

Investment trends in the Utility and Energy sectors

accenture

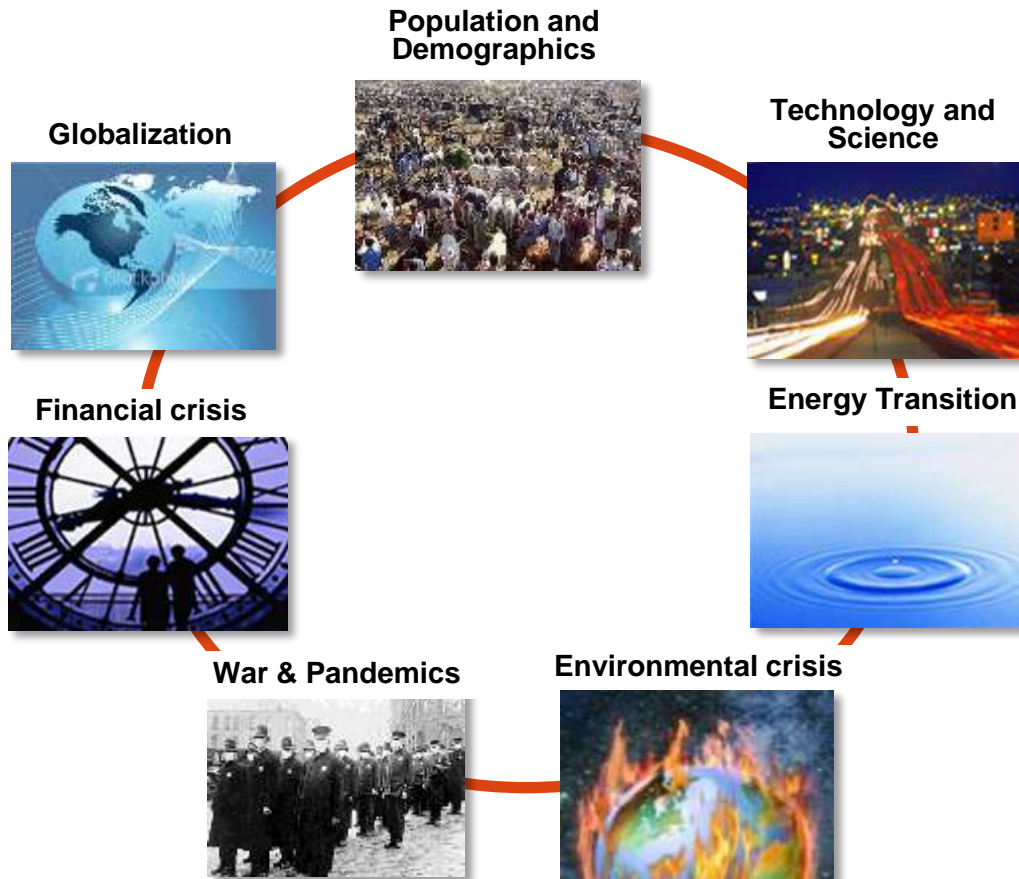


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- 
- Global macro-economic context**
 - Zoom on Utilities trends and challenges
 - Zoom on Energy trends and challenges
 - Summary

2020 Key Drivers of Global Change:



Utilities:

