

# Tilting the Balances: A Comprehensive Look At Energy in China through 2025

## A New Multi-Client Study

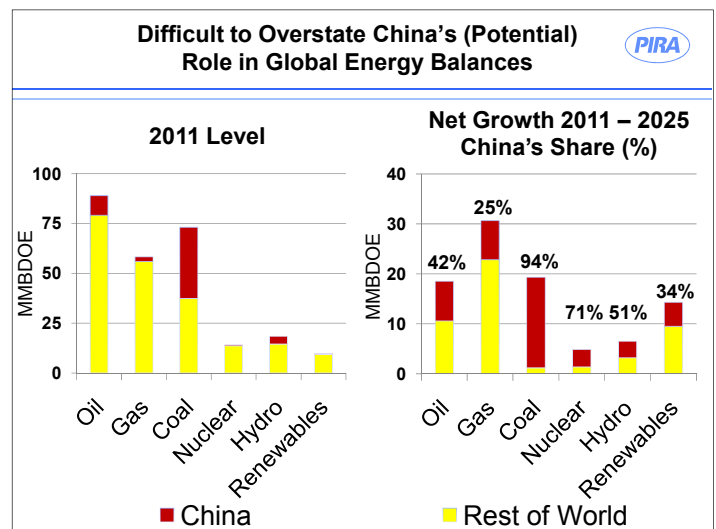
### OVERVIEW

One traditional saying dominates the minds of planners in China: “Even a small act of lifting a strand of hair sets the whole body in motion.”<sup>1</sup> The Western analogy is known as the “butterfly effect.” A centrally planned action in Beijing causes a reaction as far away as Brussels, Washington, Vienna, and Moscow. The Chinese government is determined to keep its country’s economic engine running in high gear, which will require an unprecedented alignment of foreign and domestic energy resources. **China is slated to become the biggest single importer of all three primary fuels (oil, coal, and gas) in the next five years.**

With China investing in oil, gas, coal, nuclear, and renewable energy, every single aspect of global energy balances will be influenced by the extensive growth in Chinese energy use. To help clients follow and understand this development, PIRA is undertaking a comprehensive study that will examine the Chinese energy sector in depth and the new challenges — and opportunities — that buyers and sellers will face. *TILTING THE BALANCES: A COMPREHENSIVE LOOK AT ENERGY IN CHINA THROUGH 2025* will help market participants follow and understand these dynamics, instructing them on how to take into account China’s future world role in the context of their respective businesses.

**The study — already begun — is set for release in May 2012. The longer timeframe is necessary due to the exhaustive nature of the analysis, providing — as the title suggests — a truly comprehensive treatment of the subject matter, which includes the following key topics:**

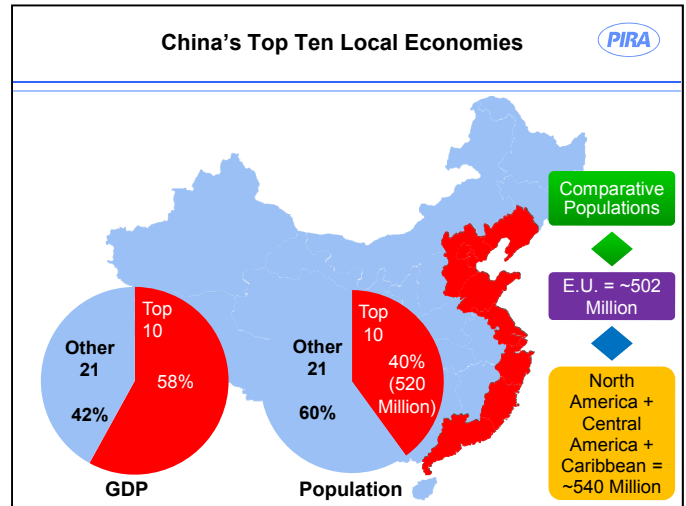
- **Supply and demand, fuel switching, and the role of different energy sources in different sectors.** As a whole, coal may be king in power generation in China even if it may not be every policymaker’s favorite fuel. But, realistically, what can replace or supplement coal? Meanwhile, gas is poised to assume a key role in the residential/ commercial sector, which has been the stronghold of LPG. Do different fuels compete in this sector or do established roles of LPG and gas remain rigid?
- **Regional differences in seasonal demand, price tolerance, and fuel availability.** China is a market composed of multiple markets, which must be economically dissected in any forecast, and its geographical expanse is a challenge in many ways. Varying climates affect seasonal fuel demand in different regions. These factors will affect what types of energy are used, especially when supplies tighten due to weather or other unforeseeable events (e.g. nuclear outages in Japan).



