

Gridlocked: Investment opportunities in America's grid upgrade

Research & Insights

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Ausbil Investment
Management Limited
ABN 26 076 316 473
AFSL 229722
Level 27
225 George Street
Sydney NSW 2000
GPO Box 2525
Sydney NSW 2001
Phone 61 2 9259 0200

The world's electricity grids are large, but they are about to become giants with the fundamental shift to the electrification of everything as the world moves towards net-zero carbon neutrality targets. Ausbil's Global SmallCap team looks at this generational change in power markets and discovers opportunities for unrecognised growth in the world's global small-cap markets from this rolling thematic.

10-minute read

Key points

- Opportunity: Small companies that are demonstrating unrecognised growth potential driven by their exposure to the forthcoming US electricity grid infrastructure upgrade needed to deliver decarbonisation and achieve net zero targets.
- By 2050, US power capacity is set to double with increasing demand and a growing dominance of renewable energy sources. It is estimated that the grid will likely need to triple in size by 2035 to be able to meet the supply and demand dynamics of renewable energy, and users of electricity.
- Extensive US stimulus packages focused on infrastructure, semiconductor chips, and on inflation reduction are providing significant capital to fund the changes needed by the grid and its users.
- It will not just be infrastructure and utility companies that benefit from the expansion, upgrade and renewal of America's electricity grids. We believe that there are many opportunities in global small caps to benefit from this major grid expansion over the coming decades.

Q: In a nutshell, what is happening to electricity grids as we decarbonise?

A: In order to address global warming and the existential threat of climate change, the world has embarked on a process of decarbonisation in order to reduce, and in many cases eliminate, carbon emissions that are damaging the earth's atmosphere, with the aim of achieving net zero carbon emission by 2050. The shift from fossil fuels, which are the major cause of carbon emissions, to renewables is a multi-decade challenge. The US is expected to see installed grid capacity double or triple and will require approximately 10,000 miles of new high-capacity lines. We believe that there is a major opportunity in small caps that are leveraged to the huge flow of capital in all parts of this grid upgrade in order to ensure that it is not 'gridlocked' as the shift to renewable power grows.

According to the US Department of Energy (2022), more than 70% of transmission and power transformers in the US energy infrastructure are over 25 years old. Increasing demand will require an estimated 60% expansion in US transmission systems by 2030 and a three-fold increase in existing capacity by 2050. Moreover, frequent and extreme weather events like hurricanes and wildfires threaten reliability and resilience, requiring upgrades in cables, operating plants and technology. There is currently insufficient manufacturing capacity to meet demand for grid transformers and component parts in the US, which is creating major demand for a specialist list of companies that are optimally placed to benefit from the ensuing expansion of America's grids.



Simon Wood

**Portfolio Manager -
Global Small Caps**

Phone: +61 2 9259 0251

Email: simon.wood@ausbil.com.au



Tobias Bucks

**Portfolio Manager -
Global Small Caps**

Phone: +61 2 9259 0246

Email: tobias.bucks@ausbil.com.au



Joseph Kim

**Equities Analyst -
Global Small Caps**

Phone: +61 2 9259 0217

Email: joseph.kim@ausbil.com.au

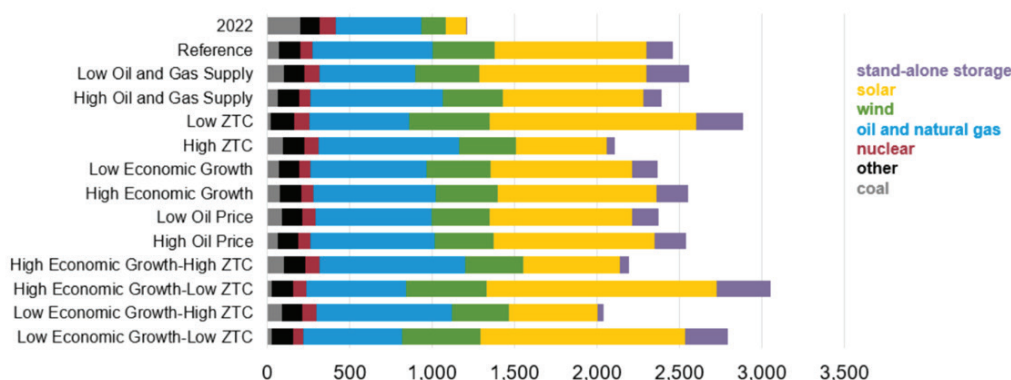
Q: How is the US electricity grid expected to change over the next few decades?

