KEYNOTE INTERVIEW

Electrification: The backbone of the energy transition



US electricity demand could double by 2040, mainly driven by the growth in data centre computing capacity and the electrification of transport, say Energy Capital Partners' Francesco Ciabatti, Matt Himler and Alexandra Witteveen

Energy Capital Partners (ECP) has been in the electricity business for almost 20 years, but has never witnessed the level of stakeholder interest seen today. That's because, while there is consensus between governments, regulators, investors and consumers that reducing global carbon emissions is one of the greatest priorities in generations, the challenges of reaching net zero (without sacrificing reliability and affordability) are forcing stakeholders to recognise the importance of electrification in lowering the carbon footprint of many segments of the economy.

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This decarbonisation-by-electrification will result in significant electricity demand growth that, it seems, many in the industry have been caught unprepared for. ECP sees an urgent need to invest meaningfully in infrastructure assets that will support accelerating demand for electricity and make the grid more reliable.

Q What is driving this step change in electricity demand growth, and why now?

Matt Himler: After decades of relatively stagnant US electricity demand growth, we now expect electricity demand to increase by between 1.5 and two times over the next 15 years. There are a number of different forces contributing to this growth, including a revival of US manufacturing, underpinned by federal and state incentives supporting the decarbonisation and digitalisation transition. In addition,

households are shifting away from fossil fuels by installing electric appliances and heat pumps. Some of this is being driven by consumer preference, but local jurisdictions are also mandating this shift. New York State, for example, has decreed that all new buildings must install electric heating and cooking appliances by the end of the decade.

While the above are contributing to the increase in US electricity demand, the two largest demand drivers are the proliferation of energy-intensive data centres and the penetration of EVs. Data centres account for around 2.5 percent of US electricity consumption; this number is expected to increase to between 7.5 and 10 percent over the next 10 years.

This rapid increase can be attributed to AI and machine learning applications, relatively newer demand drivers that are three to four times more energy intensive than traditional data centres. To put this in perspective, each high-performing chip utilised in these applications annually consumes as much electricity as one US household.

Francesco Ciabatti: In the latter part of this decade and the 2030s, we believe it will be the electrification of transport that is going to drive meaningful incremental electricity growth and really carry us into 2040. A combination of carrots, in the form of EV tax credits and other incentives at the federal level, coupled with federal regulations meant to tighten internal combustion engine (ICE) pollution standards and certain states banning the sale of gas-powered cars, are expected to drastically increase the number of EVs on the road.

There were about one million EVs sold in the US in 2023, which was a 50 percent increase from the year prior but still a small fraction relative to the 13 million ICE vehicles sold during that same period. Importantly, EV sales are expected to continue to grow and will account for a third of new vehicle sales by the end of the decade.

As a result, we are still in the very early innings of realising the impact of EVs on electricity demand. With automakers ramping up EV production, and improvements in battery technology and cost making EVs competitive with ICE alternatives, the conversation around EVs is rightfully shifting to the incremental electricity needed to fuel these vehicles and the charging infrastructure required to support it. The forecasts are staggering: US electricity demand from EVs is expected to grow from a relatively modest 17 terawatt hours per year today to 200 terawatt hours by 2030 and 800 terawatt hours by 2040.

To add to this puzzle, the need for millions of new EV chargers will be a

Q Why does it feel like the need for greater capacity is catching people off guard?

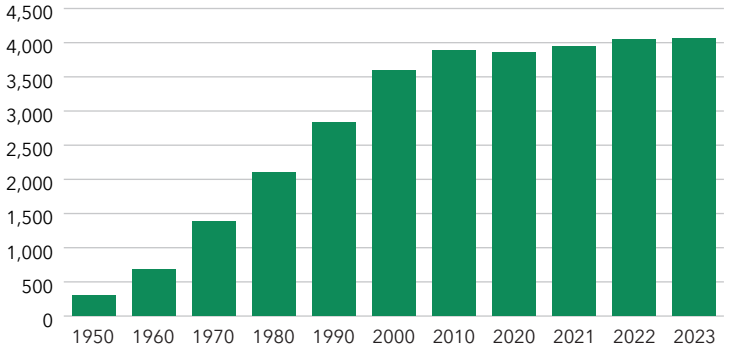
Alexandra Witteveen: Despite recent media attention, we believe the aggregation of forecasts prepared by regulators, system planners and load serving entities for the US continues to be 15 to 20 percent light by 2030 and perhaps as much as 25 percent light by 2035.

In their defence, this is partly due to how quickly some of these drivers, AI-powered electricity consumption in particular, have developed. The power industry is used to things moving slowly and this has been anything but that.