<sup>1</sup> The Chinese original is “牵一发而动全身/qian yi fa er dong quan shen.”

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- Effects of political and cultural tendencies in China.** Centrally directed decisions are the rule in China, and they override market-oriented norms, but affluence is spreading rapidly in China, with people making more “quality of life” demands that go beyond economic gains. More than ever, the government is heeding these public wishes. The interplay between the government and the public will affect undertakings in energy-related projects in areas such as the environment, carbon emissions, nuclear power development, hydropower, and overall fuel choices.

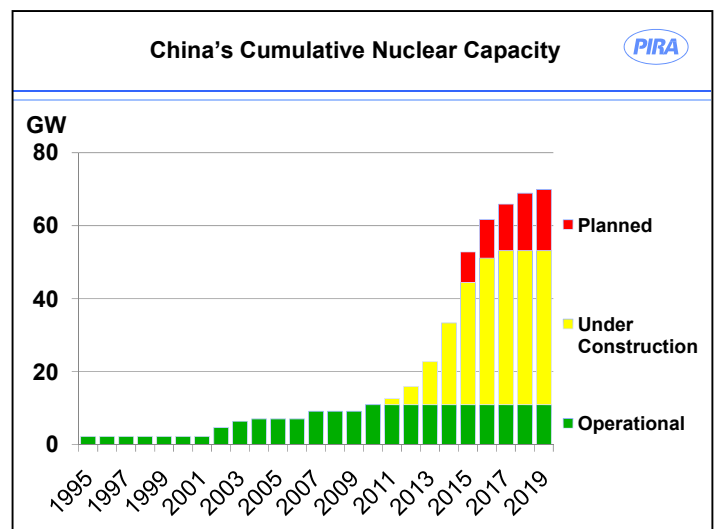


## STUDY BACKGROUND

The Chinese energy market is unique. No country faces as much pressure in providing so much energy to so many people in so little time. No single country carries as much weight in altering the incremental world energy balance as China. The country’s looming energy demand growth is casting a worrisome shadow on competing buyers while opening unprecedented opportunities to sellers.

From domestic production to international imports, China stands at center stage in terms of competitive fuel use and pricing, including oil vs. gas, coal vs. nuclear power, and greenhouse gas vs. renewable. What China cannot produce, it will import and is prepared to purchase these resources as far upstream as possible. The volume, quantity, price, and type of fuel will depend on where and when these needs occur. What central planners in China ultimately decide must benefit the country’s unique socioeconomic “ecosystem.” This process is the defining characteristic of Chinese energy policy and will determine the timing, volume, sources, and distribution pattern of various energy resources.

China’s breakneck pace of development calls for a top-to-bottom understanding of how much energy it wants, how much it needs, how much it is willing to pay, and how its goals can be reached. PIRA believes that any prognosis on China’s energy demand potential that is based solely on mechanical number crunching is clearly missing the point: Cultural and political positions carry at least as much weight. For example, the Chinese have believed for millenia that taming their ravaging rivers is a sign of positive governance; therefore, the enormous Three Gorges Water Dam was built despite controversies. PIRA’s China Study will combine its industry-leading global energy forecasting prowess with an intimate interpretation of what motivates the Chinese.



