Utilities industry

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Global Utility Trends – *Q1 FY15*

Presented by Bob Knox, OSIsoft T&D User's Conference 2015

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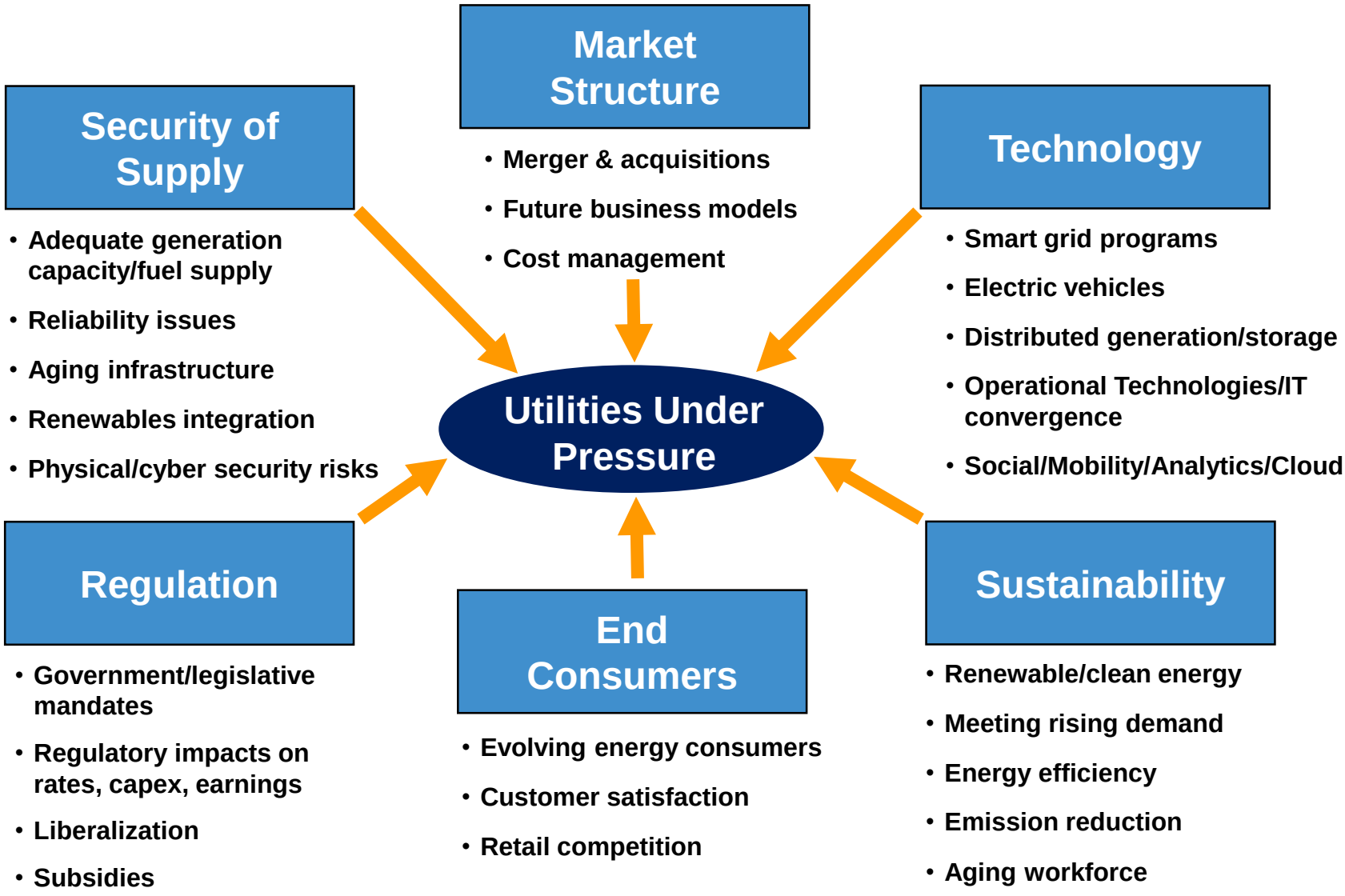
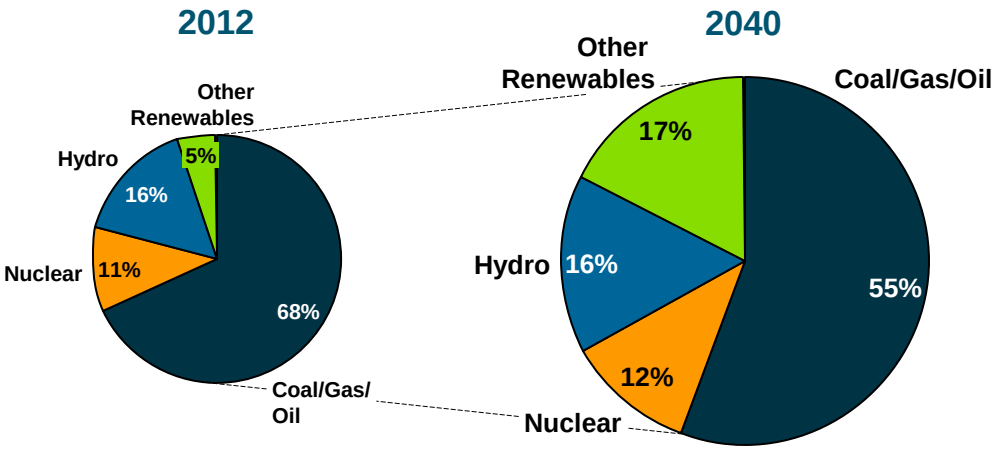
Utilities are impacted by a variety of long-term trends



Source: Accenture Research

Global Electricity Outlook 2012- 2040

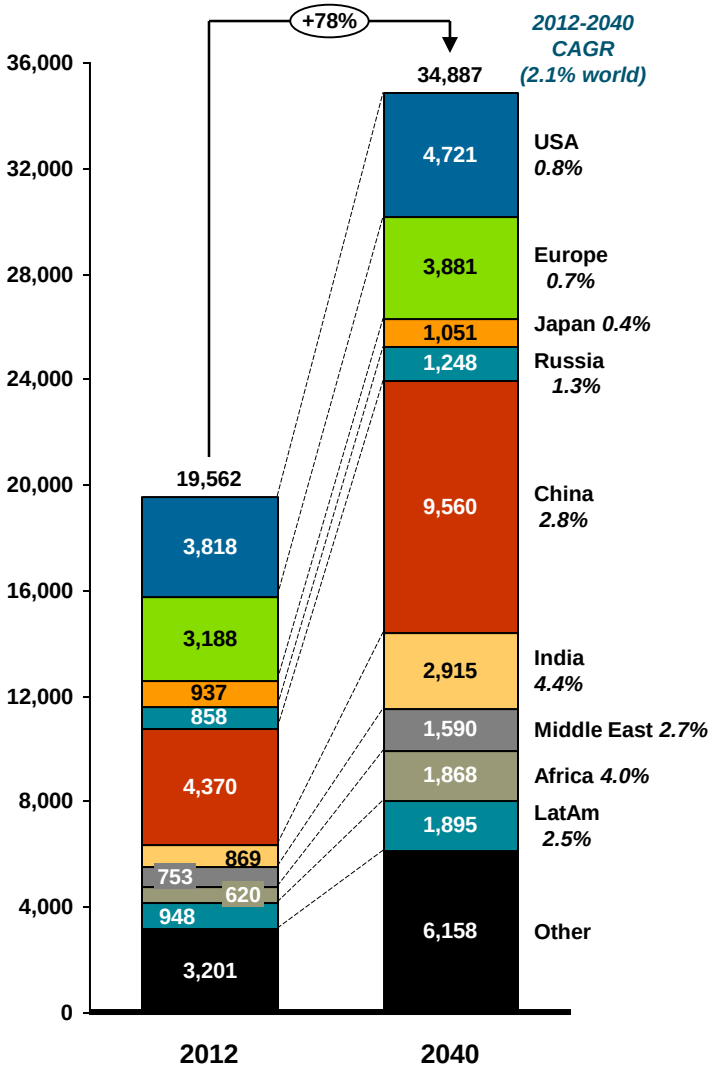
Electricity Generation by Source 2012 – 2040 (TWh)*



- The IEA estimates that **installed capacity worldwide rises by 80%,** from 5,952 GW in 2013 to just above 10,700 GW in 2040
- Cumulative capacity additions total 7 200 GW over 2014-2040, of which **34% is needed to replace retired plants**
- The **need to replace existing capacity is particularly large in the European Union**, as close to 60% of it is retired by 2040. The comparable need is lowest in China, at 16%
- By 2040 **the share of fossil fuels in electricity generation declines** from its peak in 2013, pulled down by falling shares of coal and oil. Gas and nuclear see their share in the power mix increase.
- **Renewables-based electricity generation, including hydropower, nearly triples** over 2013-2040, increasing more than coal and gas combined, becoming the largest source of electricity.

