets back to this concept of a utility's basic function – creating this balance between generation and load. It's our opinion that having an organized market hands down does more to help economically integrate variable renewable generation.

Colorado has less than half of the wind generation that is in Iowa and that is because they are smack in the middle of the 15-state Midcontinent Independent System Operator (MISO) system. The larger the geographic area and the more utilities involved, you get this larger generation portfolio. So increasing the size reduces the variability and increases your flexibility.

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**Cedric Ireland, Husch Blackwell:** I think this is the key for the West -- the coupling of a broader cooperation and shorter time dispatch is really going to solve many of our issues. You've got to set up the mechanisms for it. You've got to set up communications. You have to be mindful of the transmission network. But in the broader sense, this is kind of the Holy Grail that we're aiming towards.

**Parsons:** I think it's critical that we move in that direction, as broader cooperation certainly helps resolve questions about costs and reliability.

**Milligan:** We will also need to change some of our historic, embedded practices. For example, we've got a fragmented number of balancing authorities that could consolidate operationally throughout the Western Interconnect. These things are not simple to fix, but they're not rocket science either.

**DBJ:** As more renewable energy comes on line, what's the most exciting opportunity from your perspective?

**Burt:** There are some really exciting new projects being built, both here in the states and other parts of the world. My hope is that technology continues to improve and becomes more efficient and economically viable.

**Bartlett:** If we can expand the reach of our balancing authority, I think we can see a whole lot more development in Colorado and Wyoming and that energy can go to places that may not have the wind resources we do. So I think that's tremendously exciting.

**Parsons:** It's exciting that we have the tools and technology, and the understanding of how more cooperation can help.

**Johnson:** In the future, we could see over 50 percent of our electricity being provided by renewable energy. It is exciting to consider we are the generation working to make this happen and to see what technologies are developed to allow for this fundamental change in how we currently operate the grid.

**Milligan:** If you have 50 percent annual energy coming from renewable resources, how many hours of each year are you going to be getting essentially all of your generation from these sources? These are hours you could shut off all of the coal plants and the gas plants. You've got a 100 percent renewable power supply. Now will the system even work? That's the question, and I'm certain that we can figure out a way to make that work.

**Ireland:** What excited me most is that we're in the early stages of an entirely new energy revolution based on emission-free power generation. The business models are proving to be viable and cost-effective, and I'm confident the progress we've made thus far will continue.

*Husch Blackwell LLP is proud to sponsor this professional roundtable event and would like to thank the Denver Business Journal and our participants for their contributions.*

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