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### STUDY OUTLINE

The key component of the multi-client study, due for full release in May 2012, is a comprehensive written report. **An outline of this report is as follows:**

#### 1. Overview of China

- a) Regional summary
  - i. Economic distribution
  - ii. Climate and seasonality
  - iii. Energy demand
- b) China's 12<sup>th</sup> Five-year plan
  - i. Domestic production and importation of energy resources
- c) Major energy-consuming sectors
  - i. Industrial
  - ii. Residential/Commercial
  - iii. Power generation
  - iv. Transportation
- d) Key energy companies and major energy-related infrastructures
  - i. Company directives and objectives
  - ii. Oil and gas pipelines
  - iii. Power grids
- e) Existing energy policies and prognosis of future direction

#### 2. Demand and Supply of Energy to 2025

- a) Overall energy demand in China
  - i. By sector, sources of energy, and region
    - Demand seasonality
- b) Supply of energy resources in China
  - i. Oil and petroleum products (e.g. LPG, gasoline, and potential of shale liquids)
  - ii. Natural gas: Domestic conventional and unconventional production; pipeline/LNG imports
  - iii. Coal: Domestic production and imports
  - iv. Renewables
- c) Demand vs. Supply, and Forecast of Shortage to 2025
  - i. Regional and sectoral hierarchy/priority in filling supply-demand gap
  - ii. Applicable fuels (e.g. oil/gas/coal/renewable for power gen; CNG/LNG for transportation)

#### 3. Pricing of Energy Resources in China

- a) Extent and effects of energy subsidies
- b) Global oil price forecast to 2025
- c) Coal and implication for electricity
- d) Natural gas pricing in China
  - i. Domestic gas prices vs. international gas/LNG prices
  - ii. Emerging natural gas transportation network and inter-province arbitrage possibilities
- e) Inter-fuel competition
  - i. Possibility and elasticity of fuel substitution in different sectors and different regions

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### WHO WILL BENEFIT FROM THIS STUDY?

The immense role that China will play in shifting future global energy balances is undeniable. Every aspect of the energy business — from gas reserves in North and South America to coal prices in Central Asia and electricity prices in South Africa — will be influenced by Chinese decisions on where it will buy reserves, what type of imports it will choose, and how it will plan to grow on a regional and country-wide basis. What the major Western oil companies were to the 20<sup>th</sup> century will be what Chinese firms will be in the 21<sup>st</sup> century. It will be hard to find a major transaction around the world that does not have some type of Chinese involvement in terms of bidding or procurement.

#### The following market participants will all benefit from TILTING THE BALANCES:

- **Producers** have experienced firsthand the importance of the Chinese market and its rapid transformation of the global energy landscape. The country's recent spate of asset purchases through a growing list of Chinese state firms is only the beginning of something far bigger. This study will help producers worldwide understand the extent that China will affect investments from upstream to downstream and also provide insight into which Chinese firms will play what particular role in terms of partnerships for domestic energy development in areas such as oil and gas shale.
- **Marketers** need to understand the potential rise and fall of different energy resources in China. As basic needs are satisfied in China, its people are making demands for a cleaner environment. Advance knowledge of Chinese preferences in fuel choices will allow sellers of energy resources and energy-related equipment and services to move ahead of the trend and reach their target customers first. China may be a single country, but it is far from a single market and the regional distinctions are important to understand.
- **Trading companies** want to anticipate regional supply/demand changes and price dynamics. Traders need to understand China's seasonal demand issues and the prospect of potential shortages of a variety of commodities in different regions because they will determine tolerable price levels. Understanding China's comparative position among other international markets will aid in the understanding of and planning for trading and infrastructure needs to best capture future opportunities.
- **Financial institutions** must make sound evaluations of how changing market conditions will affect the economics and financing of new investments and marketing ventures. TILTING THE BALANCES will allow for more informed decision-making on potential projects. Just as some energy companies in China have grown to become some of the largest in the world, their corporate objectives have also changed. Since the future of these Chinese companies is tightly tied to the future of China itself, no financial institution that invests in China-related projects can afford to misdiagnose the country's energy requirements.