*based on IEA's New Policies Scenario

Electricity Demand by Region 2012 – 2040 (TWh)*



Source: © IEA/OECD World Energy Outlook 2014; Accenture Research

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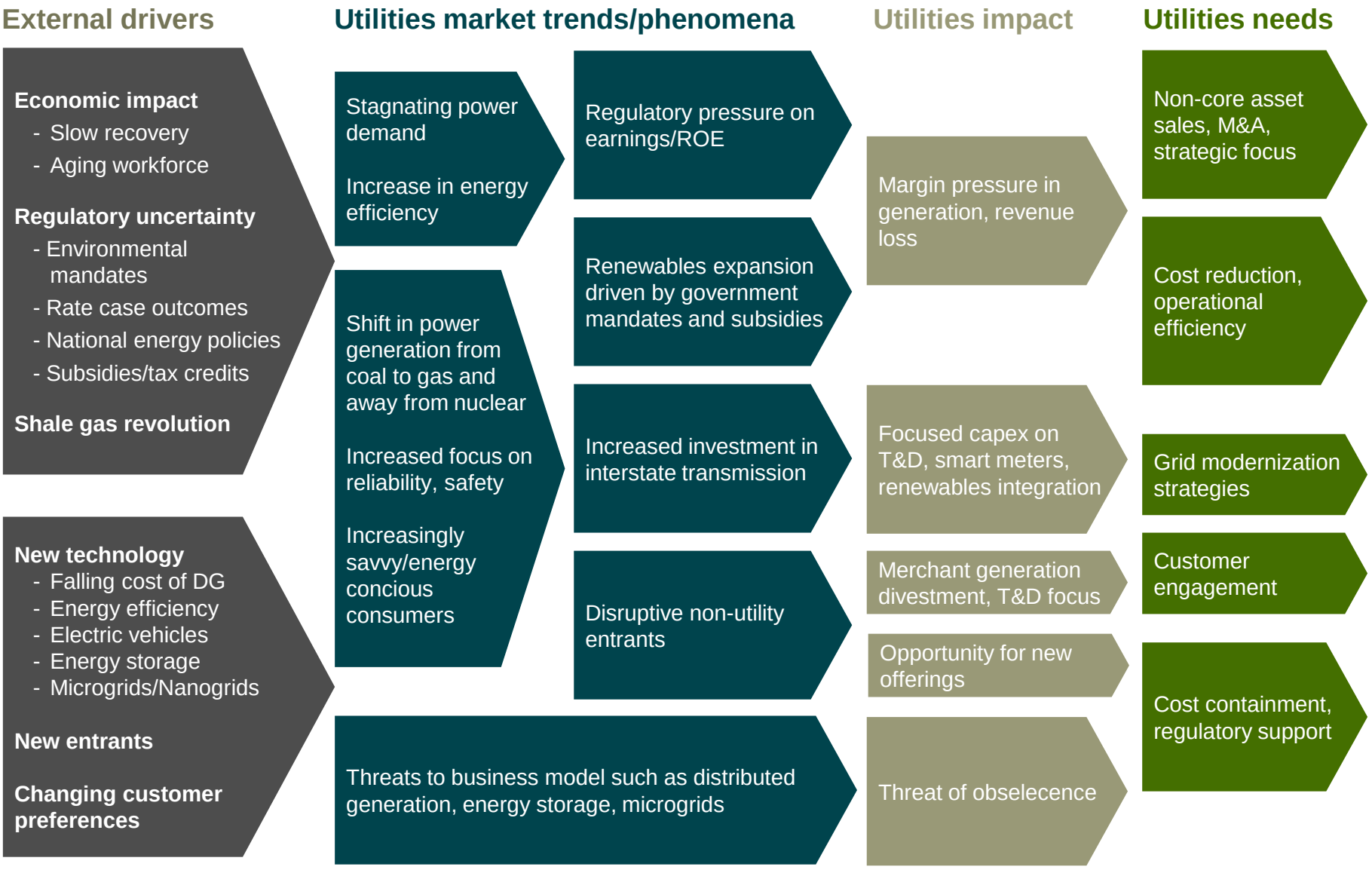
North America Utilities Trends Framework



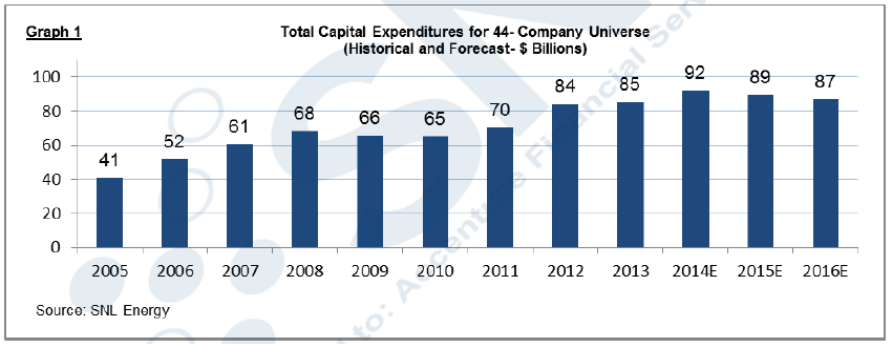
Summary of utility trends by region

	NA	EALA	APAC
Security of Supply	 Steady T&D Capex with emphasis on congestion relief		
Market Structure	 M&A for utility mid-caps remains steady but mixed results		
Technology	 Smart meter slows but EVs and storage increases		
Regulation	 Evolving EPA standards and state laws		
Sustainability	 Renewables grow due to lowering costs and subsidies		
End Consumers	 Energy efficiency programs produce mixed results		

North America
Security of Supply

Utility capex spending in 2014 is forecast to reach a new all-time high, declining in 2015 and 2016

- Robust spending on new generation over the past decade has been driven, in part, by the economics of gas prices and coal-to-gas switching, as well as the recent flurry of coal plant retirement announcements, totaling nearly 3.2 GW for 2014
- T&D capex should remain relatively steady over the next three years, and account for nearly 50% of total spending by electric utilities



Relieving transmission congestion a key focus of utility capex

- The DoE approved the construction of a 1 GW transmission line to bring hydro power from Quebec to New York City. The $2.2 bil line is scheduled to be in service by 2018, helping to address long-term demand and put downward pressure on market prices
- NextEra Energy has proposed burying a 68-mile, 520 MW undersea transmission line that would bring much-needed energy into the Boston area, at a cost of $1 bil
- Oncor plans to invest $1.2 bil over the next four years into the Permian Basin's energy infrastructure on the back of the boom in the oil industry

Utilities look to invest in upstream shale resources to incorporate into rate base to serve as a physical and financial hedging tool

- Duke Energy is interested in making its first investment in the production of shale gas as its power plants become more dependent on natural gas
- Southern Company is starting to see adding shale gas reserves to the rate base as an increasingly relevant possibility according to the CEO

Source: SNL Energy/RRA; Accenture Research

North America
Market Structure

Utility M&A activity focuses on midcaps but not all deals have been successful

- NextEra has agreed to acquire Hawaiian Electric Industries, parent company of the Hawaiian Electric utilities, in a transaction valued at about $4.3 bil with the assumption of $1.7 bil debt from HEI, which is also spinning off its banking subsidiary, American Savings Bank
- CenterPoint Energy, NextEra, Hunt Consolidated and Berkshire Hathaway Inc. are among ten companies exploring bids for Texas utility Oncor. Oncor, which did not file for bankruptcy, was initially valued between $15-16 bil, but could approach $20 bil in a bidding war
- Macquarie Group has backed out of the proposed purchase of Cleco's electric utility when co-investors reportedly hesitated over the utility's high share price, low growth prospects and expected low returns
- The Philadelphia City Council rejected UIL Holding's proposed acquisition of Philadelphia Gas Works
- PSEG has been looking for M&A partners and had been linked to merger talks with Pepco, which it lost to Exelon, and PPL, which fell through. Analysts say that if PSEG can't find a merger, it could unload its 13.5 GW merchant business to reduce exposure similar to what PPL and Riverstone did to form Talen Energy

Unregulated acquisition deals aim to boost market share

- NRG Energy acquired VC-funded Pure Energies Group, a 150-employee online solar customer acquisition platform, as part of an effort to grow NRG's residential solar business to gain share from SolarCity and Vivint
- Constellation doubles size by buying retailer Integrys, nearly doubling Constellation's customer count, which now serves 2.5 million power and natural gas customers across the US
- Comverge and Constellation have reached an agreement to combine their demand response businesses, targeting commercial and industrial customers

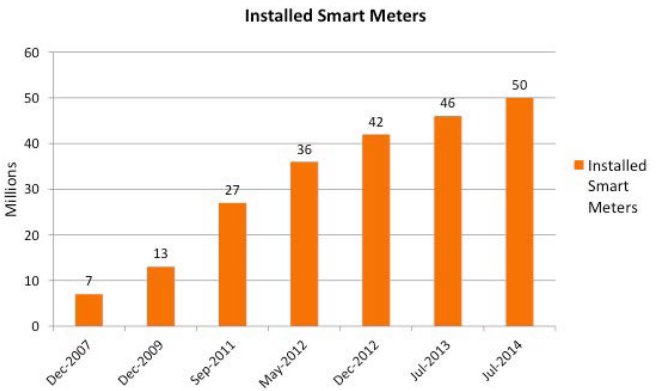
- NiSource intends to split itself into two distinct businesses - regulated utilities, and a pure-play gas pipeline, midstream and storage firm called Columbia Pipeline Partners LP. The gas assets will go into a master limited partnership that will use a favorable tax status to boost investment in shale gas

Source: Accenture Research

North America
Technology

Smart meter installations continue but at a slower pace

- As of July 2014, over 50 mil smart meters have been deployed in the U.S., covering over 43% of homes, up from 46 mil a year ago



