




Asian Energy Futures **Event Report**

by

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with

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and inputs from

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16 April 2001 revised edition
[to update with most recent Dept. of Energy projections]

Please direct all feedback to [Tom Barnett](#), and contact him directly if you wish to receive the hard-copy version.

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Asian Energy Futures Event Report (I): Project overview and introduction



This annotated briefing serves as the Decision Strategies Department (DSD) Report for the Asian Energy Futures decision event held in New York City on 1 May 2000.

As of April 2001, this summary brief of the *NewRuleSets.Project* (both an overview of the project and a summation of the 1 May event) has been presented on over 50 occasions to a variety of Washington think tanks, government agencies, and Wall Street firms. Future briefs are still being scheduled, so contact Tom Barnett directly if you are interested in receiving the brief.

The original draft of the Asian Energy Futures report was posted on the Naval War College's web site (<<http://www.nwc.navy.mil/newrulesets/AEFreport.htm>>) on 29 June 2000. The first hard copy publication was dated August 2000. We decided to update and revise both our hard-copy and online versions in April 2001 to include the Department of Energy's most recent long-term projections, which appeared in the March 2001 *International Energy Outlook*, available on the web at <www.eia.doe.gov/oiaf/ieo/index.html>.

Comments on this revised version are welcome from all quarters, but especially from the workshop's participants and anyone who's seen the brief in person. Comments should be emailed directly to Tom Barnett, the project's director <barnett@nwc.navy.mil>. He can also be reached by phone at 401.841.4053.



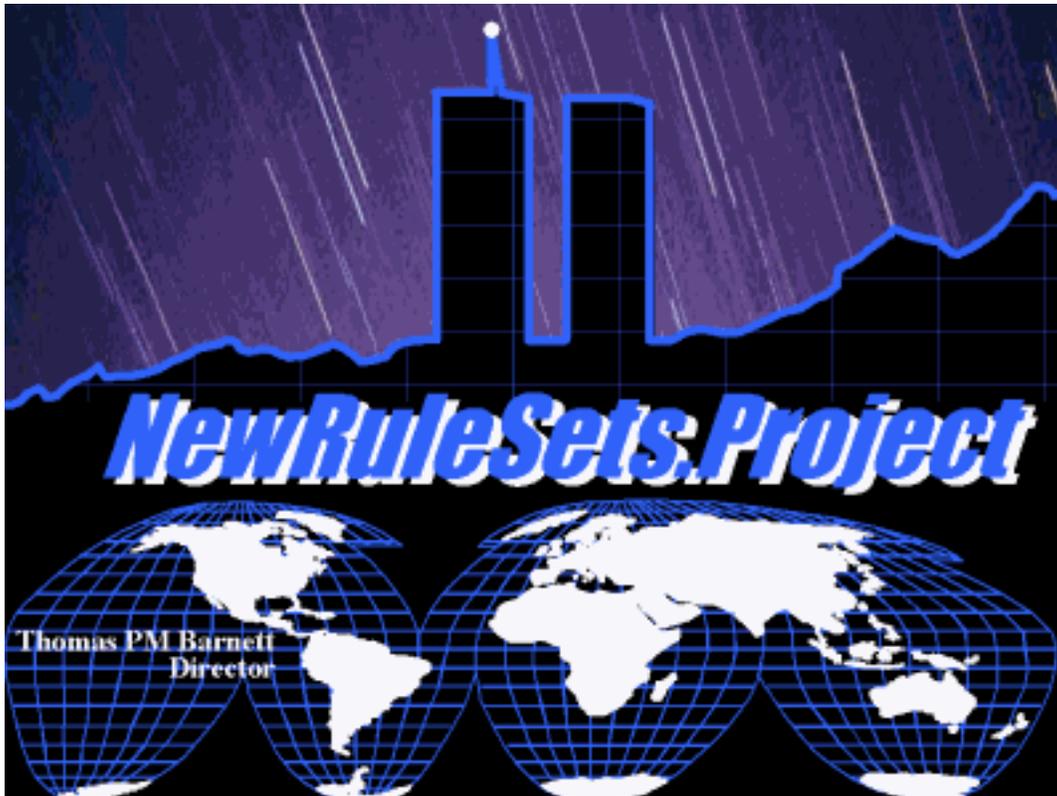
The Asian Energy Futures event was the fourth in a series of Economic Security Exercises that the DSD has conducted in New York City with the support of Cantor Fitzgerald, the world's largest broker of U.S. Government securities, Eurobonds, and sovereign debt. These events are designed to bring together the worlds of finance and national security to explore issue areas of common interest and, by doing so, build mutual understanding.

For more than 25 years, Cantor Fitzgerald has played a pioneering role as a private-sector intermediary for the fixed income markets. In the early 1970s, Cantor developed the world's first screen-based marketplace for the trading of U.S. government securities. In 1998 it created Cantor Exchange, the first U.S. electronic futures exchange for U.S. Treasury futures. Just last year Cantor launched a new division known as eSpeed to operate all of its electronic markets. All told, Cantor's business operations involve financial flows of approximately 50 to 70 trillion dollars a year.

Cantor Fitzgerald provided significant analytic and organizational support to the first three Economic Security Exercises in the series:

- December 1997 event focused on a dual cyber terrorism/disruption of the sea lines of communication (SLOC) scenario involving Wall Street and Southwest Asia, respectively (hard copy of event report is available from the DSD by calling 401-841-1798)
- June 1998 event focused on a dual financial crisis/SLOC disruption in Asia involving Indonesia (hard copy of event report is available from the DSD by calling 401-841-1798)
- May 1999 event focused on the potential global financial repercussions of a substantial Year 2000 Problem (find the report online at <<http://www.nwc.navy.mil/y2k/y2krep.html>>).

eSpeed has stepped to the fore on the *NewRuleSets.Project*, and will serve as Cantor's support lead for all five of the planned Economic Security Exercises envisioned in this project, beginning with the Asian Energy Futures event.



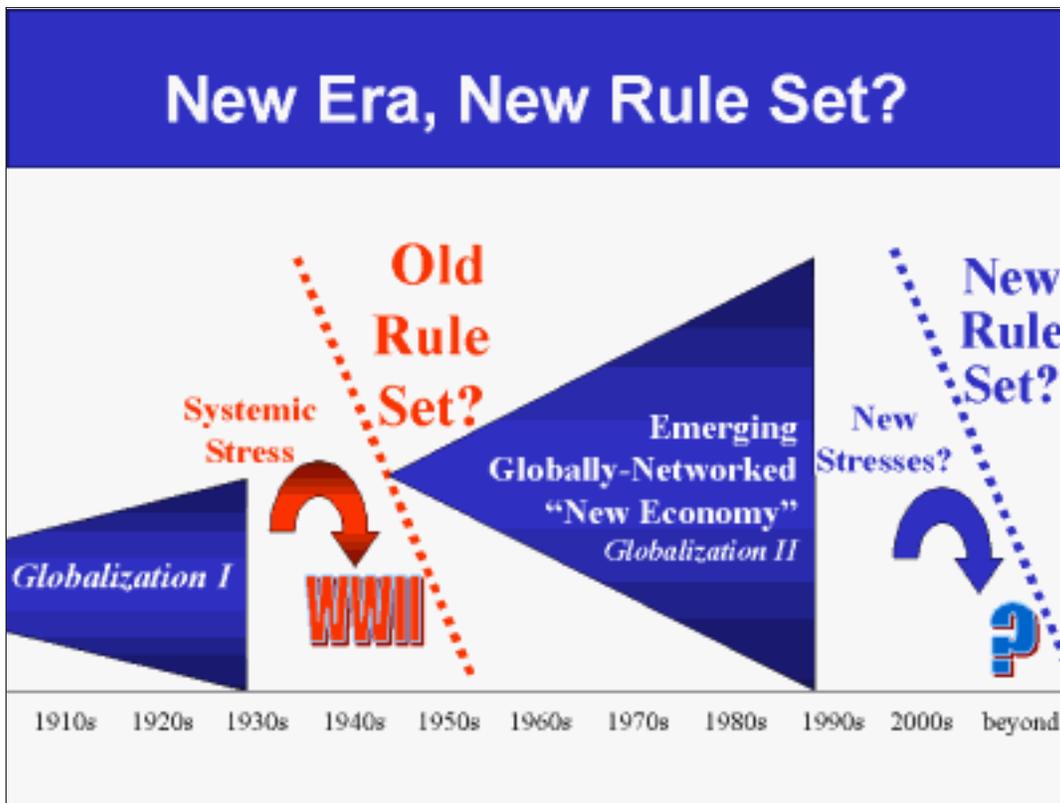
The *NewRuleSets.Project* is a two-and-a-half-year, five-workshop effort designed to explore how globalization and the rise of the New Economy are altering the basic "rules of the road" in the international security environment, with special reference to how these changes may redefine the U.S. Navy's historic role as "security enabler" of America's commercial network ties with the world. Not a data gathering effort, this project lives and dies with the participants we bring together at our workshops—from throughout the global financial and national security communities. The project has five main goals:

- Explore how globalization and the rise of the New Economy are generating new rule sets with regard to how nation-states and national economies interact with one another
- Determine how these new rule sets alter the basic "rules of the road" in the international security environment
- Link these changes in the international security environment to the U.S. Navy's current quest for a "transformation strategy," with special reference to how these changes may redefine the U.S. Navy's historic role as "security enabler" of America's commercial network ties with the world
- Translate these changes in the international security environment into conceptual paradigms of use to strategic planners in the international financial community
- Generally deepen the cross-cultural understanding both sides—the Pentagon and Wall Street—bring to the table during periods of overlapping geo-strategic and geo-economic instability.

Dr. Thomas P.M. Barnett serves as project director. He is currently a Professor/Senior Strategic

Researcher in the DSD. Other DSD personnel involved in the project include:

- Prof. Bradd Hayes, Senior Strategic Researcher, DSD
- Dr. Lawrence Modisett, Chairman, DSD
- CDR. Carl Carlson, USN, Deputy Chairman, DSD
- Prof. Gregory Hoffman, Associate Researcher, DSD.



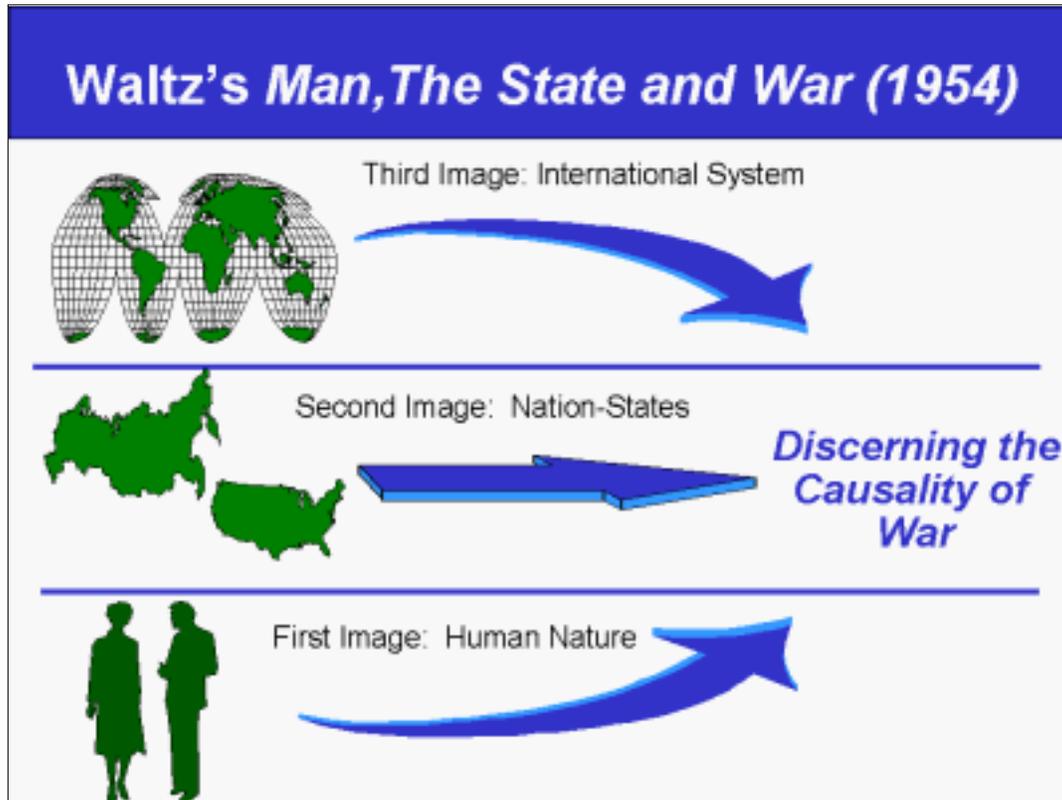
The global rule set that has characterized international relations throughout the Cold War period finds its roots in the systemic stresses of the 1930s—namely, the Great Depression and the rise of fascism in Europe. These twin developments led inexorably to the Second World War, from which sprang the hope that "never again" would the international community allow itself to engage in the sort of economic protectionism that destroyed most of the global economic connectivity achieved by "Globalization I" (roughly, 1870 to 1929).

Based on that "never again" spirit, the postwar Western great powers, led by the United States, attempted to "firewall off" the experiences of the 1930s by creating a new *global rule set*, whose main attributes were exemplified by such international organizations as the General Agreement on Trade and Tariffs, the UN, the International Monetary Fund (IMF) and the World Bank (WB).

