Global Utilities

Has the declining utilisation rate been priced in?

Equities

Global
Electric Utilities

Stephen Oldfield
Analyst
stephen.oldfield@ubs.com
+64-9-913 4862

Sam Arie
Analyst
sam.arie@ubs.com
+44-20-7567 1107

Simon Powell
Analyst
simon.powell@ubs.com
+852-2971 7772

Julien Dumoulin-Smith
Analyst
julien.dumoulin-smith@ubs.com
+1-212-713 9848

William Li
Analyst
william-w.li@ubs.com
+852-2971 6123

Ken Liu
Analyst
ken.liu@ubs.com
+852-2971 7516

Marcelo Sa
Analyst
marcelo.sa@ubs.com
+55-11-3513 6518

Overcapacity mostly priced in but renewables growth underappreciated

With falling or low power demand growth along with increasing generation capacity driven by renewables, utilisation rates of thermal power plants has been under pressure in most markets. We believe that the markets have generally priced in the poor outlook in most cases, but we highlight stocks in China and Europe where we think there is further downside risk to share prices. We also believe the market is giving limited value to capacity growth for many renewable companies. Although there are regulatory and/or operational risks for some of these operators, we believe the market has been overly cautious in some cases. We reached these conclusions by capitalising the current level of earnings of the utilities we cover and comparing this value to current share prices and examining the reasons for any significant apparent mismatches.

Supply growth driven by renewables in weak demand growth environment

The slowdown in power demand growth is due to both cyclical and structural reasons. We forecast power demand to stay flat or decline in developed markets like Europe, the US and Australia, and muted in historically high-growth markets in Asia. Despite weak power demand growth, supply and renewable energy capacity continues to grow in most major markets. We expect installed capacity from renewable sources to continue to increase, as governments around the world respond to pressure to reduce carbon emissions from fossil-fuel based power generation.

Increasing imbalanced supply and demand put pressure on utilisation rate

In the face of increasing renewables supply, low demand and an ultimately lossmaking generation business, a logical outcome would be closure of excess capacity. However, due to the intermittent nature of renewables, traditional thermal capacity often needs to be retained as backup until (unless) there are advances in storage technology. We expect utilisation rates of thermal generators in these markets to fall.

Top buys and sells

Our top sells are EDF and Fortum in Europe; and Datang International Power- A and Huaneng International Power – A in China. Our top picks are renewable companies that have high growth in capacity but no or low growth implied by current share prices: Longyuan Power and Huaneng Renewables, DONG Energy and NextEra Energy.

Figure 1: Top pick valuation summary

	Reuters code	Rating	Current price	Price target	Price Upside	PE 2016E	PE 2017E	P/BV 2016E	P/BV 2017E	ROE 2016E	ROE 2017E	Dividend yield 2016E	Dividend yield 2017E
Top Buy													
Longyuan Power	0916.HK	Buy	HK$7.05	HK$8.50	21%	12.1x	9.0x	1.3	1.1	10.9%	13.3%	1.7%	2.2%
Huaneng Renewable	0958.HK	Buy	HK$3.10	HK$3.50	13%	10.1x	8.7x	1.3	1.1	13.3%	13.7%	1.6%	2.0%
DONG Energy	DENERG.CO	Buy	€271.40	€300.00	11%	22.6x	15.5x	1.3	1.3	6.2%	8.6%	2.2%	2.4%
NextEra Energy	NEE.N	Buy	US$120.86	US$140.00	16%	19.1x	17.9x	2.3	2.2	12.2%	12.5%	2.8%	3.2%
Top Sell													
EDF	EDF.PA	Sell	€11.95	€8.00	-33%	6.9x	15.5x	0.6	0.7	9.2%	4.3%	9.2%	9.2%
Fortum	FUM1V.HE	Sell	€13.86	€10.45	-25%	21.7x	24.1x	0.9	0.9	4.2%	3.8%	3.0%	2.7%
Datang International - A	601991.SS	Sell	HK$3.95	HK$3.60	-9%	13.6x	13.8x	1.1x	1.1x	8.4%	7.9%	2.9%	2.9%
Huaneng International - A	600011.SS	Sell	HK$7.20	HK$6.50	-10%	10.0x	12.0x	1.2x	1.2x	12.7%	10.2%	4.4%	3.7%

Source: Company report and UBS estimates; Note: Data as of 11 September 2016

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UBS Research THESIS MAP

MOST FAVORED	LEAST FAVORED
Longyuan Power, Huadian Fuxin, DONG Energy, KEPCO, Huaneng Renewable, NextEra Energy	**Datang International– A, Huaneng Power– A, Fortum**

PIVOTAL QUESTIONS

Q: Where are the most dramatic declines in grid power demand and growth?

We forecast power demand to stay flat or decline in developed markets like Europe, the US and Australia. For historically high-growth markets in Asia (such as China), we still forecast demand growth to be positive at a much lower rate than in the last decade or so.

more →

Q: Where are the most significant increases in supply and renewable energy capacity occurring?

China and India are among the highest in terms of absolute capacity additions, while increase in renewables in developed markets have been significant as well. We expect installed capacity from renewable sources to continue to increase….

more →

Q: What are the implications of growing renewable supply in a low demand growth environment on conventional power generation?

Renewables have reduced generation volumes for conventional generation. However, in the absence of storage solutions needed because most renewable energy is intermittent in nature, this conventional capacity is still needed…..

more →

WHAT'S PRICED IN?

Based on our analysis of 104 electric utility stocks we cover globally, we think a decline in utilisation rates of thermal power plants is now mostly priced in and some traditional utilities are now starting to see value emerge. However, although investors have priced in the effect of strong renewable power supply growth into these companies, they have not yet priced in the growth opportunity for the renewable energy companies themselves, in our view.

more →

UBS VIEW

We believe the challenges facing traditional power generators as a result of lacklustre power demand, yet growing supply from renewable sources is an ongoing and structural challenge, but this is mostly understood by investors and we see value emerging in many of these traditional power generators and think that growth is underappreciated in many renewable energy companies, particularly in China.

EVIDENCE

Using power demand and supply forecasts for the markets around the world covered by members of our global utilities team, we have inferred the likely overall utilisation rate trends for thermal (mostly coal and natural gas-fired) power plants and compared the growth expectations implied in current share prices. We have also compared the anticipated growth priced in to the share prices of renewable energy companies to the likely growth in renewable installed capacity in those markets.

OUR THESIS IN PICTURES

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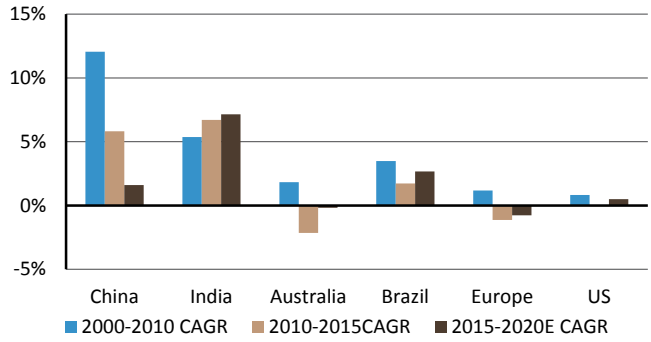
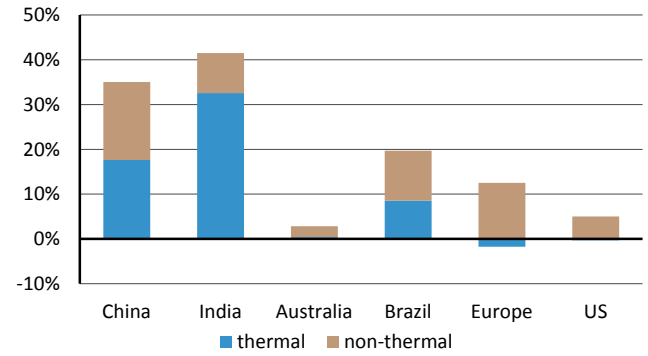
Power demand growth in select markets



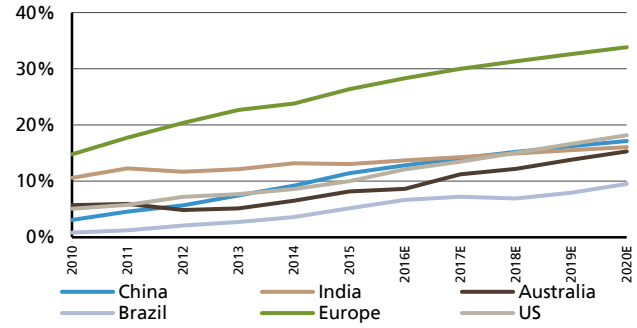
While power demand growth falls due to cyclical and structural reasons…

Increase in capacity over total base in 2010-2015(2015Base)



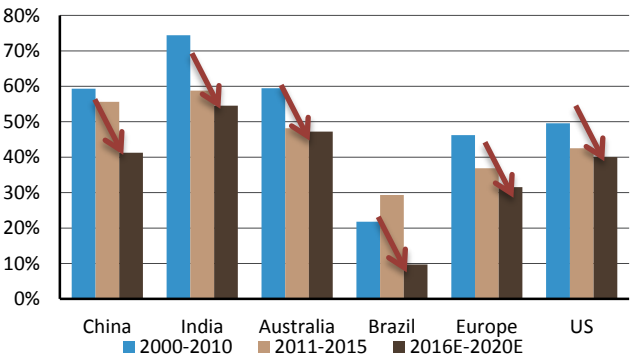
… Increase in capacity remains strong…

Non-hydro enewables capacity mix



…especially in renewables which is driven by policy support and falling cost

Thermal Utilistion rate in select markets



Imbalanced supply and demand drives thermal utilisation rate down

Sources for exhibits above: CEIC, EIA, UBS Research

OUR THESIS IN PICTURES

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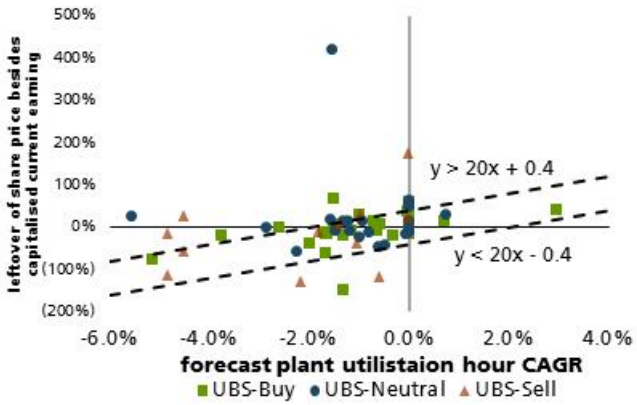
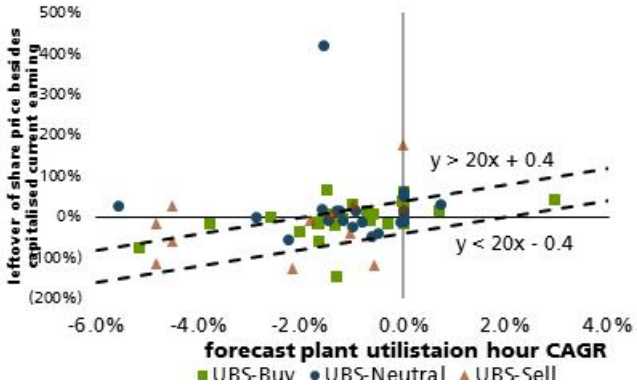
Stock Screening for generation, integrated companies



Using the UBS residual income model, we have screen out 22 generation/integrated companies…

Stock Screening for T&D, regulated companies



…and 15 T&D and regulated companies from the utilities stock we cover.

