

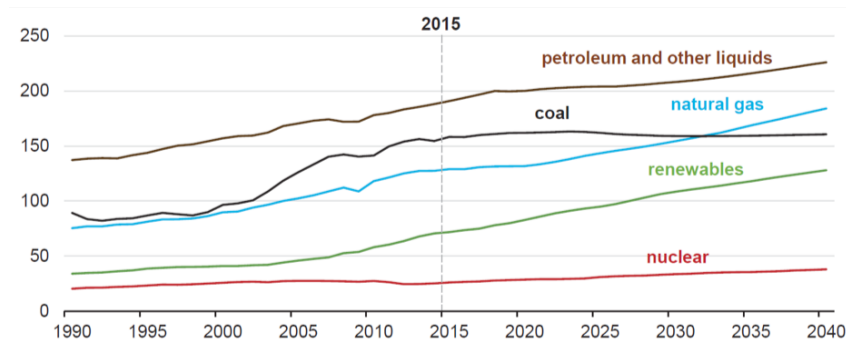
Global energy and the leading role of listed utilities

By Fraser Hughes



The increasing demand for cleaner energy, and especially renewables, will be met by an engaged and greener utilities sector.

According to the International Energy Agency, if we continue our current path, global energy demand will grow by 28% by 2040¹, with increasing electrification transforming traditional ways of meeting demand. It is envisaged that 40% of this growth will be met by clean energy technologies, with solar power becoming the cheapest form of new electricity in many countries around the world in the future.

Chart 1: World energy consumption, by energy source (QBTU)


Source: International Energy Outlook 2017

Challenges faced by utilities:

- Increased interconnection
- Small-scale generation
- Storage efficiency
- Changes in demand for electricity
- Regulation changes

Another key development is the growth in natural gas. By the mid-2020s, the USA will become the world's largest exporter of Liquid Natural Gas (LNG). Chart 1. maps the consumption of energy sources over the coming 25 years. A third of energy demand growth will come from India, as China's new economic strategy takes it on a cleaner energy growth path. Today's changes in the electric industry are unlike anything in recent history. Historically, the focus was on the grid network and centralized generation, but now and in the future, the industry is focused on the end-to-end system that delivers energy services to the customer. Moreover, it focuses on the information-sharing relationship between the utility company and its customers, both business and residential.²

The integration of new technologies empowers customers to increase their energy productivity and better manage their energy use. In addition, customers, regulators and policy-makers are also looking beyond safety, reliability and cost, to the environmental aspects of generating and transporting electricity.

In the Energy Information Administration (EIA) Annual Energy Outlook 2017, total electric power industry capability in the USA is forecast to increase a total

of 20%, or an annual rate of 0.8% from 2015 through 2040. The USA will become less energy intensive (as is the case in all other regions/countries) because of the wide use of electric appliances and improving energy-efficiency standards. However, it is the mix of energy sources that will change significantly, with coal capacity expected to decrease 35%, an estimated 90 gigawatts of capacity going into retirement.

Conversely, renewable generation capacity is estimated to grow by 117% over the 2015 to 2040 forecast period.³ In Europe, the European Commission has reaffirmed its goal of a 40% reduction in CO2 emissions by 2030 and its intention for the European Union to lead the energy transition through its 'Clean Energy for All Europeans' package of proposals. The challenge is combining this transformation with growing populations and the future demands on the grid.

The Shifting Landscape

Residential and commercial buildings currently account for approximately 21% of the world energy consumption, and this is expected to be remain consistent to 2040. Growth is projected to be 32% between 2015 and 2040 driven by growing populations and urbanisation in emerging non-OECD countries. This energy mix will be led by the growth in the use of electricity and natural gas. Industrial energy use makes up approximately 50% of global energy use and it is projected to increase 18% (the vast-majority from non-OECD countries) to 2040, at a slower rate compared against transportation and residential and commercial buildings.

Transportation will remain heavily reliant on refined petroleum and other

liquids despite the rapid growth in electric vehicles numbers. Demand from petrochemicals, trucks, aviation and shipping will increase oil demand to 2040. Alternative fuels such as natural gas and electricity will eat into transportation market share over the period, but not in a significant way.