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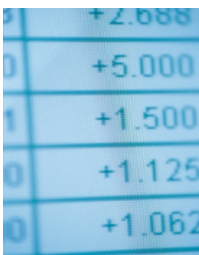
### WHAT DO STUDY SUBSCRIBERS RECEIVE?

Companies purchasing the study will entitle 5 users to each of the following deliverables (licensing options are available to add extra users):



#### **WRITTEN REPORT** (May 2012)

A detailed written report will spell out the findings of the study, the bases of underlying the Reference Case, and a discussion of key uncertainties that impact the major findings. An outline appears on page 3 of this prospectus.



#### **ONLINE DATABASE** (May 2012)

Historical data back to 2005 and forecasts through 2025 in Excel spreadsheets for:

1. Demand by sector breakdown (e.g. Residential/Commercial, Industrial, and EG.)
2. Demand by source of fuel (e.g. oil, natural gas, and coal.)
3. Supply by source of fuel (e.g. oil, natural gas, and coal.)
4. Projected prices of oil, coal, and gas



#### **STUDY PRESENTATION** (May-June 2012)

A live presentation, conducted online (date TBA), will present the key results of the study, discuss the market implications of these findings, and offer the ability to question the study's authors. The presentation will also be recorded for online playback at the buyers' convenience.

**OPTION: PRIVATE WORKSHOP** – Study buyers may choose to have a private (online or on-site) briefing of the study's findings for an additional fee. Such an option allows for a more thorough dialog with the authors as well as some customization of the presentation. Arrangements (location, date, etc.) are made on a case-by-case basis, which will determine the cost of the option. Please contact your PIRA account representative if you are interested.

### FEES AND OPTIONS

- **TILTING THE BALANCES: A COMPREHENSIVE LOOK AT ENERGY IN CHINA THROUGH 2025** can be purchased by both current PIRA Retainer Clients and non-clients.
- Existing PIRA retainer clients will receive a reduced price.
- **Private Workshop Option:** The study may include a live video briefing at a mutually agreed upon time. For an additional charge (to be quoted by PIRA), clients may choose a customized on-site presentation. **Contact your PIRA account representative.**

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### THE STUDY TEAM

**Mickey Kwong** (Director, International Gas; Study Leader) is responsible for analyzing global gas pricing and market fundamentals, including business structures, demand, production, unconventional gas, and imports, and he contributes to all of the International Gas Group's reports. He developed and maintains PIRA's LNG spot price calculator. In 2008 and 2011, he co-authored PIRA's *Globalization of Natural Gas* and *Unconventional LNG: Monetizing North American Gas Exports* multi-client studies, respectively. Mickey has also authored single-client special studies on topics ranging from LNG procurement strategy, business models, unconventional gas in China, to long-term international gas market developments. From 1998 to 2006, he was an LNG/natural gas consultant at Poten & Partners, where he advised clients from the Americas, Africa, Asia, and Europe on pricing, demand, and price risk management.

**Dr. Mark Schwartz** (President and Managing Director of the Scenario Planning Group) works closely with PIRA's Global Oil and Natural Gas groups to evaluate the key assumptions underlying their outlooks and to develop plausible alternative assumptions and outcomes, delivered in the Scenario Planning Service. Before joining PIRA in 2002, he was the Chief Economist of ExxonMobil Corp., where he was responsible for developing the company's long-range economic and energy outlook. During his 25 years at Exxon he also had assignments in Upstream Planning, Treasurers, and Corporate Planning functions. Mark holds a Ph.D. in economics from the University of Pennsylvania.