Sources for exhibits above: CEIC, EIA, UBS Research

PIVOTAL QUESTIONS

return ↑

Q: Where are the most dramatic declines in grid power demand and growth?

UBS VIEW

We forecast power demand to stay flat or decline in developed markets like Europe, the US and Australia. For historically high-growth markets in Asia (such as China), we forecast demand growth to be positive but at a slower rate than in the past. The exception is India were bottlenecks holding back generation are gradually being removed, allowing growth to accelerate.

EVIDENCE

Although demand has been low due to weak economic activity in several markets, we highlight structural pressures such as a decreasing power demand to GDP multiplier, energy efficiency and peak-shaving by solar, which may have a more permanent impact on power growth trends.

WHAT'S PRICED IN?

We think the lack of power demand growth is quite well and is priced in by investors by now, although the market is not quite sure to what extent the decline is cynical vs structural, especially in developing markets such as China.

Slowing trend in power demand growth

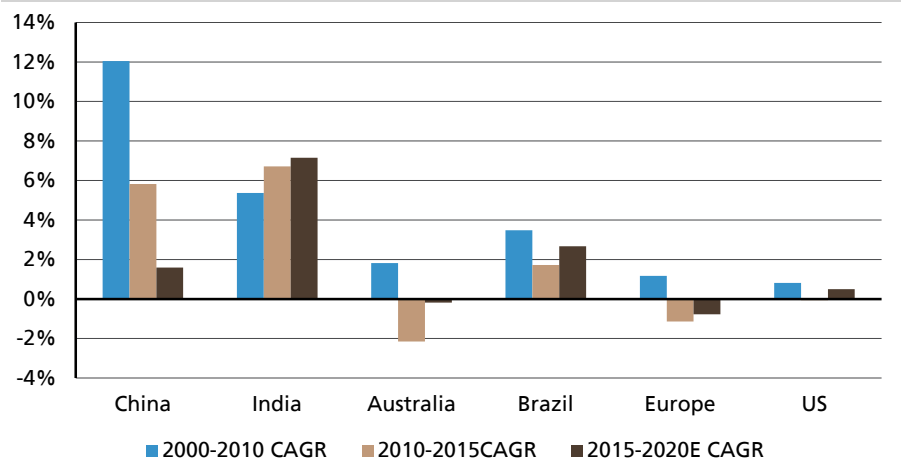
Power demand growth has fallen in most markets during the past five years, and we forecast power demand to stay flat or decline in developed markets like Europe, the US and Australia. For historically high-growth markets in Asia (such as China), we forecast demand growth to be positive but muted.

Figure 2 shows power demand growth for key markets over 2000s and 2010-2015 and UBS estimates for demand growth over 2015-20. Figures 3 and 4 shows demand and demand growth for markets covered by UBS for 2015-2020E, compared to the last 15 years.

There are two takeaways:

- Power demand growth over the remainder of the current decade is forecast to be lower than the 2000s in almost all markets but will have slight improvement compared the past five years.
- There is a clear distinction between developed market growth (almost zero or negative) and emerging market growth (modest but positive) over the remainder of the decade.

Figure 2: Power demand growth for select markets over different periods



Source: EIA, CEIC, ENTSOE, Government websites, company data, UBS estimates

Figure 3: Power demand(TWh) for 2010-2020E across all markets

	2010	2011	2012	2013	2014	2015	2016E	2017E	2018E	2019E	2020E
China	4,228	4,731	4,987	5,372	5,576	5,610	5,610	5,722	5,836	5,953	6,072
Hong Kong	42	42	43	43	44	44	44	45	45	45	46
India	788	858	911	960	1,031	1,091	1,170	1,258	1,346	1,440	1,541
South Korea	475	497	510	517	522	523	536	548	561	574	587
Thailand	160	159	173	174	177	183	190	197	204	212	218
Philippines	68	69	73	75	77	82	86	90	94	98	102
Malaysia	101	103	107	111	114	114	118	121	124	128	132
Australia	231	226	219	212	209	208	209	209	208	207	206
New Zealand	39	38	38	38	39	39	40	41	41	42	42
Brazil	493	494	505	527	539	537	524	537	558	581	612
Europe	2,842	2,784	2,793	2,771	2,707	2,684	2,682	2,667	2,640	2,612	2,581
Germany	547	545	559	531	518	521	521	518	511	504	497
UK	336	329	313	309	325	340	306	303	301	298	296
US	4,125	4,100	4,048	4,066	4,093	4,113	4,134	4,155	4,175	4,196	4,217
PJM											
ERCOT											

Source: EIA, CEIC, ENTSOE, Government websites, company data, UBS estimates

Figure 4: Power demand growth (yoy) for 2010-2020E across all markets

	2010	2011	2012	2013	2014	2015	2016E	2017E	2018E	2019E	2020E
China	15%	12%	5%	8%	4%	1%	0%	2%	2%	2%	2%
Hong Kong	1%	0%	2%	-1%	3%	0%	1%	1%	1%	1%	1%
India	6%	9%	6%	5%	7%	6%	7%	8%	7%	7%	7%
South Korea	9%	5%	3%	1%	1%	0%	2%	2%	2%	2%	2%
Thailand	10%	-1%	9%	0%	2%	3%	4%	4%	3%	4%	3%
Philippines	9%	2%	5%	3%	3%	7%	5%	4%	4%	4%	4%
Indonesia	8%	8%	9%	8%	6%	-2%	12%	12%	12%	12%	10%
Malaysia	8%	2%	4%	3%	3%	0%	3%	3%	3%	3%	3%
Australia	-2%	-2%	-3%	-3%	-2%	0%	0%	0%	0%	0%	0%
New Zealand	3%	-1%	0%	1%	2%	1%	1%	1%	1%	1%	1%
Brazil	11%	0%	2%	4%	2%	0%	-2%	3%	4%	4%	5%
Europe	5%	-2%	0%	-1%	-2%	-1%	0%	-1%	-1%	-1%	-1%
Germany	4%	0%	3%	-5%	-2%	0%	0%	-1%	-1%	-1%	-1%
UK	7%	-2%	-5%	-1%	5%	5%	-10%	-1%	-1%	-1%	-1%
US	4%	-1%	-1%	0%	1%	0%	0%	0%	0%	0%	0%
PJM											
ERCOT											

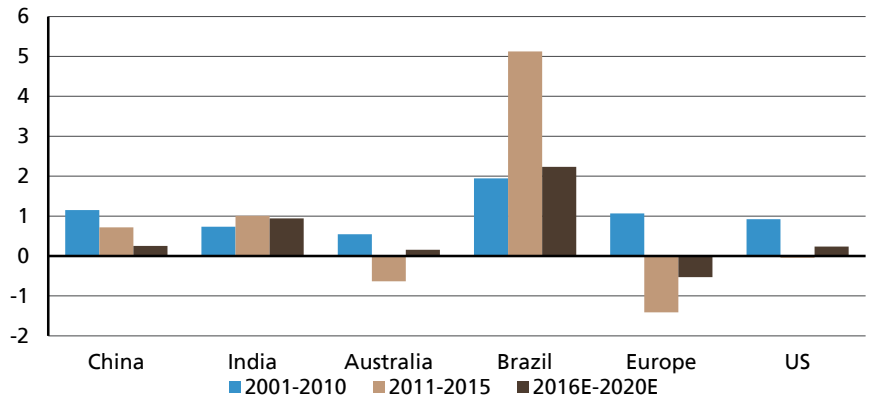
Source: EIA, CEIC, ENTSOE, Government websites, company data, UBS estimates

Weak economic activity but more structural decline

Although demand has been low due to weak economic activity in several markets, we highlight structural pressures which may have a more permanent impact on power growth trends.

In many markets around the world, the power demand growth to GDP multiplier growth trend has declined (Figures 5 and 6). We expect this trend to continue. Reasons for a falling multiplier include: the shift of economic structure from industry to service sector; and an increased focus on energy efficiency, which is further discussed in the following section.

Figure 5: Average power demand multiplier for select markets



Source: EIA, CEIC, ENTSOE, Government websites, company data, UBS estimates

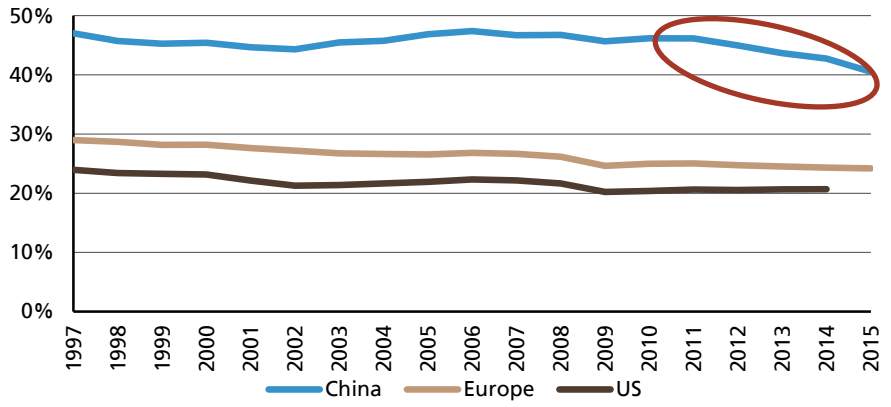
Figure 6: Power demand multiplier over different period for all markets

	2010	2011	2012	2013	2014	2015	2016E	2017E	2018E	2019E	2020E
China	1.4	1.3	0.7	1.0	0.5	0.1	-	0.3	0.3	0.3	0.3
Hong Kong	0.1	0.1	1.4	(0.4)	1.2	0.0	1.3	0.7	0.7	0.8	0.8
India	0.5	1.3	1.1	0.8	1.0	0.8	1.0	1.0	0.9	0.9	0.9
South Korea	1.5	1.2	1.3	0.5	0.3	0.1	1.0	1.0	1.0	1.0	1.0
Thailand	1.4	(1.0)	1.2	0.1	2.8	1.0	1.4	1.6	1.4	1.5	1.2
Philippines	1.2	0.6	0.8	0.5	0.4	1.1	0.8	0.8	0.8	0.8	0.8
Malaysia	1.1	0.4	0.7	0.7	0.6	0.0	0.6	0.5	0.6	0.6	0.6
Australia	(0.8)	(0.9)	(0.9)	(1.6)	(0.6)	(0.2)	0.2	-	(0.2)	(0.2)	(0.2)
New Zealand	2.2	(0.6)	(0.2)	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5
Brazil	1.4	0.0	1.2	1.5	22.8	0.1	0.7	3.1	2.6	2.1	2.7
Europe	2.2	(1.1)	(1.1)	(2.8)	(1.6)	(0.5)	(0.0)	(0.4)	(0.7)	(0.7)	(0.8)
Germany	1.0	(0.1)	4.3	(12.6)	(1.5)	0.3	0.0	(0.5)	(1.1)	(1.2)	(1.3)
UK	4.4	(1.0)	(4.2)	(0.6)	1.8	2.0	(7.6)	(1.7)	(1.7)	(1.6)	(1.6)
US	1.7	(0.4)	(0.6)	0.3	0.3	0.2	0.4	0.2	0.2	0.2	0.2

Source: EIA, CEIC, ENTSOE, Government websites, company data, UBS estimates

It is clear in Figure 2 that China has seen the most dramatic decline in power demand growth over the last five years, which happened in the early 2000s in Europe and US. We believe demand growth in China during the 2000-2010 period was driven by the rapid move of global manufacturing capacity to China from Europe and North America after China entered the World Trade Organisation and that process appears to have largely run its course. We believe weaker power demand growth in China will continue given China's efforts to move towards higher value-added manufacturing, and the emergence of its service & consumer-based sectors. As shown in Figure 7, the contribution of the industry sector to GDP decreased from 46% in 2010 to 41% in 2015.

