Energy Infrastructure and Vulnerabilities

*Insurance Market Perspectives*

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Energy Is a Very Large and Very Challenging Business for Insurers Worldwide

Energy is One of the Few Major Markets/Industries With Clear Long-Term Growth Trends
Energy Insurance Market Summary

- Energy is Among the Insurance Industry’s Largest Industry Sectors

- Insurers Have Extensive Experience Offering Comprehensive Solutions Across the Entire Spectrum of Energy Industry Property and Liability Exposures
  - Extraction (on/offshore)
  - Refining and Storage
  - Transportation (marine, rail, truck)
  - Generation (Electricity)
  - Renewables
  - Workers Compensation
  - Management Liability (D&O)
Energy Insurance: Market Summary (cont’d)

- Multi-Billion Dollar Limits Are Available in Most Segments
  - Property and liability exposures
  - Risks are rewarded for superior experience

- Results Can Be Volatile

- Insurers Work Closely With Client Risk Managers

- Price of Coverage is Both Event Driven and Cyclical

- Market is Truly Global
  - Substantial share of underwriting capacity originates abroad

- History of Working Closely to Reduce Loss, Enhance Resilience
  - Major losses stimulate innovative risk management
  - Price (premium/rate) is a powerful signal about risk; Motivates
Between 2010 and 2040, energy consumption is projected to increase by 56.4% worldwide.

Growth in worldwide energy consumption will create more risk and vulnerabilities (natural and manmade); Innovations in risk management and insurance are needed.

Cumulative Projected Investment in Global Energy Infrastructure, 2011-2035 ($ Trill.)

Projected energy infrastructure investment through 2035 total $38 trillion; Implies substantial incurrence of risk.

- Natural Gas, $9.5, 25%
- Oil, $10.1, 27%
- Power, $16.9, 44%
- Biofuels, $0.3, 1%
- Coal, $1.1, 3%

US Electric Power Generation by Fuel Source, 2010-2035F (Billions of Kilowatt Hours)

Demand for Electricity Is Expected to Grow at a 0.6% Annual Rate Through 2035. Renewables and Natural Gas Will Account for an Increasing Share of Fuel Source

The Past Few Years Have Not Been Kind to Insurers or Utilities

Hurricane Irene: Aug. 27-29, 2011
Insured Losses: $4.3 Billion
Customers w/o Power: 5 Million

“Snowtober” Blizzard: Oct. 29, 2011
Insured Losses: ~$1 Billion
Customers w/o Power: 2.7 Million

Derecho: June 29, 2012
Insured Losses: ~$1+ Billion
Customers w/o Power: 3.7 Million

Superstorm Sandy: Oct. 29-30, 2012
Insured Losses: $18.8 Billion
Customers w/o Power: 8.1 Million

Source: Insurance Information Institute research.
U.S. Insured Catastrophe Losses

($ Billions, $ 2012)


*Through 12/31/13.

Note: 2001 figure includes $20.3B for 9/11 losses reported through 12/31/01 ($25.9B 2011 dollars). Includes only business and personal property claims, business interruption and auto claims. Non-prop/BI losses = $12.2B ($15.6B in 2011 dollars.)

Sources: Property Claims Service/ISO; Insurance Information Institute.
Inflation Adjusted U.S. Catastrophe Losses by Cause of Loss, 1993–2012

1. Catastrophes are defined as events causing direct insured losses to property of $25 million or more in 2012 dollars.
2. Excludes snow.
3. Does not include NFIP flood losses
4. Includes wildland fires
5. Includes civil disorders, water damage, utility disruptions and non-property losses such as those covered by workers compensation.

Source: ISO’s Property Claim Services Unit.

- Wind/Hail/Flood (3), $14.9
- Geological Events, $18.4
- Terrorism, $24.8
- Winter Storms, $27.8
- Tornadoes (2), $140.9
- Fires (4), $6.5
- Other (5), $0.2

Insured cat losses from 1993-2012 totaled $391.7B, an average of $19.6B per year or $1.6B per month.

Hurricanes & Tropical Storms, $158.2

Wind losses are by far cause the most catastrophe losses, even if hurricanes/TS are excluded.

Tornado share of CAT losses is rising
Top 16 Most Costly Disasters in U.S. History

(Insured Losses, 2012 Dollars, $ Billions)

Hurricane Sandy became the 5th costliest event in US insurance history

Hurricane Irene became the 12th most expense hurricane in US history in 2011

12 of the 16 Most Expensive Events in US History Have Occurred Over the Past Decade

*PCS estimate as of 4/12/13.
Sources: PCS; Insurance Information Institute inflation adjustments to 2012 dollars using the CPI.
Hydraulic fracturing (fracking) has pushed US natural gas productions to record levels. The U.S. is now the world’s largest NG producer.
The US is now the largest gas producer in the world, though Russia is the largest exporter. The US needs to invest in its pipeline and LNG infrastructure and expedite regulatory approval to realize its full export potential.
Crude oil production in the U.S. is expected to increase by 82.6% from 2008 through 2015.
Oil and gas extraction employment is up 33.1% since Jan. 2010 as the energy sector booms. Domestic energy production is essential to any robust economic recovery in the US.
Insurance Industry Concerns Related to Energy Infrastructure

- Grid Vulnerability to Physical (Terrorist) Attack
  - April 2013 attack on PG&E substation in Metcalf, CA
  - Question of public disclosure of such events per DOE IG report
  - Expiration of Terrorism Risk Insurance Act 12/31/14

- Pipeline Risks
  - Pollution/Environmental risks

- Offshore
  - Remains a concern post-Deepwater Horizon
  - Vulnerable to manmade and natural disaster risks

- Arctic Pollution
  - New frontier

- Rail Transportation
  - Concerns in the wake of several major, costly explosions

- Cyber
  - “Data” policies available (protects value of digital assets)
  - Management liability coverage (D&O) increasingly available
  - Broad property and liability is not commonly available

The Spectrum of Political Violence Including Terrorism

DISTURBING FACTS

- In the US, 40% of all cyber attacks on critical infrastructure assets in 2012 occurred against the energy sector.
- Globally, it’s estimated that cyber attacks against oil and gas infrastructure will cost oil and gas companies $1.87 billion by 2018.
- The UK govt. estimates that oil and gas companies in the UK already lose ~GBP400 million per year as a result of cyber attacks.

Sources: ICS-CERT; ABI; KPMG

The view is that eventually terrorism risk could be managed within the spectrum of Political Violence risks, which are a constant concern in the global energy sector.

Thank you for your time and your attention!

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