A: The need to expand the power distribution grid is driven by economic growth, population growth, the switch to renewable energy and the electrification of things, and will see installed electricity almost double on the base case out to 2050, according to the US Energy Information Administration (EIA). The outcomes may vary depending on zero carbon technology costs, economic growth, and the oil price. Chart 1 illustrates the range of scenarios.

Chart 1: Total installed capacity projections for the US

Total installed capacity in all sectors, 2022 (history) and 2050
gigawatts

eia



Data source: U.S. Energy Information Administration, *Annual Energy Outlook 2023* (AEO2023)

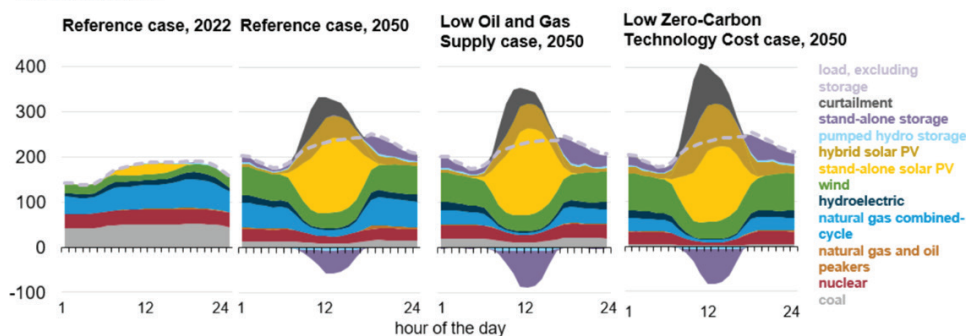
Note: ZTC=Zero-Carbon Technology Cost; other=geothermal, biomass, municipal waste, fuel cells, hydroelectric, pumped hydro storage.

As illustrated in Chart 2, changes to the energy generation mix will see coal shift from one of the major power sources to one of the least significant. According to the EIA, base case coal consumption in the US electric power sector drops to 189 million short tons (MMst) in 2030, and to 131 MMst in 2050 from 458 MMst in 2022, representing a fall in coal's contribution by over 70% from 2022 to 2050.

Chart 2: The energy mix changes radically as we approach 2050

Hourly U.S. electricity generation and load by fuel for selected cases and representative years
billion kilowatt-hours

eia



Data source: U.S. Energy Information Administration, *Annual Energy Outlook 2023* (AEO2023)

Note: Negative generation represents charging of energy storage technologies such as pumped hydro storage and battery storage. Hourly dispatch estimates are illustrative and are developed to determine curtailment and storage operations; final dispatch estimates are developed separately and may differ from total utilization as this figure shows. Standalone solar photovoltaic (PV) includes both utility-scale and end-use PV electricity generation.

With an almost doubling in grid capacity by 2050, as illustrated in Chart 1, the US electricity grid is on the cusp of needing major renewal, expansion and digital upgrade in order to be able to carry and process this huge ramp-up in renewable energy. The US electricity grid has been described as the largest machine in the world, comprising eleven thousand power plants, three thousand utilities, and over 3.2 million kilometres of power lines. Underlying this massive web of wires, power stations and transformers across the US are three key macro-grids that link to one another, but are each their own ecosystem, the East, West and Texas grids.¹

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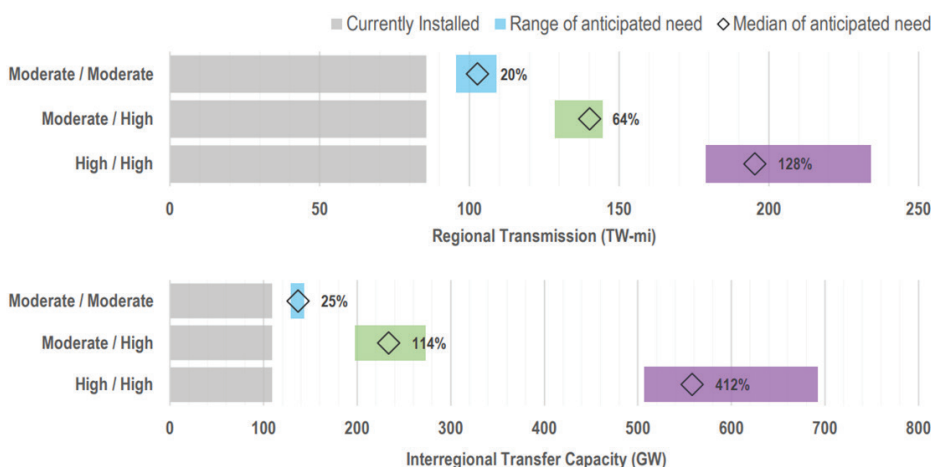
These three major transmission grids only connect at a few points and share relatively little electricity between them. According to Popovich and Plumer (2023), these three grids each comprise a patchwork of operators that often have competing interests, making it difficult to build the additional power lines needed to support new power, including solar and wind. These hurdles include convoluted permitting processes, community engagement and opposition across multiple jurisdictions, and the lack of an overriding authority for a national grid.ⁱⁱ