This new global rule set engendered the second great period of economic globalization, creating what we've come to know as the globally networked "New Economy." As this New Economy spreads across the planet, it has suffered significant "growing pains" (e.g., Mexico '94, Asia '97-'98, Russia '98, Brazil '98-'99), leading some to question whether the postwar rule set is still appropriate for the 21st Century. In other words, as national economies become increasingly intertwined in this information technology-driven New Economy, legitimate questions arise as to whether or not a new global financial architecture is in order and, if so, what it might entail.

While not focusing specifically on any of the ideas currently forwarded by economists for such a new financial rule set, our project takes as its starting premise that the current era will witness great change in the planet's economy, and that these changes will eventually alter our definitions of national security.

NOTE: A portion of this text is adapted from Thomas P.M. Barnett et. al, *Final Report of the Year 2000 International Security Dimension Project*, DSD Report 00-5, pp. 15-16, found online at <http://www.nwc.navy.mil/y2k/y2krep.html>.



As our starting point for analyzing how an emerging new global economic rule set could alter U.S. definitions of national security, we employ the three-tiered analytic perspective introduced by Kenneth Waltz in his seminal 1954 book on the theory of the causality of war entitled, *Man, the State and War* (New York: Columbia University Press). Waltz's approach to this eternal question ("Why do interstate wars start?") was simply to "view" the matter from three separate perspectives, which he labeled "images":

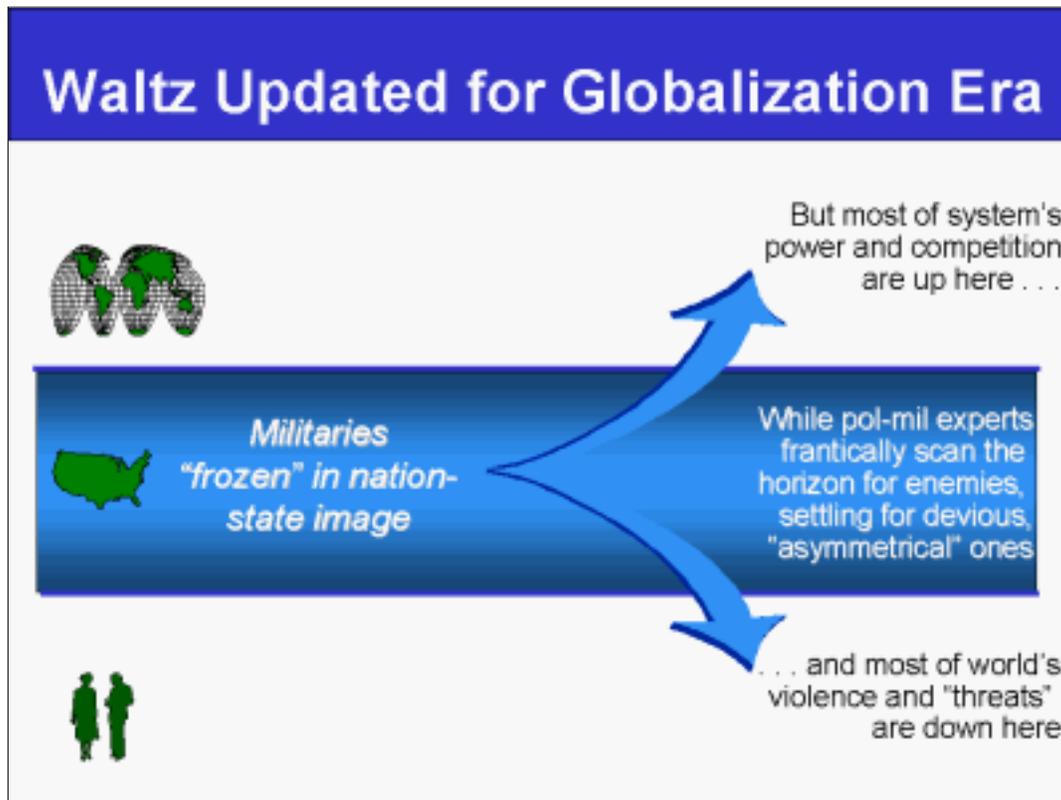
- The first image, or "bottom up" perspective, is that of humanity itself, or better stated, *human nature*. In other words, the question he posed was, is it the essential nature of humanity to engage in violence?"
- The second image, or "straight on" perspective, involves the nation-states themselves. In other words, do certain types of states instigate wars while others do not?
- The third image, or "top down" perspective, involves the all-encompassing international system within which these wars between states occur. In other words, does the current structure (i.e., lacking Thomas Hobbes' Leviathan, or authoritative enforcer of global order) simply allow or even encourage conflict among states?

In essence, Waltz used these three perspectives to test—or poke holes in—conventional wisdom concerning the presumed complicity of man, states and the international system in fomenting war.

We likewise employ Waltz's analytical framework in discerning the future of inter-state relations in the

post-Cold War era, which we will label the Era of Globalization. We think this three-tiered approach forces a certain discipline to our analysis by pushing us to dis-aggregate the emerging global rule sets according to the “location” of the needs they seek to address—namely, the international system, state governments, or individuals.

NOTE: A portion of this text is adapted from Thomas P.M. Barnett et. al, *The U.S. Marine Corps and Non-Lethal Weapons in the 21st Century: Annex A—Alternative Global and Regional Futures*, Center for Naval Analyses Quick-Response Report 98-9, September 1998, pp. 2-3.



It is our baseline contention that most militaries—but especially the U.S. military—are largely “frozen” in Waltz’s nation-state image. Why so?

In the Cold War, things were fairly straightforward, as both the international system (through blocs) and individuals (through ideologies) were kept in strict subordination to the state-centered superpower conflict. So when the Pentagon looked abroad, all it saw was "us" and "them" states, with that pesky nonaligned gang in between. The focus on states remains to this day. We call it the "Willie Sutton effect," after the famous bandit who, when asked why he robbed banks, replied, "Because that's where the money is." In other words, nation-states have long served as the preeminent collection point (i.e., taxes) for collective security efforts (militaries), but that has begun to change.

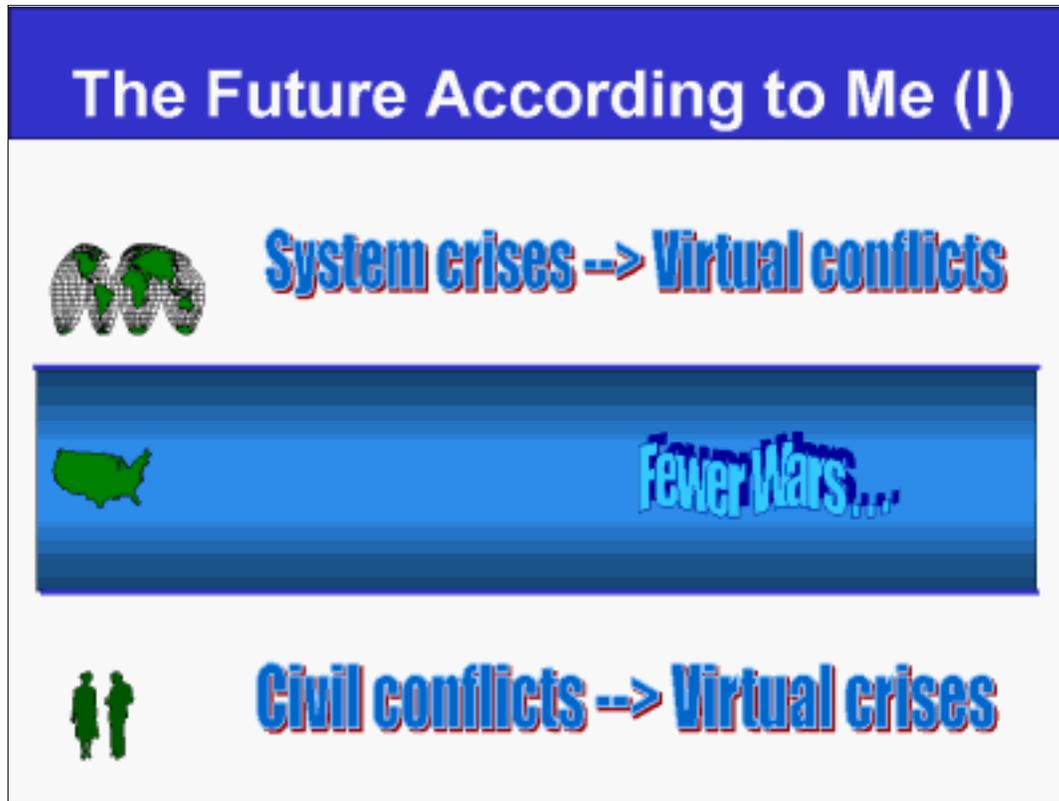
The United States has not yet adjusted its state-centered defense policy to account for the two biggest security trends of the globalization era:

- Power and competition have shifted upward, from the state to the system (in the form of the global economy, culture, and communications grid).
- Violence and defense spending (e.g., small arms races, private security firms) have shifted downward, from the state to the individual.

Worldwide state defense spending and arms transfers are down dramatically from Cold War peaks, leaving some observers to wonder if the U.S. military is being *disintermediated* from the global security

environment—namely, the perception that it is both irrelevant to the rising market of system perturbations (e.g., financial crises) and largely impotent in responding to the booming market of civil strife. While this is a decidedly harsh judgment, we think it’s important to consider the possibility that the U.S. military is—in effect—losing its market share as global security is transformed by the New Economy.

NOTE: A portion of this text is adapted from Thomas P.M. Barnett, “Life After DODth or: How the Evernet Changes Everything,” U.S. Naval Institute *Proceedings*, May 2000, p. 48.



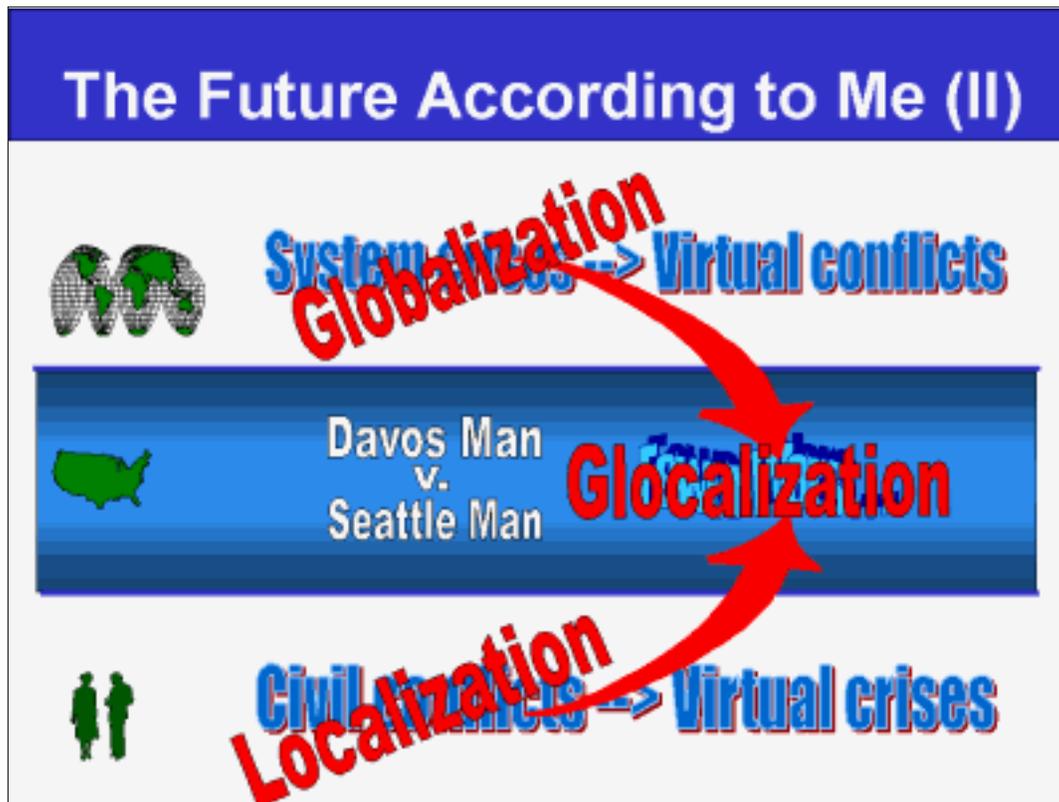
Our take on the future stems from our appreciation of the different trends we see unfolding across the three Waltzian perspectives. First and foremost, we see a future of fewer interstate wars. The early 20th century's high volume of state-on-state warfare will not carry over into the 21st. Nuclear weapons ended great power-versus-great power warfare back in 1945, and as John Keegan predicts, the future belongs far more to civil strife than traditional war.

However, on the international system level we’ll see the U.S. government focusing a lot of diplomatic attention on trying to keep systemic crises—usually triggered by financial tumults—from blossoming into real conflicts among states. Much of this future potential for system-based conflict arises from threats to the global information infrastructure (GII). We get only the slightest hint of this possible future through the emergence of worldwide computer viruses such as the “Love Bug” virus of early 2000. For now, such disruptions seem relatively minor, and since no focused motivations lie behind the acts, little danger is perceived. But it only makes sense that as Information Age economies become increasingly dependent on the movement of raw data, much as Industrial Age economies depended on the movement of raw materials, system-based conflict will be characterized by focused and well-motivated attacks on GII functioning. In short, this is a growing market.

In comparison, real conflicts below the level of the nation-state (i.e., civil strife) should remain fairly constant in the future. Globally there have been a good three to four dozen conflicts every year since

World War II that generate 1,000 or more casualties. And while these conflicts are real, U.S. interests tend to be virtual, affording us the flexibility to choose the ones we want to deal with (e.g., Bosnia) and to turn a blind eye to those we don't (e.g., Rwanda).