Energy storage activity takes center stage

- SoCal Edison signed contracts for 250 MW of energy storage, despite only being required to seek at least 50 MW of storage per CPUC mandates. The CPUC has recognized that the cost of storage may be too high in the early years of the mandate and have given utilities an escape hatch in case the systems were too expensive
- Oncor is proposing a $5.2 bil, 3-5 GW energy storage plan to better integrate wind and solar power into the state's electric grid, stating it would be the most cost-effective way to solve issues renewable integration of renewable power, estimated at an installed cost of $350/kWh

Electric vehicles get a boost from utilities

- Georgia leads the nation in electric vehicle adoption and Georgia Power will invest $12 mil to accelerate the momentum by adding EV charging infrastructure through 2016 via cash incentives and 50 new public charging locations
- California utilities have been under a rule prohibiting them from owning EV charging stations since 2011. SDG&E and SCE have recently proposed investing $500 mil in infrastructure and PG&E is waiting to hear decision and may act as well. SDG&E filed that they would contract with third parties to build, install, operate and maintain EV charging facilities (5,500 stations) under a service level agreement
- Pepco will utilize car charging stations in a demand response pilot to assess an EV station's ability to support consumer engagement, demand response, time-of-use rates and embedded revenue-grade metering
- PSNM is converting its vehicle fleet to electric hybrids, nearly 450 cars, pickups and trucks to plug-in hybrid electric vehicles

Source: Edison Foundation; Accenture Research

North America
Regulation

EPA proposes new standards while legal challenges make their way through the courts

- The EPA proposed new smog and ozone standards, designed to lower the current threshold for ozone pollution from 75 parts per billion to a range of 65 to 70 parts per billion and will take comments on a standard as low as 60 parts per billion
- Appeals court cleared the way for the start of the EPA's Cross-State Air Pollution Rule (CSAPR), reversing a decision by the D.C. Circuit in 2011
- The U.S. Supreme Court will review the first-ever national environmental standards requiring power plants to reduce emissions of mercury and other toxic air pollutants, saying it would decide whether the government should have considered how much the rules would cost utilities.

California enacts new laws to protect environment and advance clean transportation

- California Governor signed 11 bills into law that will further California's effort to cut greenhouse gas emissions and boost the state's leadership in the U.S. fight against climate change
- Brown announced a new goal of getting 1.5 million zero-emission cars on California's roads in the next ten years and increase permits for clean-air vehicles' use of car-pool lanes by 15,000, create rebates for low-income residents' purchase of lower emissions cars, require streamlined permitting by local jurisdictions for residential solar, and require a state standard to control methane and other pollutants

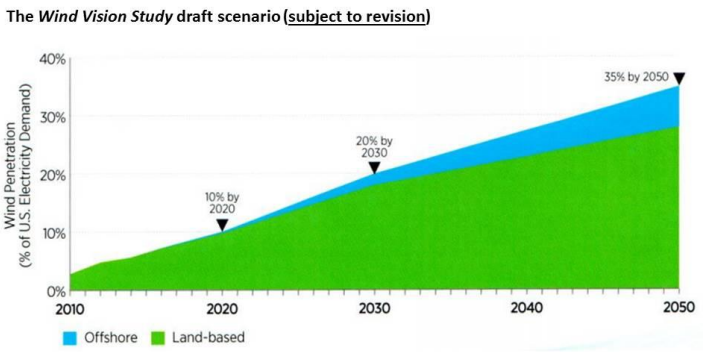
- In Illinois, the Citizens Utility Board and the Environmental Defense Fund have filed an Open Data Access Framework with the ICC to ensure that customers can easily move data to third parties. They want Illinois utilities ComEd and Ameren to incorporate data sharing into their smart grid deployment plans when they go through their annual review in April 2015
- The City of Minneapolis has signed tentative agreements with Xcel Energy and CenterPoint Energy ending a prolonged battle over municipalization. The pact extends the utilities' franchise agreements while setting up a board to consider expanding clean energy programs

Source: SNL Energy; Accenture Research

North America
Sustainability

Renewables share of total supply continues to grow…

- Power produced from wind, solar, hydro and other renewables will jump 6.3% in 2015, according to the EIA, with wind and solar producing 5.2% of power in the lower 48 in 2015 vs. 4.9% in 2014
- The Dept. of Energy puts wind's share for the U.S. in 2020 at 10%, up from 2013's 4.5% and projects 20% of power to come from wind in 2030 and 1/3rd by midcentury



…boosted by cost competitiveness and continued subsidies

- According to the Lawrence Berkeley National Laboratory, the price of electricity sold to utilities from large-scale solar power projects has fallen by more than 70% since 2008, to $50 per MWh. And the average installed price of those projects dropped by more than 33% since the 2007-2009 period.
- The cost of electricity from wind and solar resources in some markets now beats coal and natural gas and the trend is accelerating, especially in the Midwest and Southwest. Investment banking firm Lazard's most recent levelized cost of energy analysis shows utility-scale solar energy is as low as $0.056/kWh with subsidies and about $0.072/kWh unsubsidized, wind is as low as $0.014/kWh with subsidies and $0.037/kWh without, while natural gas is $0.061/kWh, and coal is $0.06/kWh
- Deutsche Bank finds the price of solar power will be at or below average power prices in most states by 2016, though the numbers change based on what happens to the solar production tax credit. If the credit is maintained at 30%, solar with reach grid parity in 47 states; should the credit be dropped to 10%, grid parity can still be achieved in 36 states. Solar power is already as cheap or cheaper than conventional supplies in 10 states, and those states are set to experience a boom in solar generation
- Congress passed a one-year extension of wide-ranging package of tax credits, including the wind industry's vital $0.023/kWh production tax credit. The extensions are retroactive to the beginning of 2014 and allow wind projects that break ground by Dec 31 to qualify for the tax break

Source: EIA; Accenture Research

North America
End Consumers

Energy efficiency programs face mixed results

- Ohio regulators approved FirstEnergy's proposal to end most of its efficiency programs, which include rebates and discounts on efficient appliances and lighting, after state lawmakers passed a law freezing the state's renewable energy standards
- Florida regulators have slashed the energy efficiency targets of the state's largest IOUs, as well as allowing a solar rebate program to expire at the end of 2015
- Michigan's energy efficiency measures exceeded their targets and returned almost $4 in savings for every dollar spent, according to a new report from the state's energy regulators
- California utility regulators authorized utilities and other retail energy service providers to spend $938 mil on energy efficiency programs in 2015 while they continue to wrestle with fundamental program changes

- Some 30% of utility customers would reportedly choose another electricity provider and 64% of those customers would choose an alternative provider like Google, Comcast, or SolarCity, according to a survey from the Shelton Group. Dissatisfaction with utilities among those surveyed rose from 43% in Jan 2013 to 55% in Aug 2014
- ComEd is signing up customers for a new Peak Time Savings plan that will award bill credits for voluntary power reductions with consumers earning a $1/kWh credit for cutting usage during peak demand times
- Avista Utilities has created a rebate program for residential customers that have bought a new smart thermostat as part of a drive to improve energy efficiency, offering customers a $50 rebate for self-installed thermostats and $100 back for contractor-fitted devices
- Opower survey showed that even without extra economic incentive, many people will turn down the thermostat when asked, as people want to conserve when utilities reach out to them
- ComEd announced that it will refund customers $46.2 mil or $8 per residential customer as part of a settlement following the illegal levying of a surcharge to fund a smart meter pilot

Source: Utility Dive; Accenture Research

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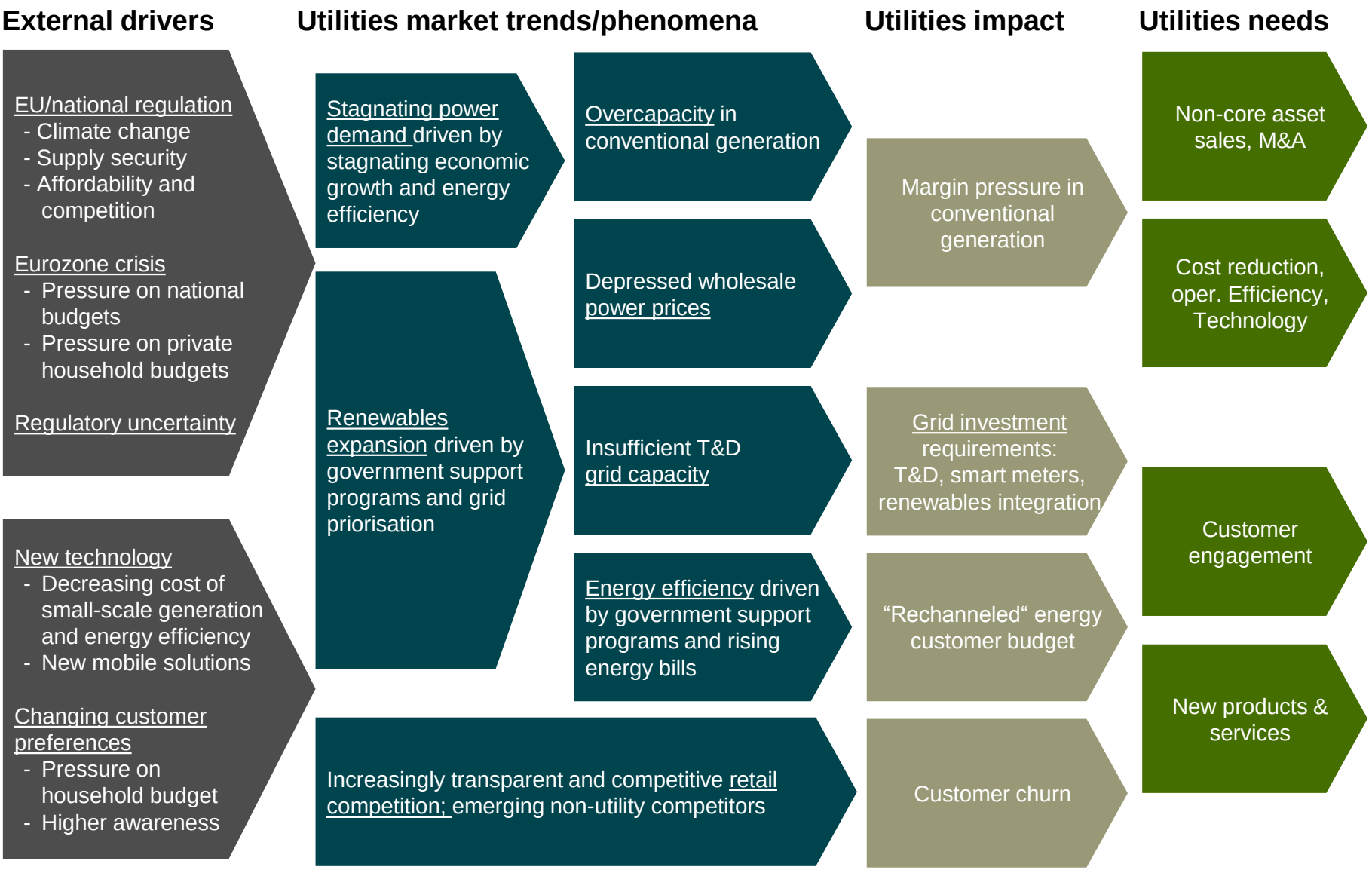
EALA Utilities Trends Framework