Further, the tools used for forecasting really weren't designed to capture structural change. System planners mostly rely on regressions for forecasting future electricity demand. Regressions are the mathematical equivalent of saying, 'What has the historical relationship between electricity consumption and key economic indicators such as GDP growth been? Let's use that relationship going forward.' Through the late part of the 20th century and into the early 2000s, it was a safe bet that electricity demand growth would be 60 to 80 percent of GDP growth. In the early 2000s though, energy efficiency measures hit the scene, causing that historical relationship to fall apart. This led system planners to systemically over-forecast electricity demand for almost half a decade, as GDP grew but electricity demand remained flat.

We believe something of the opposite is now happening. It is counterintuitive, but by lowering its cost and making our consumption of electricity more efficient, we have dramatically increased demand in opening up large new uses for electricity like data centres and EVs. The tools used by system planners weren't designed to capture these structural changes, so they have been caught off guard.

US electricity demand (terrawatt hours)



Source: US Energy Information Administration

complex challenge for utilities across the country; much of the last mile infrastructure was not designed to deliver the quantities of power that will be needed at centralised charging locations, and individual consumers will risk stressing the grid beyond its limits should they choose to home charge their vehicles during peak hours.

Q How is this translating into investment opportunities?

Alexandra Witteveen: The US needs power plants – and lots of them. We are the largest private owners of natural gas generation capacity in the country and, last year, natural gas generation accounted for approximately 40 percent of all electricity produced.

The role of gas will evolve as the needs of the grid change, but almost all of the high-quality gas plants in operation today will still be needed by 2050. Furthermore, difficulties in permitting and interconnection, together with supply chain challenges and higher interest rates, mean new gas plants are increasingly difficult and expensive to build. These trends increase the value of existing infrastructure – this is not a passing trend, but rather a durable and attractive investment opportunity.

MH: There is a wave of renewable capacity coming online. This is driven by declining equipment costs and improving technology, long-term visibility around tax credits via the IRA and maybe most importantly, society's view of a decarbonised power grid, which is resulting in corporates like Amazon and Google signing power purchase agreements for renewables.

Putting this together, we expect renewable capacity to more than double from 350GW to over 750GW by 2030. To fund this growth, especially in the higher interest rate environment, renewable developers are raising capital by selling interests in operating assets and then taking that capital and rotating it into higher returning development projects.

Given our sector knowledge and relationships in the power markets, we believe there is a large and growing opportunity to acquire interests in operating renewable projects. Last year, we executed on this strategy with Orsted for its first North American renewable asset sell-down, and we believe there is more to come.

AW: We are also seeing a lot of opportunity to build new infrastructure. Renewable additionality is core to our investment mandate and the opportunities are attractive.

Historically, a lot of the challenging work in renewable development concerned the procurement and construction phase of a project; this difficulty led to higher returns for developers able to navigate that. We pursued that thesis by bringing projects through construction and into operation in investments such as Terra-Gen.

However, we are increasingly of the view that permitting and interconnection is where the friction lies today, and therefore where to find attractive risk-adjusted returns. We have pursued this thesis with recent investments in New Leaf Energy and Triple Oak Power, which are developers taking projects from conception through to the point at which you would put a shovel in the ground. The projects are then sold to traditional developers, who take them through construction and into operation.

FC: We are also not losing sight of the demand-side management part of the equation. As the electrification of transportation and industrial processes expands, the value proposition of energy efficiency and other demand-side measures is expected to continue to increase, as avoided electricity consumption becomes more valuable.

The US still has a lot of work to do, as more than 80 percent of buildings are more than 20 years old and often suffer from inefficient equipment such as lighting, air-conditioning and building management systems. As avoided electricity becomes more of a priority and retail rates rise, we are seeing a broadening of the traditional energy efficiency universe to focus on measures like electric heat pumps.

We have already backed the team at Metrus Energy to tackle the problem of decarbonising US infrastructure, and we believe the urgency of lowering consumption will only increase as electricity demand continues to spike.

Q What do you see around the corner as you focus on future capital deployment into the energy transition?

MH: Digital infrastructure, and the future development and construction of data centres, is now a power puzzle. This power puzzle is not about physical generation, but access to grid interconnection where bottlenecks are slowing the development of data center capacity. As a large owner of power interconnects via many of our portfolio companies, ECP is well positioned to solve this puzzle for data center operators and hyperscalers.

FC: Looking just a bit further ahead, we see a number of emerging subsectors that have the potential to add meaningful incremental electricity demand to the equation. For example, we have been studying green hydrogen as a potential meaningful contributor to decarbonising hard-to-abate sectors. Building these assets will require access to a massive amount of electricity, thus creating another strong contributor to the electricity growth story.

We see electricity as the main character in the global energy transition, but there is also a supporting cast including the likes of sustainable aviation fuel, renewable natural gas, renewable diesel, carbon capture and green hydrogen. Ultimately, we are looking for exposure to a wide spectrum of decarbonisation assets, all of which represent important investment opportunities. ■