NOTE: A portion of this text is adapted from Barnett, "Life After DODth," p. 51.

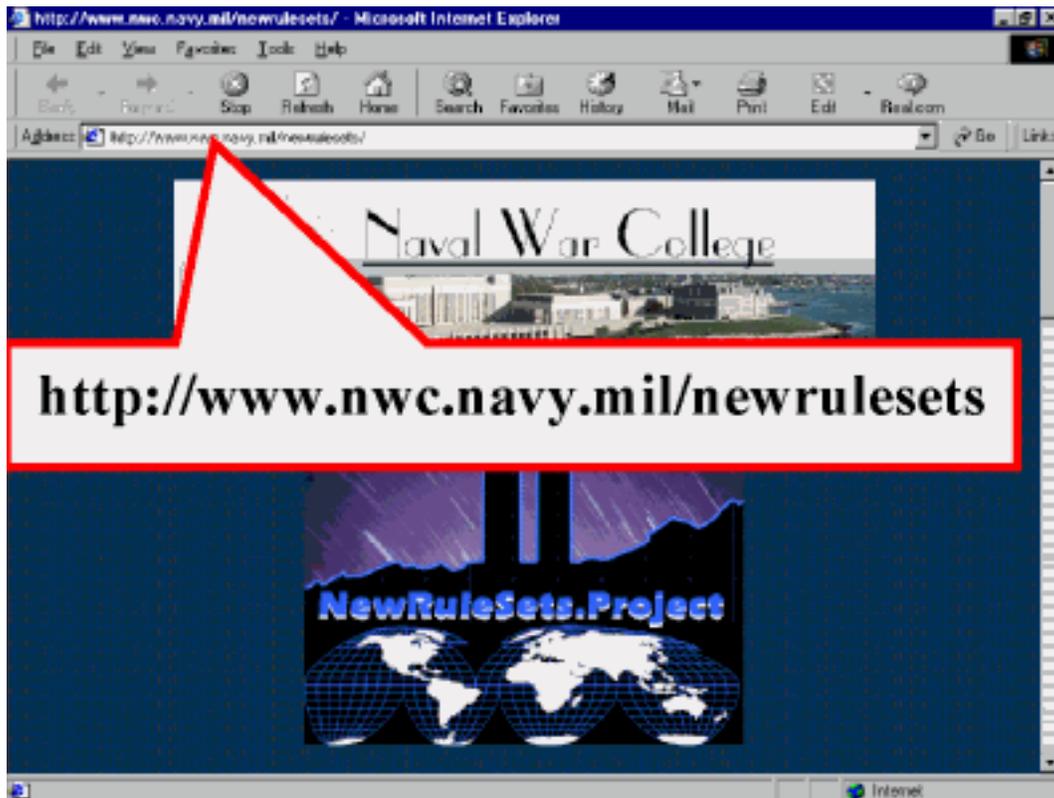


So where can a military fit in this new global environment, where almost all the important crises are either too global or too local for most states to tackle with military force? In a world featuring both integrating *globalization* (i.e., we are all drawn together by the Internet, transportation, mass media, e-commerce, etc.) and dis-integrating *localization* (so why then do so many societies and economies seem to be coming apart at the seams?), the great challenge facing governments is fostering compromises between the two, otherwise known as *glocalization*—adapting the local to the global in ways that improve the former's living standards.

Naturally, this can be fairly contentious, with many societies resisting what Thomas Friedman calls "revolution from beyond" (see his *The Lexus and the Olive Tree*; New York, Farrar Straus Giroux, 1999). In many societies, globalization is looked upon as forced Americanization, and frankly, that's too much for most people to swallow. Localization, then, becomes a largely anti-Western rejection of the social homogenization fueled by globalization. In turn, any rejection of globalization constitutes a rejection of the concept of a single global rule set, meaning you tell the world, "Hey, in this corner of the planet we do things differently!" You can call it "Asian values," or "Chinese characteristics," but in effect you're just saying that local identity still matters, even as your region may increasingly embrace globalization and all the social and political change that it ultimately forces.

In short, *glocalization* is the containment of the Globalization Era—sort of a dot communism, love it or leave it. This individual choice, made again and again in societies throughout the world, will define the ideological conflict of this age: *Davos Man* (globalization) versus *Seattle Man* (localization).

NOTE: A portion of this text is adapted from Barnett, "Life After DODth," pp. 49-50.



All of the published analytic output connected with the *NewRuleSets.Project* is available online at the Naval War College's web site at the following address: <http://www.nwc.navy.mil/newrulesets>.

The web site provides a Project Summary, which we will update on a regular basis as the multi-year research effort unfolds.

For each decision event, such as the Asian Energy Futures event, we will post three products:

- [Read-ahead package that details the event from a procedural standpoint](#)
- [Copy of the brief slides](#)
- Event report, such as [this annotated briefing](#).

The web site also offers links to various related sites:

- [Naval War College](#)
- [Center for Naval Warfare Studies](#)
- [Decision Strategies Department](#)
- [Biographies of *NewRuleSets.Project* personnel](#)
- [eSpeed](#).

The web site also offers direct email to project director [Tom Barnett](#) for the purposes of commentary and feedback.



The Asian Energy Futures event is only the first of at least five Economic Security Exercises we plan on conducting for the *NewRuleSets.Project*. Our current schedule is as follows:

- Asian Energy Futures (conducted 1 May 2000)
- Foreign Direct Investment (conducted 16 October 2000)
- Special Decision Event with the National Intelligence Council (conducted 6 December 2000 at the Center for Strategic Studies, Alexandria VA)
- Asian Environmental Futures (planned for 4 June 2001)
- Special Decision Event with the Naval War College Foundation Board of Trustees (planned for 14 June 2001)
- Food and water resources (tentatively Fall 2001)
- Critical assets of the New Economy (tentatively Spring 2001).

Beyond the June 2001 events, the schedule is tentative and subject to change. We may also add additional events as the research warrants.

Each of the decision events—unless otherwise noted—will occur in one of two places:

- Windows on the World conference center, World Trade Center, New York City
- Decision Support Center, McCarty-Little Hall, U.S. Naval War College, Newport, Rhode Island.

If you or someone you know is interested in attending one of these events (space is extremely limited), please feel free to contact project director Tom Barnett with your nominations.

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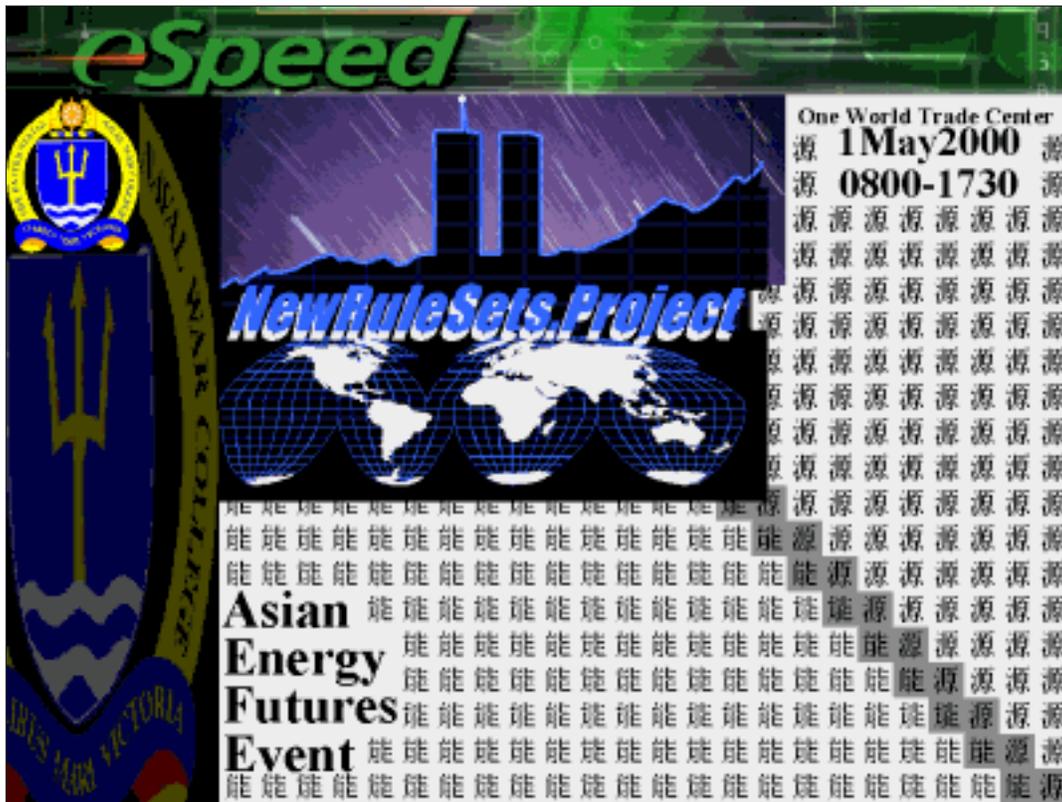
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Asian Energy Futures Event Report (II): The Asian Energy Futures decision event



We designed the Asian Energy Futures decision event with these major goals in mind:

- Generate "new maps" of global energy market relationships based on a clearer understanding of the developmental challenges faced by major Asian economies over the coming decade
- Delineate the key scenario variables and dynamics likely to emerge as Asia's energy needs balloon in the coming years, focusing on possible regional flashpoints
- Construct comprehensive downstream scenarios capturing both the regional and global adjustments to Asia's energy expansion.

The event involved two dozen participants drawn equally from the financial community, the political-military community, and the regional expert community. The point of the effort was not to amass the most impressive collection of energy and Asian experts, but to bring together a diverse array of experts, decision makers, and opinion leaders from both the public and private sectors, and let the synergy of their intellectual interactions serve as the fundamental analytic output. In short, this event's

calling card was a “clash of paradigms,” and not a rigorous forecasting effort.

The event unfolded over four major sessions. Each session involved both facilitated discussion by the group as a whole and individual participation in collective brainstorming tasks, in which we employed a decision software system known as GroupSystems. Using GroupSystems, each participant entered ideas *anonymously* via a dedicated laptop, while simultaneously commenting on each other’s inputted ideas asynchronously via a portable Local Area Network, or LAN. In effect, then, we interspersed facilitated discussion with a LAN equivalent of a “chat room” where we explored numerous specific ideas in greater detail.



The Asian Energy Futures event basically explored, over four substantive sessions, a rough "influence net" model that we’ve constructed regarding the key dynamics of Asia's energy future and its impact on the global economy and security environment:

- Concerning “The Choice,” we conducted one session called “You Make the Call! Participants were shown the current energy profile of the country(ies) in question (expressed as percentage breakdown by major category—namely, oil, natural gas, coal, and renewable), as well as the expected total energy requirement for 2020, and were asked to propose a new percentage breakdown for the 2020 timeframe. We did separate mini-sessions on Japan, India, China, the rest of Asia, and Asia as a whole.
- Concerning “The Players,” we conducted a session called “The List” (based on the cable network VH-1's show of the same name). Participants were asked to nominate countries and/or non-state actors for the following "best awards": Best New Villain, Best New Ingénue, Best New Odd Couple, Best New Long-Distance Romance, Most Likely to Get Hitched, and Most Likely to Get Dumped (these categories are explained in detail in later slides).
- Concerning “The Unfolding,” we conducted a session called “Scenario Flashpoints,” where participants wrote advisory emails to the leaders of countries involved in three crisis scenarios: oil

blockade/sanction vignette, gas pipeline disruption vignette, and coal emissions/air pollution vignette.

- Concerning “The Adjustment,” we conducted a session called “Headlines from the Future,” where participants named four long-term outcome scenarios for Asian energy developments, brainstormed likely headlines found along each pathway, and decided which Asian states are most likely to end up in each scenario.

All of these participant brainstorming sessions were captured in the GroupSystems software program for our subsequent analysis. They form the basis for the analysis we present in this report.



Our participants can be grouped in the following manner:

Foreign Policy

- Dr. David Gordon, National Intelligence Council
- Cdr. Mark Montgomery, USN, National Security Council
- Mr. Robert Randolph, U. S. Agency for International Development.

Military

- Under Secretary of the Navy Jerry Hultin
- Dr. Leif Rosenberger, U.S. Pacific Command
- Dr. Alberto Coll, Center for Naval Warfare Studies
- Amb. Paul Taylor, Center for Naval Warfare Studies
- VAdm. Arthur Cebrowski, USN, U.S. Naval War College.

Financial

- Adm. William Flanagan, USN (ret.), Cantor Fitzgerald
- Dr. Philip Ginsberg, Cantor Fitzgerald
- Mr. Doug Gardner, eSpeed
- Mr. Lundy Wright, Morgan Stanley Dean Witter
- Mr. Neal Wolkoff, New York Mercantile Exchange
- Mr. Roy Nercesian, Poten Partners
- Mr. Mike Feeley, Sino-American Development Corporation.

Energy

- Mr. Jim Caverly, Department of Energy
- Dr. David Jhirad, Department of Energy
- Mr. Jim Bishop, Caithness Energy
- Dr. Dennis Eklof, Cambridge Energy Research Associates

Research

- Capt. Dave Duffie, USN, Council on Foreign Relations
- Dr. Minxin Pei, Carnegie Endowment for International Peace
- Dr. Ellen Frost, Institute for International Economics/National Defense U.
- Dr. David Baldwin, Columbia University
- Dr. Katsuaki Terasawa, University of Mississippi.



This graphic serves as both table of contents for the presentation of analysis to come and as rough theoretical model for the *NewRuleSets.Project* as a whole.