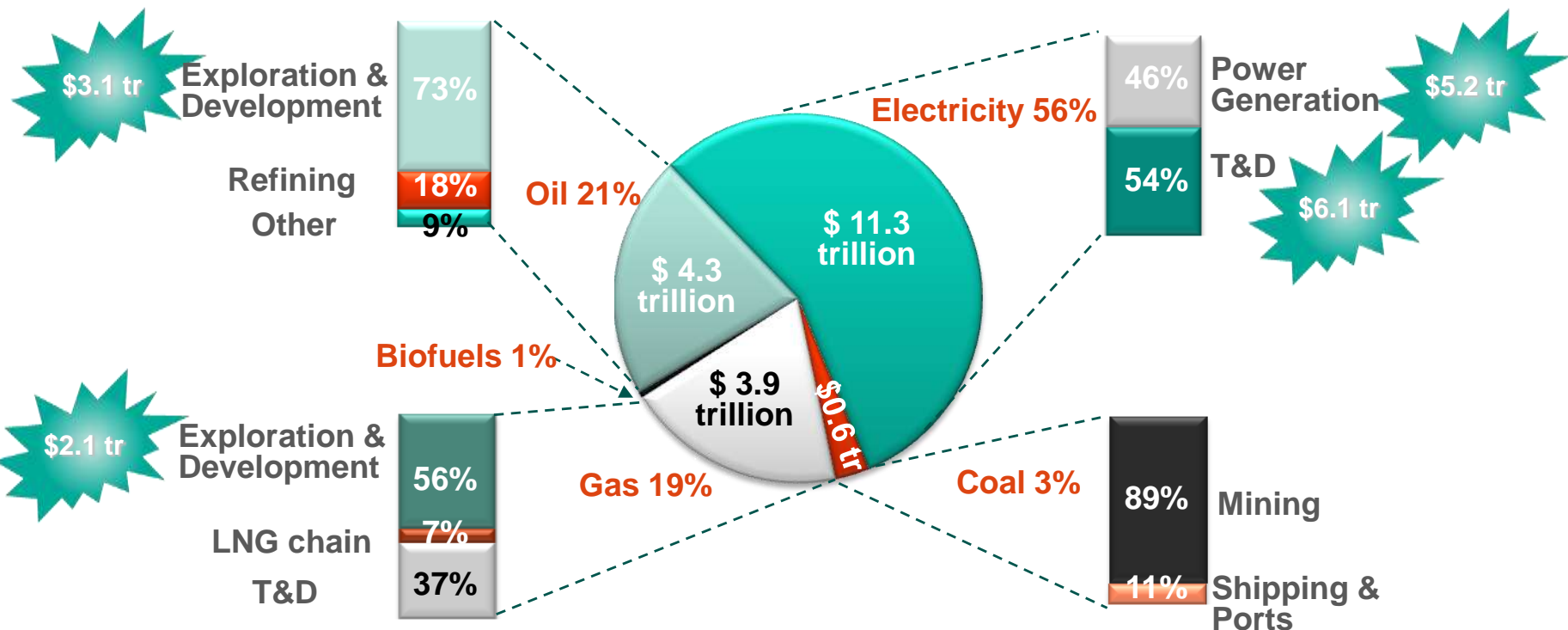
- Changing Energy mix
 - Distributed generation
 - Renewables, Nuclear,...
 - PHEV (Plug-in Hybrid Electric Vehicles)
 - Smart technologies
 - Interconnection and Trading
- ➔ Market restructuring

Energy:

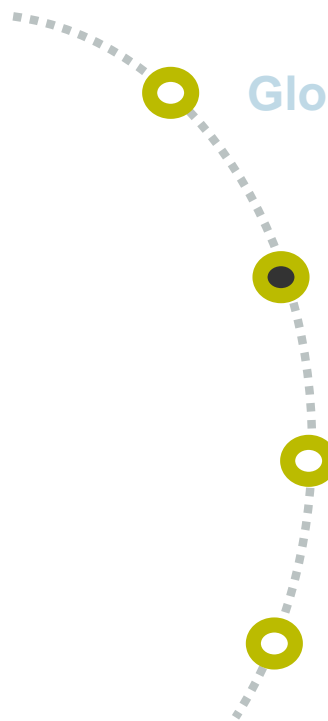
- Continued focus on Fossil fuels
 - Industry structure: Oil vs. Gas; ownership; regulation
 - Difficult growth opportunities
 - Price Volatility
 - Services business models
 - NOCs, Sovereign Funds,...
- ➔ Repositioning of the players

These changes will fuel a new investment wave in Energy Supply

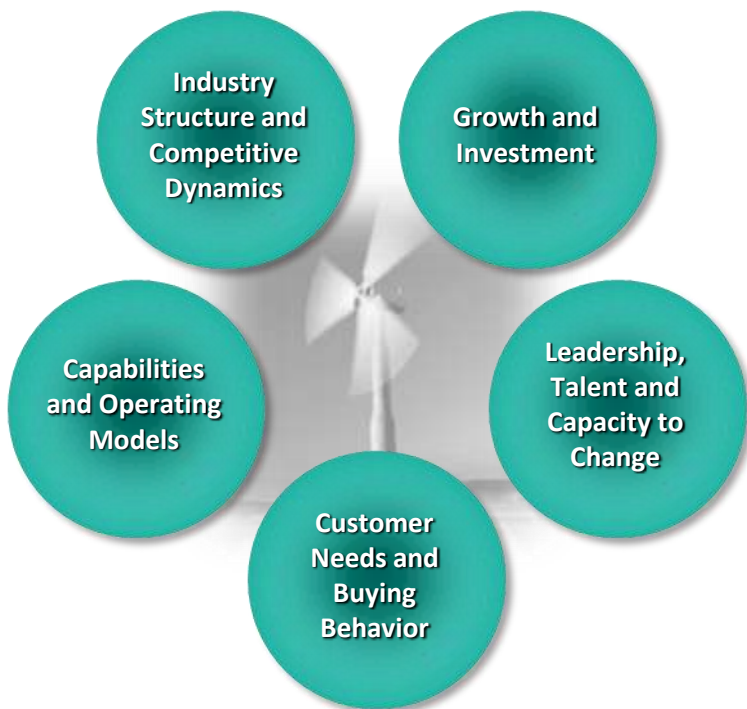
2005 – 2030 world wide investment in Energy Supply: US\$ 20.2 tr
(In 2005 dollars)