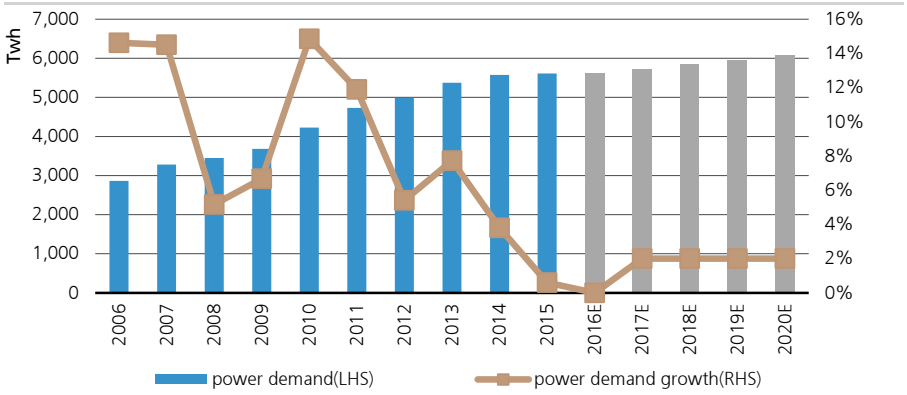
Figure 7: Contribute to GDP from industry for China, Europe and US



Source: World Bank

As the economy becomes less energy-intensive in China, power demand growth continues to decline from double digit over the past decade to only 0.6% growth in 2015 (Figure 8)

Figure 8: Power demand (TWh) and demand growth in China



Source: CEIC, UBS estimates

Energy efficiency erodes demand further

Energy efficiency standards can also reduce power demand, especially in developed markets like US and Europe. Although the energy standards issued by governments in several developed markets are mandatory, we expect rising power tariffs (driven by investments to integrate renewables and other technology) to act as an additional catalyst to ensure that customers switch to using appliances that are more energy efficient.

The U.S. electricity sector has seen steady but shrinking levels of growth in overall demand since the 1950s as a result of more efficient appliances, especially air conditioning and lighting. The US Department of Energy (DOE) expects this trend to essentially level off through 2040 as energy efficiency initiatives offset the effects of a growing population.

We project the electric utility industry in US to experience weak or negative electric demand growth in coming years as a tepid economy and energy efficiency dampen demand.

After a lost decade, recovery in Europe is possible

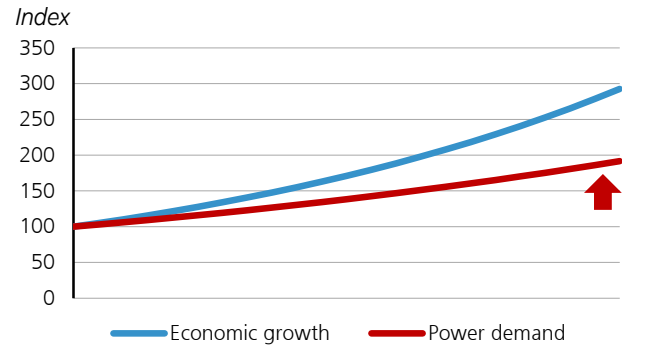
The power demand growth turned negative in Europe for the past five years, mostly due to energy efficiency. Looking ahead we expect further increases in energy efficiency, but question whether such increases will be sufficient to cause continued, absolute reductions in power demand.

We distinguish between two models of energy efficiency (as shown in Figure 9): relative and absolute efficiency. In our scenario analysis, under relative efficiency the power demand multiplier falls, but total power demand still rises with economic output. Under an absolute efficiency scenario, power demand falls in absolute terms even when the economy is growing.

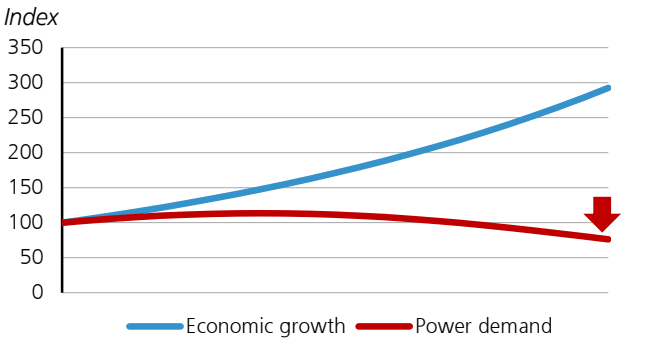
Absolute efficiency is what we have experienced in most of the larger EU markets since 2005/2010.However our analysis clearly shows that relative efficiency was the norm until prices began to rise steeply from the early 2000s, when the result was a steep correction in demand. In other words: end users did not reduce their absolute power consumption until triggered to do so by the steepest price increases in more than a generation. We believe this dynamic (basically price elasticity for power) has largely been overlooked by the market.

On the expectation that power prices will continue to fall under pressure of falling commodity markets (and some reductions in public levies) we see a possible return to relative efficiency which would allow for future growth in absolute power demand.

Figure 9: Relative efficiency …



… v absolute efficiency



Source: UBS estimates

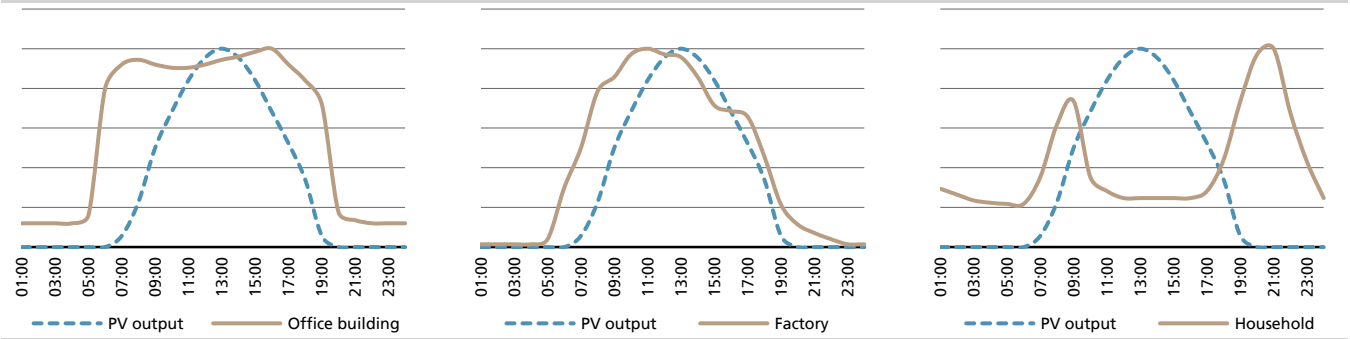
Distributed generation lower volumes for networks

From the perspective of the networks, we expect distributed generation such as point of use solar (photovoltaic panels on the roofs of consumers, for example) to lead to lower volumes of power sold through the grid. Distributed roof-top solar panels are becoming economical at a faster pace compared to utility scale solar or wind installations.

The cost of roof-top solar in several markets has fallen to levels which bring them to parity with other sources of power from the end-user perspective (i.e., including the cost of delivery of power from other sources to the consumer through the transmission and distribution networks). Distributed solar is also potentially less expensive than utility level grid connected solar, because in the latter case, transmission and distribution (T&D) costs also need to be added to the total.

Contrary to the solar panels installed on rooftops – which in theory are primarily installed for self-consumption – utility-scale solar parks would have to find an "end market" to sell their output. Based on given the consumption profile, industrial customers, shopping malls or office buildings could be ideal clients, to sign a "fixed price" agreement, such as a PPA. Figure 10 shows the load profile of office and factory. One challenge for residential rooftop solar is that, compared to industrial and commercial users, households are typically less likely to be at home during the middle of the day, when power output from solar panels is at its highest.

Figure 10: Load profile of office and factory is better fit than household with solar output (MW)



Source: UBS estimates

PIVOTAL QUESTIONS

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Q: Where are the most significant increases in supply and renewable energy capacity?

UBS VIEW

China and India are among the highest in terms of absolute capacity additions, while increase in renewables in developed markets have been significant as well. We expect installed capacity from renewable sources to continue to increase, as governments around the world respond to pressure to reduce carbon emissions from fossil-fuel based power generation.

EVIDENCE

Regulatory support over the years has had an effect on the cost curves for most renewable technology. Technological innovation, streamlining of the supply-chain and scale-production have contributed to declining costs.

WHAT'S PRICED IN?

We think the market understands the significant increase in supply although the share price performance of renewables companies has been relatively disappointing because of other factors such as regulatory and uncertainty.

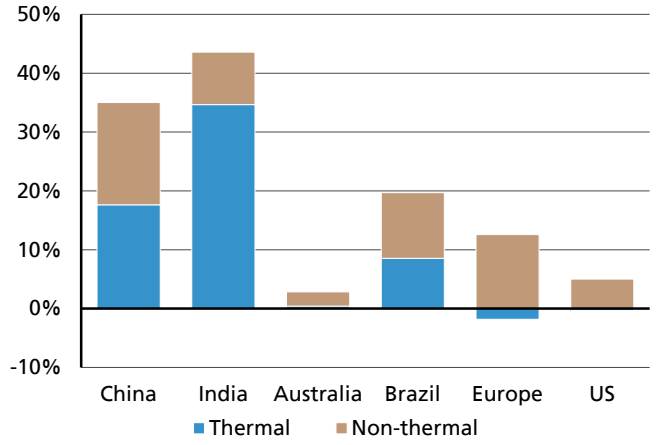
Continued increase in supply and renewables installed capacity – despite weak demand growth

Despite weak power demand growth, supply and renewable energy capacity continues to grow in most major markets. The fundamental, historic issue in the liberalised markets in recent years has been overcapacity, triggered mainly by renewable subsidies but also by cyclical overbuilding of conventional capacity following a period of stronger returns in 2005- 2010.

As shown in Figure 11, China and India among the highest in terms of capacity additions, while increase in renewables in developed markets have been significant as well. The growth in thermal capacity in US and Europe was negative.

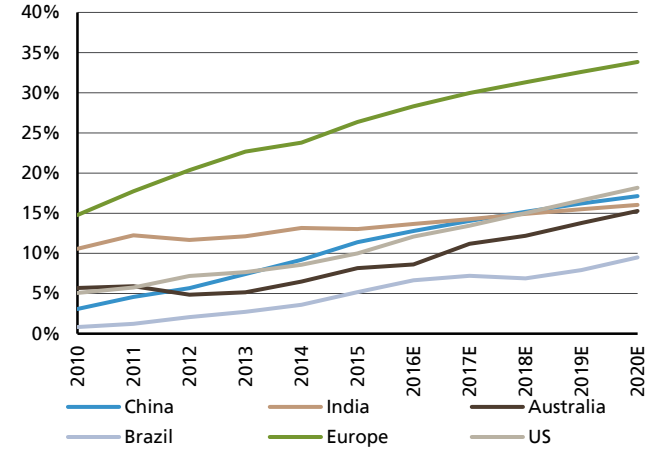
Figure 12 shows the capacity mix of renewables has been increasing significantly in major markets. We expect installed capacity from renewable sources to continue to increase, as governments around the world respond to pressure to reduce carbon emissions from fossil-fuel based power generation. Figure 13 shows the non-hydro renewable capacity of all markets covered by UBS.