On the question of Asia's future energy requirements, we break the process down into five distinct stages (moving from left to right across the graphic):

- We begin with the *Here and Now* time period, which encompasses the *Starting Line* environment (i.e., current global energy market), the dialectical relationship between *Plans* (what Asian states hope to achieve in energy consumption by 2020) and *Realities* (the roadblocks they may face in that quest), and the *Altered States* (new roles, new relationships) that may result from whatever gap arises between what is planned and what actually unfolds.
- Moving from the *Here and Now* into *New Rule Sets*, we describe the transition point as Asia's fundamental acceptance of, and adaptation to, the energy *Rules of the Road*, meaning certain underlying realities, trends, and "iron laws" that cannot be ignored if progress is to be achieved in meeting most or all of Asia's planned energy needs up to the 2020 timeframe.
- In the *New Rule Sets* time period, we define two possible pathways: one where Asia *Finds* [its] *Way* to achieving its ambitious energy growth plans, and one where countries *Lose* [their] *Way*. Rather than trying to present an all-encompassing theoretical model of how those pathways unfold, we offer instead a "black box" model, or *Scenario Dynamics Grid* that displays a matrix listing of the key economic, political, technological, cultural, environmental, and security dynamics involved in Asia's expected energy expansion.
- Moving from the *New Rule Sets* to the *There and Then*, we describe the transition point as a series of *Tipping Points*, or paradigm shifts that we think Asia must undergo before being able to achieve its energy growth targets within the 2020 timeframe.
- In the *There and Then* time period, we lay out a series of possible sign posts (here, projected newspaper headlines) for both positive (*Good Signs*) and negative (*Bad Signs*) outcome scenarios. We also present an X-Y axis with four major outcome scenarios, or *Landing Paths*, and wrap up this model with a simple prediction of "who ends up where?" (*Kto Kovo?*, or the Russian phrase meaning, Who gets whom?).

We begin our analysis with the *Starting Line*.

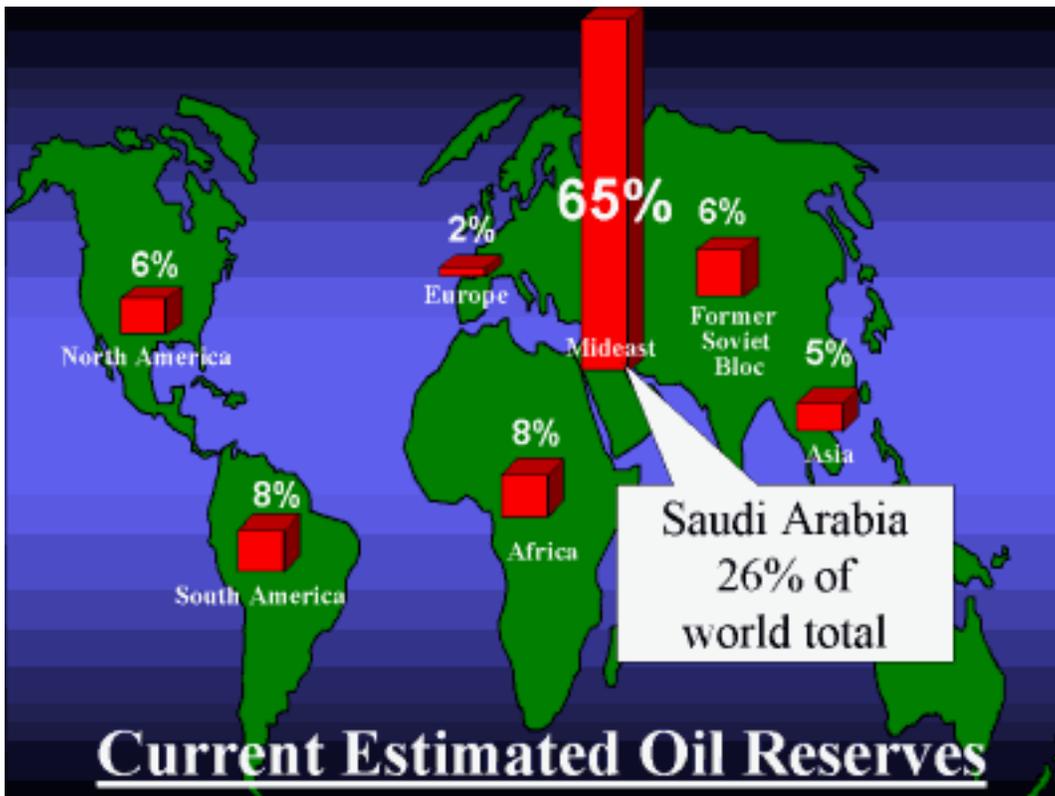
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Asian Energy Futures Event Report (III): Starting line analysis



We begin our *Starting Line* analysis by noting the best current estimates of global oil reserves, as defined by the Energy Information Administration (EIA), U.S. Department of Energy (DOE), at their web site <http://www.eia.doe.gov/emeu/iea/table81.html> (last updated on 02/05/2001).

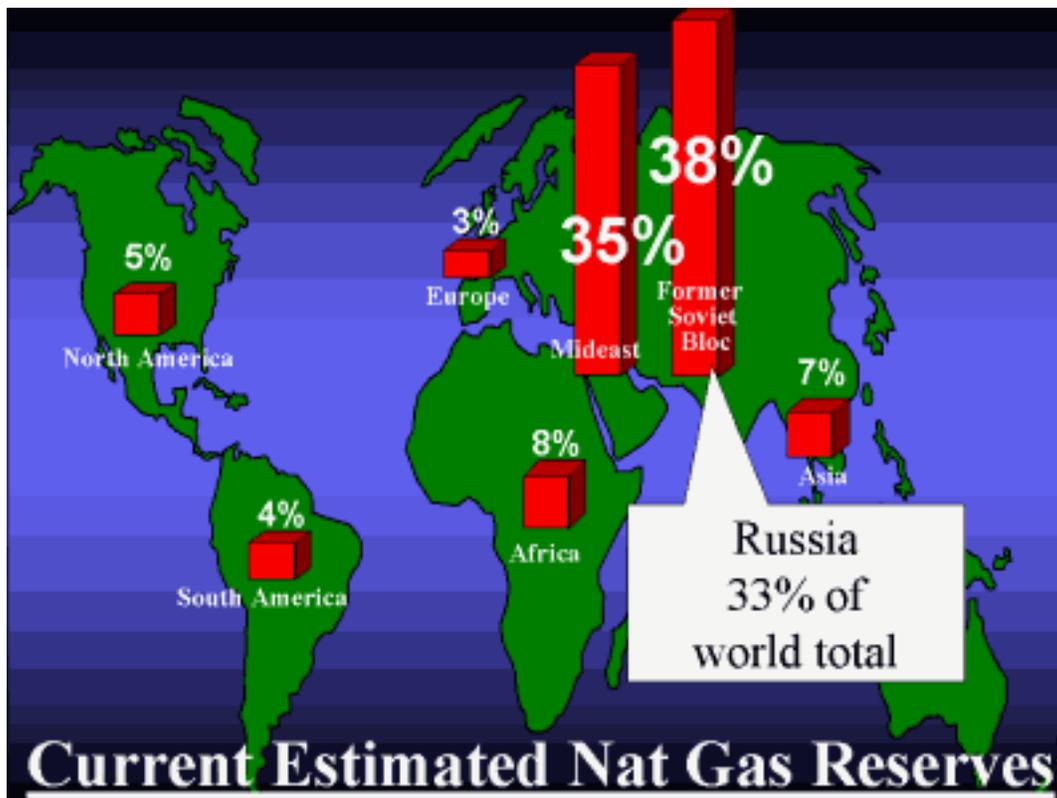
EIA data divides up the world into seven major categories:

- North America
- South America (to include Central America)
- Europe (i.e., *Western* Europe only)
- Former Soviet Bloc (Eastern Europe & Former U.S.S.R., to include what we now identify as Central Asia)
- Middle East
- Africa

- Asia (Far East and Oceania).*

As the data makes clear, the Middle East dominates global oil supplies, with Saudi Arabia as the largest player in the global market (26 percent).

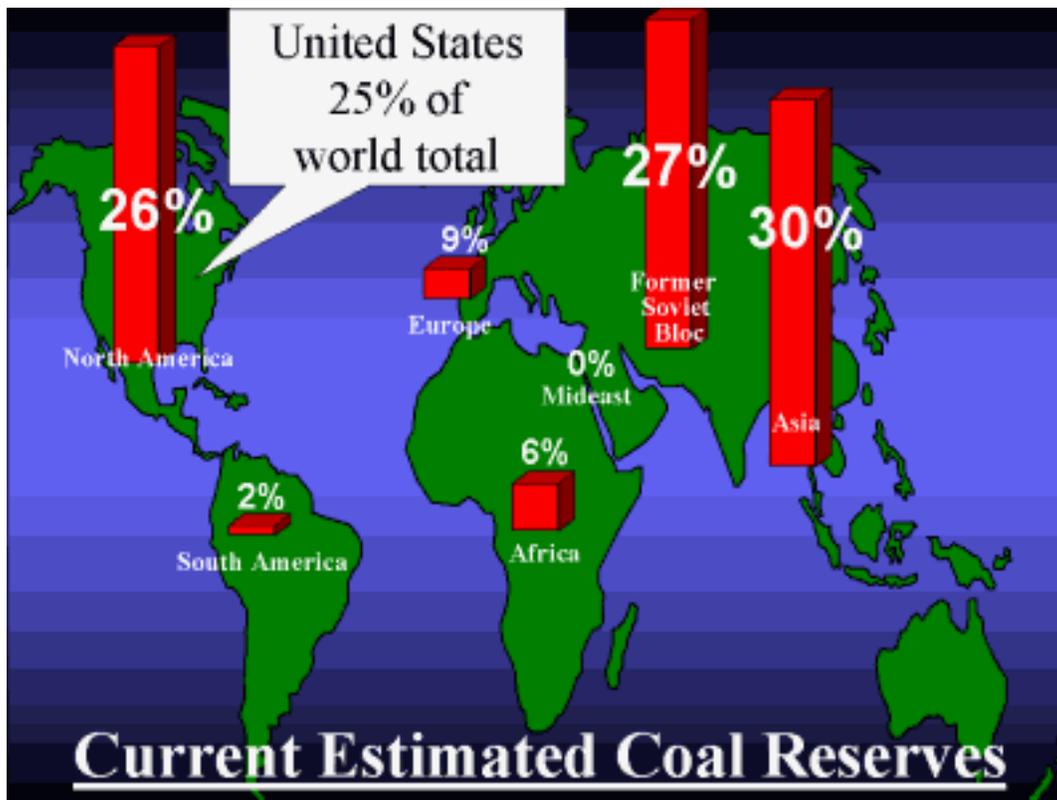
* For the purposes of this report, we're defining Asia to include the following states: Afghanistan, Bangladesh, Bhutan, Brunei, Cambodia, China, Fiji, French Polynesia, Hong Kong, India, Indonesia, Japan, Kiribati, Laos, Malaysia, Macau, Maldives, Mongolia, Myanmar, Nauru, Nepal, New Caledonia, Niue, North Korea, Pakistan, Papua New Guinea, Philippines, Samoa, Singapore, Solomon Islands, South Korea, Sri Lanka, Taiwan, Thailand, Tonga, Tuvalu, Vanuatu, and Vietnam. Note that Australia and New Zealand are not included in this definition. Like Japan, they are considered part of "Industrialized Asia," but we exclude them on the basis of the strong political and cultural ties to the West—meaning they already adhere to a Western-defined rule set.



Next we note the best current estimates of global natural gas reserves (which does not include any estimates of undersea methane hydrate deposits). This data is likewise drawn from the EIA's web site, and can be accessed at the address <<http://www.eia.doe.gov/emeu/iea/table81.html>> (last updated on 02/05/2001).

As the data makes clear, the Middle East and Former Soviet Bloc combine to account for almost three-quarters of the known proven gas reserves, with the Russian Federation as the single most dominating presence in the global market (33 percent).

Iran leads the Middle East with 16 percent of the global total.