Over 50% investment in emerging countries, 18% in China

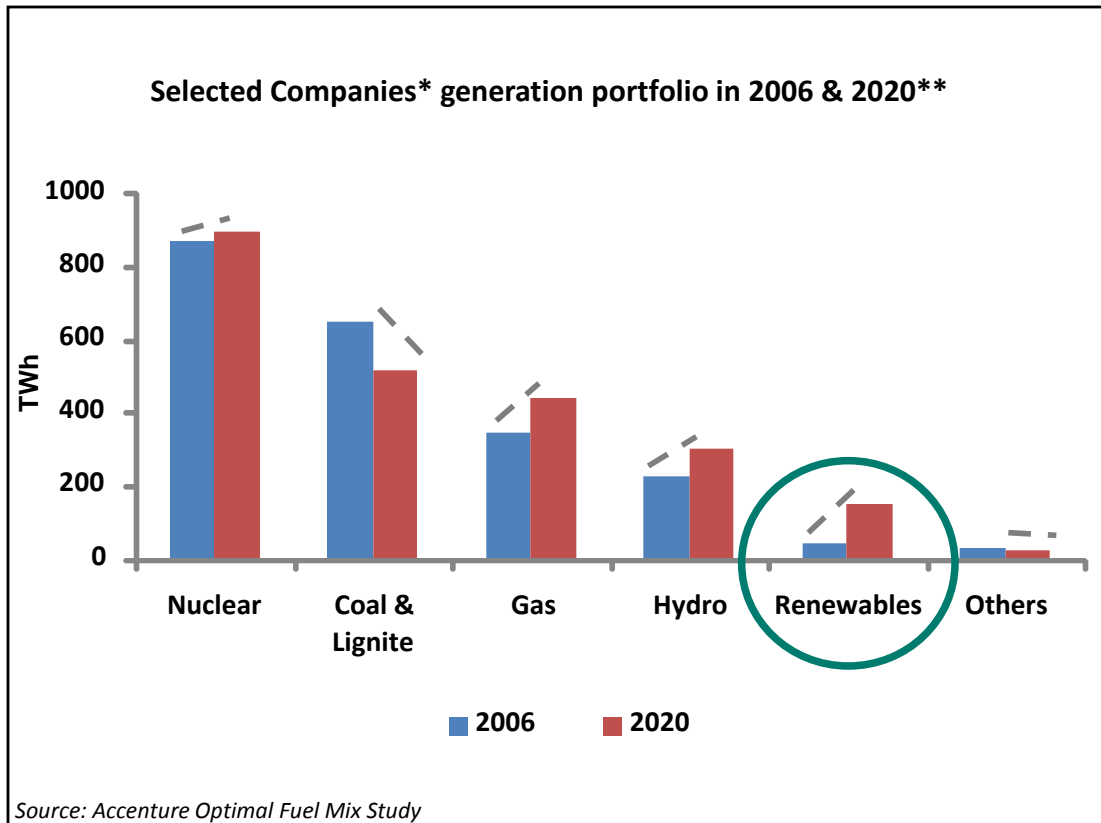
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- A vertical dashed grey line with four yellow circles. The second circle from the top is filled with a dark blue color, while the others are hollow. The line curves slightly to the left at the top and right at the bottom.
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Dimensions of change:
(a framework used to assess the nature and extent of industry change)