For example, natural gas for passenger and freight transportation is envisaged to increase 500% from 2015 to 2040. The global car fleet could reach 2 billion, double current levels, but oil used by passenger vehicles will peak thanks to fuel efficiency gains and rising electric car sales. Electricity use for rail will expand, but this will still only account for 4% of total electricity consumption by 2040. Subsequently, in this area, global energy-related CO2 emissions increase slightly according to the IEA, which is a major concern.

The Rise of Natural Gas & Renewables

Regarded as the cleanest of the fossil fuels, natural gas consumption is estimated to increase 43% to 2040 at a global level. This demand will mainly come from non-OECD countries which will see expanding industrial sectors and increased electricity use, with gas generation flexibility complementing intermittent renewable energy. Subsequently, the share of natural gas consumption will move from 53% to 59% for non-OECD countries by 2040.

LNG is projected to dominate US natural gas exports by the early-2020s according to the EIA. LNG is easy to transport and takes up one six hundredth of the volume of gaseous natural gas. US companies have been developing the infrastructure to service this development for years. Cheniere Energy loaded the first export of US-produced LNG at its Sabine Pass terminal in 2016. There are four other export terminals either recently constructed, Dominion Energy (Cove Point), or under construction: Sempra Energy (Cameron LNG), Cheniere Energy (Corpus Christi) and Freeport LNG.

Three of the four, Cheniere, Dominion and Sempra are major US-listed companies in the GLIO Coverage⁴. By the mid-2020s, the USA will become the world's largest exporter of LNG, and a net exporter of oil by the end of 2020. The country is expected to increase >

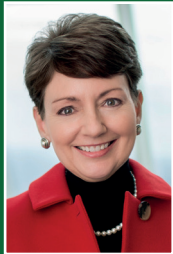
2. For example, approximately 50% of US customers now have smart meters, doubling since 2010.

3. Energy Information Administration's Annual Energy Outlook 2017.

4. Full GLIO Coverage available in the Coverage pages of the GLIO Journal.

INDUSTRY COMMENT

**Lynn J Good,
Duke Energy's President & CEO**



Getting the energy mix right at any one point in time can be challenging, as pointed out by Lynn J Good: "Our carbon emissions are down 30% from 2005. We're working toward 40%. It's going to take a combination of renewables, natural gas conversion and energy efficiency for us to continue to move in that direction. Some stakeholders may argue we're not moving fast enough. Others may argue that we are prioritizing sustainability over lower prices. It's a balancing act to manage the tensions between different priorities and to keep the business running, affordable, safe, reliable and clean."

natural gas production by 12% accounting for 20% of the global growth by 2040. This growth rate is second only to the middle east.

Thomas E. Hamlin of Dominion Energy explains the growing importance of this sector: "Natural gas is a growing source of cleaner energy for businesses and electricity producers worldwide. LNG exports from the USA will be an important factor in meeting that demand. The Cove Point LNG Export project is in its final stages of commissioning and will achieve commercial operations very soon, providing customers in Japan and India access to abundant natural gas supplies from the USA."

Globally, wind and solar became for the first time the majority form of new power in 2016, together representing more than half of all new power generation capacity. In Germany for example, approximately 35% of power was produced by renewables in the first half of 2017, and at certain times of day the percentage of power coming from renewables exceeded 80% according to the BEE renewable energy association.⁵

In fact, power generation worldwide reached a significant landmark in 2016. In Energy Intelligence's annual ranking of the world's top 100 "green" power generators which was launched in 2012⁶, the 100 companies in the ranking emitted less than 500 kilograms of carbon dioxide per megawatt hour generated in 2016, on average – at 496 kg/MWh, down from 512 kg/MWh in 2015 and 569 kg/MWh in 2011. Leading companies like NextEra Energy which is ranked No.1 green utility in the USA and No.2 in the world⁷, recorded emissions that are considerably less than half of the average at 216kg/MWh.

More generally, this continued decline in emissions is due to the progressive switch of large utilities' and independent power producers' (IPPs) installed capacity to carbon-free technologies, including renewables and nuclear energy. The 100 companies in the EI ranking represent almost 55% of the world's generating capacity. They represent 85% of the nuclear capacity and 40% of the renewable capacity.