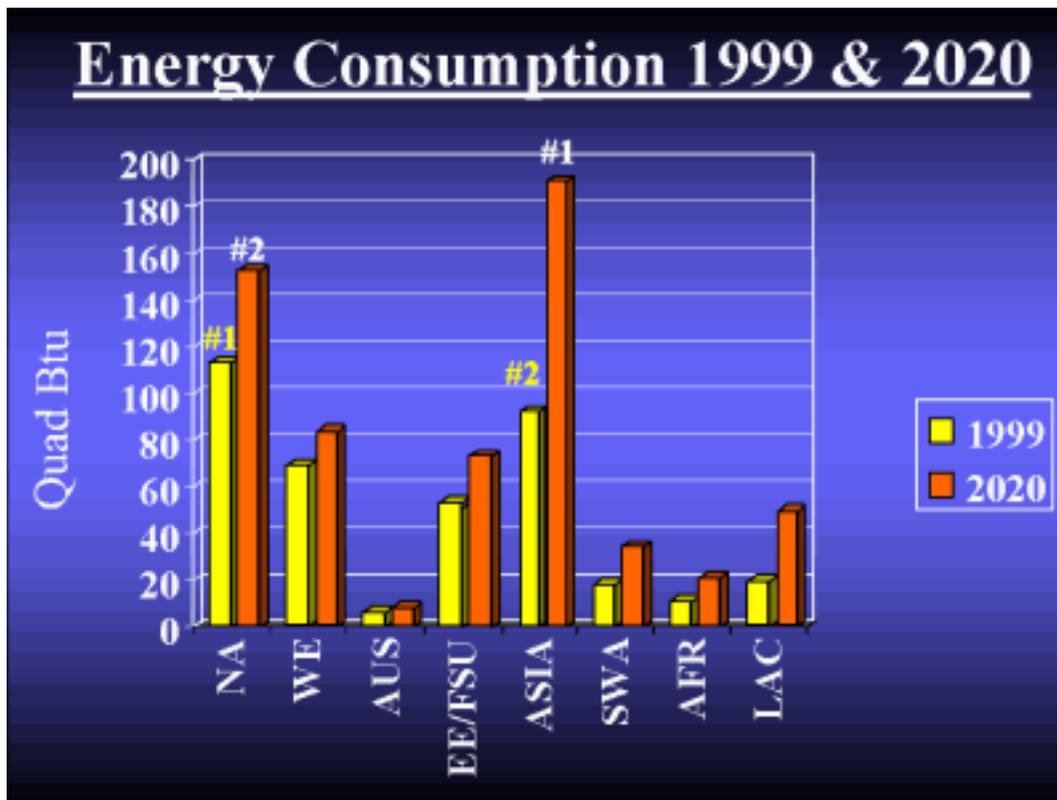
Finally we note the best current estimates of global recoverable coal reserves (both anthracite/bituminous, known as the "cleaner" coal, and lignite/ subbituminous, known as the "dirtier" coal). This EIA can be accessed at the address <<http://www.eia.doe.gov/emeu/iea/table82.html>> (last updated on 01/31/2001).

As the data makes clear, coal is the one great energy source *not* concentrated in the Middle East, but spread rather evenly between three main regions:

- North America
- Former Soviet Bloc
- Asia.

To the surprise of many, it's the United States which stands as the single largest presence in the global coal market, with 25 percent of the total. The U.S. holds the greatest amount of both types of coal.

Russia is the largest former Soviet Bloc player at 16 percent, and China leads Asia at approximately 12 percent of the global total.



Here we present the regional breakdown of total energy use for 1999 and expected demand for the year 2020. The measure used is quadrillion British thermal units (Btu).

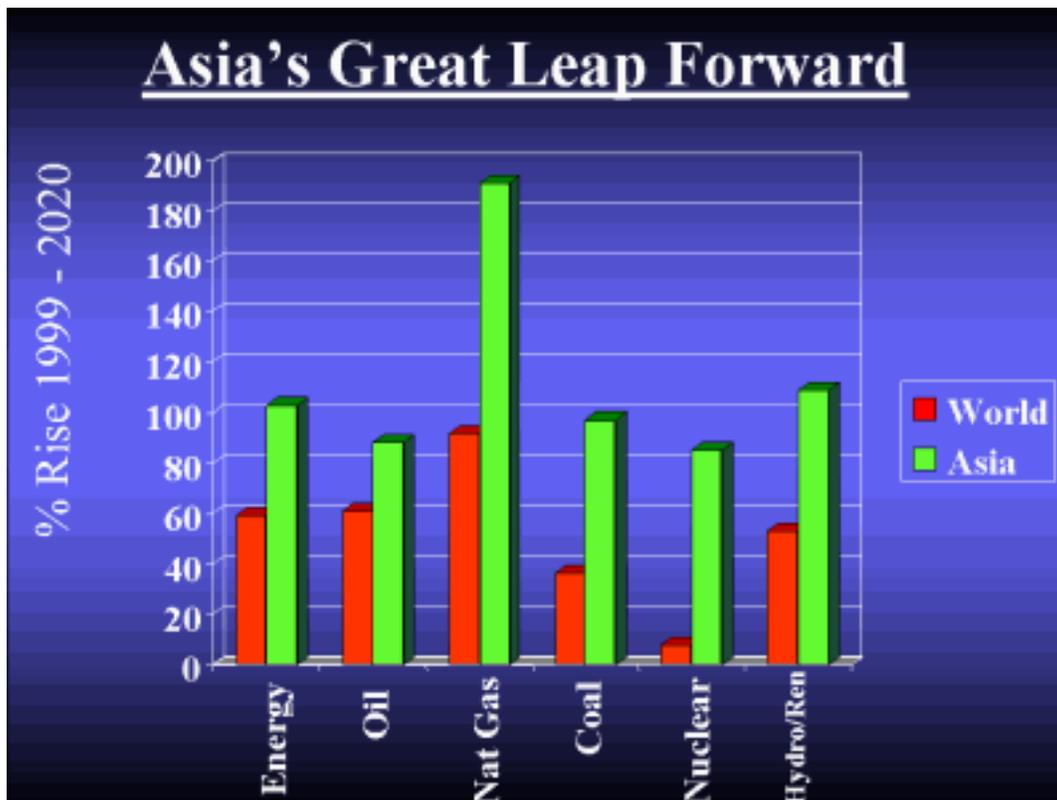
A good rule of thumb for thinking about Quad Btu is that you can take the annual number for a region, divide it by two, and that would give you the rough equivalent in millions of barrels of oil per day the region would need to burn if it was achieving that entire energy amount by oil alone. For example, North America used 116 Quad Btu in 1999, so that would equate to approximately 58 million barrels of oil a day (mbd) if that entire amount was achieved by oil alone. For point of comparison, we'll note that the United States currently uses about 20 mbd, importing roughly half that number.

The major impression one takes away from the data is that a changing of the guard is happening in global energy consumption, if the projections regarding Asia are to be accepted. Currently, North America accounts for the largest regional share of energy use at 30 percent of the global total. Asia stands in second place for 1999 at 24 percent.

By 2020, however, Asia will surpass North America and occupy the top share at 31 percent, while North America will decline to 26 percent. The other regions of the world will shift only a percentage point or two, keeping the same order throughout the time period.

This data was obtained from the Energy Information Administration's annual *International Energy Outlook*, the March 2001 edition with projections to 2020. It is available online at <http://www.eia.doe.gov/oiaf/ieo/index.html>.

LEGEND: NA = North America, WE = Western Europe, AUS = Australia, EE/FSU = Eastern Europe/Former Soviet Union, ASIA = Asia (excluding Australia), SWA = Southwest Asia, AFR = Africa, LAC = Latin America/Caribbean



Global energy use is expected to increase by roughly 60 percent from 1999 to 2020, but the bulk of that increase will be centered in Asia, where energy demand is expected to roughly double by 2020 (103 percent). In comparison, the world minus Asia will increase only 45 percent over the same timeframe.

Asia's expected plus-ups are significant no matter what the energy category:

- Oil increases by roughly 88 percent
- Natural gas, 191 percent
- Coal, 97 percent
- Nuclear, 85 percent when Japan is included, but 178 percent when it is not
- Hydroelectric/renewable, 109 percent.*

When members of the Western financial community talk about Asia's economic development between now and 2020, they describe it as basically *the greatest massing of private capital in human history*. As these numbers suggest, much of that capital employment will focus on meeting the region's burgeoning energy requirements, primarily in terms of generating the massive growth in energy distribution infrastructure required to reach these very ambitious targets.

We decided to focus our first *NewRuleSets* decision event on Asian energy precisely because of the huge numbers involved: not only in terms of energy growth, but the unprecedented external capital flows needed to pull it off over a relatively short historical time frame. In short, new rule sets will inevitably emerge from this much structural change in the global economy.

* Calculated from EIA's *International Energy Outlook 2001*, pp. 175-83.



Projecting ahead from our current starting line to Asia's expected energy requirements in 2020, we begin our cursory review with coal.

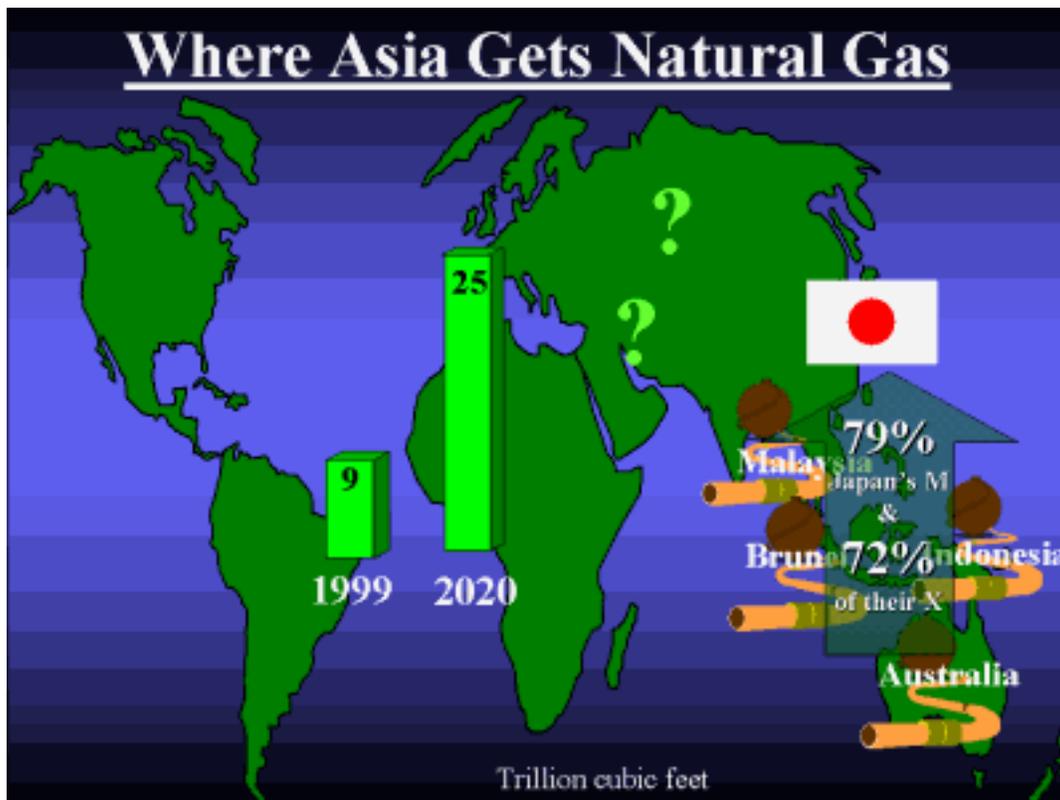
Currently, Asia gets virtually all of its coal from in-region, with the four largest suppliers being:

- China (which mostly supplies itself)
- India (which mostly supplies itself)
- Indonesia
- Australia (which, given it's relative proximity, we consider to be part of Asia proper in this regard).

Asia's relative autonomy on the subject of coal will continue through 2020, as it will "self-supply" almost all of its expected coal requirements, which are projected to roughly double over that time span.*

In essence, Asia has all the coal it needs within the region to meet both its current and projected needs. To the extent that coal is the answer, there are no difficult questions regarding *access to supply* in this decade or the next.

* Calculated from EIA's *International Energy Outlook 2001*, pp. 76.



Our review of natural gas offers a similarly sanguine picture regarding near-term access to supply. By way of example, Japan currently accounts for the largest share of natural gas use in Asia (almost a third). It imports methane almost exclusively in liquid form (liquid natural gas, or LNG) via tankers, with the overwhelming bulk (79 percent) coming from just four in-region countries:

- Malaysia
- Indonesia
- Brunei
- Australia.*

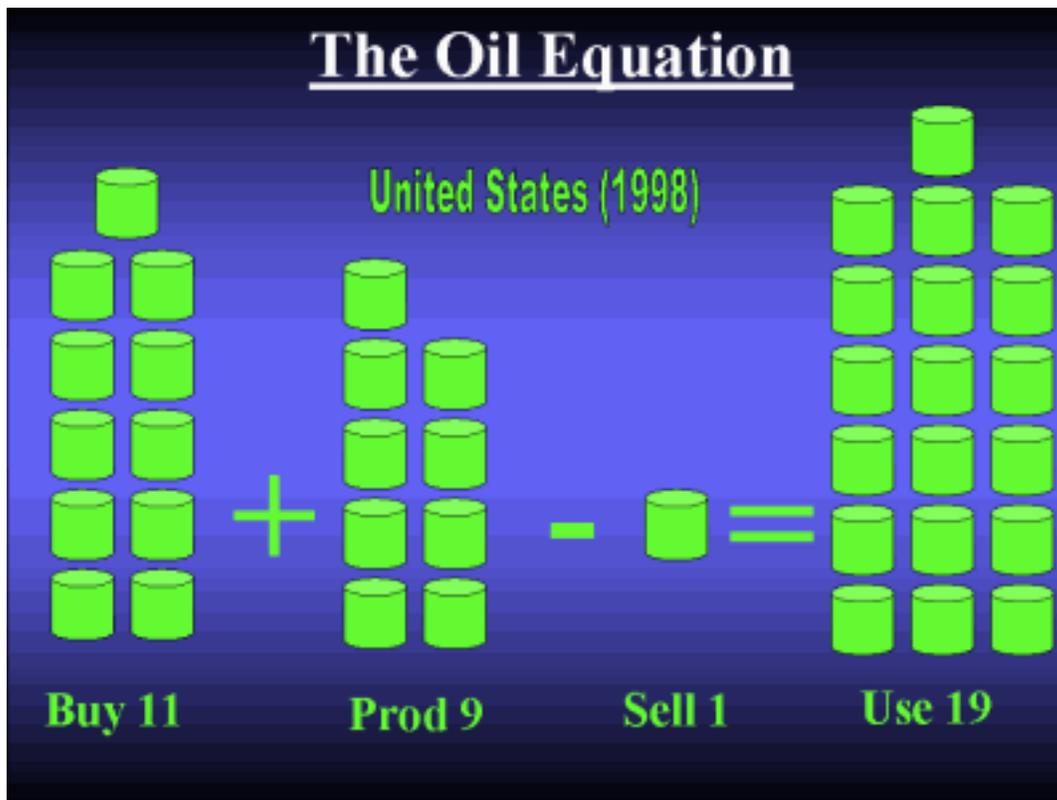
In terms of the total gas exports shipped by those four countries, Japan imports almost three-quarters (72 percent). That means not only does Japan get the vast majority of its gas from these four in-region states, but it buys the vast majority of their exports (the rest going almost exclusively to South Korea and Taiwan).**

If, as expected, the region's natural gas demand increases 191 percent by 2020, the bulk would apparently have to come from out of area, since three Asian states currently buy up 99+ percent of what's available for sale in region. Where does that additional amount of roughly 16 trillion cubic feet come from? Logic says it comes from SW Asia and the Former Soviet Bloc states.