Figure 11: Capacity additions in 2010-2015 over total 2015 capacity



Source: EIA, CEIC, ENTSOE, Government websites, company data

Figure 12: Non-hydro renewables capacity, as a proportion of total installed capacity for selected markets



Source: EIA, CEIC, ENTSOE, Government websites, company data, UBS estimates;

Figure 13: Non-hydro renewables capacity(GW) across markets

	2010	2011	2012	2013	2014	2015	2016E	2017E	2018E	2019E	2020E
China	30	49	65	93	125	169	203	237	270	304	337
Hong Kong	0	0	0	0	0	0	0	0	0	0	0
India	18	25	26	29	36	39	44	49	54	59	64
South Korea	0	0	0	0	0	0	0	0	0	0	0
Thailand	0	0	0	0	0	1	2	2	3	3	4
Philippines	2	2	2	2	2	2	3	4	4	4	4
Malaysia	0	0	0	0	0	0	0	0	0	0	0
Australia	3	4	3	3	4	5	5	7	7	8	9
New Zealand	1	1	1	2	2	2	2	2	2	2	2
Brazil	1	1	3	3	5	7	10	11	11	14	18
Europe	120	145	178	201	212	239	256	275	292	309	324
Germany	47	54	70	77	81	89	95	100	105	110	115
UK	3	3	6	8	9	19	23	27	31	34	35
US	48	56	71	75	85	100	124	141	160	182	203
PJM	2	3	7	7	7	8	10	10	10	11	12
ERCOT	9	10	10	11	13	16	22	23	31	38	44

Source: EIA, CEIC, ENTSOE, Government websites, company data, UBS estimates

Regulatory support underpins renewable growth

The biggest impetus to growth in renewables capacity recently has been regulatory and policy support. Renewables policies are mostly part of a broader set of policies that governments have formulated to tackle the problems of global climate change and achieve energy independence.

- **Global climate change:** In late 2015 195 countries agreed on an objective to limit global warming to 2°C, which implies tougher targets than previous international targets. If legally ratified, the "COP 21" agreement will likely lead to significantly stronger carbon reduction targets over time, as it is generally agreed that the currently announced targets will not limit warming to 2°C, and

yet the signatories have agreed to hold the increase to "well below 2°C". Various studies have concluded that the current targets will result in an unacceptable level of warming that is between 2°C and 4°C. On 3 September 2016, a major step forward happened when the two largest emitters of greenhouse gases, the United States and China, ratified COP21.

If warming is to be limited to 2°C, it implies an around 80% reduction in emissions on a global scale over the next 30 years. This would likely require most thermal generation to be replaced by low/no emission technology. We discussed the COP21 agreement and its implications in detail in our 16 December 2015 report on Global Utilities, titled: "COP 21—Mind the Gap".

- **Energy independence:** The renewables, especially "solar fuel" is abundant and free. Hence, developing renewables will improve energy independence of any country. The mismatch between energy users and producers could push the former to purse an "energy preservation" strategy, which may well see solar at its core.

Although we believe that there will be no reversal in the broad renewables strategy across markets, there may be political demand for changes in the precise form and extent. In Europe, renewable investment has now peaked and the UK and German governments have recently acted to reduce subsidies.

Figures 14 and 15 summarise the key policy support categories and targets for renewables across market by different scheme and for different sources.

Figure 14: Renewable policy across markets

Country	FiT/premium payment	Energy Production Payment	Capital Subsidy	Public Investment	Tendering	Reduction in taxes	Targets
China	●	●	●	●	●	●	At least 15% from non-fossil energy by 2020, and at least 20% by 2030
India	●	●	●	●	●	●	175GW renewable power by 2020
South Korea	■		●	●		●	8% from renewable energy by 2020
Australia	■		●	●			33,000GWh renewable energy sources by 2020
New Zealand							90% from renewable electricity by 2025
Germany	●	●	●	●	●	●	45% from renewable energy by2030
UK	●	●	●	●	●	●	15% from renewable energy by 2020
US	■	●	●	●	■	●	n.a.
Brazil					●	●	23% of electricity from non-hydro renewables by 2030

● National Policy ■ Provincial/State/Local Policy

Source: REN21, Various Government, World Bank

Figure 15: Renewable policy support for different sources

Country	Hydro	Wind	Solar	Others
China	___	-Feed-in tariff/ premium payment -Reduction in taxes -Public Investment	-Feed-in tariff/ premium payment -Capital Subsidy -Public Investment	___
India	___	-Reduction in taxes Renewable Energy Targets Capital Subsidy	-Feed-in tariff/ premium payment -Capital Subsidy -Public Investment -Reduction in taxes	-Energy production payment for bioenergy
South Korea	-Energy production payment	___	- Electric utility quotas obligation/RPS	-Energy production payment for bioenergy
Australia	___	___	-Electric utility quotas obligation/RPS -Feed-in tariff/ premium payment -Public Investment	___
New Zealand	___	___	___	___
Germany	-Energy production payment	-Feed-in tariff/ premium payment -Energy production payment	-Energy production payment	-Energy production payment for geothermal & bioenergy
UK		-Capital Subsidy	-Capital Subsidy	
US	___	___	___	-Energy production payment &capital subsidy for bioenergy
Brazil	-Tendering -Public competitive bidding	-Tendering -Public competitive bidding	___	-50% reduction in transmission fees

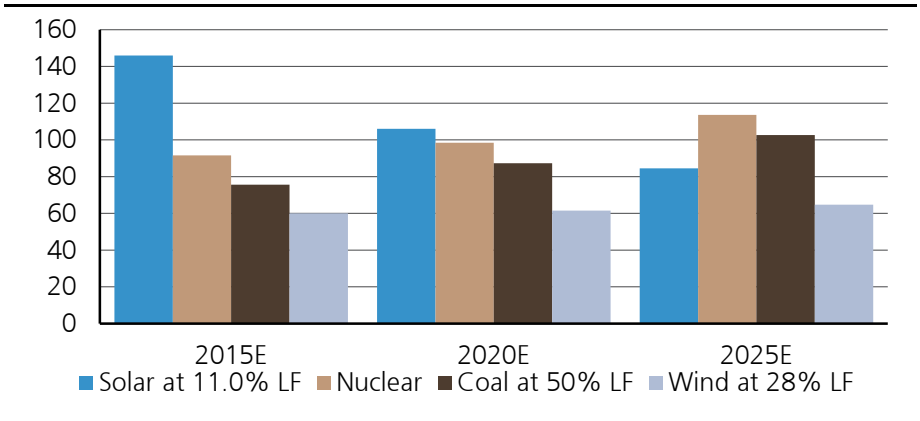
Source: REN21, Various Government, World Bank

Falling costs make renewables more competitive

Regulatory support over the years has had the effect of reducing the cost curves for most renewable technology, but mostly for wind and solar. Technological innovation, streamlining of the supply-chain and scale-production have all contributed to declining costs, and we expect this trend to continue.

The IEA 2012-20 projections on cost/W targeted cumulative 25-30% reduction but proved overly conservative. The targeted decline was already achieved by 2014, in just over two years. Figure 16 compares the competitiveness of solar in 2015-25E against conventional technologies and wind. Solar clearly remains less competitive, although the gap is quickly closing and the outcome largely depends on the capacity factors.

Figure 16: New entrant cost by technologies (€/MWh)



Source: UBSe

However, regulatory support is still essential for the development of renewables at the moment for most markets. Large-scale solar, for instance, will remain uncompetitive until 2020-25 in most mature regions which are largely in oversupply and where wholesale prices are depressed, such as Europe. In regions where actually the installed base has to grow to meet rising demand (Asia or Latin America for instance) solar could be already viable by 2018-20 as competitive vis a vis thermal new entrant costs.

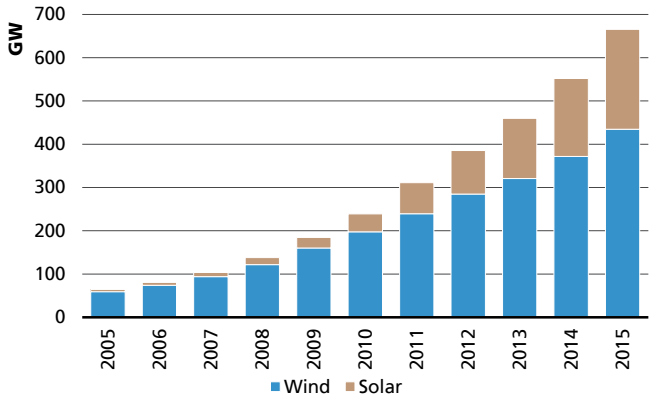
Renewables development: wind the leader; solar growth higher

Globally among non-hydro renewable power generation sources, the contribution of wind power is the most significant although solar has grown more in percentage terms. Wind accounted for 342 TWh of energy consumption in 2010, rising to 842 TWh by 2015. Solar, on the other hand, accounted for only 33 TWh in 2005, rising to 253 TWh by 2015.

Figures 17 and 18 indicate the increase in installed capacity for wind and solar globally between 2005 and 2015. They show the significant head start that wind has over solar, but also the higher growth rate for solar capacity additions.

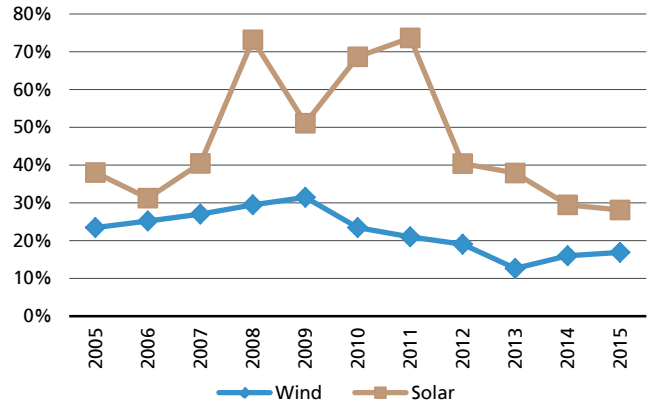
We believe solar growth could well exceed our forecasts as – similar to what happened in nuclear since 1970s – solar could become a "default" choice to support global climate change targets, promote energy independence and also due to the fact that the technology is still relatively young, which may suggest ongoing reduction in costs.

Figure 17: Global solar and wind installed capacity(GW)



Source: BP,UBS

Figure 18: Solar and wind capacity growth(yoy)



Source: BP, UBS

PIVOTAL QUESTIONS

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Q: What are the implications of growing renewable supply in a low demand growth environment on conventional power generation?

UBS VIEW

We expect the increase in renewables power capacity, coupled with lower rates of demand growth will likely lead to declines in utilisation rates for thermal (mostly coal-fired and natural gas-fired power plants) in most markets that UBS covers. The effect on revenues depends on the regulatory or contractual regimes for each market: in markets where revenues or earnings are determined by capacity or availability, the effect on existing assets should be limited. For power plants whose revenues are driven by volumes, especially in markets where pricing varies based on demand, the revenue impact could be significant. In addition, the ability to close uneconomic power plants may not always be possible if those plants still need to be available because of the intermittent nature of renewable power (it's not always windy or sunny).

Renewables have impacted the business model for conventional generation, but not the overall need for conventional generation. The generator of the future will no longer be able to rely on historic load factors; peak prices or forward hedging: new business models will be required.

EVIDENCE

Our analysis shows that utilisation rates in recent years across much of the thermal power generation fleet around the world are unlikely to recover and could decline further. We have assumed that power plant utilisation rates for renewables (including hydro) remain stable and estimated the decline in utilisation hours, taking into account the demand growth and capacity growth forecasts of our global utilities team.