Summary of utility trends by region

	NA	EALA	APAC
Security of Supply	T&D Capex spending With emphasis on Utility congestion relief	Massive T&D spend To meet utilities growth in E & LA	
Market Structure	M&A for utility mid-caps remains steady but mixed results	Increased competition from 3rd party utility services	
Technology	Smart meter slows but EVs and storage increases	Renewable technologies and demand response	
Regulation	Evolving EPA standards and state laws	Reduction in renewable subsidies to take decades	
Sustainability	Renewables grow due to lowering costs and subsidies	Wind and solar investments soar due to costs and regulation	
End Consumers	Energy efficiency programs produce mixed results	Electricity demand is slowing (vs GDP)	

EALA
Security of Supply

Optimistic outlook for the gas supply from Russia despite challenges

- The European Union expects stable gas supplies this winter under a deal by Russia and Ukraine, despite the currently frozen shipments
- Russia to abandon South Stream due to missing support from the EU – CEE nations shocked
- Gazprom revenues hit by the US shale gas exports
- IEA: Europe gas demand to stay weak until mid-2030, driven by a weaker economy, a push towards renewable energies and low coal prices

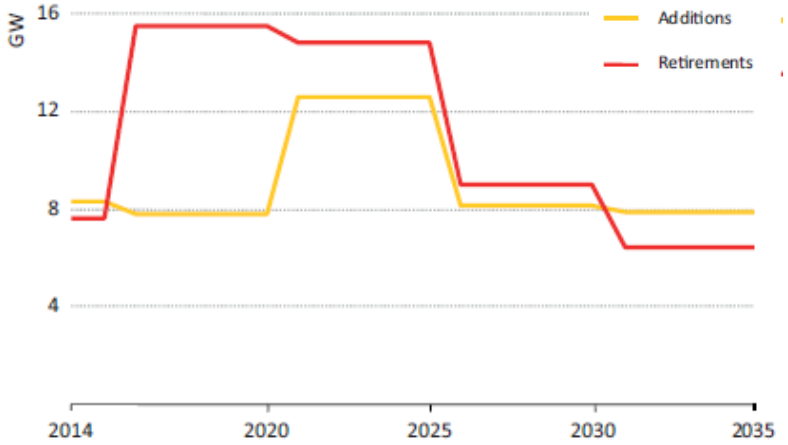
Future thermal generation capacity expected to practically support renewables growth only

- Less than 1/3 of the retiring coal power plants in Europe expected to be replaced by 2035
- Of the coal-fired replacements, 20% already under construction, 20% will be CHP and 20% CCS based
- Majority of additions linked to efficient CCGT for baseload flexibility during renewables growth

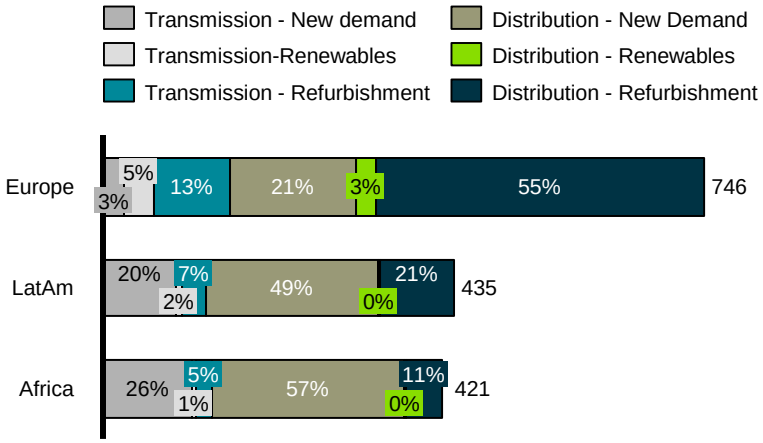
T&D investment focus in EALA varies by region

- Massive investment in T&D in Europe especially to meet renewables growth and upgrading for the grid for smart technology
- Grid upgrade focus in LatAm and Africa to meet growing electricity demand

Average retirements and capacity additions of thermal plants in the EU



Investment in EU T&D infrastructure 2014-2035 (bn USD)*



* IEA "New Policies" Scenario

Source: IEA World Energy Investment Outlook Nov 2014, Press

EALA
Market Structure

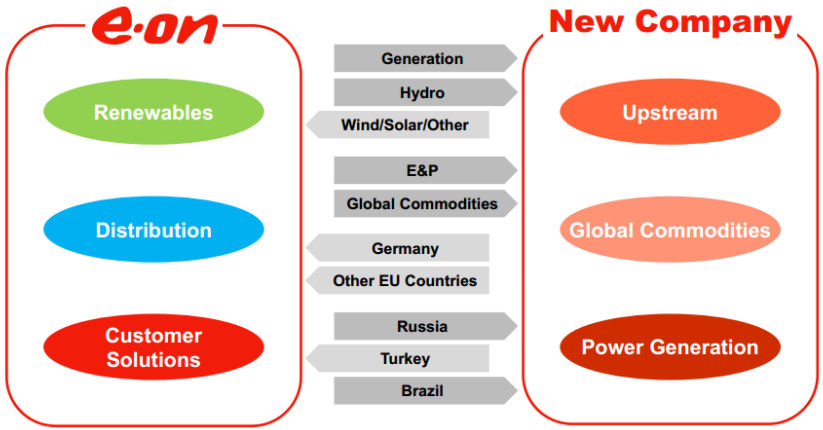
E.ON to spin off its baseload & trading business

- The "NewCo" will consolidate the Conventional and Hydro Power generation, as well as the Upstream and Trading business in 2016
- Despite the "Bad Bank" comparisons, several analysts praise the move as the new listed company combines segments for investors with risk appetite
- Yet no other major utility in Europe is expected to follow a similar strategy despite insufficient cost recovery in traditional generation in the future

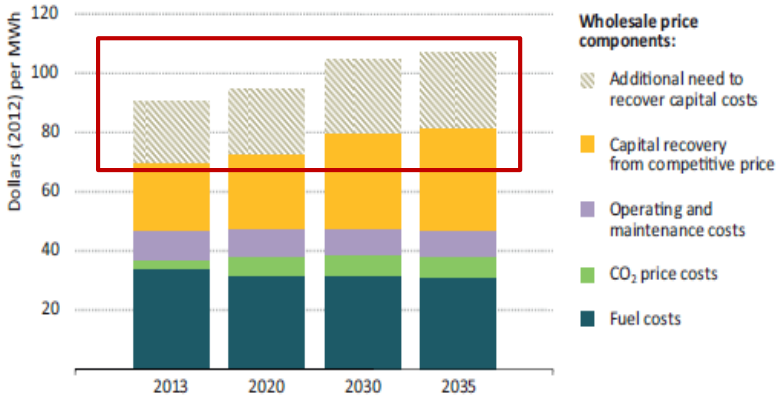
Emerging new competition for Utilities in Europe

- According to the new Accenture Digitally Enabled Grid survey update, a significant majority of European utilities executives expect continued competition from new entrants
- Especially intense competition expected *globally* in
  - data-related services (92%)
  - beyond-the-meter solutions such as energy efficiency and demand response (90 %)
  - distributed generation (87%)
  - plug-in electric vehicles (PEVs) and associated charging infrastructure (81%)
- IEA: >50% of the non-hydro renewables capacity owned already today by less traditional investors (of which 2/3 households / communities / autoproducers)

E.ON business split-off planned in 2016



Gap between the EU wholesale prices & cost recovery



Note: Prices are generation-weighted averages.