From the GLIO coverage, in Europe, Iberdrola (4), Enel (9), SSE (17) and Engie (31) all rank highly according to EI's ranking. While perhaps less radical than in Europe, the switch from fossil fuels to renewables among the largest US utilities has still been remarkable. NextEra Energy (2), Berkshire Hathaway Energy (13), Exelon (14), Dominion Energy (37), PSEG (38), Duke Energy (39), Southern Co (41) and Entergy (44), which together account for around 270GW, or a quarter of total US capacity, have added 19GW of renewable generation in the past five years.

Meanwhile, their fossil fuel-fired fleet got 22GW smaller, driven predominantly by a switch from coal to gas⁸. Of course, challenges remain in integrating a greater share of renewable energy, but the trend is clear: renewable energy is no longer a minor player in many global power systems, but rather one of the largest sources of new generation, and this will further increase over the next two decades.

From an investment perspective, global utilities competitive positioning for the



Key Industry Event 2018 IREI - VIP Infrastructure Toronto, Canada Shangri-La Hotel June 12-14, 2018.

VIP Infrastructure brings together institutional investors and investment managers who are actively investing in the infrastructure asset class or are exploring it for the future. The event will offer exclusive content, expert analysis and insightful perspectives.

**GLIO Supporters receive a
20% discount on registrations**

5. As technology further develops, solar panel over-capacity and longer wind turbine blades are rapidly transforming renewables economics, with a resulting impact to utilities that is greater than appreciated.

6. Energy Intelligence, New Energy Supplement – Top 100 Green Utilities, based on carbon emissions and renewable energy.

7. Energy Intelligence, New Energy Supplement – Top 100 Green Utilities.

8. Energy Intelligence New Energy, August 31, 2017.

growth in renewables will vary significantly. Regulated utilities will generally be less exposed to the upside and downside than companies with merchant exposure. It should be noted, that the GLIO Coverage of utilities companies favors the more stable regulated market.

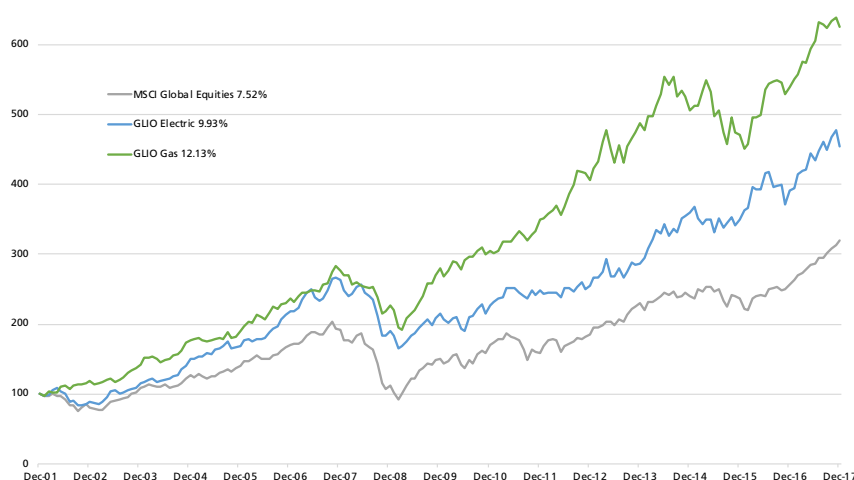
Key Investment

According to the American Society of Civil Engineers (ASCE), much of the US energy system predates the turn of the 21st century and they estimate that \$177bn of new investment is required in the next ten years. The major listed utilities in the USA have completed a large portion of the critical network investment over the past decades and they have multiple billions of dollars earmarked for future investment.

For example, NextEra Energy invested \$75bn in the period 2004 to 2016 and the company envisages a further \$40bn in new infrastructure investments through 2020⁹. This is a common theme across the major listed US utilities. Since 2007, Dominion Energy has invested approximately \$27bn, mostly in regulated electric and natural gas infrastructure growth projects – ranging from new power stations, sub-stations and compressor stations to new, or modernized, wires and pipelines. The company's estimated cumulative infrastructure investment is \$13-20bn to 2020¹⁰.