WHAT'S PRICED IN?

We think the decline in utilisation rates is well-known by most investors.

Implications of growing renewable supply in a low demand growth environment

The implications of weak power demand growth and increase in intermittent renewable supply are primarily:

- A reduction in the utilisation rate for conventional capacity;
- Lower peak prices due to the low-to-zero marginal cost of solar and wind, particularly solar because its production is typically the highest during the middle of the day, when peak demand typically occurs;
- A deterioration in the earnings outlook for traditional thermal power generators and negatively affected dividend sustainability and predictability; and

- The possible closure of some thermal generation supply, which could add more pressure on the rest of the generation fleet to remain on service and dependable, but with lower revenues.

In the medium term, we anticipate a heightened risk of eventual re-regulation in the utility sectors of several developed markets such as Europe, the US and Australia. In order to incentivise private companies to continue to maintain and operate conventional thermal power generation, which is required for system reliability issues, governments may need to introduce a system of capacity payments, paying generators for capacity installed rather than output sold.

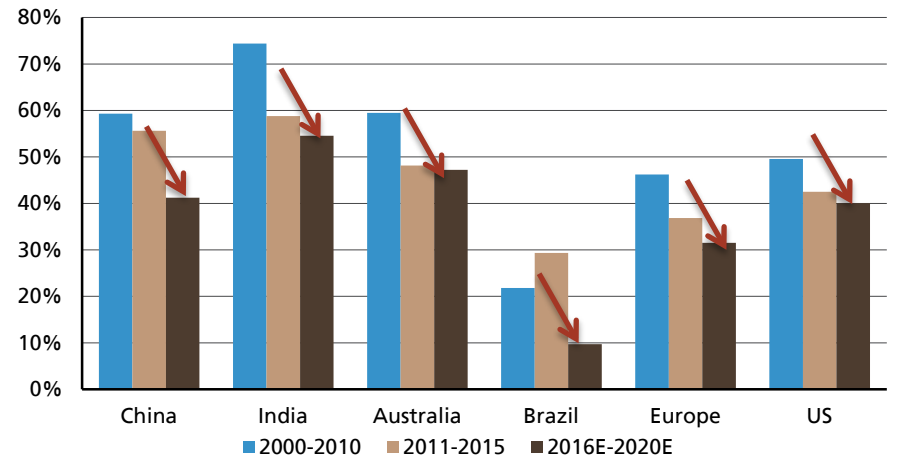
Closures unlikely beyond a particular level without storage technology, result in underutilisation

In the face of increasing renewables supply, low demand and an ultimately lossmaking generation business, a logical outcome would be closure of excess capacity. By 2017, we estimate that half of thermal plant in Europe will be FCF negative. Without the introduction of additional compensation measures, utilities would be forced to close 125GW thermal capacity, resulting in a negative reserve margin.

Thermal capacity still indispensable unless scale and economic storage solutions are developed

However, due to the intermittent nature of renewables, traditional thermal capacity has needed to be retained as backup unless there is advance in storage technology. We believe that the extent of the closures required to stabilise profits is so large that it cannot be approved by the regulator as reserve margins would get too low. As output from renewables increases in low power demand environment, it would also mean that the utilisation rates of the existing thermal fleets will decline, which has been seen in most major markets (Figures 19 and 20).

Figure 19: Average thermal utilisation rate over periods in major markets



Source: EIA, CEIC, ENTSOE, Government websites, company data, UBS estimates

Figure 20: Thermal utilisation rate across markets in 2010-2020E

	2010	2011	2012	2013	2014	2015	2016E	2017E	2018E	2019E	2020E
China	57%	60%	56%	57%	54%	50%	45%	43%	41%	39%	37%
Hong Kong	45%	45%	46%	46%	47%	47%	47%	48%	50%	51%	52%
India	70%	66%	61%	57%	56%	54%	53%	53%	54%	55%	57%
South Korea	76%	75%	78%	79%	70%	65%	64%	63%	64%	64%	64%
Thailand	66%	61%	66%	64%	63%	61%	58%	58%	59%	58%	59%
Philippines	54%	52%	53%	54%	55%	57%	53%	47%	43%	39%	36%
Malaysia	56%	55%	58%	61%	63%	61%	59%	57%	57%	55%	53%
Australia	55%	52%	48%	46%	47%	47%	47%	48%	48%	47%	46%
New Zealand	51%	44%	49%	46%	42%	43%	45%	54%	57%	59%	57%
Brazil	22%	15%	21%	35%	40%	37%	14%	8%	8%	8%	10%
Europe	45%	45%	44%	44%	45%	46%	48%	49%	50%	51%	51%
Germany	54%	56%	53%	46%	43%	44%	42%	41%	39%	37%	36%
UK	49%	43%	42%	43%	47%	44%	37%	35%	35%	35%	36%
US	45%	43%	43%	42%	43%	42%	41%	41%	40%	39%	39%
PJM	44%	44%	43%	43%	45%	43%	41%	41%	40%	40%	39%
ERCOT							48%	48%	48%	48%	47%

Source: EIA, CEIC, ENTSOE, Government websites, UBS estimates;

Network tariffs may need to rise

Networks need to cope with higher investment to accommodate technology improvements such as smart metering, and also to incorporate behind the grid, utility scale renewables generation which happen to have variable output. As large scale renewable generation are generally located a long distance from the large thermal generators and demand centres, there has been a lot of talk of increasing transmission investment.

With falling demand, the costs of grid investment, integrating renewables and energy efficiency technology would need to be spread over a smaller base. This should lead to higher tariffs that reflect higher grid fees and renewable surcharges on a per kilowatt hour (kWh) basis. As the savings potential/profitability from using PV installation increases if tariff rates for grid supplied power are higher, it will strengthen the economic case for PV installations and serve as a positive feedback loop.

The unintended social consequences of residential solar

This may have an unanticipated social consequence: residential users who install solar panels on their roofs while likely still wish to remain connected to the grid from when solar panels are unable to satisfy their energy needs. However, this means the customers benefit from the presence of the power network, while using it less (and, with volume based tariffs, using it less). However, if network investments need to rise but volumes are not growing much, or even declining, unit network prices will likely need to rise.

For those able to afford solar panels, this won't matter so much because their network-sourced power purchases will decline. However, for those unable to use or afford solar panels, higher network costs may be unavoidable. Higher network

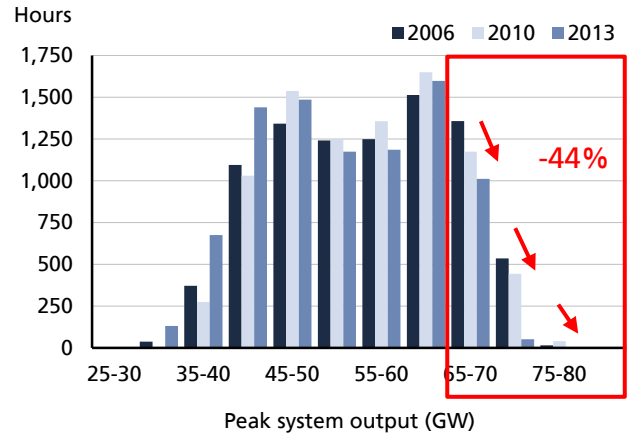
costs will incentivise yet more conversion to rooftop solar, further lifting unit prices for those unable to use or afford solar in a negative feedback loop.

Solar shaves away the demand curve and reduce price

Solar power output is highest at mid-day, which is also generally the peak profitable hours for utilities. Thus, from a utilities perspective, solar shaves the "peakiness" of their demand curve. Peak hours have historically been the most profitable hours of production for conventional utilities.

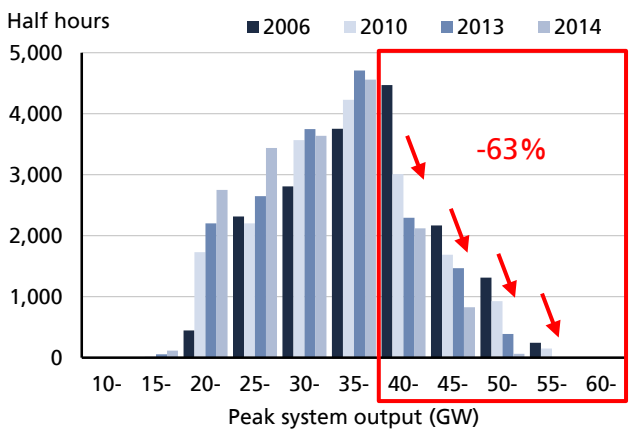
Figuratively speak the 'bell curve' of demand is shifting to the left and squeezing inwards on the right hand side, with a significant impact. As shown in figure 21 and 22, there has been a 63% reduction in hours above 40GWp (UK) and 44% reduction in hours above 65GWp (Germany) from 2006 to 2013.

Figure 21: Germany 44% reduction in peak hours



Source: National Grid/INDO, UBS analysis

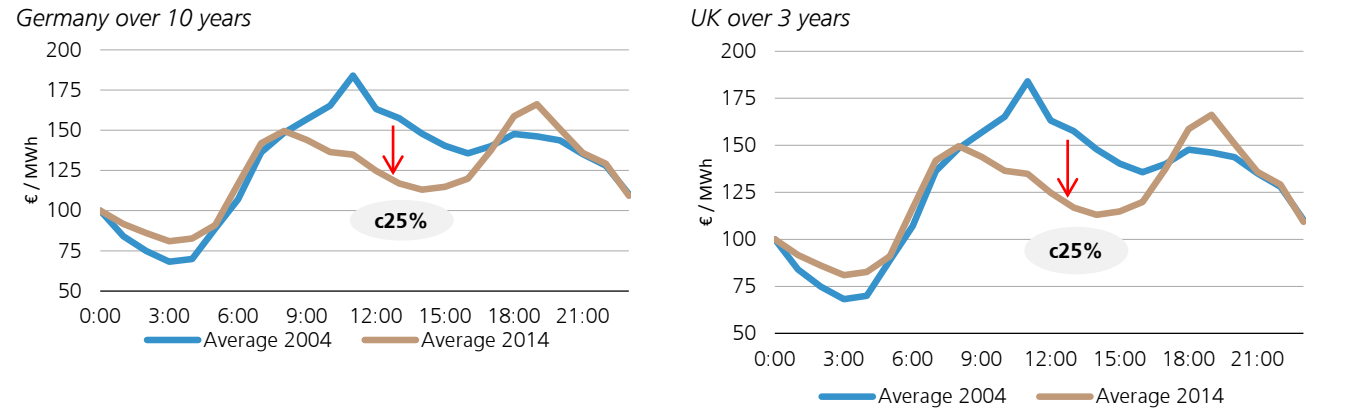
Figure 22: UK 63% reduction in peak hours



Source: Bundesnetzagentur, UBS analysis

Due to the low-to-zero marginal cost of renewables; as shown in Figure 23, we estimate that hourly prices between 9am – 1pm were c25% lower in Germany last year relative to 10 years ago, equivalent to a 2-3% reduction pa; the deployment of renewables is less advanced in the UK but prices in the same daily time period look 5-10% lower already in 2014 than in 2011, again roughly equivalent to a 2-3% rate of reduction p.a.