The projected doubling of installed energy capacity in the US by 2050 (EIA, 2023) will require significant upgrade and expansion of the national grid. According to research by the National Renewable Energy Laboratory (Denholm et al., 2022), the US electricity grid will require capacity up to almost three times today's capacity and will need up to 10,000 miles of new high-capacity lines by 2035ⁱⁱⁱ. A recent report from the US Department of Energy (2023) has projected that regional transmission grids in the US will need to increase installed grid capacity by around 64% for the most commonly expected energy growth case, with high demand requiring the grid to more than double its transmission capacity (+128%) by 2035. There will also need to be an expansion of inter-regional transfer capacity from 114% to meet moderate load and high clean energy growth, and 412% to meet high load growth by 2035, as illustrated in Chart 3.

Chart 3: The huge projected grid resizing needed for the US

Anticipated transmission and transfer capacity need for contiguous United States in 2035

Three different future scenario groups labeled as ___ load / ___ clean energy growth.
Median % growth compared to 2020 system shown.



Note: Median and interquartile range of within-region transmission and interregional transfer results for six different recent capacity expansion models shown. Currently installed transmission and transfer capacity as pictured from Denholm et al. (2022a). Considered scenarios are categorized into groups by their future load and clean energy growth, respectively (e.g., High load/High clean energy growth).

Source: US Department of Energy, Denholm et al. (2022).

Q: What is helping drive and fund the expansion of electricity grids in America?

A: Supporting grid development is a range of policy initiatives and stimulus largely linked to the pandemic stimulus packages, and driven by the shift towards decarbonisation. The Infrastructure Investment and Jobs Act (2021) is providing US\$1.2 trillion in stimulus, including US\$550 billion of new federal investment in America's infrastructure, economic resilience, internet, and other initiatives. The Inflation Reduction Act (2022) has added US\$500 billion in stimulus through spending and tax credits. The CHIPS and Science Act (2022) - CHIPS (Creating Helpful Incentives to Produce Semiconductors) - has added US\$280 billion in funding for American semiconductor research, development, manufacturing and workforce development, some of which will factor in the upgrade and renewal of US electricity grids. Other funding will come from utilities, the users and operators of these grids, and the customers who ultimately pay for energy and transmission.

Q: What is the small-cap opportunity here?

A: While the electricity grid might seem the domain of mega-cap utility stocks, due to the complexity of the nature of this infrastructure and its underlying components, we believe that companies that contribute to the servicing, upgrade and expansion of the electricity infrastructure will also have significant roles in the infrastructure upgrade. We believe that certain small-cap companies, due to the relevancy and competitiveness of their operations, will benefit from the potential sizeable investment in the upcoming upgrade. Three such small caps that we think are set to benefit from potential growth in demand for their products and services from the infrastructure upgrade are: Atkore (NYSE: ATKR), which manufactures electrical cable and cable infrastructure; EMCOR Group (NYSE: EME), involved in electrical and energy infrastructure construction; and NKT (OMX: NKT), a manufacturer of cables and cable accessories for energy infrastructure.

Q: What types of companies are you talking about? Can you give us some examples?

A: Simply put, there is significant potential for some specialist small-cap stocks which the market may have under-appreciated. Atkore, for example, is a leading provider of electrical infrastructure, including cables, piping conduits and electrical raceways used in a whole array of construction (data centres, grid upgrades, manufacturing facilities, and office, industrial and residential new builds, and renovations). Atkore's conduit products serve a crucial role in facilitating the underground placement of power lines, commonly known as grid hardening. By moving power lines underground, this enables the electricity grid to better withstand the effects of extreme weather events and other natural disasters, such as wildfires.