Assuming it would be too large a bulk to import exclusively via LNG shipping, then Asia is looking at significant infrastructural expansion in intra- and inter-regional gas pipelines, and that means foreign direct investment in very large sums.

* The remainder comes from the United States, Qatar, and the United Arab Emirates.

** Calculated from EIA's *World LNG Imports by Origin, 1999 (Billion Cubic Feet)*, available online at <<http://www.eia.gov/emeu/international/LNGimp99.html>> (last updated on 09/25/2001).

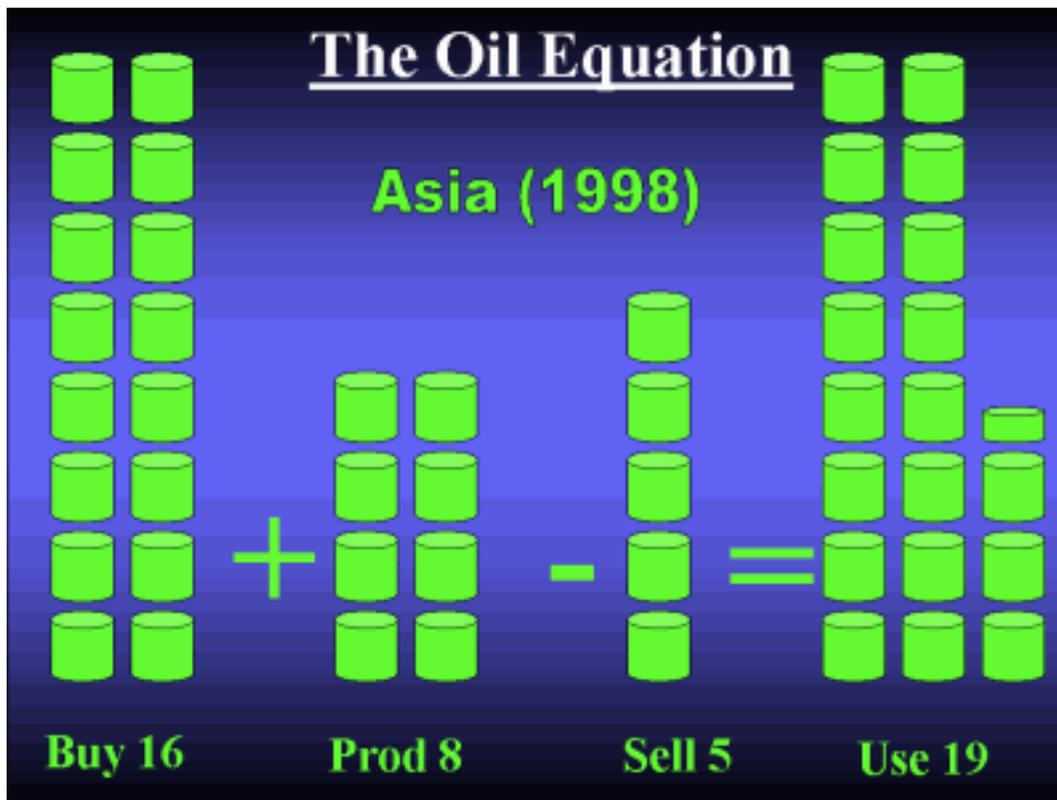


Before we discuss where Asia will get its oil over the next decade, we want to explain how we arrive at these million barrels per day (mbd) numbers.

For purposes of comparison, we start with the U.S.'s oil equation for the year 1998, which, as you will see, is very similar in rough numbers to that of Asia as a whole.

The United States used roughly 19 million barrels per day in 1998. It achieved that number by producing roughly half and importing roughly half. The one "barrel" it sold went in the form of refined oil products.*

* Calculated from EIA's *World Petroleum Supply and Disposition, 1998*, found online at <<http://www.eia.doe.gov/emeu/iea/table31.html>> (last updated on 01/29/2001).



Turning to Asia's equation for the same year, we see a similar requirement at 19 mbd, with roughly the same percentage of both production and imports (because most of what's sold by Asia remains in region).

So, from today's perspective, Asia and the U.S. are essentially similar in terms of oil profiles:

- Roughly half is produced at home
- Roughly half is imported from "outside" (defining "outside" for Asia as out-of-region).
- Total usage is approximately 20 mbd.*

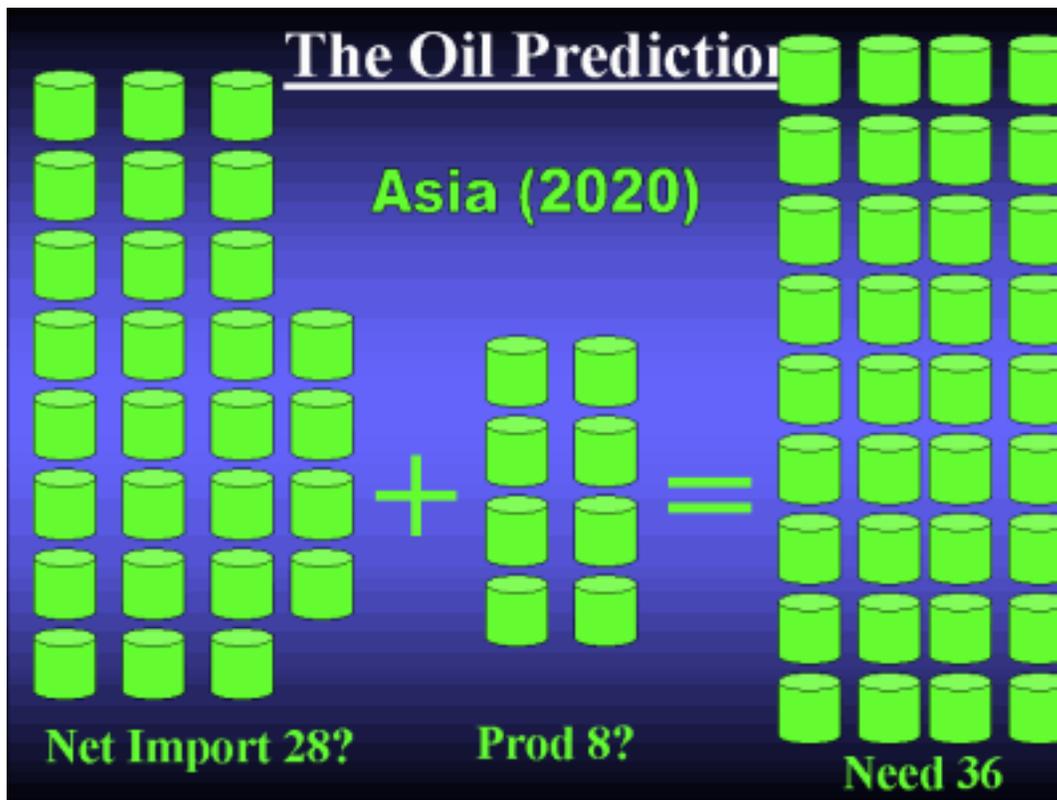
The big difference is that, of the roughly 10 mbd each imports from "outside," 90 percent of what Asia imports comes from the Middle East, while about one-fifth of U.S. imports originate from the Persian Gulf.** The U.S. gets the bulk of its imports from four western hemispheric sources (in descending order of volume):

- Canada
- Venezuela
- Mexico
- Colombia.***

* Calculated from EIA's *World Petroleum Supply and Disposition, 1998*, found online at <<http://www.eia.doe.gov/emeu/iea/table31.html>> (last updated on 01/29/2001).

** As noted in Fereidun Fesharaki, "Energy and the Asian Security Nexus," *Journal of International Affairs*, Fall 1999, vol. 53, no. 1, pp. 90 & 97; also EIA's *International Energy Outlook 2000*, p. 38.

*** Calculated from Matthew Wald, "The United States, OPEC and Oil: A Snapshot," *New York Times*, 26 March 2000, p. B3. Saudi Arabia exports oil to the U.S. at a rate roughly equivalent to that of Canada, or 1.5 mbd.

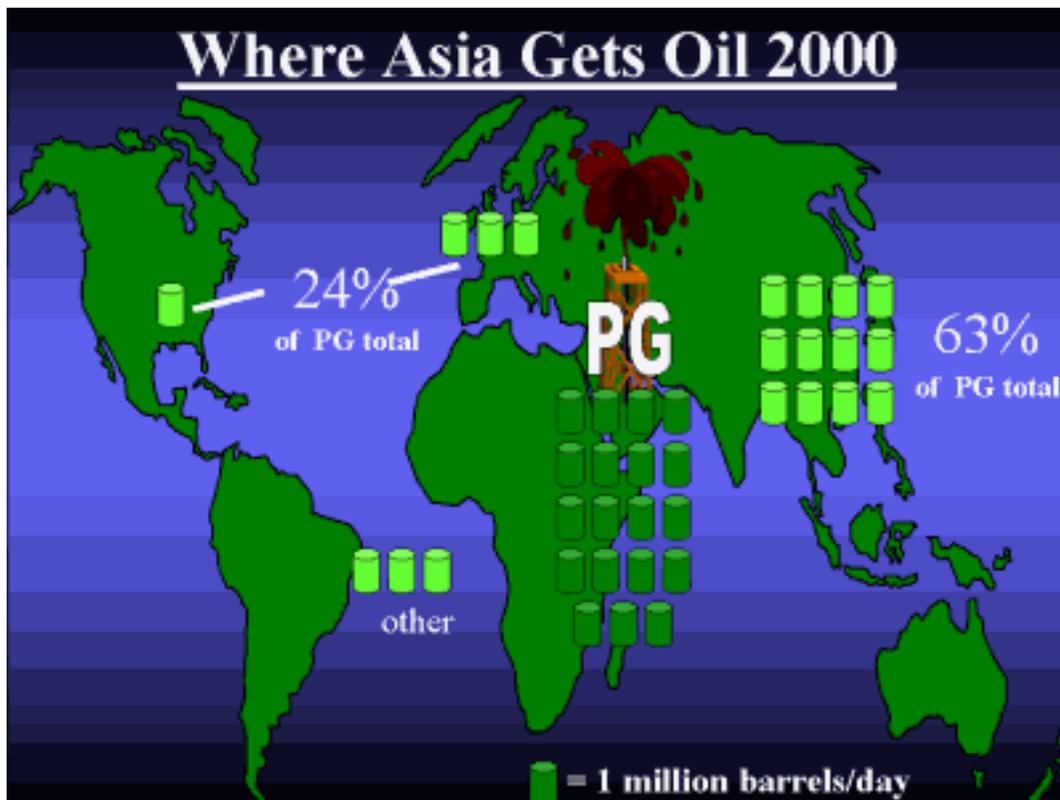


Asia's import requirements diverge significantly from that of the U.S. come 2020. While the U.S. is expected to use a total of 26 mbd in 2020 (importing in the range of 18 mbd, or roughly two-thirds), Asia's total requirement is expected to jump to 36 mbd. As estimated by Cambridge Energy Research Associates, Asia will be fortunate to produce approximately 8 mbd at that point (their expected peak rate for 2000-2005), meaning a shortfall of approximately 28 mbd that will have to be met from extra-regional sources.*

While the U.S. import requirement will increase by 7 mbd by 2020, only 2 of that 7 will come from the Persian Gulf, meaning U.S. dependency on the region will remain relatively stable over the time frame, measured as a percentage of imports. The Mideast's share of Asian imports cannot increase much from its currently high percentage (90%), but clearly the volume is likely to jump dramatically higher (upwards of 12 mbd). Is this an unrealistic projection of the Mideast's productive capacity? Most experts say no. In short, it's not the geology that generates the uncertainty here, but the politics and the economics.

But one thing is clear: Asia will have less control over its energy future. Today it produces roughly 40 percent of what it needs in oil, but in 20 years it will produce somewhere between a quarter and a third of what it needs.

* These calculations are obtained from EIA's *International Energy Outlook 2001*, p. 39, Fesharaki, "Energy and the Asian Security Nexus," p. 97; and Daniel Yergin, Dennis Eklof & Jefferson Edwards, "Fueling Asia's Recovery," *Foreign Affairs*, March/April 1998, pp. 38-39.