Figure 23: **Renewables reducing prices in the middle of the day by c2-3% annually**



Source: Bloomberg, UBS analysis

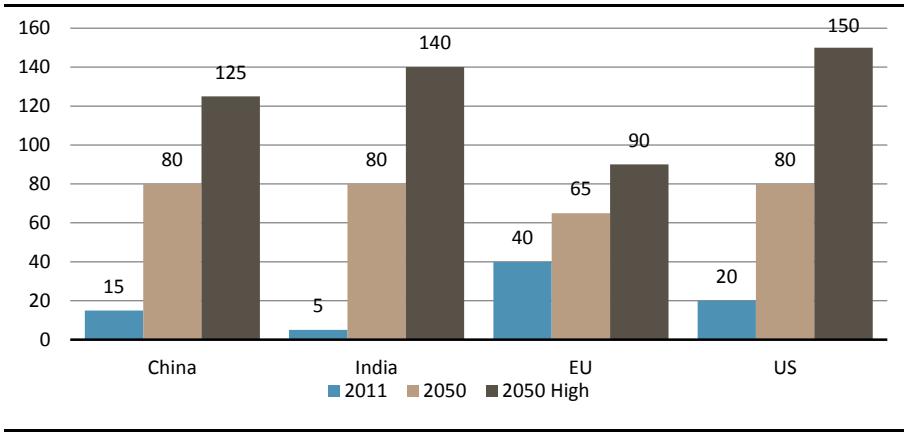
Energy storage needs to develop with renewables, but can't yet

The surge in intermittent supplies and the mismatch that is frequently typical between hours of renewables production and hours of consumption has led to the need to invest in new solutions to store power. The development of storage technology on a large scale is still at its early stages and, for now, is not effective in storing sufficient energy from renewable sources to facilitate the closure of all conventional power generation facilities.

Energy storage could indeed, bridge the temporal and geographical gap between power supply and demand, in a decarbonised, renewable-intensive world. Although we will address this topic in a much wider and deeper effort, for now we will just share some high level conclusions and key calculations.

Although there are different energy storage devices, for electricity the largest source of storage is from pumping hydro plants. In the future though, batteries should be playing an increasingly important role. Based on data provided by the IEA, in 2011 the global storage installed base in China, India, the EU and US amounted to about 80GW. IEA projections suggest that, by 2050 this could rise to 300-500GW (Figure 24). Based on these two scenarios by 2050, the IEA presents capex projections of US$600-750bn.

Figure 24: IEA electricity storage scenarios to 2050 (GW)



Source: IEA.

Which regions are most at risk?

Although the growth of renewables is a global phenomenon, the impact of renewables supply on utilities' profitability is not the same across the world. The impact is the highest where: 1) end-user tariffs for grid supplied power are relatively higher, thus making renewables (especially distributed solar) competitive even at relatively higher costs; 2) where increase in renewables supply has coincided with significantly low power demand; and 3) where power prices are driven by commodity prices, thus creating an additional burden on utilities during an era of low commodity prices. As a result, it becomes clear that developed markets are at a higher risk compared to emerging markets.

EU thermal profits have already largely bottomed

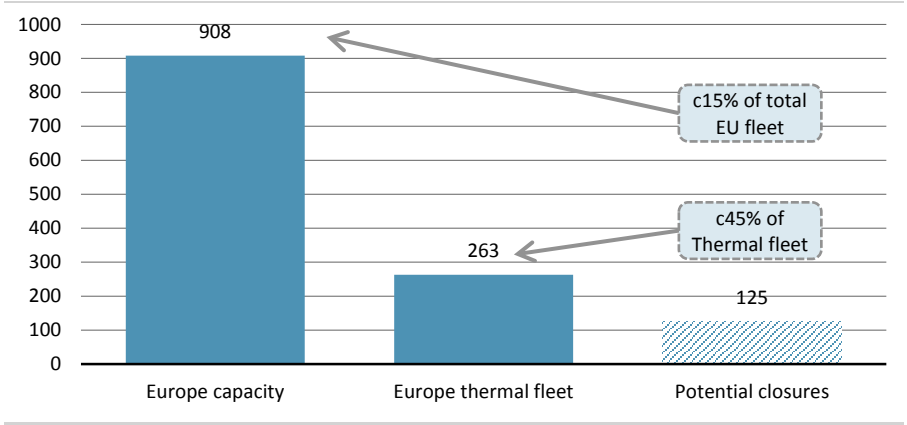
In Europe, we estimate that half of the thermal fleet will be free-cash-flow negative by 2017. Based on our 2015-17E assumptions of 1) cumulative demand

drop of -1.5% (c7GW), and 2) cumulative renewable additions equivalent to 3% of the installed base (c50GW), we estimate that, to keep stable profits, power generators would have to close c10GW of thermal capacity pa (c4% of the EU thermal fleet). Interestingly, this process is already in motion: during 2013-14, coal/gas closures exceeded 25GW pa.

Lack of action by policymakers would therefore trigger a wave of closures (or at least, of closure requests). We estimate 125GW or one coal/gas plant out of two (Figure 245. This would theoretically lead to major savings for utilities and a spike in power prices. As a result the EPS of the integrated names would rise by about one-third.

However, from a security-of-supply perspective, we calculate that only c20% of the FCF-negative plants would be allowed to shut and hence lead to cost savings. The rest should receive some form of incentive (strategic reserve, capacity payment, ancillary services) and remain available to guarantee security of supply. This would ultimately upgrade the EPS of integrated utilities by 5%, on our assessment.

Figure 25: European capacity and 125GW of potential closures (GW)



Source: UBS estimates

China: risk of a 20% equity value write-off in 2018E

Despite weak power demand growth, China is still committed to developing clean power sources, primarily to reduce its reliance on coal and to lessen pollution. This implies strong capacity growth in renewables such as solar and wind, and nuclear.

We think a combination of overcapacity, power sector reform and potentially stricter environmental policies could cut Chinese coal generators' equity value by 20% in 2018E. We forecast net profits and dividends to fall an average 46% in 2018 compared to the 2015 peak.

However, contrary to Chinese wind and nuclear generators, which trade below replacement cost, we estimate that coal generators trade at par. The market therefore assumes coal generators will recover their cost of capital in the long term. However, we forecast most coal IPPs to earn below cost of equity at 8.5% by 2018E and 6.7% by 2020E.

Power demand growth in China has been below 2.5% for fourteen months, which we think is an inflexion point where stranded asset risk emerges. We discuss this in detail on a report by our China utilities team dated 15 July 2015, titled: Are China's coal power plants stranded assets?.

We expect asset underutilisation to persist because we believe local governments prefer that to capacity closures in order to maintain employment levels. We expect announced power reforms (mostly through direct sales) to continue to pressure IPP margins. In addition, we think stricter environmental policies including carbon and "green certificate" trading pose risks for the IPPs.

US: challenges in both unregulated and regulated sector

In the unregulated merchant power space of US, we see limited potential for a meaningful recovery from currently low power prices due to limited projected demand growth, growth of subsidized renewables, and potential for only modest further retirements. At regulated utilities, we believe the prospect of rising interest rates along with robust valuations are a challenge to the sector, particularly as earnings growth stalls once EPA-mandated growth capex slows mid-decade. We expect cost-cutting and strategic planning to be a key theme across both regulated and competitive companies, with M&A at modest (at best) premiums designed to extract cost synergies. We believe utilities with high parent leverage will disproportionately suffer, as they are unable to recoup from rising interest rates.

WHAT'S PRICED IN?

return ↑

Given the modest and negative power demand growth in most markets occurring at the same time as ongoing addition of renewable energy capacity, we would expect utilisation rates of thermal power plants to be declining in many markets. At the same time, we assume that utilisation rates for renewable power capacity should be roughly stable (allowing for year-to-year fluctuations in wind resources.

With this in mind, we would expect to see markets pricing in declining revenues for thermal power plants but rising revenues for operators of renewable power generation as the amount of capacity grows.

With this in mind, we have screened the utilities under coverage to see if there are variances from this that cannot be explained. For the traditional thermal power plant operators we found that, except for some of the Chinese IPPs listed in Shanghai (A-shares), the market seems to have priced in declining utilisations rates. However, for the operators of renewable power, the market seems reluctant to price in the future growth of capacity.

Screening thermal power plants operators and network owners

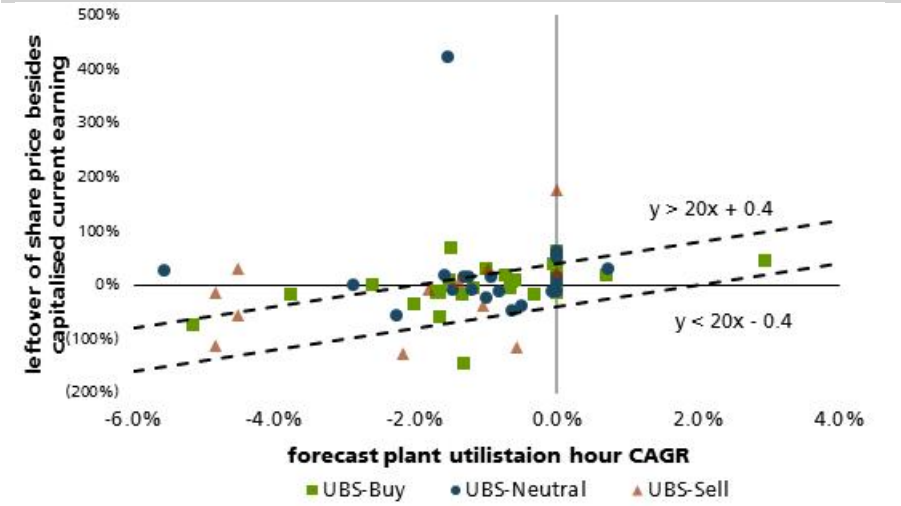
If utilisation rates are likely to decline for thermal power plants then we would expect earnings of these plants to decline if revenues are driven by volumes sold and/or market prices of electricity. This means that we would expect to see, that when screening all the thermal power generation stocks and integrated companies (companies owning both power generation and network assets) with thermal generation using the UBS residual income model in the absence of other factors, that capitalising earnings would produce a value higher than the current share price. We use the cost of equity using the capital asset pricing model when capitalising earnings.

For companies operating both thermal and renewable power generation capacity, we weight the utilisation rate outlook by the proportion of capacity that is thermal vs renewable/hydro.

For networks in markets where demand growth is negative but earnings are based on returns on assets, we could still see growth in assets (and therefore earnings) although this could mean that the cost of network charges for users could be increasing, which could be a source of future regulatory risk.

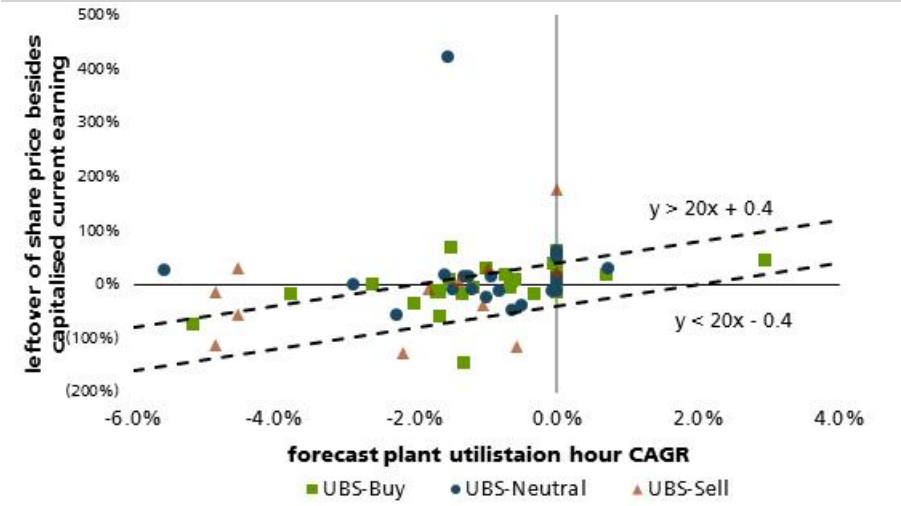
The result of screening is shown in Figure 26 and 27 for 104 electric utilities stock we cover. For companies that have a mismatch or large difference between market outlook and trend in demand or utilisation rate, we have then performed a stock-by-stock analysis to find those that have not priced in those factors. The lines shown, in Figures 26 and 27 that determined whether we look into the stocks more deeply are somewhat arbitrary to give us a reasonable number of outliers to investigate.