Dimensions of Change	Sub Components	Characteristics of the Coming Decade
Industry Structure and Competitive Dynamics	Energy Supply Security and Independence	<ul style="list-style-type: none"> • Demand to increase in all regions • Dependency on foreign energy supplies • Energy efficiency policies
	Market Restructuring and Deregulation	<ul style="list-style-type: none"> • Introducing competition increases market efficiency
	Mergers, Acquisitions and Joint Ventures	<ul style="list-style-type: none"> • A new wave of M&A activity can be expected in the area of renewable energy as larger, primarily fossil-fuel operators, seek ways to reduce or offset emissions costs.
Growth and Investment	Increased Focus on Renewable Sources	<ul style="list-style-type: none"> • Climate change initiatives and legislation • Technologies are improving • Higher percentage of intermittent renewable generation and non-utility ownership
	The Intelligent Grid	<ul style="list-style-type: none"> • Utilities must plan for and manage the exponential growth of operational technology devices to effectively realize the benefits of the intelligent grid.
	Aging Assets	<ul style="list-style-type: none"> • Many utilities are operating assets nearly at or beyond their designed useful lives
Capabilities and Operating Model	Services	<ul style="list-style-type: none"> • New sources of Revenues through Services
	Diversification in Trading	<ul style="list-style-type: none"> • Carbon • Renewables
Leadership, Talent & Change Capacity	Aging Workforce	<ul style="list-style-type: none"> • Aging staff who are nearing retirement and lacking younger replacements
	Knowledge and Skills	<ul style="list-style-type: none"> • Knowledge management and Skill development
Customer Needs and Buying Behavior	Environmental Concerns	<ul style="list-style-type: none"> • Changing regulatory sentiment and consumer attitudes
	Energy Technology Consumerization	<ul style="list-style-type: none"> • Interest in end-user energy efficiency is creating market opportunities for new entrant

As per the announced planned investments , the big European utilities are investing Euro 50 billion in Renewable power plants



- Over the next ten years the leading European utilities will build/buy additional/replacement production plants for ~700 TWh
- Renewables will account for about 17% of the additional capacity, with wind (mainly onshore), biomass, and mini hydro accounting for 79% of total investment in Renewables
- For leading European utilities this would mean a 300% increase of Renewables in the energy mix from the current share
- Their expected investments in Renewables will be around Euro 50 billion

* The companies considered in this sample are: EdF, E.ON, RWE, Vattenfall, GdF-Suez, Enel, Iberdrola, Atel, British Energy, Cez, EdP, Eni, Fortum, SSE, Statkraft and Verbund.

** Based on announced capex investments. Not all companies have announced investment plans till 2020

Smart Grids will offer the flexibility required to include intermittent technologies, along with several other benefits



Key advantages of a Smart Grid

- Accommodates all generation and storage options
- Optimizes assets and operates efficiently
- Smart meters for better outage management, distribution planning, load forecasting and demand-side management
- Self healing, flexible network that can more precisely monitor and control the power delivered to customers

Case Example

Xcel Energy SmartGridCity™ in Boulder, Colorado

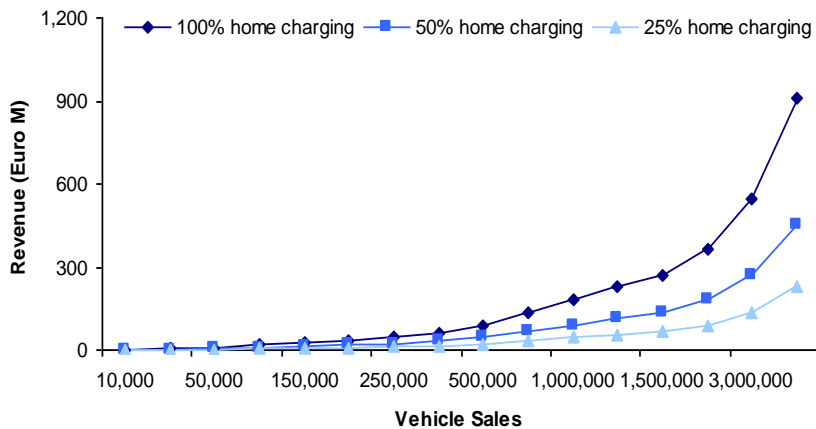
Xcel Energy, along with a consortium including Accenture, is currently developing and implementing a fully integrated “smart grid” power system. The main upgrades include:

- Real-time, high-speed, **two-way communication** throughout the distribution grid
- “Smart” substations capable of **remote monitoring**, near real-time data and optimized performance;
- Potential to install In-home control devices to fully **automate home energy use**
- Integration of infrastructure to support easily dispatched **distributed generation technologies**
- Support for plug-in hybrid electric vehicles** and intelligent-home appliances.

PHEVs are also seen as a major (r)evolution, offering new revenue streams to Utilities for an existing offering

Economic potential

Home Charging Revenue Potential for Utilities



Assumptions:

- Recharge cost €1.33/100km @ € 0.07 KWh
- Annual mileage of 18,000km

Business Attractiveness

- Big business evolution potential Minor modifications are required to current operations and home infrastructure
- Potential profit from load balancing, having to upgrade grid anyway
- Ability to leverage existing customer relationships
- Capture revenue generated from additional electricity usage without having obligations to any new partners
- Need mechanisms to manage charging as penetration increases
- Winners: early movers with control mechanisms