Source: IEA World Energy Investment Outlook, Nov 2014, E.ON, Press

EALA
Technology

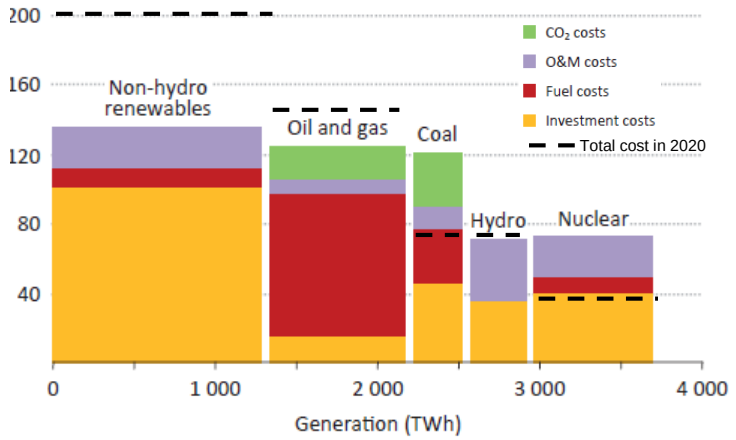
Long-term market competitiveness of renewables

- IEA expects the total power generation costs for non-hydro renewables in Europe to reach the level of thermal generation by 2040 as for the impact of missing emissions- and decreased investment costs
- Hydro and nuclear expected to remain the most cost-efficient forms of power generation, even when considering the decommissioning investment
- Technological future learning rates:
  - Solar PV: 18%
  - Marine: 14%
  - Solar CSP: 10%
  - Offshore wind: 9%
  - Onshore wind / Geothermal / Biomass: 5%
  - Hydro: 1%

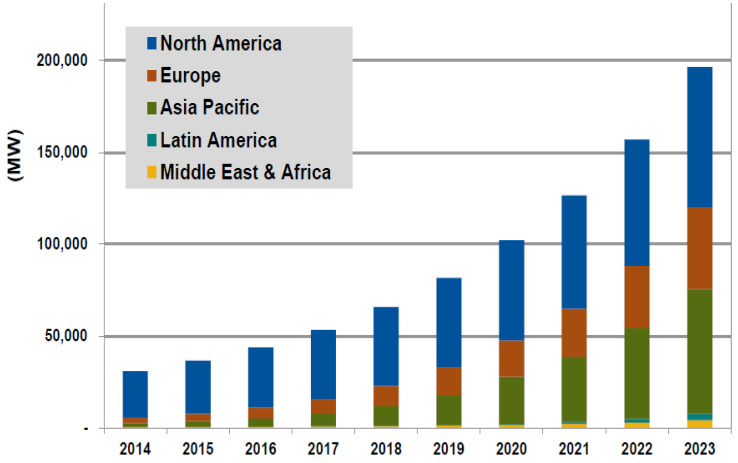
Demand response to emerge as a major parallel market in Europe

- Close to 50GW of currently practically non-existing aggregated reduced consumption capacity expected to emerge in Europe in the next decade
- "Demand aggregators" expected to enter the wholesale and ancillary markets, similar to traditional generation capacity providers today
- Demand response "negawatt" capacity expected to increase alongside with the smart meter rollouts

Total power generation costs in Europe by technology in 2040 vs 2020 (USD/MWh) *



Demand response capacity by region



Source: IEA World Energy Outlook Nov 2014, IEA World Energy Investment Outlook Nov 2014, Navigant Research (Demand Response 2014)

EALA
Regulation

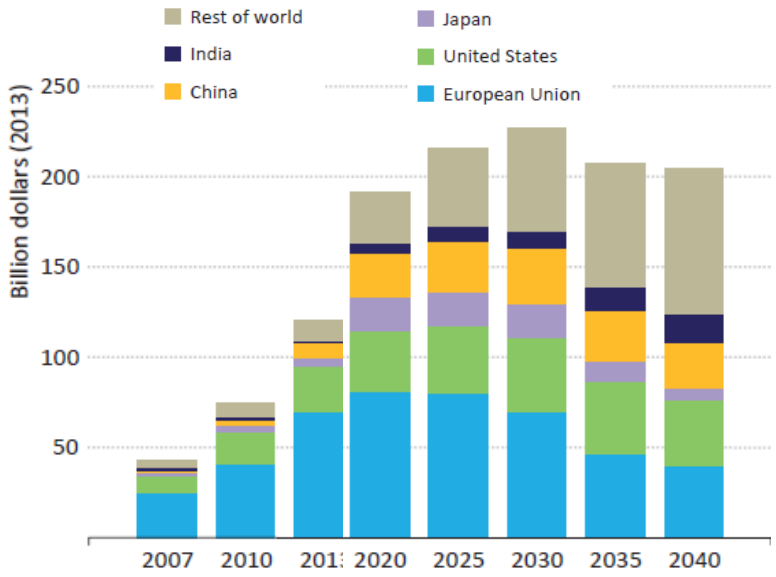
The full phase-out of existing subsidized renewables capacity expected to take decades

- The EU is currently the leading region worldwide for renewables subsidies with 57% of the total costs
- Even though the new subsidized capacity is decreasing rapidly already today, the total costs are expected continue to grow until reaching a plateau by 2020 and to fall to about half by 2040

BRA/TUR/MEX improve regulatory conditions

- Mexico's electricity sector opens to private businesses following the energy reform approval
- Regulator in Turkey announces Renewable Energy Resources Support Mechanism "YEKDEM"
- Brazil regulator allows attractive prices designated for thermal power generators in September

Global renewables subsidies by region*



Country	Major regulatory measures / interventions in the EU
UK	Ofgem to punish Big6 if they fail to hit Govt targets for home insulation and over advice on comparing tariffs
UK	Ofgem investigates British Gas, E.ON and Npower performance over their roll-out of B2B smart meters
Sweden	Tougher taxes spell the end for older Swedish E.ON nuclear fleet
Germany	Grid fees expected to grow double digit while the renewables levy to remain stable
Spain	Spanish regulator CNMC says concerned with Endesa 's assets sale
Spain	Spain's 2013 power deficit debt to be issued without state backing despite utility demands
Spain	Spanish market, competition regulator to investigate electricity prices

* IEA “New Policies” Scenario
Source: IEA World Energy Outlook Nov 2014; press

EALA
Sustainability

Wind and solar to dominate new capacity investment

- Despite the drop in subsidies since the peak in 2011, wind and solar PV are expected to dominate investment in the new generation capacity in Europe, almost doubling their overall share 2012-2035

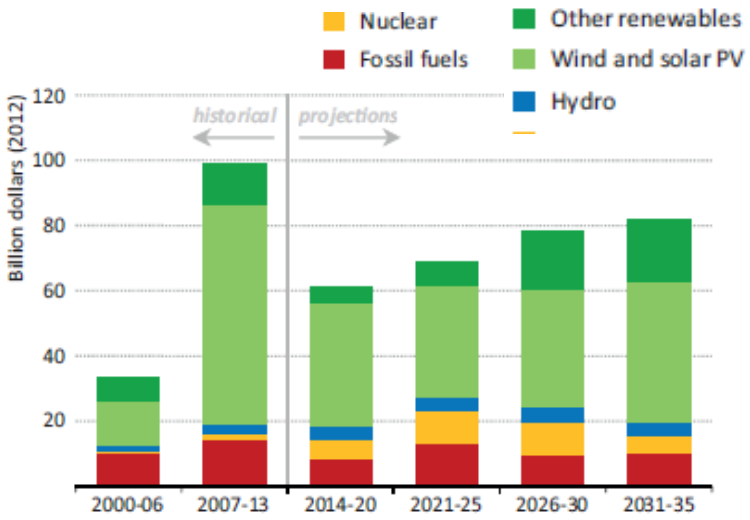
New non-binding renewables and EE targets

- EU leaders have agreed on the targets by 2030 to include 40% carbon cut, 27% renewables, 27% energy efficiency
- While the CO2 cut target is binding; renewable target is only binding in aggregate rather than for each member state; whereas the efficiency target is non-binding

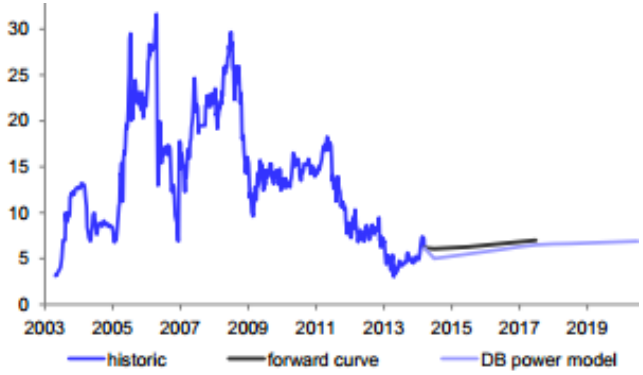
Dysfunctional carbon trading continues to struggle

- A massive surplus of over 2bn tn of allowances continue to keep the carbon prices down
- Germany's new, lower targets for CO2 emissions will further curb demand for carbon permits
- The proposal to create a stability reserve system, where the EU Commission could buy or sell up to 100m tones of allowances looks wholly inadequate to tighten the market.
- Further measures desperately needed – however securing approval of Poland and other peripheral countries seems challenging given current high unemployment and weak

EU forecasted power plant investment until 2035*



Carbon price (EUR/tn), Oct 2014 estimate



* IEA "New Policies" Scenario

Source: IEA World Energy Investment Outlook, Nov 2014; Deutsche Bank "2030 target mix positive for utilities" (Oct 2014), and "CEZ - Weakening pricing & outperformance" (Oct 2014)