We believe core earnings are supported by the strategy's expectation that non-residential capital expenditure will continue to increase in the US, driven by several themes, including: the onshoring of supply chains back to the US; grid upgrades; ongoing non-residential manufacturing investment; and government support. The strategy is also seeing catalysts supporting demand for Atkore's conduit products from some of the largest direct US federal grid investments in history. This includes the Grid Resilience and Innovation Partnerships (GRIP) Program initial \$3.46bn investment (of a total \$10.5bn) for 58 projects across 44 states to strengthen electricity grid resilience and reliability across the United States. We believe Atkore's national network of manufacturing plants are positioned to capture national grid hardening and resiliency investments with the potential to drive positive earnings revisions for these segments.

Another notable US company that we think is positioned to benefit from the boom in grid investment is EMCOR. EMCOR is at the heart of the grid expansion as a constructor of critical electrical infrastructure, including semiconductor plants, biotechnology environments, and energy infrastructure. EMCOR's electrical construction and facilities segment covers planning, installing, operating, maintaining, and protecting complex operating plants, including those required to support and maintain complex electrical energy grids.

Large scale grid related projects which tend to be long-term endeavours are expected to provide a stable and growing revenue stream while also improving margin profile for EMCOR as they optimise their operations to cater for increased demand.

Based out of Denmark and listed on Nasdaq Copenhagen, another company set to benefit is NKT which manufactures and installs low, medium and high voltage cable for the electrical grid. Founded in the 19th century, NKT is a leader in electrical transmission and distribution across 16 countries.

The pipeline of renewable energy installations has surged on rising net zero commitments and investment, driving the need to expand and upgrade transmission networks. This includes renewable energy from remote resource-rich areas to population or industrial centres. Integral to transporting power over long distances are high voltage direct current (HVDC) transmission systems due to their efficiency qualities compared to other systems.

Significant HVDC equipment and cable capacity has already been secured by large scale projects in Europe, pushing delivery dates for new HVDC converter and cable orders into the 2030s. This has tightened global supply significantly and is expected to stay tight as demand for grid cable and component parts remains strong due to demand from the US, and other developed and emerging markets.

NKT's own order book has risen to €14bn in contracts for projects, with a further €13bn in framework agreements with state utility operators because of concerns around the availability of supply cables to meet regulatory obligations. This has risen from a typical €1.2bn worth of orders received annually in the period from 2017 to 2019. As an example, the Champlain Hudson Power Express is a project in which NKT is involved. This project is focused on New York state and will deliver electricity generated from Hydro-Québec in Canada directly to New York City.

We believe that the constrained capacity within the market, guarded by specialised manufacturing processes and facilities, is expected to result in a substantial rerate in operating margins for NKT in a sector historically characterised by low profitability.

Q: In conclusion what excites you about this opportunity?

A: Perhaps the most exciting aspect of the grid upgrade is that these small-cap companies have strong, largely unassailable specialisations in the manufacture, installation and maintenance of this major energy infrastructure. As a result, they are looking into decades of above-average demand growth which is hard for others to contest. We believe that the outlook for earnings and earnings growth for these small caps is largely yet to be recognised by the market, offering significant potential for unrecognised earnings growth over the coming years, backed by a rapidly unfolding world charged with renewable energy.

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Contact Us

Institutional



Adrian Amores

Head of Global Institutional Distribution
Phone 0435 962 052
Email adrian.amores@ausbil.com.au



Fawaz Rashid

Senior Manager, Global Institutional Distribution
Phone 0401 830 483
Email fawaz.rashid@ausbil.com.au

Wholesale



Hik Chadirchi

Head of Wholesale Distribution
Phone 0424 160 728
Email hik.chadirchi@ausbil.com.au



Andrea McGarry

Business Development Manager, QLD & NT,
Wholesale Clients
Phone 0411 465 426
Email andrea.mcgarry@ausbil.com.au



Dimitri Giannaras

Business Development Manager, NSW & ACT,
Wholesale Clients
Phone 0431 576 815
Email dimitri.giannaras@ausbil.com.au



William Orr

Business Development Manager, NSW,
Wholesale Clients
Phone 0402 620 188
Email william.orr@ausbil.com.au



Marko Matosevic

Business Development Manager, VIC, TAS & WA,
Wholesale Clients
Phone 0431 340 553
Email marko.matosevic@ausbil.com.au



Michael Peros

Business Development Manager, VIC,
Wholesale Clients
Phone 0401 430 426
Email michael.peros@ausbil.com.au

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