Figure 26: Screening for mismatches in generation and integrated companies



Source: UBS analysis

Figure 27: Stock screening for network and regulated companies



Source: UBS analysis

Possible factors leading a stock to be an outlier

Shares that are trading higher than the value of capitalising current earnings could indicate a negative utilisation rate outlook for thermal power plants is not priced in. However, there are other reasons that could drive this, including:

- The decline in commodity price is large enough to offset the decline in demand or utilisation rate.
- Revenues for power plants could be based on capacity rather than volume with regulated prices, so the company would have less exposure to demand or utilisation rate changes.
- Although the regional outlook is negative, the company remains growing due to strong relative competiveness.
- The company also run business in other markets with better profitability.

Better cost control than competitors.

- The company has been successfully increasing exposure to renewables, distributed generation, downstream transmission and distribution (T&D), and other downstream subsidiary services
- The company operates in regulated market and has very small exposure to declining power demand or utilisation rate
- The stock has overreacted to declining demand growth or utilisation rate.

Generation & integrated companies

We looked further into 22 of 64 generation and integrated utilities companies UBS covers that fell above or below the bands shown in Figure 26. Figure 28 highlights stocks with a market cap over 2b USD and average daily trade value over 2m USD.

Our top Sells are Datang International Power – A and Huaneng Power International – A, EDF and Fortum. They do not appear to have priced in the downside mentioned above and therefore the market outlook is slightly negative or even positive.

We believe the market has generally priced in the declining utilisation rate of thermal power plants except for Chinese coal-fire power IPPs. We believe the market hasn't fully priced in the further downsides including:

(1) Further lower utilisation (market consensus is around 3,800 hours, but we expect it could be as low as 3,500-3,600);

(2) Further higher coal price (market consensus is around Rmb400-420/ton, while spot price is reaching 500 now);

(3) Further lower coal-fired tariff (due to more portion of direct sales which has much lower prices).

- **Datang International Power – A (Sell, 3.60):** The market seems to have priced-in the potential benefits the company can gain from the spin-off its coal-to-chemical business, which had continuous losses in the past several years.
- **Huaneng Power International – A (Sell, 6.50):** We believe the company will underperform in the next five years given its high exposure to thermal power (>90% of capacity by 2020) and coastal provinces (>50%of thermal capacity), where we believe overcapacity is the most serious.
- **EDF (Sell; EUR 8.00):** Our rating on EDF is driven by stock-specific issues around the equity story that are potentially not fully priced in, when risks and negative market trends are taken into account. This includes the uncertainties around the Hinkley Point UK nuclear project, the nuclear maintenance and life extension in France, the liberalisation of the French supply market, the carbon floor price (or its absence) implementation, the outcome of the planned €4bn equity issuance, the overhang risk represented by the large c85% government ownership. Load factors are likely to remain fairly steady given the majority baseload fleet.
- **Fortum (Sell; EUR 10.45):** We remain sellers of Fortum based on weak Nordic power prices and limited remaining benefits from re-leveraging, however like EDF the majority of Fortum power generation is baseload generation (nuclear, hydro and CHP), therefore although falling load factors are a background risk they are not the primary challenge for the Fortum business, in our view.

Figure 28: Highlighted generation and integrated stocks

Company	*Rating*	*Market*	*Type*	*Discount rate(CoE)*	*capitalised current earnings over share price*	*leftover of share price besides capitalised earnings*	*plant utilisation growth (2015-2020E CAGR)*
GD Power Development	*Buy*	*CN*	*Generation*	*8.4%*	*129%*	*-29%*	*-3.8%*
China National Nuclear Power	*Neutral*	*CN*	*Generation*	*8.7%*	*47%*	*53%*	*0.0%*
Datang International Power - A	*Sell*	*CN*	*Generation*	*9.0%*	*42%*	*58%*	*-4.5%*
Huaneng Power International - A	*Sell*	*CN*	*Generation*	*8.4%*	*124%*	*-24%*	*-4.8%*
Centrica	*Buy*	*EU*	*Integrated*	*7.5%*	*92%*	*8%*	*-1.5%*
E.ON	*Neutral*	*EU*	*Integrated*	*6.4%*	*131%*	*-31%*	*-1.6%*
EDF	*Sell*	*EU*	*Integrated*	*6.6%*	*204%*	*-104%*	*-0.6%*
Fortum	*Sell*	*EU*	*Generation*	*6.8%*	*71%*	*29%*	*-1.0%*
Engie	*Neutral*	*BR*	*Generation*	*7.1%*	*110%*	*-10%*	*-2.9%*
Sempra Energy	*Buy*	*US*	*Integrated*	*6.7%*	*73%*	*27%*	*-1.0%*
Calpine Corporation	*Buy*	*US*	*Generation*	*8.1%*	*31%*	*69%*	*-1.5%*

Source: UBS analysis

The other companies highlighted in Figure 28 have other reasons than not pricing in utilisation rate trend:

- **GD Power Development (Buy, CNY 4.00):** We maintain our Buy rating on GD Power, as we believe its exposure to clean energy – the largest among A-share-listed IPPs – will offset the downside risks to coal-fired power.
- **China National Nuclear Power (Neutral, CNY 7.90):** CNNP is the only listed nuclear play in China (another Chinese nuclear power company is listed in Hong Kong) and while we expect almost no power demand growth the market rightly expects that the company we expect CNNP will expand its installed capacity by 40% between now and 2020
- **Engie (Neutral; BRL 38.00):** Engie (formerly Tractebel Energia) is a pure generation company with long-term energy contracts at inflation-adjusted prices. Capitalising current earnings explains all of the company's current share price. Investors normally don't pay for growth in Brazil, as companies need to participate in competitive regulated auctions, bidding for the lowest energy contract price, to build new capacity. Given the uncertain outcome of the auctions, its current stock price reflects ongoing energy contracts and expectations regarding energy prices, as generation companies have to sign new PPAs when their current ones expire.
- **Sempra Energy (Buy; USD 123.00):** Sempra's recently outlined 12% EPS CAGR through 2020 with 8-9% DPS growth highlighted management's focus on capital deployment over share buybacks, which is likely helping to drive embedded growth expectations in the share price. Further, we note Sempra's diversified focus includes a variety of 'non-power' assets including LNG and pipelines, as well as international opportunities across asset classes in Mexico, Chile, and Peru.
- **Calpine Corporation (Buy; USD17.00):** Calpine is valued by most investors on an EBITDA basis which could skew our residual income model results in this case as street EPS estimates show a wide dispersion. Further, recent decision to

shut down Texas legacy CCGT Clear Lake plant emphasizes the shift towards shutting down coal units of late in ERCOT. Overall, we still see CPN as a value on an EBITDA basis and see more limited recovery from peers with greater exposure to PJM.

Renewable companies

As discussed in previous sections, increase in renewables remains strong driven by policy support and falling cost. Due to its zero-marginal cost, generation from renewables should not be not affected by slow or negative demand growth.

We should expect the market to be pricing in future growth (i.e., a share price that is higher than what would be based on capitalising the current level of earnings). Therefore, we have screened for stocks there the share price is not higher compared to capitalised current earnings. Stocks where we believe the growth priced in to the share price is relatively small or even negative given strong growth in capacity are shown in Figure 29.

Figure 29: Stock screening for renewables companies

Company	Rating	Market	Type	Discount rate(CoE)	capitalised current earnings over share price	leftover of share price besides capitalised earnings	Capacity mix of renewables	Renewable capacity growth of the market
Huaneng Renewable	Buy	CN	Generation	9.9%	110%	-10%	100%	15%
China Longyuan Power	Buy	CN	Generation	8.7%	93%	7%	90%	15%
Huadian Fuxin Energy	Buy	CN	Generation	10.1%	170%	-70%	52%	15%
Energy Development Corp	Buy	PH	Generation	8.8%	96%	4%	91%	9%
DONG Energy A/S	Buy	EU	integrated	6.5%	118%	-18%	50%	6%
NextEra Energy	Buy	US	Integrated	6.2%	84%	16%	53%	15%

Source: Bloomberg, UBS analysis

- **Huaneng Renewable Corporation (Buy; HKD 3.50):** We believe the shares have been oversold on risks regarding power curtailment and tariff cuts. Despite near-term challenges in 2016, we think power curtailment could be reduced in the short to medium term, driving ROE from 9% in 2015 to 13% in 2018E. We also forecast Huaneng Renewable to be FCF-positive in 2019.
- **China Longyuan Power (Buy; HKD 8.50):** We believe Longyuan will remain the best-quality operator among its peers, with good management and premium return. The market has been over concerned about the power curtailment risk and only pricing in 9% of the share price attributes to growth. Since Longyuan has the strongest balance sheet and project returns in the sector, we believe it would face lower risk if power curtailment continues in 2016. We forecast Longyuan to be the first company among the wind farm operators to turn FCF-positive, in 2017.
- **Huadian Fuxin Energy Corporation (Buy; HKD2.60):** We believe the market has been overly concerned about the power curtailment risk to Fuxin's wind business and utilisation risk to its coal business. We view Fuxin as the biggest beneficiary of China's grid infrastructure built-out, which drives our estimated 2015-18 earnings CAGR of 16%. We believe the stock has re-rating potential, as clean energy (hydro, renewables and nuclear) as a proportion of Fuxin's

earnings increases from 30% in 2015 to 100% in 2017E, with declining reliance on coal.

- **Energy Development Corp (PHP 6.80):** We believe the market may be overly concerned about execution risk due to EDC's track record (i.e. earnings had been volatile in the past due to power plant breakdowns). However, we think management's initiatives to spend more on capex to improve the reliability and resiliency of its power plants could help deliver more stable earnings. Meanwhile, we think the market has yet to price in renewable growth potential, as it awaits the government's policy on the energy mix. With the increasing focus on renewable energy and potential crackdown on coal plants, we think EDC may benefit.
- **DONG Energy A/S (Buy; DKK 300):** We believe that concerns on long-term returns in offshore are overdone: Returns will likely compress but significant long-term value creation potential should remain, in our view. On this basis, we would expect the stock to gradually start pricing some of this post-2020E potential, as it becomes more visible and secure (we think none of it is priced in at current levels). With a steady stream of offshore auctions to be held in Europe over 2016-17 (>8GW announced already) and DONG's proven ability to win tenders, we see plenty of possible near-term catalysts for the story
- **NextEra Energy (Buy; US$140):** We continue to favour NextEra shares despite continued breakthroughs into all-time highs given the company's significant multi-GW renewables runway and smooth prospects in Florida around rate activity. The story remains the 'go-to' renewable player in the wider Utilities & Alternative Energy sectors, grabbing continued meaningful market share.

T&D and regulated companies

Out of 40 T&D and regulated utilities companies that UBS covers, 15 with mismatches between market outlook (leftover of the share price besides capitalised earnings) and the power demand growth. Figure 30 highlights stocks with a market cap over 2b USD and average daily trade value over 2m USD.