EALA
End Consumers

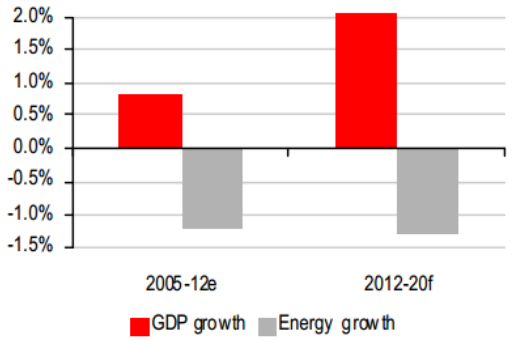
Stagnant electricity demand growth

- Electricity / heat demand in Europe remained comparatively dampened during the unusually mild autumn
- IEA: Very slow growth of 0,7% in Europe expected by 2040, vs 2.5% in LatAm and 4% in Africa
- In the "worst case scenario" as depicted in the DEG2 study*, the prolonged subsidies promote surging energy prices, leading eventually to higher household needs for energy efficiency and reduced consumption

Death spiral posing potentially a lower risk than expected

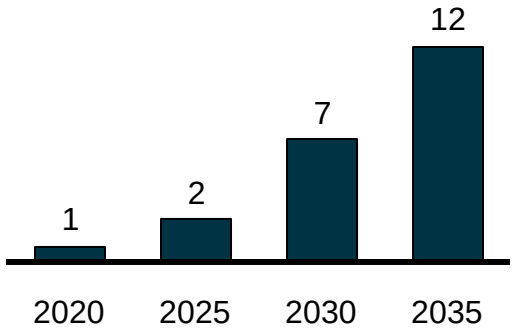
- Although 58 % of European utilities executives believe the 'death spiral'** will materialize, only 13 % consider it to be a significant risk
- In Europe, by 2035, an average of 11 % of consumers are expected to become energy self-sufficient and either migrate off the grid or use it only as back up. (nearly 7 percent by 2030, and just over 2 percent by 2025)
- Potential driver: insufficient rooftop space for solar installations – typically comprising only a part of certain types of household buildings

Disconnect widens between GDP and energy demand in Europe



Source: Eurostat, NREAP, HSBC estimates

Anticipated average % of customers becoming self-sufficient and either migrate off the grid or use the grid only as a backup resource



*Accenture study "Digitally Enabled Grid 2014", Dec 2014 ; ** The phenomenon known as the utilities 'death spiral', in which consumers migrate off the grid or use it only as backup, is unlikely and uneconomic for a large number of consumers due to natural limitations on viability and cost constraints.

Source: HSBC; ACN "Digitally Enabled Grid 2014" Dec 2014

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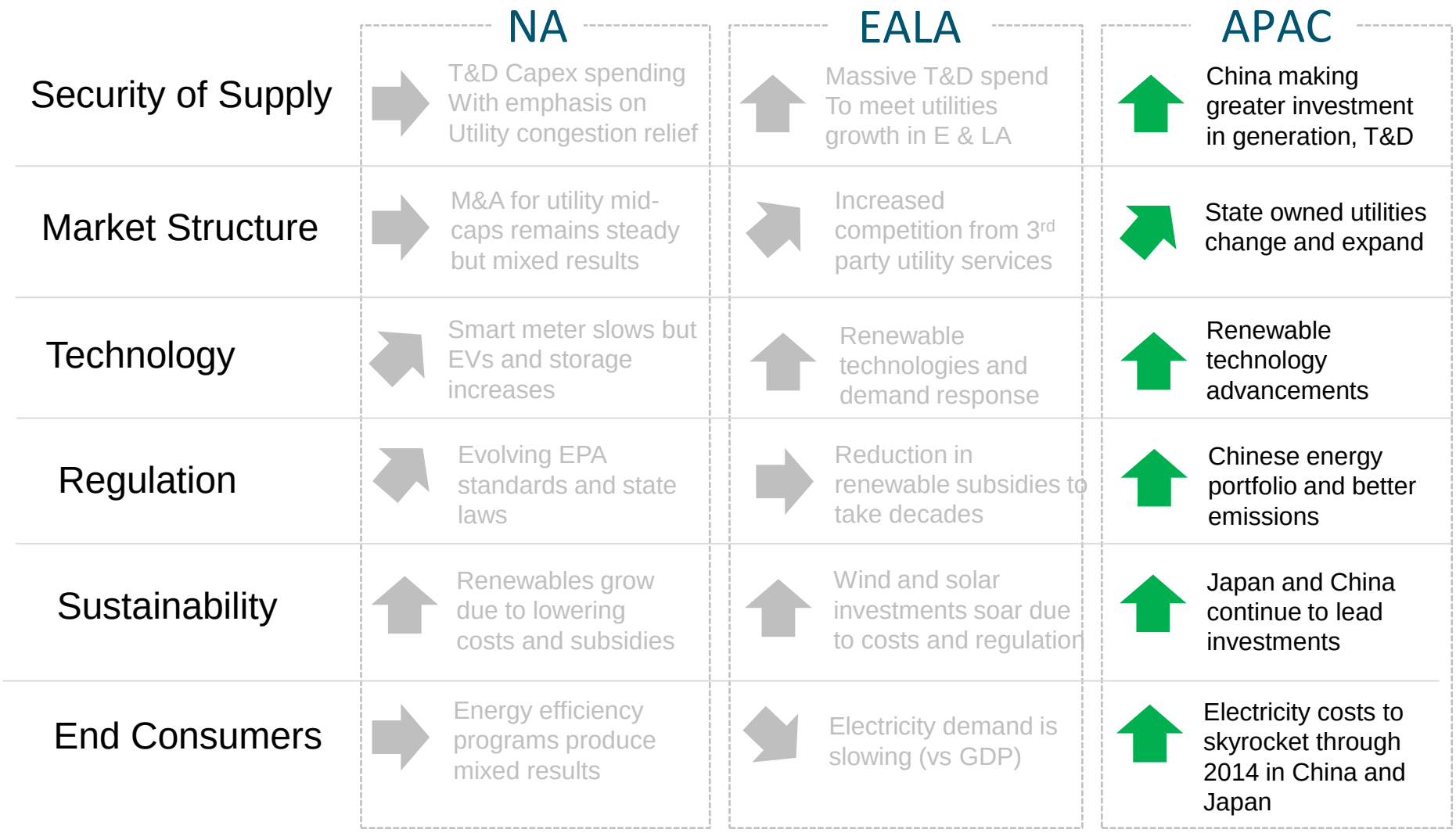
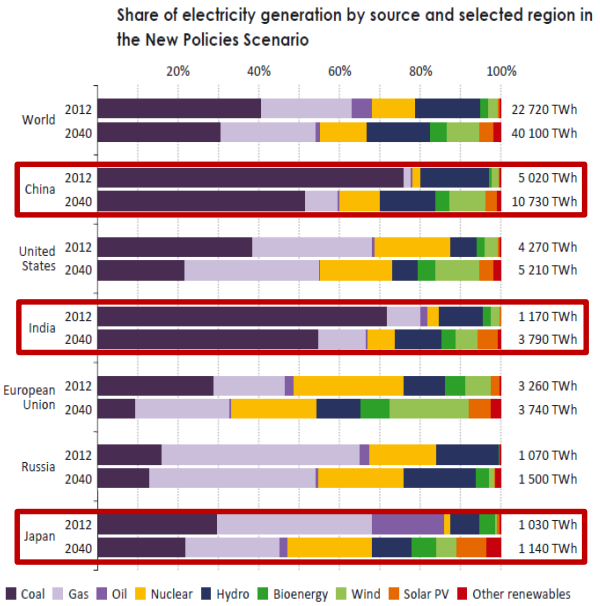


APAC
Security of Supply

- World Energy Outlook 2014 shows shares of coal and oil are dropping while gas is the only fossil fuel that sees its share increase over the projection period
- **EIU expect Asia will remain at the heart of the global LNG market**, with China taking an increasing share of regional demand as Japan's imports begin to fall from a peak in 2014. Australian production is to expand rapidly from 2015
- **In 2014, Japan remains heavily dependent on imported gas, oil and coal** to generate power, though the contribution of solar PV is growing rapidly; wind is struggling to make inroads.
    - Tokyo Electric Power and Chubu Electric have signed a memorandum of understanding on forging a new strategic alliance that could create the world's biggest LNG buyer, with imports of up to 40 mil tons/yr
    - Japan's dependence on Russia for its thermal coal and crude oil supply has significantly risen (imported 30% more thermal coal and 18% more crude oil)



China will enlarge supply capacity of resources:

- China will enlarge supply capacity of oils, natural gas and mineral resources
- Regional power transmission will be sped up
- Social capitals will be lured in power infrastructure construction and private investment will be encouraged in poverty relief
- Installed nuclear power capacity will hit 58 mil kWs in 2020, with under-construction figure exceeding 30 mil kWs
- IEA forecasted that the share of coal in Chinese electricity generation will drop from 76% to 52% in 2040, while the share of nuclear power increase five-fold to 10%.