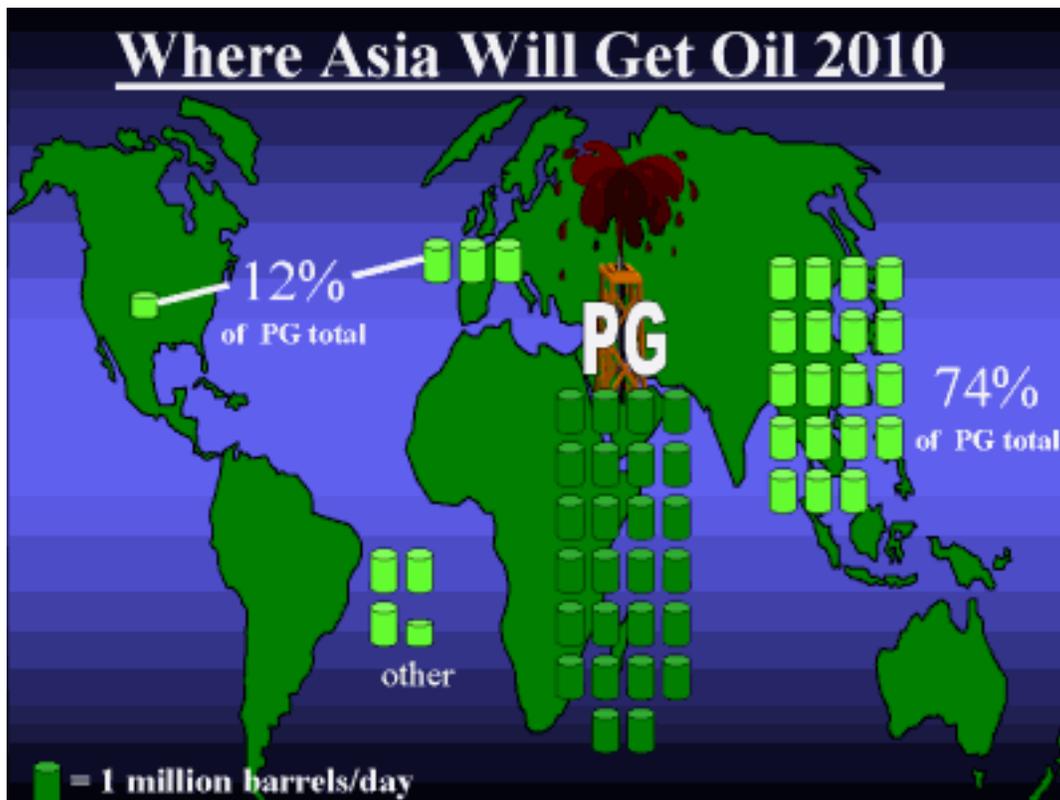
If Asia is already overwhelmingly dependent on the Persian Gulf for its oil imports, then conversely the Persian Gulf is becoming increasingly dependent on Asia as its primary market.

In 2000, the Persian Gulf will export roughly 19 mbd, of which almost two-thirds (63 percent) will be exported to Asia. The West (defined here as the U.S. and Western Europe), in contrast, will account for only 24 percent of the Gulf's global market.*

In short, the Persian Gulf is largely Asia's oil and not—as is commonly assumed—the West's. So, if Asia is rightly described as *hooked* on Gulf oil, we can likewise describe the Gulf as *hooked* on Asia's energy market. This relationship, while increasing in strategic importance, is hardly one-sided, but rather a *co-dependency that portends rising Asian interest in Middle East stability and rising OPEC interest in Asia's continued economic growth.*

By definition, the rise to primacy of an Asian interest in Middle East peace would constitute a dramatically different political-military rule set.

* These calculations are obtained from Fesharaki, "Energy and the Asian Security Nexus," p. 90.



Moreover, the balance of Western versus Asian national interest in Middle East stability will shift increasingly in the latter's favor, as this slide suggests.

By 2010, the Persian Gulf is expected to produce 26 mbd for export, with just over a tenth destined for the West, while Asia's share will jump sharply from roughly two-thirds to three-quarters.

In absolute terms, Asia's Gulf connection will be almost six times larger than that of the West's (18.8 mbd to 3.2 mbd).*

To demonstrate the difference here, let's imagine that Persian Gulf exports were completely cut-off in 2010 for some disastrous reason. In that case, the West would have to replace something on the order of three-to-four percent of its total energy requirement (3.2 mbd equals roughly 6.5 Quad Btu, which is 3.2 percent of the West's expected 2010 Quad Btu total of 204). In contrast, Asia would need to replace upwards of 28 percent of its total energy requirement (18.8 mbd equals roughly 38 Quad Btu, which is more than a quarter of Asia's expected 2010 Quad Btu total of 137).

* These calculations are obtained from Fesharaki, "Energy and the Asian Security Nexus," p. 90.

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Asian Energy Futures Event Report (IV): The Here and Now of Asian energy



Having completed our cursory tour of Asia's *Starting Line* energy environment, let's now turn our attention to the dialectics of *Plans* versus *Realities*. The analysis presented in this section comes directly from the GroupSystems sessions and facilitated discussions of Session II(A) of the 1 May decision event, which we labeled, "You Make the Call!"

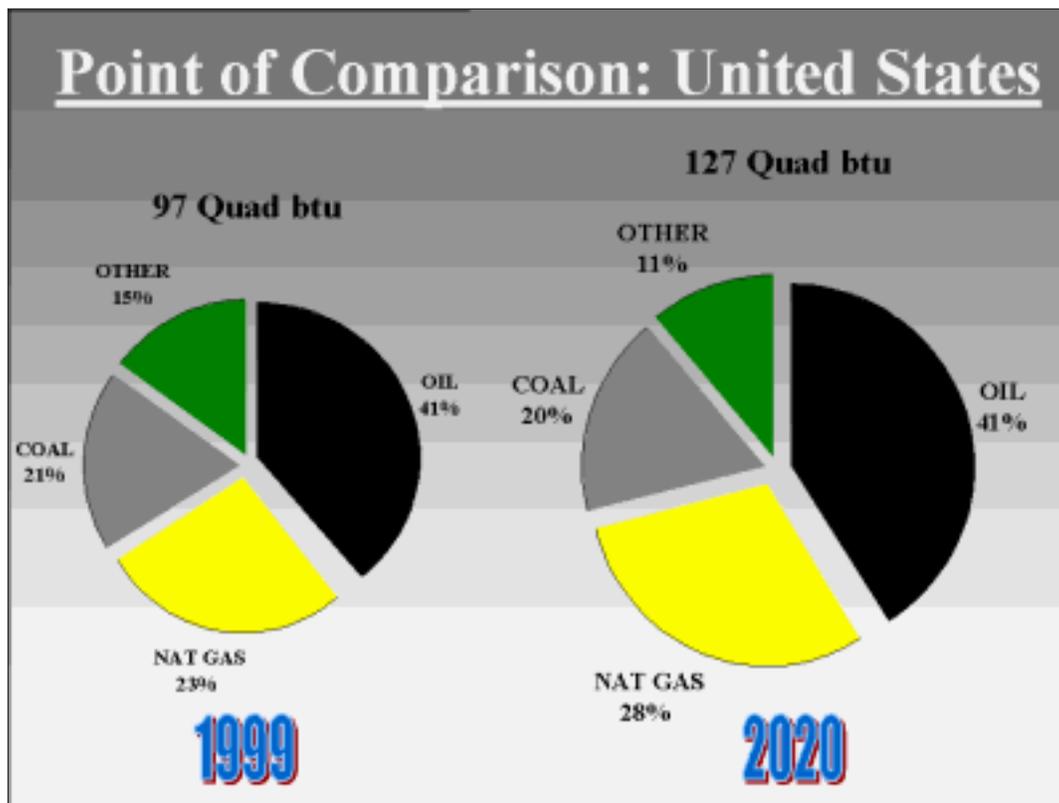
In this session, we put the participants through an alternating series of GroupSystems exercises and facilitated discussions for each of four subjects:

- Japan
- India
- China
- Asia as a whole.

The process, in each case, unfolded as follows:

- First we showed the participants the subject's current (1997) percentage spread among energy categories (oil, gas, coal, and "other"—meaning nuclear and renewables).
- Then we showed EIA's predicted Quad Btu increase from 1997 to 2020 and asked the participants to vote collectively as to the likely changes in percentage spread among the energy categories resulting from this overall increase.
- Once voting was complete, we engaged in a 20-minute facilitated discussion of the likely roadblocks the subject would face in trying to achieve the 2020 Quad Btu target.
- We concluded each mini-session with a GroupSystems brainstorming session where participants entered the roadblocks each felt would be most significant.

The updated DoE projections (not available at the time of the event) for 2020 are presented in this revised edition. In the cases of Japan and India, the baseline update from 1997 to 1999 was statistically insignificant, but in the other two cases (China and Asia As a Whole), it was not only significant in terms of the baseline, it also reflected dramatically different DoE projections for 2020. We will compare and contrast the 2000 and 2001 data from DoE for China, Asia as a Whole, and India (whose long-term projections have likewise changed dramatically despite no significant change in baseline numbers).



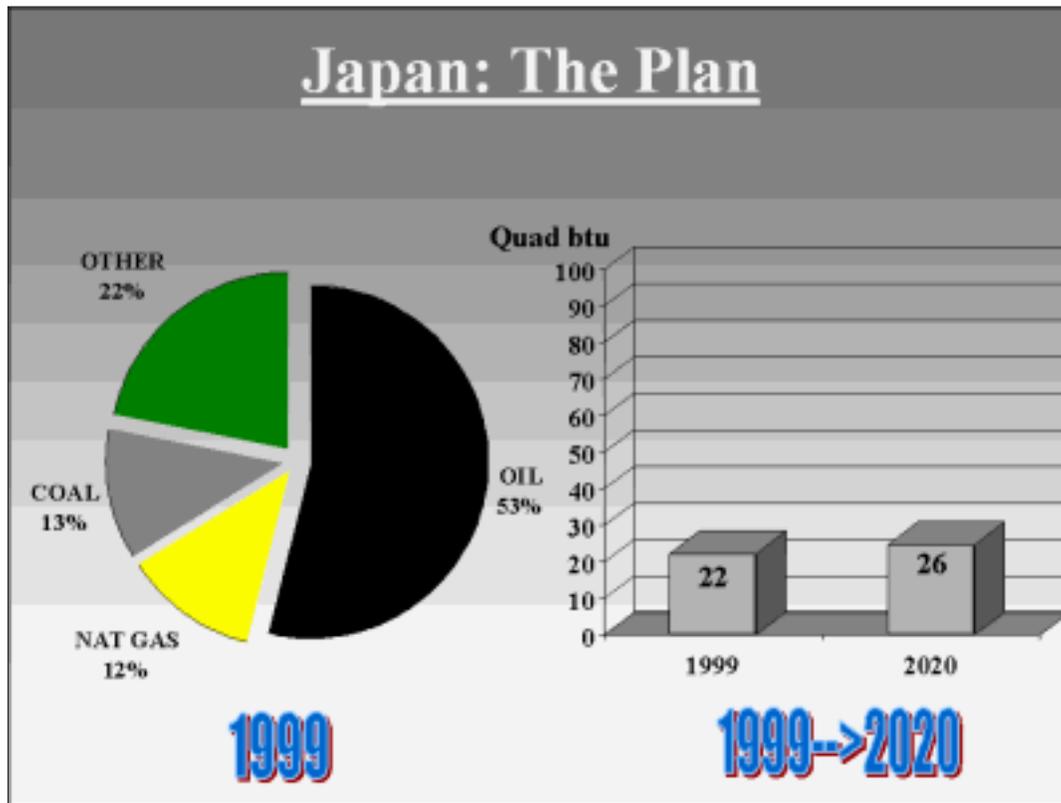
As an initial point of comparison, we show the percentage spread across major energy categories for the United States in 1999 and the expected shares for 2020. The Quad Btu growth in this case is from 97 in 1999 to 127 in 2020—a 31 percent increase.*

The modesty of the U.S. growth rate (roughly half the global average) is reflected in the relatively minor percentage share shifts than occur over the 21-year time frame:

- Oil and coal essentially retain the same percentage shares
- Upward movement in natural gas (23 to 28 percent) and downward slide in nuclear and renewables (15 to 11 percent).

This is clearly the profile of an advanced economy enjoying predominately *intensive* growth (i.e., greater productivity) vice *extensive* growth (i.e., more resources employed).

* All energy data presented in this section comes from the EIA's *International Energy Outlook 2000*, pp. 169-77 and *International Energy Outlook 2001*, pp. 175-84.



In our first case, Japan, we see an Asian economy that is distinguished by a very small reliance on coal (13 percent) and a relatively high reliance on "Other" (22 percent), which reflects the country's extensive employment of nuclear power. Compared to the similarly advanced economy of the United States, Japan uses substantially more oil (although per capita use of oil in the U.S. is much higher) and a bit more than half the percentage share of natural gas.