**Roman Kramarchuk** (Managing Director, Emissions and Clean Energy) heads up PIRA's Greenhouse Gas Emissions Service. Prior to joining PIRA in 2005, he was extensively involved in the development of the CAIR and CAMR (Mercury) Rules and the BART Guidelines with the U.S. EPA's Clean Air Markets Division. Working at PG&E NEG and with PA Consulting / PHB Hagler Bailly, he evaluated strategies regarding power sector fuel choice, allowance purchases and capital investments in pollution control equipment and advised on plant development/acquisition and asset valuation. Roman also spent several years working on USAID- and World Bank-funded projects to develop power markets, market rules and regulatory capacity in Ukraine, Armenia and India. He has an M.P.P. from the Kennedy School of Government at Harvard and a B.A. in economics and B.S.E. in systems engineering from the University of Pennsylvania.

**Daniel J. Klein** (Senior Director, International Coal) heads up the International Coal Services and is the primary author of the *International Thermal Coal Market Forecast* and *International Coal Markets Scorecard*, as well as collaborating on the short- and long-term outlooks for the *U.S. Coal Market*. Prior to directing the International Coal Service, Mr. Klein was a member of PIRA's North American Electricity team, beginning in 2003. He has a B.A. in economics from Calvin College.

**Peter Jaquette** (Director, Global Oil) is a key contributor to PIRA's Scenario Planning Service and is the coordinator of the Planning for Tomorrow study series, working closely with PIRA's Global Oil, Refining, Biofuels and Freight groups. Peter joined PIRA in 2007 with more than 25 years of experience in corporate strategic planning and economic consulting, including 14 years with ARCO and nine years with Weyerhaeuser, where he was involved in evaluating cellulosic ethanol and other energy projects. Peter has a B.A. in economics from Swarthmore College and an M.A. in economics from Stanford University.

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**Miriam Levy** (Senior Analyst, Global Oil) supports both the Political Risk and Global Oil groups, analyzing the downstream and upstream implications of political, economic, and fundamental issues. She is responsible for the weekly Energy Market Recap and contributes to special projects and multi-client studies. From 2006 to 2009, she consulted electric utilities on power procurement at NERA Economic Consulting. She also worked as an analyst at an emerging markets hedge fund. Miriam has a B.A. in Ethics, Politics, and Economics from Yale University and an M.A. from Columbia University in International Energy Management and Policy.

**Asif Gangat** (Analyst, Global Oil) joined PIRA in 2008. He is responsible for the analysis and forecast of short-term crude oil supply. Prior to PIRA, Asif worked at Newedge USA, where he researched and modeled U.S. oil market fundamentals to predict weekly U.S. crude and product demand. Asif received his masters in international energy and management from Columbia University and bachelors in computer studies from Pace University.

**Nobuo Tarui** (Associate Director, Global Oil) has over 10 years of experience in energy and economic issues and is responsible for tracking and analyzing economic data for energy market implications. He is responsible for PIRA's weekly *Economic Recap* report as well as quarterly China and India oil demand reports. Prior to assuming his current position, he worked for the Dai-Ichi Kangyo Bank Research Institute as a U.S. macroeconomist and at UBS Energy as a U.S. natural gas market analyst. Nobuo holds a B.A. and an M.A. in economics from NYU.

**Lila Noury** (Senior Analyst, Political Risk) is responsible for analyzing political and economic issues in key energy-producing and -consuming countries. Prior to joining PIRA, she analyzed Iran's oil and gas sector for a leading consulting firm in Iran. She also worked with Grameen Bank, a micro-finance institution in Bangladesh, evaluating and researching alternative-energy programs. Lila has a B.A. in economics and international relations from Bowdoin College and an M.A. from Columbia University in international energy management and policy.

**Dr. Naing Oo** (Associate Director, Global Oil) joined PIRA's Global Oil Group in 1995. He focuses on quantitative and econometric analysis for forecasting oil demand and is responsible for maintaining PIRA's global short-term oil demand model. Naing is also involved in both short- and long-term analysis of crude and product supply/demand balances and trade flows, and he has contributed to numerous PIRA multi-client studies and consulting projects. Naing holds a Ph.D. in economics from the City University of New York.