



# STORAGE: THE GLUE OF THE LOW CARBON ECONOMY

## VIDEO TRANSCRIPT

**Caroline Narich, Managing Director, NA energy transition services lead, Accenture**

Good morning, Dan.

**Daniel Kammen, Director of Renewable and Appropriate Energy Laboratory (RAEL) at the University of California, Berkeley**

Good morning.

**Caroline**

Thank you so much for sitting down with me today. After months of research, countless discussions, and several industry workshops our study is finally out. I personally am really proud of the work we've done. And I really believe that our findings will help to move the dialogue along. But let's start talking today about why we chose to do the study in the first place and **why storage is such a hot topic for utilities today.**

**Daniel**

Well, I would say the fundamental one is that we now see jurisdictions around the world here in California, now federal in the United States, and China, Korea, across Europe, all embracing the 100% clean energy target By the mid century, or roughly by mid century. And to do that we're going to need all of our clean energy options. But we're also going to need dynamic and smart

storage. And our study is all about how to innovate for that and how to integrate that in not only technically but in terms of ways to really make the markets excited and hum in this new direction.

**Caroline**

Yeah, I think one thing that you mentioned to me before is you called it the glue of the low carbon economy. And I really liked that analogy. And I think it's one that really reinforces the traction really, that we're seeing storage get across the world. But you know, so we know it's an important topic to study. **But why this study?**

**Daniel**

Well, I think you're right, I do think that glue is the term we're going to think about in terms of storage later on. It's not just a smart grid, but it's also having storage when you need it at the home scale at the business scale at the kiosk, scale, industrial scale. And to do all that the crucial thing you need to look at is not just how the technology is evolving, which we do in the study. But it's to understand where the markets are, where the markets opening, where are the markets need some policy and regulatory support, and everyone from businesses, to policymakers, to investors to environmental groups that want to see real progress all are



looking for studies like ours, that integrate the technical progress with the policy in the market progress.

**Caroline**

Yeah, I agree. I think that was one of the things that that really stood out to us as a gap in the market before we kind of kicked off right, just a combination of having the long term policy landscape where we saw the market, the kind of the policy landscape going and then, as you said, really like the practical realities of deploying storage onto the grid today, which, you know, are challenging for sure. Um, so let's talk about our findings a little bit. What did the study really validate for you? And what do you think kind of surprised you most as we went through the work?

**Daniel**

Well, I guess what surprised me is the place to start and that is we are far better armed with tools to make energy storage a technical and economic reality than many people realize. We tend to look at the learning curve, the cost curve as a starting ground. But the fact that storage is diverse in its technologies, and that there's options for the shorter term storage like lithium ion batteries, but a whole range of emerging long term options, including flow batteries and flywheels and hydrogen, there's a wide range and so I think the surprise is exciting me, but with the study really validated for me was that as much as we push the prices down for renewables, it means far, far less unless we also not only push the price down for energy storage, but also push it into the market because 30:00 we need to have experiments done by cities and states and nations and provinces and cantons to really figure out which aspects are going to best meet their local market conditions.

So, we focused a little more on the western US market. But it's emblematic, because we have states that are very fossil dominated. And states like California, and now Washington, New Mexico that are very clean, and they're going to

need different types of storage. And I think that's what gives me the most excited hope that we've got those technologies. Now we need to really have this technology push, demand pull conversation for a decade to really get this out there.

**Caroline**

No, I agree, I think also, you said something about, you know, having the tools but also needing a lot more studies, right, and a lot more kind of examples and, and really kind of a body of learning great and case studies, for us to kind of further the application of storage in the market. So just you know, given that context, I wonder if you could talk a little bit more about **what you see, as the kind of the key takeaways for industry practitioners?**

**Daniel**

We actually have a chart in the report that highlights there are so many different economic opportunities for storage, it's not just providing that backup power, its ancillary power, it's cold storage capability, its frequency regulation, it's a whole range of things. And there's no market in the world that values, even a fraction of them. Some are good on one, some are okay on the other, but we don't have is a holistic perspective on all of the different services that storage provides.

And when you get into those details, you really find that even very traditional utilities could leapfrog to a much smarter system if storage was entered in it removes, of course, any anxiety about intermittency of renewables.

But it also provides a higher level of resilience and backup. And it's not just a normal operation, when we have crises or power lines go down or fire something we have in California, unfortunately, now, all of those things, storage has been a real winner in allowing us to move to a smart grid.

And so, I see that package is something that



every investor, every technologist, and really every policymaker should think through because these are the markets of the future. And if we're serious about 100% clean energy, which we must be, we've got to think of storage as a co-equal as the glue to hold that low carbon economy together.