Duke Energy has a ten-year \$25bn mod-

Chart 2: Global Utilities Total Returns v Global Equities



Source: Reuters, GLIO

ernization plan for its energy grid, which is the largest in the USA when measured in line miles. In addition, the company plans to invest \$11bn in generating cleaner energy through natural gas and renewables¹¹. Southern Company invested \$4.5bn including wind projects in 2016, and has \$5bn through 2019 in gas infrastructure projects¹².

Tom Fanning, President & CEO, Southern Company, explains the focus of his company's investment plans: "Southern Company is investing in the full portfolio of energy resources, including

building the nation's only new carbon-free nuclear reactors in more than 30 years. Additionally, as one of the largest owners of solar energy in the USA, the Southern Company system is committed to growing our 8,000-megawatt renewable portfolio in order to continue providing clean, safe, reliable and affordable energy to our customers."

Parallel Developments

The story is similar across the Atlantic. In February 2017, Madrid-listed Iberdrola announced an increase of future investments to €25bn through 2020. The capital spending will be focused on renewable capacity in the USA, Mexico, Brazil and UK, pumped storage capacity in Europe as well as transmission networks in the USA, Brazil and UK. With about 30 gigawatts of renewables in operation, Iberdrola was one of the first in the energy industry to invest in utility-scale renewables, and led the integration of digital technology into electricity grids. The company estimates that the investment will result in 6.5GWs of additional renewable capacity and over €6bn of additional regulated asset value.

Ignacio Galan, Chairman & CEO of Iberdrola, elaborates on the company's strategy: "Iberdrola is investing in renewable energy, distribution grids, >



9. www.nexteraenergy.com/

10. Dominion Energy, Investor Relations Reference Book, May 2017.

11. Duke Energy, Annual Report 2016.

12. Southern Company Gas, American Gas Association, 2017 Forum

Table 1: GLIO Coverage – Infrastructure Sector Breakdown, December 29, 2017

Sector	MC \$mn	MC Wght	FF MC \$mn	FF Wght	Yield	Beta
Electric Utilities	716,008	32.3%	631,560	34.2%	3.6%	0.58
Ground Freight	303,130	13.7%	281,352	15.2%	1.7%	1.14
Oil & Gas Distribution	287,781	13.0%	253,790	13.7%	4.5%	0.94
Multiutilities	163,773	7.4%	145,555	7.9%	5.2%	0.71
Telecom Infrastructure	145,475	6.6%	123,575	6.7%	2.4%	0.76
Ground Transportation Services	123,886	5.6%	97,843	5.3%	1.2%	0.88
Highways & Railways	113,388	5.1%	81,275	4.4%	3.8%	0.85
Airports	130,927	5.9%	67,339	3.6%	2.7%	0.79
Gas Utilities	94,994	4.3%	65,763	3.6%	2.6%	0.77
Water Utilities	74,264	3.3%	54,164	2.9%	2.9%	0.80
Marine Ports	33,559	1.5%	17,196	0.9%	3.6%	0.85
Satellites	16,561	0.7%	13,720	0.7%	7.5%	0.77
Diversified	5,429	0.2%	4,995	0.3%	8.9%	0.75
Environmental Services & Equip	4,445	0.2%	4,445	0.2%	4.7%	0.79
Construction & Engineering	5,745	0.3%	4,429	0.2%	1.5%	0.65
Grand Total	2,219,365	100.0%	1,847,002	100.0%	3.3%	0.79

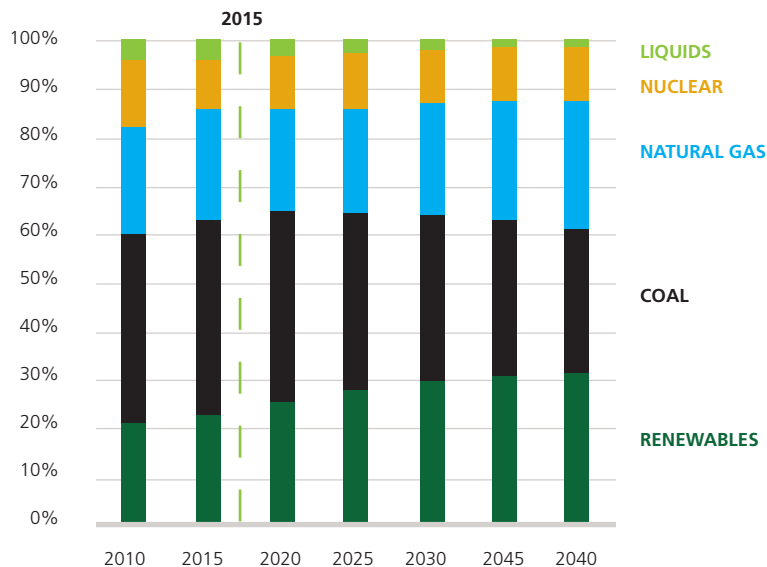
Source: GLIO

As those sub-sectors grow, storage capacity will evolve, smart grid technology will become the norm, and energy intensity will fall.