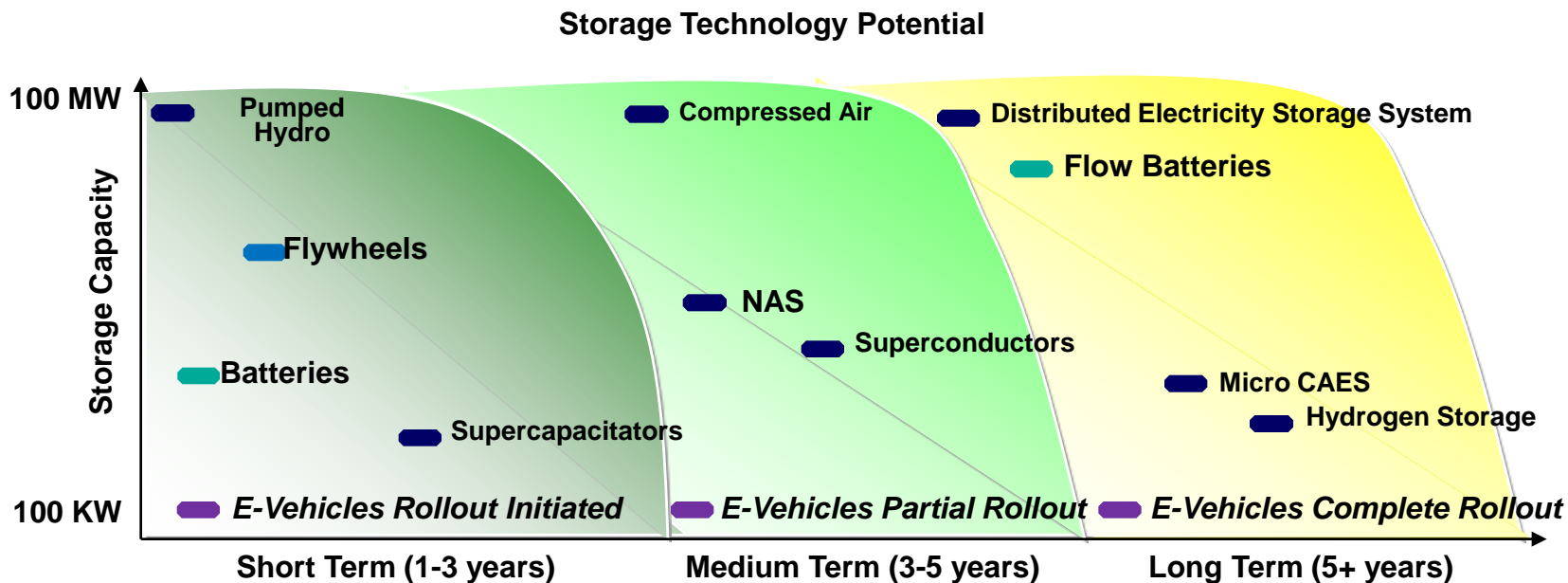
Key challenges going forward

- Predicting and controlling charging behavior
- Significant investments necessary to upgrade grid and build out capacity to enable large scale penetration of e-vehicles

Required Core Capabilities

- Control mechanisms in place
- Power trading capabilities
- Load balancing technology
- Influence standardization and regulation trends
- Developing strategic partnerships (with OEMs)

Storage technology is another area where Utilities could potentially be actively involved, as from the R&D phase



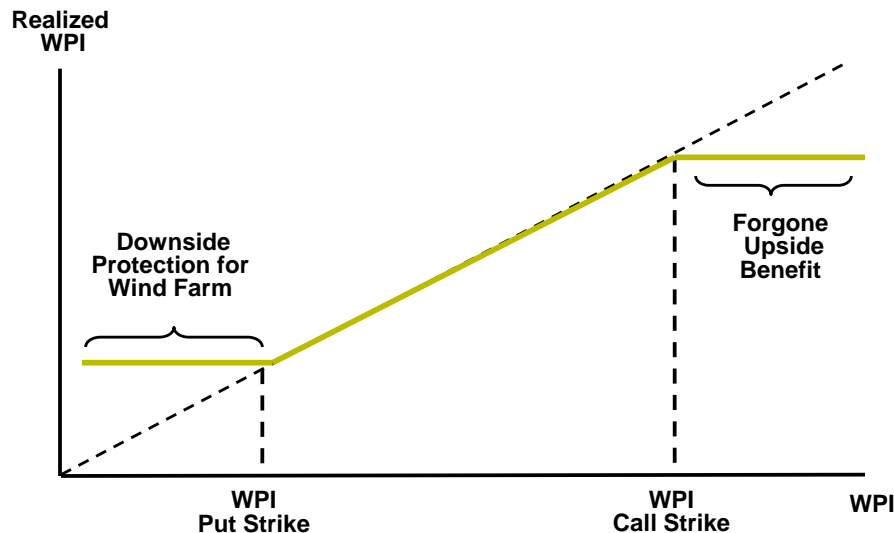
- Invest in flywheels that have excellent cyclic and load following characteristics. They could bridge the gap between short term ride-through and long term storage
- Battery technologies could be expanded for much larger applications, given the right level of R&D investment