**Caroline**

Yeah, I think that there was another phrase that came up in one of our workshops, just moving away from the perspective of reviewing storage as a last resort, right, and really providing the incentives in order to kind of allow a variety of assets to compete in the market, and to really provide that flexibility that we need for variable energy.

**Daniel**

Well, that's right, I personally think of storage as a co-equal. And whether you're in a world where it's carbon price that's a driver or a European style feed in tariff or US style renewable portfolio standard. I think of storage as just on the front lines with the renewable sources, the low carbon sources, and the market should reflect that it should reflect that all of these play in a critical way.

And to devalue one versus the others, holds back and makes more expensive the transition, it also makes the transition less socially and racially just because if we don't invest in the storage, we need now to support frontline communities, communities, we haven't invested in low income estates, housing projects, if we don't make those co equal on getting clean energy access, we hold back not only the market, but we also hold back so many of the social benefits that come from that 100% clean energy economy.

**Caroline**

Yeah, I think that's a really good point. And I think, luckily, something that the current administration is really focused on as well. So

hopefully, we'll see kind of do things moving together. I think one other thing that I would add in terms of maybe the industry takeaway, from my perspective, also is just the additional investment that we need in digital as well to support energy storage.

And I think we saw that with some of the market examples, right, just the reliance on machine learning to really optimize the revenue stack for storage, [which is very challenging to achieve, because of the reasons that you mentioned just now, right? There just aren't that many markets open to storage, but balancing the different pieces.

And one of them one of my colleagues has been very in the weeds on this has been such an aid to me, which I thought really resonated, which was just a human cannot do the trading and the optimization that machine learning can do.

**Daniel**

I'm really glad you said that, because I think a couple years ago, saying that, we're going to have to make the system smart, we're going to need sensors, we're going to need machine learning to really optimize would have been kind of a scary proposition. But the one thing that's very clear is that the single commodity that's decreasing in cost and increasing and performance most quickly in the world, is actually information technology.

And so the more we build this in so that our storage units anticipate what's going to happen with clouds that are coming in, so that we know there might be a drop in solar, so they should get ready and spin up some of the storage resources. And being able to sense nodes in the distribution grid, that might need to be reinforced by having some power come out of storage.

These are things that are all actually quite easy today. They make utilities jump from being creatures of the 19th and 20th century to being creatures of the 21st century. And smart systems, digital technology, storage are core to



that.

So I actually think that for utilities that really want to be at the forefront, they want to meet customer demands, they want to maximize revenue, this is a place to hit the environmental, social justice and financial bottom line all at once. The triple bottom line, I think, requires technology, smarts and storage.

### **Caroline**

I think that's an interesting point. I, I definitely see, from my perspective, working with a number of utilities in North America and in the past, kind of in Europe, and just how much also utilities, you know, it's obviously a patchwork but how much they are embracing and how much they realize the importance of digital.

So, I think it's really exciting. I do think it's that the pace of technology is really accelerating the pace of business change as well. So these things are kind of coming together. And all of these commitments that we're seeing as well. Hopefully, we can bring all the pieces of the puzzle together and really kind of drive change.

### **Daniel**

Hopefully, the number of markets where this is going on really grows, because I don't know any place that doesn't benefit by having storage into the system. We have different rules around the world. But certainly any place that thinks through a transition and plans, the path to zero carbon is going to have to embrace what we have in the report, it's going to have to embrace kind of customer dialogue that you do at Accenture, which is really to make clear how these opportunities are a mixture of technology business and providing a social good, and that's, you know, what I think most companies ultimately want to say they're doing so I'm very excited about what I think we brought together in this report.

What I think is so exciting about the work we've done is that not only do we see that storage is

here now, but the path of innovation is fast and is furious. And it means that we have the storage glue ready to go for the markets that are ready to uptake. This technology. So we've got the tools. Now we need to really get on with the deployment and innovation will follow. It's really exciting, dynamic time

### **Caroline**

I think it's a great study, hopefully, people will get some interesting insights from it. And it will help to push the dialogue along. I think there are a lot of questions still to explore. So I'm looking forward to continuing to work with you to explore some of those questions. And yeah, thank you so much for kind of sitting down with me today and talking through the report. I look forward to kind of more conversations with our broader kind of industry colleagues on the topic.

### **Daniel**

And it's exciting, we've got a lot to do so but it's the perfect time to start. So thanks for working with us. We really appreciate it.

### **Caroline**

We really enjoyed it. So thank you so much. And thanks for your time today. And yeah, looking forward to our follow up conversation.

### **Daniel**

Perfect. My thanks as well.

Copyright © 2021 Accenture  
All rights reserved.

Accenture and its logo  
are registered trademarks  
of Accenture.