power-storage and innovative customer solutions to deliver long-term, sustainable growth while contributing to the de-carbonization of the economy. Low carbon sources are essential, but the intermittent nature of renewables requires more storage capacity. Given the good financial conditions and the existence of new investment opportunities, we have accelerated our investment commitments in long-term contracted activities. In fact, complying

with climate-change targets implies, in all credible scenarios, a deeper electrification of the economy.” Elsewhere in Europe, ENEL plans to invest €5.3bn to digitize its asset base, operations and processes and enhance connectivity. The UK’s National Grid, which has a presence in the UK and the USA, invested over £10bn 2014-2017 in its natural gas and regulated assets. It has invested almost £14bn in critical transmission infrastructure over the past ten years.¹³

Chart 3: Share of net electricity generation



Source: International Energy Outlook 2017

13. <http://investors.nationalgrid.com/>.

Global utilities play a major role in the infrastructure allocation mix. Looking at the GLIO Coverage, electric utilities, gas utilities and multi-utilities make up just under 50% of total market capitalization. With the addition of oil & gas distribution, that figures move to just over 60%, see Table 1.

It is difficult to over-play the importance of utilities to the functioning of the global economy and the global social infrastructure framework. Given the dominance of listed utilities in the global energy space, a diversified mix of companies provides excellent exposure to the energy needs. The future need for generation changes and grid modernization provides otherwise lower-growth utilities with strong expansion prospects and the need for investment somewhat ensures that regulators are incentivized to reward capital investments. This provides good growth and a strong defensiveness.

Ted Brooks, Portfolio Manager, CenterSquare Investment Management, explains the importance of utilities in his infrastructure portfolio. “In addition to exhibiting lower volatility and higher yields than broader global equities, utilities are a critical part of any infrastructure portfolio because they sit at the nexus of many key issues facing all of us in the early 21st Century.”

He continues: “There’ll be a shifting mix of energy away from traditional fossil sources and skewing more heavily toward renewables, a changing relationship between provider and customer that

Given the dominance of listed utilities in the global energy space, a diversified mix of companies provides excellent exposure to the energy needs.


focuses much more acutely on data collection and analysis by parties on both sides of the equation, and a massive investment surge to help make way for a smarter energy delivery system that better anticipates the needs of customers and their economies in the coming decades.”

Conclusion

The world needs a diverse energy mix to ensure a reliable supply of energy. To serve customers effectively and efficiently,

energy must be generated when, where and how it is needed. Ensuring reliability under all circumstances, including weather extremes and emergencies, requires utility companies to use a mix of energy sources.

These energy sources are key to companies’ ability to serve all customers, including businesses and industries whose energy usage differs from that of most residential customers. As energy trans-

formation develops over the next 20 years, the generation mix will naturally continue to skew towards natural gas and renewables. As those sub-sectors grow, storage capacity will evolve, smart grid technology will become the norm, and energy intensity will fall. The global listed utilities that rise to these challenges will be fundamental to fuelling that development and will continue to comprise a key component of any investor’s portfolio. 

INFRASTRUCTURE INVESTOR



Global Summit
Berlin

20-22 March, 2018
Hilton Hotel, Berlin

Today’s leaders. Tomorrow’s infrastructure.
The Global Summit.

The largest gathering of global institutional and private investors in infrastructure for 3 days of cutting-edge debate

The only event bringing the entire infrastructure ecosystem together with the most senior figures in the asset class speaking and attending

Hear from and meet 100+ thought-provoking speakers from the world of infrastructure and beyond

Network with 1400+ peers, clients and prospects under one roof enabling deal making and business opportunities

**To get a 15% discount supporters should go to
www.glio.org/events**