Source: World Energy Outlook 2014, IEA, Accenture Research

APAC
Market Structure

- **Japan released a revised law to liberalize the retail sale of power to households in 2016.** Consumers will be able to choose which power suppliers to buy from, and the government hopes the influx of new entrants to the liberalized market will pave the way for discount rates and new services.
- **China State Grid would become the first utility to build a major regional electricity grid portfolio in Europe.** SGCC with its deep pockets and reputation for hands-off management, has had an easier ride, buying minority stakes in Portuguese and Italian grid operators and pursuing designs on Greece and Spain, too. If all goes to plan, it would become the first utility to build a major regional electricity grid portfolio.
- According to IBIS report, **industry revenue of Australia's electricity is forecast to fall by 30.4% to $10.3 billion** in the current year, following the repeal of the carbon tax in early 2014-15.
- **Australian Competition and Consumer Commission chairman Rod Sims has urged the Queensland government to split its electricity generators into three companies to boost competition.**
- **Snowy Hydro sizes up big three retailers**:
  - NZ-listed Infratil has announced it has agreed to sell its Australian businesses Lumo Energy and Direct Connect Australia to Snowy Hydro Limited for A$605 million.
  - AGL Energy, Origin Energy and EnergyAustralia face a fresh competitive threat in their key electricity retail markets after Snowy Hydro declared its intention to use newly acquired Lumo Energy to beef up its position in NSW and as a springboard into new markets.
- **The initial public offering of Chinese nuclear plant operator CGN Power (China General Nuclear Power Group) raises $3.2 billion and** will be second-largest IPO in Asia-Pacific for 2014. Its capacity is expected to grow eightfold by 2030.

Source: Accenture Research

APAC
Technology

- **Tokyo-based renewables developer Smart Energy will build the world's largest floating PV project** - a 7.5MW installation - on a reservoir north of the Japanese capital.
- A research from China indicates: **Crystalline silicon solar cells play a leading role in the photovoltaic market.** In order to select the key technologies related to silicon solar cells for the next 5-10 years, a Delphi-AHP (analytic hierarchy process) framework is presented to analyze the potential space for each technology in the solar cell industrial chain.
- The U.S. Department of Energy's Argonne National Laboratory in Illinois teamed up with the Korea Atomic Energy Research Institute to develop a prototype sodium-cooled nuclear fast reactor.
- **Super-smart grid spies out leaks in Singapore**. Singapore's water grid monitors for leaks every millisecond. The technology is being installed in cities worldwide to conserve scarce supplies and avert floods.
- NEC Asia Pacific has collaborated with Singapore's Economic Development Board, with the main objective of this association is to focus on product research and developing solutions for energy management and control, smart grid, energy storage and renewable energy integration**.** It is said to be in accordance with Singapore's targets to be a global leader in sustainable energy management..
- Western Australia company developed new technology to access lithium as demand for batteries to store renewable energy grows
- Group of 20 leaders have asked Japan to fast-track the development of clean coal technology that could be used by developing countries to burn Australian coal more efficiently

Source: Accenture Research

Smart Energy floating PV site

- **Smart Energy (Tokyo-based renewables developer) will build the world's largest floating PV project:**
  - A 7.5 MW installation, on a reservoir north of the Japanese capital
  - Yingli Green Energy will supply 27,456 solar panels for the project
  - Schneider Electric will provide inverters

APAC
Regulation

China released the PRC Energy Development Strategy Action Plan (2014-20):

- Primary energy consumption - By 2020, would be limited to 4.8bn tonnes of standard coal, equal to 3.4% 7-year CAGR in 2014-20.
- Primary energy mix - By 2020, would have 15% from non-fossil fuel.
- Coal consumption rate cut - New coal-fired power plants would have coal consumption below 300g/kWh.
- More stringent emission standards - The emission of new coal-fired power plants have to be close to those of gas-fired power plants.
- More centralized coal supply - By 2020, over 95% of PRC coal output would be from 14 large-scale coal mining bases.
- More diversified NG supply - By 2020, PRC conventional NG reserves would be raised to 5,500bcm, 6.6% 7-year CAGR.
- Safety being top priority of nuclear power development - Using high global safety standards, construction of new nuclear power plants will resume in coastal provinces.

Renewable energy trade groups cheered an agreement between the U.S. and China to limit greenhouse gas emissions:

- Chinese President Xi committed to halting growth of carbon dioxide emissions in his country and increasing non-fossil fuels to 20% of energy production by 2030.
- President Barack Obama, meanwhile, said the U.S. would reduce its carbon dioxide emissions by at least 26% below 2005 levels by 2025

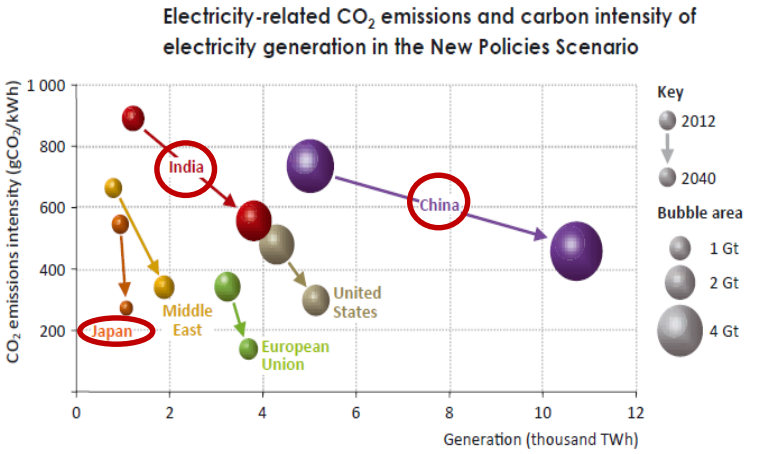
Japan's Gov't eyes system for power firms to tack reactor decommissioning costs to power bills. The Ministry of Economy, Trade and Industry has started to consider introducing a system in which major power companies can tack costs of decommissioning their nuclear reactors onto power bills for consumers even after the full liberalization of electricity retailing fees scheduled for 2018 to 2020.

Source: Accenture Research

APAC
Sustainability

Japan urged to introduce competition in purchase of renewable energy

- A member of an advisory panel to the industry ministry urged the government to introduce market competition in its feed-in tariff scheme to promote renewable energy by giving preferential treatment to solar power suppliers offering the energy at low cost.
- Kyushu Electric Power Co. and four other utilities decided to stop signing contracts to buy renewable energy from solar power suppliers in their service regions.



Note: The steep fall in intensity in Japan also reflects the fact that 2012 (the base year) was an exceptional year, due to the closure of all of the country's nuclear plants and temporarily heavy reliance on fossil fuels.

- **Tokyo Electrical Construction is building a 10MW solar project in eastern Japan's nuclear exclusion zone.**
- **China's emission grew from 4.1 Gt in 2012 to 5.4Gt in 2040**, when they are almost 70% larger than emissions from all OECD countries combined.
- **Forbes will soon be home to Australia's first solar thermal power plant to be connected to the electricity grid**, and the developers of the renewable energy project hope the milestone sparks interest from potential investors.
- **Smart Energy (Tokyo-based renewables developer) will build the world's largest floating PV project:**
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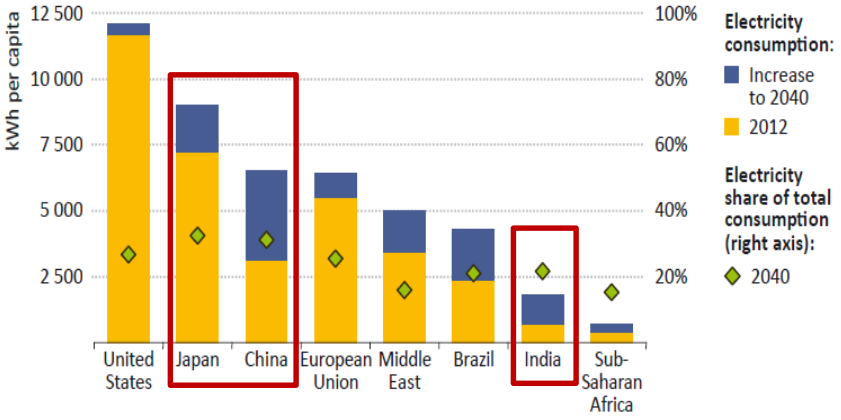
Source: World Energy Outlook 2014, IEA, Accenture Research

APAC
End Consumers

- In 2040, Chinese industrial electricity prices are 75% higher than those in the United States
- **In Japan, power utilities are obliged to purchase electricity generated from renewable sources at fixed prices.** The costs are passed on to consumers in their electricity bills, raising concerns that consumers will have to shoulder more of this burden as the supply of solar power increases.
- **EnergyAustralia and its telemarketing company are being sued in the Federal Court for signing up customers and changing their power supply without their knowledge or consent**.

Annual electricity consumption per capita and share of electricity in total final energy consumption by selected region in the New Policies Scenario



- **Electricity customers in south east Queensland will benefit from more choice, greater competition and stronger consumer protections** under landmark legislation designed to put downward pressure on electricity prices.
  - A study found consumers could save up to $475 a year by shopping around.
  - The Queensland Competition Authority (QCA) will continue to monitor the market, helping consumers to better understand and take advantage of the choices on offer, and keeping the government fully informed about how the market is developing.
- **Community-led networks are giving power to the people in Australia.** The penetration of rooftop solar in Australia tells the story of just how keen consumers are to generate their own electricity. But some are going a step further by managing the flow of their own energy usage through micro-grids and smart grids.