In our view, highlighted T&D and regulated companies do not seem to be over or under pricing in power demand growth. The relatively small growth (or discount) priced in compared to the demand growth is due to other reasons like regulatory and other factors.

Figure 30: Highlighted T&D and regulated stocks

Company	Rating	Market	Type	Discount rate(CoE)	capitalised current earnings over share price	leftover of share price besides capitalised earnings	power demand growth (2015-2020E CAGR)
Tenaga Nasional	Buy	MY	Integrated Regulated	8.8%	111%	-11%	3.0%
Korea Electric Power	Buy	KR	Integrated Regulated	6.5%	368%	-268%	2.3%
Cheung Kong Infra.	Neutral	HK	Integrated Regulated	5.5%	116%	-16%	0.9%
CLP Holdings	Neutral	HK	Integrated Regulated	5.5%	114%	-14%	0.9%
HK Electric Investments	Sell	HK	Integrated Regulated	5.1%	106%	-6%	0.9%
Equatorial Energia	Neutral	BR	T&D	7.7%	97%	3%	2.7%
ENERGIAS DO BRASIL	Neutral	BR	Integrated Regulated	8.2%	99%	1%	2.7%
COPEL	Sell	BR	Integrated Regulated	10.1%	130%	-30%	2.7%
CEMIG	Sell	BR	Integrated Regulated	11.9%	74%	26%	2.7%

Source: UBS analysis

- **Tenaga Nasional (Buy; MYR 17.00)**: over the past decade Tenaga's earnings have been volatile as the government has played around with Tariffs and kept electricity prices low. They have recently put in place a more defined cost passes through system so things are improving. This helps to account for how the market prices this stock at below capitalized current earnings as the market isn't yet convinced that earnings can be more stable going forward

- **Korea Electric Power (Buy; 71,000KRW):** long term uncertainty around what the tariffs will be for KEPCO continues to be an overhang for the company's share price. The previous Korean administration did not give sufficient tariff hikes to offset rising fuel prices but this changed with the current government, gave tariff hikes and KEPCO's earnings became positive. We continue to believe the government will be awarding reasonable tariffs for KEPCO going forward. We also believe KEPCO's improving fuel mix will also allow the company to rerate to a higher multiple.

- **Cheung Kong Infrastructure (Neutral; HKD 74.00)**: this company is a holding company for a large number of geographically diverse infrastructure investments –In terms of its 2015 EBITDA breakdown the splits across industry types are as follows: Power 69%, Gas 15%, Water 9%, Others 7%- its exposure to electricity demand is primarily through associates in a number of countries China, Canada, UK, Hong Kong, Portugal, Holland, New Zealand and Australia. In terms of what's priced in yes capitalized current earnings gives you a number higher than the current share price – we would argue that many investors in the market are taking the view that the risk free rate "stays lower for longer" and so are applying a lower COE assumption.

- **CLP Holdings (Neutral; HKD 77.00)**: CLP's power demand exposure is from a diverse geography – China, Hong Kong, India, Taiwan, Australia, and Thailand. However more than 75% of its earnings is Hong Kong related and are managed by the Scheme of Control (SoC). The SoC caps returns at 10% of average net fixed assets and in many ways helps to remove the linkage of power demand growth in that the market is more focused on what the permitted return will be than what power demand growth in HK will be. For its non HK power demand exposure the bigger driver of earnings is the wholesale / retail spread which is more to do with pool prices than demand. In terms of

what's priced in yes capitalized current earnings gives you a number higher than the current share price – we would argue that many investors in the market are taking the view that the risk free rate "stays lower for longer" and so are applying a lower COE assumption

- **HK Electric Investments (Sell; HKD 5.20)**: HK Electrics earnings are almost 100% dependent upon HK and the Scheme of Control. We are expecting a cut in the Scheme of control permitted return from 10% to 8% to happen from the start of 2019. However tight now we think that the market isn't focused on that event but is instead looking at how much dividend it will pay between now and 2018. As with CLP and CKI we think that some investors are taking the view that the risk free rate "stays lower for longer" and so are applying a lower COE assumption

- **Equatorial Energia (Neutral; BRL 51.00):** Current distribution regulation is based on benchmark methodology, allowing efficient companies such as Equatorial to pocket excess profitability. The more inefficient peers are, the better the chances for Equatorial's discos to over-earn. We believe many inefficient discos will remain so in the next tariff cycle, allowing Equatorial to "deserve" to earn above average in the eyes of regulators. Equatorial also benefits from strong demand growth in its concessions, much higher than average demand growth in Brazil.

- **ENERGIAS DO BRASIL (Neutral; BRL 14.00):** Energias do Brasil is an integrated company with generation and distribution assets. Its current market price implies that only 6% of its value comes from growth in distribution demand. Its distribution demand growth is in line with Brazilian discos and the company operates in line with regulatory targets in terms of cost efficiency and energy losses. Investors normally don't pay for growth in Brazil, as companies need to participate in competitive regulated auctions, bidding for the lowest energy contract price, to build new capacity. Given the uncertain outcome of the auctions, its current stock price reflects ongoing energy contracts and expectations regarding energy prices, as gencos have to sign new PPAs when their current ones expire.

- **COPEL (Sell; BRL 29.00):** COPEL is an integrated company with generation, distribution and transmission assets. Its current market price implies value destruction of 14% from growth. The company is building several transmission and generation assets with very low returns. COPEL not only bid aggressively during auctions but also could not deliver the projects on time and within initial budget.

- **CEMIG (Sell; BRL 5.00):** CEMIG is an integrated company with generation, distribution and transmission assets. Its current market price implies that 24% of its value comes from growth. Its short-term earnings are under pressure, given high leverage and high cost of funding. The stock is up more than 50% YTD, given talk regarding possible M&A. Management has indicated that it will sell assets to reduce leverage and the market is pricing in that the company sells them at very attractive prices. Therefore, the stock price is much more related to M&A than to current earnings, in our view.

Valuation Method and Risk Statement

We use a variety of valuation approaches for utilities globally. For companies in Asia, we generally use a discounted cash flow. We use EV/free cash flow yield in New Zealand. In the US, we use combination of target PE, EV/EBITDA DCF and DDM. In Latin America we use SOTP/DCF, In Europe, we use a combination of target PE; DDM; DY and SOTP

Risks to utilities include: movements in commodity prices, uncertainty in future rates of power demand growth, the ability to implement construction projects on time and on budget, adverse regulatory changes for regulated assets and changes in regulations and/or prices relating to resource usages or emissions, changes in interest rates or currencies, the price of electricity in markets where pricing is not regulated but driven my supply and demand balance changes.

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12-Month Rating	Definition	Coverage[1]	IB Services[2]
Buy	FSR is > 6% above the MRA.	47%	32%
Neutral	FSR is between -6% and 6% of the MRA.	38%	25%
Sell	FSR is > 6% below the MRA.	15%	21%
Short-Term Rating	**Definition**	**Coverage[3]**	**IB Services[4]**
Buy	Stock price expected to rise within three months from the time the rating was assigned because of a specific catalyst or event.	<1%	<1%
Sell	Stock price expected to fall within three months from the time the rating was assigned because of a specific catalyst or event.	<1%	<1%

Source: UBS. Rating allocations are as of 30 June 2016.
1:Percentage of companies under coverage globally within the 12-month rating category.
2:Percentage of companies within the 12-month rating category for which investment banking (IB) services were provided within the past 12 months.
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Company Disclosures

Company Name	Reuters	12-month rating	Short-term rating	Price	Price date
Calpine Corporation[4, 5, 6a, 7, 16b]	CPN.N	Buy	N/A	US$13.12	15 Sep 2016
CEMIG[16b]	CMIG4.SA	Sell	N/A	R$8.55	15 Sep 2016
Centrica[2, 4, 5, 7, 14]	CNA.L	Buy	N/A	228p	15 Sep 2016
Cheung Kong Infrastructure[3a, 16a]	1038.HK	Neutral	N/A	HK$67.90	15 Sep 2016
China Longyuan Power[2, 4]	0916.HK	Buy	N/A	HK$6.66	15 Sep 2016
China National Nuclear Power	601985.SS	Neutral	N/A	Rmb6.64	14 Sep 2016
CLP Holdings	0002.HK	Neutral	N/A	HK$78.70	15 Sep 2016
COPEL[16b]	CPLE6.SA	Sell	N/A	R$33.38	15 Sep 2016
Datang International Power - A	601991.SS	Sell	N/A	Rmb3.86	14 Sep 2016
DONG Energy A/S[2, 4, 5, 22]	DENERG.CO	Buy	N/A	DKr268.60	15 Sep 2016
E.ON[5, 7]	EONGn.DE	Neutral	N/A	€6.60	15 Sep 2016
EDF[7]	EDF.PA	Sell	N/A	€11.01	15 Sep 2016
ENERGIAS DO BRASIL	ENBR3.SA	Neutral	N/A	R$14.34	15 Sep 2016
Energy Development Corp	EDC.PS	Buy	N/A	P5.98	15 Sep 2016
Engie[5, 7]	ENGIE.PA	Buy	N/A	€13.74	15 Sep 2016
Equatorial Energia	EQTL3.SA	Neutral	N/A	R$50.40	15 Sep 2016
Fortum[5]	FUM1V.HE	Sell	N/A	€13.35	15 Sep 2016
GD Power Development	600795.SS	Buy	N/A	Rmb3.00	14 Sep 2016
HK Electric Investments[7]	2638.HK	Sell	N/A	HK$7.36	15 Sep 2016
Huadian Fuxin Energy Corporation[4, 5]	0816.HK	Buy	N/A	HK$1.94	15 Sep 2016
Huaneng Power International - A[16b]	600011.SS	Sell	N/A	Rmb7.18	14 Sep 2016
Huaneng Renewable Corporation	0958.HK	Buy	N/A	HK$2.92	15 Sep 2016
KEPCO[16b]	015760.KS	Buy	N/A	Won57,900	13 Sep 2016
NextEra Energy[2, 3b, 4, 5, 6a, 6b, 7, 16b]	NEE.N	Buy	N/A	US$122.73	15 Sep 2016
Sempra Energy[2, 4, 6a, 6b, 7, 16b, 18]	SRE.N	Buy	N/A	US$105.20	15 Sep 2016
Tenaga Nasional[4]	TENA.KL	Buy	N/A	RM14.36	15 Sep 2016

Source: UBS. All prices as of local market close.
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Additional Prices: Enel, €3.94 (15 Sep 2016); Iberdrola, €5.89 (15 Sep 2016); Energias de Portugal, €2.90 (15 Sep 2016); NRG Energy Inc., US$11.15 (15 Sep 2016); RWE, €14.61 (15 Sep 2016); Tata Power Company, Rs74.75 (15 Sep 2016); SSE PLC, 1,523p (15 Sep 2016); EDP Renovaveis, €6.91 (15 Sep 2016); SunEdison Inc., US$0.05 (15 Sep 2016); LIGHT, R$15.49 (15 Sep 2016); China Power International Development, HK$3.05 (15 Sep 2016); China Resources Power, HK$14.22 (15 Sep 2016); Datang International Power, HK$2.15 (15 Sep 2016); Wacker Chemie, €75.63 (15 Sep 2016); Suez, €14.46 (15 Sep 2016); Edison International, US$72.20 (15 Sep 2016); JSW Energy, Rs80.65 (15 Sep 2016); Red Electrica de España, €19.27 (15 Sep 2016); Source: UBS. All prices as of local market close.

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