- Develop projects in NaS battery technology for wind stabilization, as demonstrated in Japan and the US

- Flow batteries offer high potential, and investment by Electricity companies is critical for further development

Innovative risk management tools to manage intermittency risk in Renewables

- Hedge acquisition, construction and installation risk by developing capabilities for wind yield output calculations and risk identification for new offshore and onshore farms
- Use wind power indices (WPI) and related instruments to hedge against low wind output



- Develop a customized Wind Power Index which help translate wind speed into theoretical generation output
- Enter into suitable hedging agreements, based on the WPI – E.g. in a zero-cost collar agreement, the buyer pays the generator if the defined WPI falls below the put strike and vice-versa if the WPI turns out above the call strike
- The payment in either case is equal to the number of units the weather index deviates from the strike times the tick size
- This hedge helps secure wind farm financing as the guaranteed minimum income is a security for creditors

- Develop risk management capabilities to deal with carbon price risk and increasing carbon regulation. The application of more sophisticated trading skills akin to those in the financial sector are required
- Restructure trading departments to reflect the rise of regional and interconnected markets and leverage economies of scale through centralized trading activities – E.g. German utility E.ON has announced plans to align its trading and power generation businesses “on more European lines in June 2007



Dimensions of change:
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Dimensions of Change	Sub Components	Characteristics of the Coming Decade
Industry Structure and Competitive Dynamics	Supply and demand fundamentals	<ul style="list-style-type: none"> Multi-polar demand impact Increased volatility in oil/gas prices 50/50 chance of supply crunch
	Industry structure	<ul style="list-style-type: none"> NOC expansion/IOC partnership innovations Slowing industry consolidation Sovereign wealth and PE return Oil vs. Gas – Gas seen as “primary” transition fuel in move to clean alternatives
	Regulation	<ul style="list-style-type: none"> Clean energy/energy efficiency solutions due to stricter legislation Moves to limit speculators
Growth and Investment	Portfolio & growth opp.	<ul style="list-style-type: none"> Higher cost projects will be taken out of hiatus M&A returns; organic growth remains a challenge
	Financing	<ul style="list-style-type: none"> Higher oil prices reduce funding concerns Small/medium size firms face tight credit markets
Capabilities and Operating Model	Cost reduction	<ul style="list-style-type: none"> Expectations for “sustained” lower cost environment “Operational excellence” across entire value chain Sophisticated sourcing models, value for money supplier relationships
	Capability provision	<ul style="list-style-type: none"> Retaining essential technical skills critical Advanced/new technologies viewed as “must haves”
Leadership, Talent & Change Capacity	Talent management	<ul style="list-style-type: none"> Talent management remains concern - no quick fix Challenge to develop clean energy talent
	Knowledge management	<ul style="list-style-type: none"> Optimizing knowledge transfer for the next generation
Customer Needs and Buying Behavior	Fuel consumers	<ul style="list-style-type: none"> Fuel price remains key decision criterion Emission reduction and energy efficiency solutions
	Oil & gas companies as customers	<ul style="list-style-type: none"> Expectations for sustainable cost decreases Expect improved levels of quality and customer service