Source: World Energy Outlook 2014, IEA, Accenture Research

Table of Contents

Summary of utility trends by region

	NA	EALA	APAC
Security of Supply	Steady T&D Capex with emphasis on congestion relief	Massive T&D spend To meet utilities growth in E & LA	China making greater investment in generation, T&D
Market Structure	M&A for utility mid-caps remains steady but mixed results	Increased competition from 3rd party utility services	State owned utilities change and expand
Technology	Smart meter slows but EVs and storage increases	Renewable technologies and demand response	Renewable technology advancements
Regulation	Evolving EPA standards and state laws	Reduction in renewable subsidies to take decades	Chinese energy portfolio and better emissions
Sustainability	Renewables grow due to lowering costs and subsidies	Wind and solar investments soar due to costs and regulation	Japan and China continue to lead investments
End Consumers	Energy efficiency programs produce mixed results	Electricity demand is slowing (vs GDP)	Electricity costs to skyrocket through 2014 in China and Japan

Recap of trends by region

NA

- **Capex spending in 2014 is forecast to reach a new all-time high**, declining in 2015 and 2016
- **Relieving transmission congestion** a key focus of capex
- Utilities look to **invest in upstream shale resources** to incorporate into rate base to serve as a physical and financial hedging tool
- Utility **M&A activity focuses on midcaps** but not all deals have been successful
- **Energy storage** activity takes center stage while **electric vehicles get a boost** from utilities
- **EPA proposes new standards** while legal challenges make their way through the courts
- Renewables share grows, boosted by **cost competitiveness and continued subsidies**
- Energy efficiency programs face mixed results, **with some states pulling back requirements**

EALA

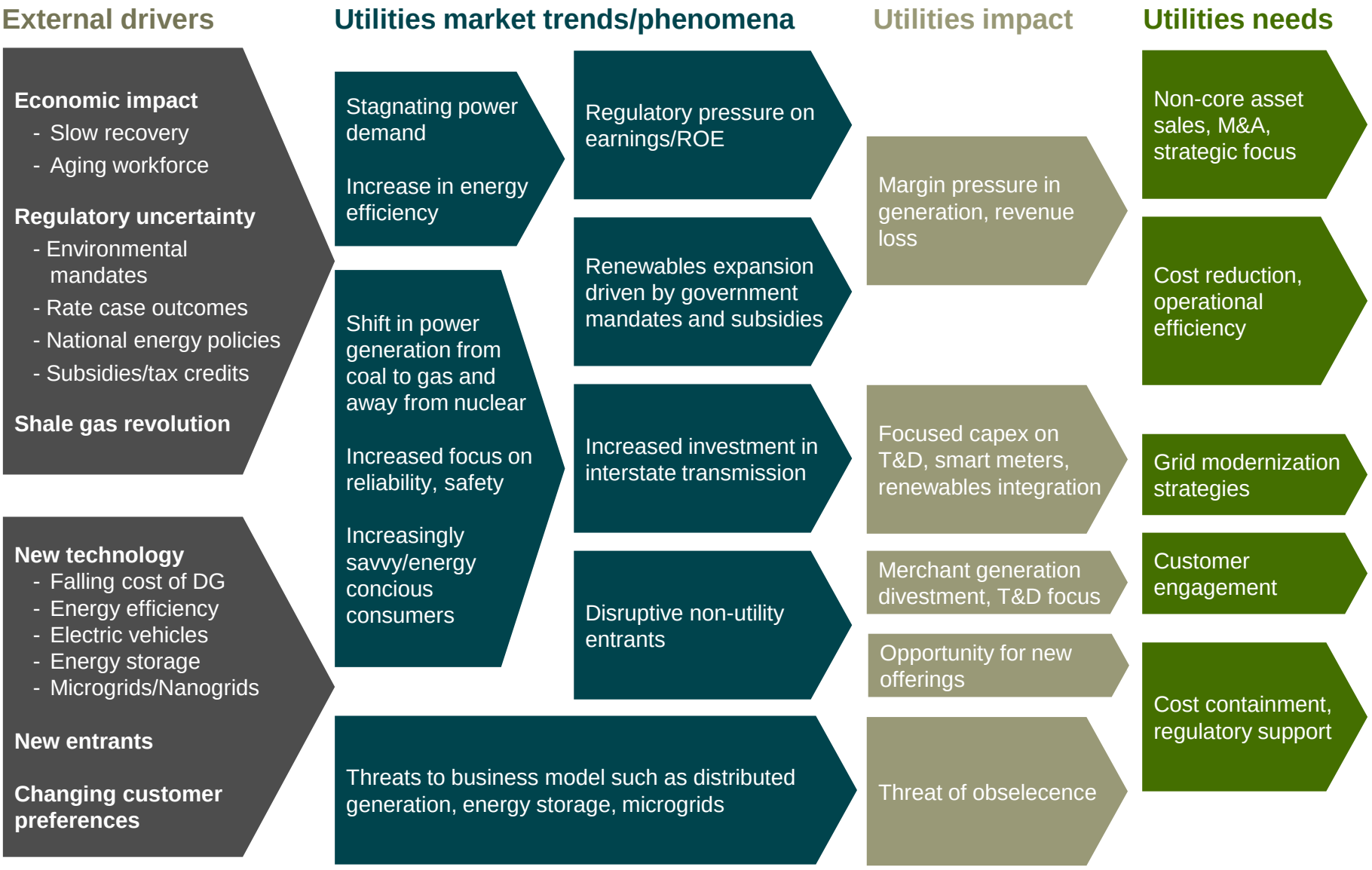
- **Optimistic outlook for Russian gas supply** despite recent events
- Future EU thermal generation capacity expected to practically support renewables growth only
- **E.ON's decision to spin off** its baseload & trading business praised by experts and investors
- EU introduces **new non-binding targets for renewables and energy efficiency**; dysfunctional carbon trading continues to struggle
- The full phase-out of existing EU subsidized renewables capacity expected to take decades
- "**Death spiral" expected to pose a lower risk than anticipated** in Europe, with <15 % of households expected to go off-grid by 2035
- Close to **50GW of "demand response" capacity expected to emerge in Europe** in the next decade, from today's practically inexistent market

APAC

- World Energy Outlook 2014 shows that the shares of coal and oil are dropping while **gas is the only fossil fuel that sees its share increase** over 2014-2040
- China State Grid could become the first **foreign utility to build a major regional electricity grid portfolio** in Europe
- Japan released a revised law to **liberalize the retail sale of power** to households in 2016
- China released the PRC Energy Development Strategy Action Plan (2014-20), **primary energy mix would have 15% from non-fossil fuel by 2020**
- Smart Energy (Tokyo-based renewables developer) will build the **world's largest floating PV project**
- Australians are increasingly taking steps to **manage the flow of their own energy usage through micro-grids and smart grids**

Source: Accenture Research

North America Utilities Trends Framework



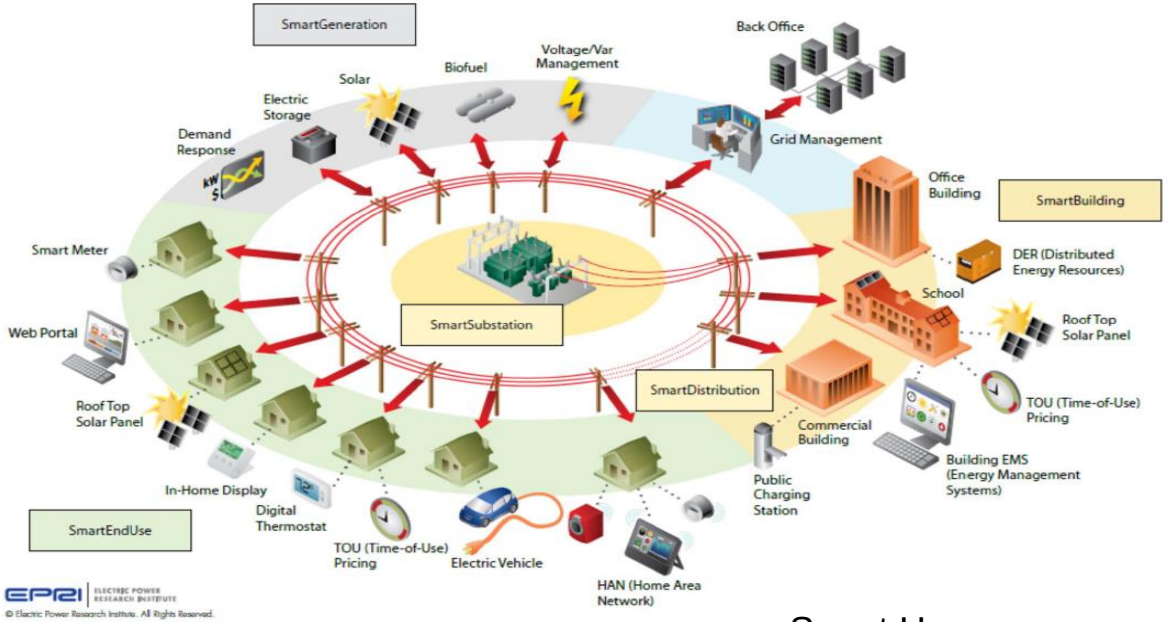
Utility innovation through business impacts and change

Utilities need today...

- Cost reduction, operational efficiency
- Grid modernization strategies
- Customer engagement
- Cost containment, regulatory support
- Insights and analytics
- New products and services

Solutions

Utilities will innovate...



Smart Homes
Micro-grids
Smart Devices
DER
AMI/Smart Meter
Intelligent S/S
Situational Awareness

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