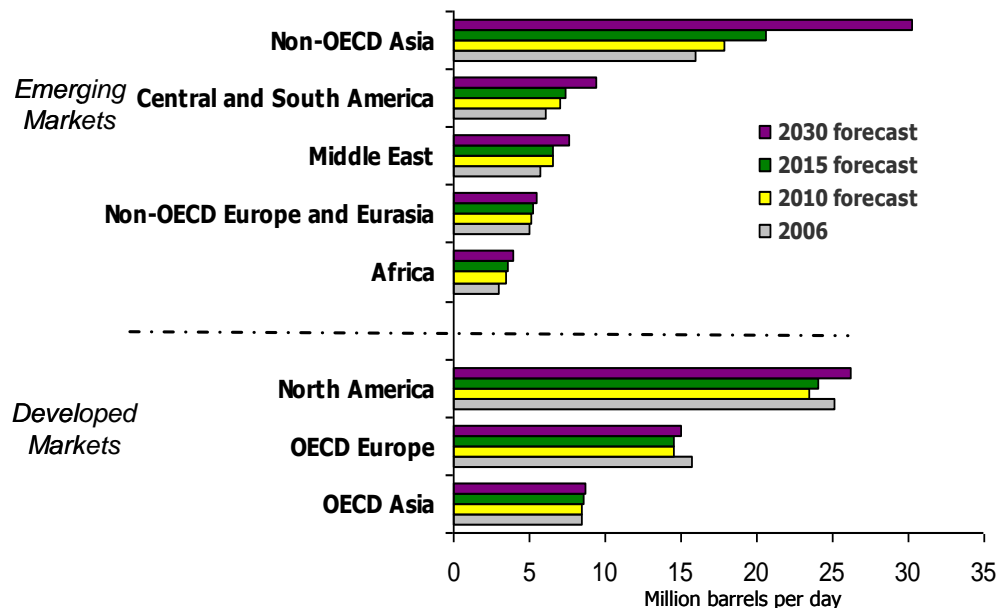
Supply/Demand Fundamentals

- Multi-polar demand impact
- Increased volatility in oil/gas prices
- Possibilities for supply crunch hinge on renewed pace of investment

Industry Ownership

- NOC expansion continues; IOCs pursuing new forms of partnerships
- Re-alignment will slow
- Sovereign wealth funds and private equity return to market

World Hydrocarbon Liquids Consumption by Region (EIA)



Source: EIA; Accenture analysis

NOC expansion examples



Hydrocarbon JV

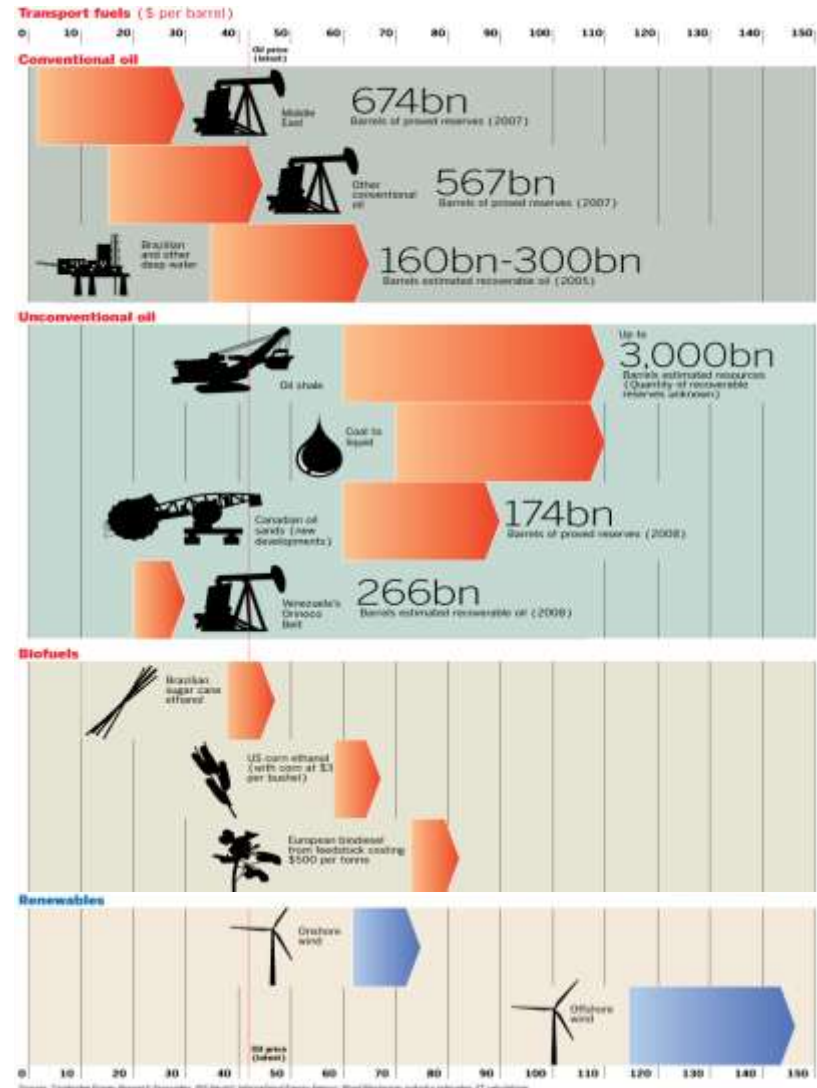
Oil for cash swaps



Portfolio and Growth Opportunities

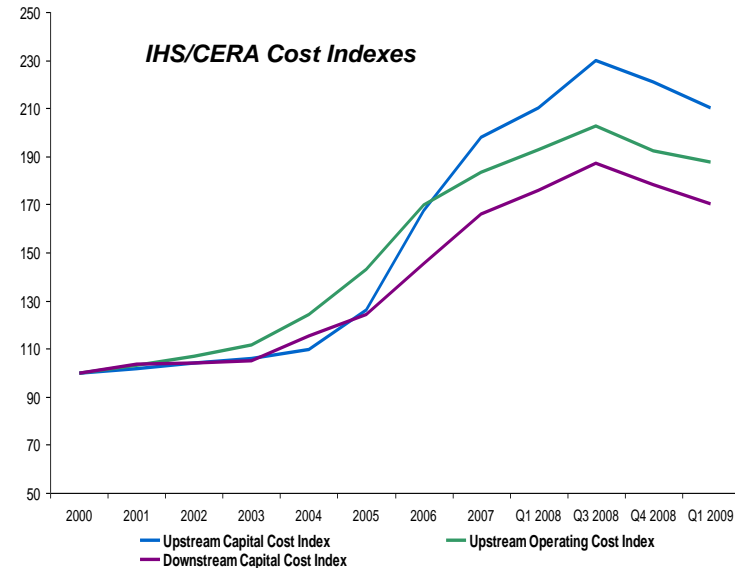
- Higher cost projects will be taken out of hiatus once project economic improve and portfolios have been optimized
- M&A returns as lead lever for growth; organic growth remains a challenge
- R&D will attract significant funds as focus turns back toward Unconventionals and new energy

Price points: Oil and renewables



Cost Reduction and Capability Provision

- Expectations set for a “sustained” lower cost environment
- Manufacturing management mantras such as “lean”, “six sigma”, and “operational excellence” will take hold across entire value chain
- Procurement processes and global sourcing models will become increasingly sophisticated
- Relationships between energy firms and third party suppliers will focus more intently on demonstrating the delivery of tangible value
- “Business service centers” in places like Argentina, India, Malaysia and the Philippines will evolve into more than just “back-office” service providers
- Oil services firms will increasingly look to outsource non-essential operations
- All firms will be keen to retain essential technical skills
- Advanced technologies (e.g. digital oil fields of the future) will be viewed as “must haves” simply to compete and new technologies (ex. cloud computing) will raise the curiosity of CIOs



Source: IHS/CERA; Accenture analysis

- Cost reductions of up to 40% sought by oil / gas firms
- BP and ExxonMobil have both announced reductions in the number of key suppliers – consolidating service provision

Fuel Consumers

- Fuel price remains key decision criterion
- Confluence of new environmental legislation, clean energy stimulus investment and industry restructuring (automotive; utilities) is establishing a world where emission reductions and energy efficiency are expected to be the new modus operandi
- Sustainable solutions will be sought by fuel consumers of all types

Oil/Gas Companies as Consumers

- Expectations set for sustainable cost decreases across sector
- Additionally there will be expectations for improved levels of quality and customer service
- Tangible value delivered will be key metric

- California's recent adoption of motor vehicle fuel efficiency levels increasing by 40 percent by 2016
- Requirement by the Obama administration that bailout packages for the automotive industry be given in exchange for a commitment to the development of new clean energy transport technologies
- Adoption in South Africa of a final energy demand reduction of 12 percent by 2015
- Emergence of energy efficiency grants for businesses as well as homes in a large number of countries



General Motors says the rechargeable electric Chevrolet Volt, which it plans to release in late 2010, should get 230 miles per gallon of gasoline in city driving.

- Industry cost levels have doubled since 2004, and have not followed falling oil price since mid-2008
- Longer term oil/gas service contracts result in lag of up to 2 years between oil/gas price reductions & service cost reductions

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Utilities

- ❑ Replacement wave of **aging Generation and T&D assets**
- ❑ **Aging workforce** and knowledge capital challenges
- ❑ **Environmental legislation** will force a **shift in the Energy mix**
- ❑ This will lead to:
 - ❑ Increased **M&A activity** (e.g., Renewables)
 - ❑ Investments in **operational technology** (e.g., Smart Grids, Storage, PHEV)
 - ❑ A need for **new skills & capabilities** (e.g., Energy Services, distributed asset management, Carbon Trading, Risk Management)

Energy

- ❑ **Multi-polar demand and resource ownership** shift
- ❑ Pressure on **future growth** and accessing **hard to reach reserves**
- ❑ **Volatile** oil and gas prices
- ❑ Climate change & environmental legislation – **challenge from new/clean energy** and impact on value chain, consumers and talent
- ❑ **Gas** taking up role as key hydrocarbon transition fuel
- ❑ Growing **shortage of engineering** and project management **skills**
- ❑ Expectations for a **sustained level of cost reduction**