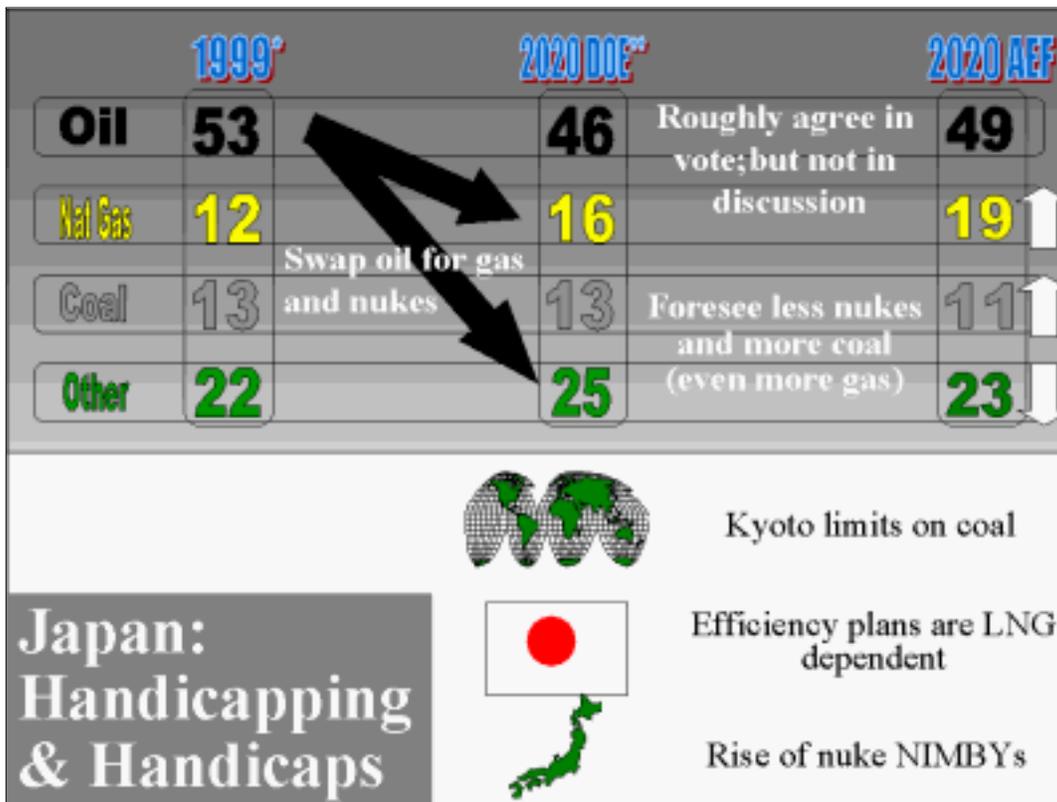
Despite the small percentage share of coal, Japan remains the world's biggest importer of coal, with a quarter share of the global market. As such, it has had an historically substantial influence over the global price of coal, as—according to the EIA—"other Asian markets also tended to follow the Japanese price in settling contracts." Japan's influence is no longer what it was following a 1996 revision of its benchmark pricing system, which marked an Asian-wide shift from contract purchases to greater reliance on the spot coal market.*

Japan is also "by far the world's largest importer of LNG," according to the EIA, which, when combined with its heavy reliance on imported coal and oil, makes it one of the world's most energy-dependent nations—and basically all of it is shipped.**

Looking at Japan's overall Quad Btu growth, we see a most modest rise of just under 20 percent.

* EIA's *International Energy Outlook 2000*, pp. 79-80.

** EIA's *International Energy Outlook 2000*, p. 119.



In our "handicapping" section (top half of slide), we offer a three-way comparison between:

- DOE's percentage share breakdown for Japan's energy use in 1999
- DOE's percentage share breakdown for Japan's expected energy demand in 2020
- The collective vote by the workshop participants as to Japan's likely percentage share breakdown in 2020.

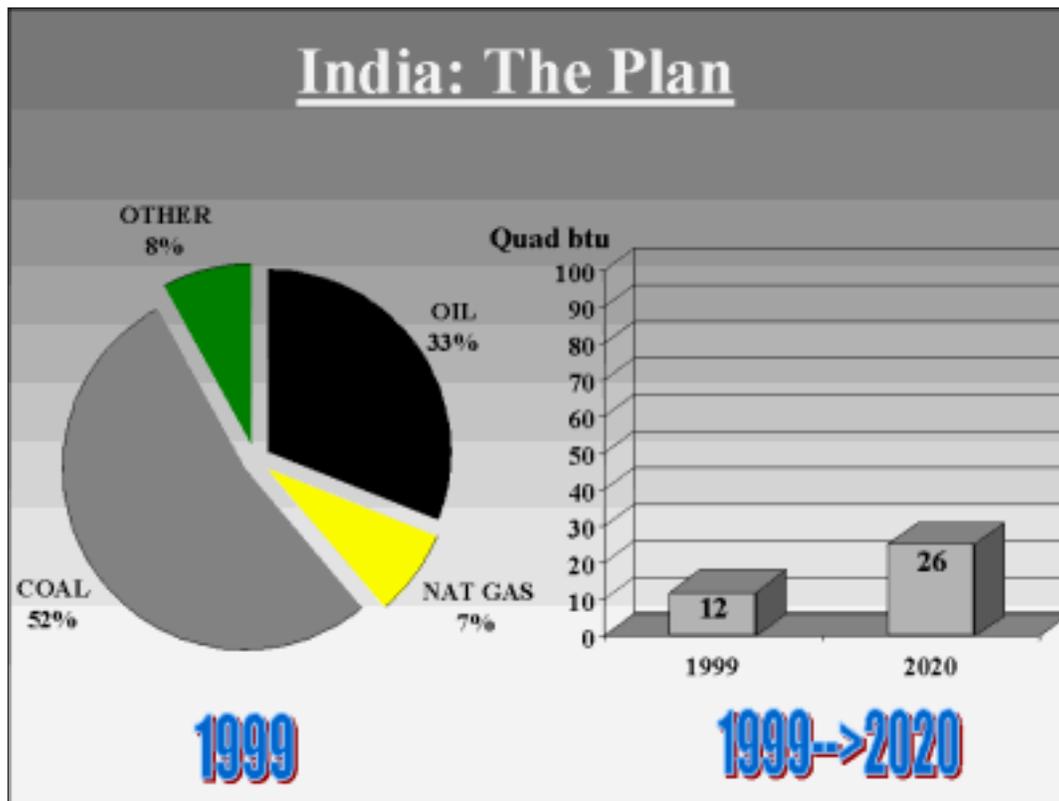
DOE's latest prediction is basically that Japan will swap oil for gas, reducing the former's percentage share to 46 (from 53) and increasing the latter's to 16 (from 12). Our workshop participants essentially agreed with this prognosis in their vote, but then backtracked substantially in the subsequent discussion (as signified by the white arrows at the far right), where many doubts were raised about Japan's commitment to further expansion of its nuclear power industry, largely as a result of its increasingly poor safety record. Several of our energy experts noted that Japan was in the process of drastically downsizing its plans for new plants in the coming decade, signaling perhaps a new era in Japanese energy planning. Given these concerns, we think it's fair to say that the group's final consensus on Japan's energy profile in 2020 was that it would be forced toward greater reliance on coal and natural gas to produce electricity, and that the "Other" share would decline.

Turning then to "handicaps," we cite three (arrayed in Waltzian fashion):

- On the system level, we see the Kyoto Protocol's limits discouraging the use of coal . . .
- Which, when combined with the rise of the domestic nuclear NIMBY (not-in-my-back-yard) sentiment in Japan . . .
- Puts even more pressure on Japan to rely on natural gas or—more specifically for now— LNG shipping.

* The 1997 shares we displayed to our participants at the actual event differed only in Oil (54 percent) and Coal (12 percent).

** *International Energy Outlook 2001* projections. The 2000 edition projections were: Oil, 50 percent; Natural Gas, 17 percent; Coal, 12 percent; and Other, 21 percent).



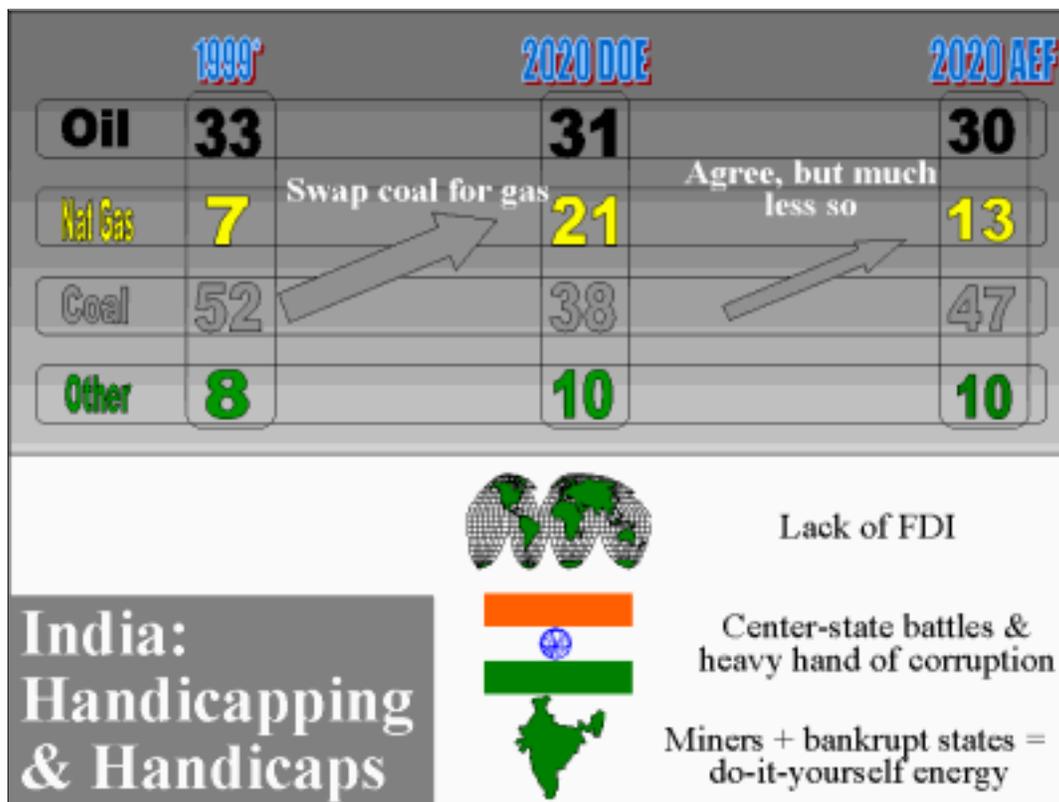
Turning now to India, we note a 1999 energy profile that—when compared to Japan’s advanced economy—is clearly far more dependent on coal. If we think in terms of "high carb" versus "low carb" (i.e., carbon emissions), then India’s economy is just over four-fifths high carb (52% coal + 33% oil = 85% high carb), compared to a Japan that is only two-thirds high carb (13% coal + 53% oil = 66%).*

The upshot is that low carb elements (natural gas, nuclear, and renewables) remain marginal within India’s overall energy profile, although EIA predicts an almost 10 percent decline in India’s carbon intensity over the 1999-2020 time period.**

It only makes sense that India’s high-carb diet will change, given the predictions of increased energy use through 2020. India, according to the EIA, should more than double its energy needs in the coming generation, meaning that even if the current shares were held constant, all would have to grow 100 percent or more.

* As a point of comparison, the U.S.’s 1997 high-carb share was just 58 percent (19% coal + 39% oil).

** EIA’s *International Energy Outlook 2001*, p. 164. Carbon intensity is measured as millions of metric tons of carbon equivalent per quadrillion Btu. India’s carbon intensity in 1999 is 19.88, and is predicted to drop to 18.23 in 2020. China, in comparison, will see its carbon intensity drop 5 percent over the same time frame (20.92 to 20.01). The U.S.’s carbon intensity will actually increase 3 percent by 2020, rising from 15.62 to 16.06.



When handicapping India's future energy profile, our workshop participants basically agreed with DOE's prediction that the country would substitute natural gas for coal, primarily in terms of electricity generation. However, our experts were far less sanguine about the size of that percentage share shift, given the tremendous overall rise in energy consumption.

While access to natural gas is not considered a problem for India (e.g., neighboring Bangladesh possesses substantial amounts), attracting the necessary foreign capital is. As one participant noted, China attracts about 25 times more foreign direct investment (FDI) than India (although FDI there has increased dramatically in the last couple of years), signaling an overall lack of investor faith in a political system that is marred by center-regional government tugs-of-war over subsidies (e.g., electricity) and substantial amounts of corruption at all levels of administration.

Sub-nationally, state governments seem caught between a rock and a hard place on infrastructural investments: unreliable miners (who often strike) push them to move off coal, and yet, their poor state of finances makes investing in natural gas difficult. Meanwhile, India's electrical transmission system remains porous and in great need of upgrading, as EIA estimates that a fifth of the country's electrical power is lost en route to consumers. Worst still, much of this loss is through "nontechnical" means (theft, bad accounting, etc.).*

One result of this poor state of affairs is that India's booming high-tech industry, the shining star of its economy, has taken—in many instances—to do-it-yourself energy generation, meaning the construction and operation of stand-alone electrical generation and transmission systems. While this answers the short-term specific needs of one economic sector, it bodes poorly for India's long-term potential to meet its growing energy requirements.

* The 1997 shares we displayed to our participants at the actual event differed slightly in Oil (31percent), Coal (53 percent), and Natural Gas (8 percent).

** EIA's *International Energy Outlook 2000*, p. 118.

India: DoE Projections Shift			
	2020 DOE 2000 proj.		2020 DOE 2001 proj.
Oil	31	Adds 1.7 mbd; or 40%!	47
Nat Gas	21	Drops 2.0 tcf; or 40%!	12
Coal	38	Drops 101 mst; or 18%	32
Other	10		9

SPECIAL REVISED EDITION ANALYSIS

The Energy Information Agency’s *International Energy Outlook 2001* presents radically different projections for India in the year 2020 from that of the previous year’s edition. Dramatically curtailed projections for both natural gas (a full 2 trillion cubic feet less) and coal (roughly 100 million short tons less) combined with a projected 40 percent increase in the oil requirement (up from 4.1 million barrels a day to 5.8) makes for a very different energy share profile.

What gives? On oil, DoE’s explanation is a revised appreciation of the impact of automobiles in India’s future. The vast bulk—or 86 percent—of the projected increase from 1999 to 2020 is accounted for by transportation. With its demand increasing an average of 5.4 percent a year, India basically leads the global pack over the next generation.* Simply put, car ownership is seen in India as a sign of wealth, and enough wealth is emerging there to cause this dramatic shift over time.

On natural gas, DoE says the following:

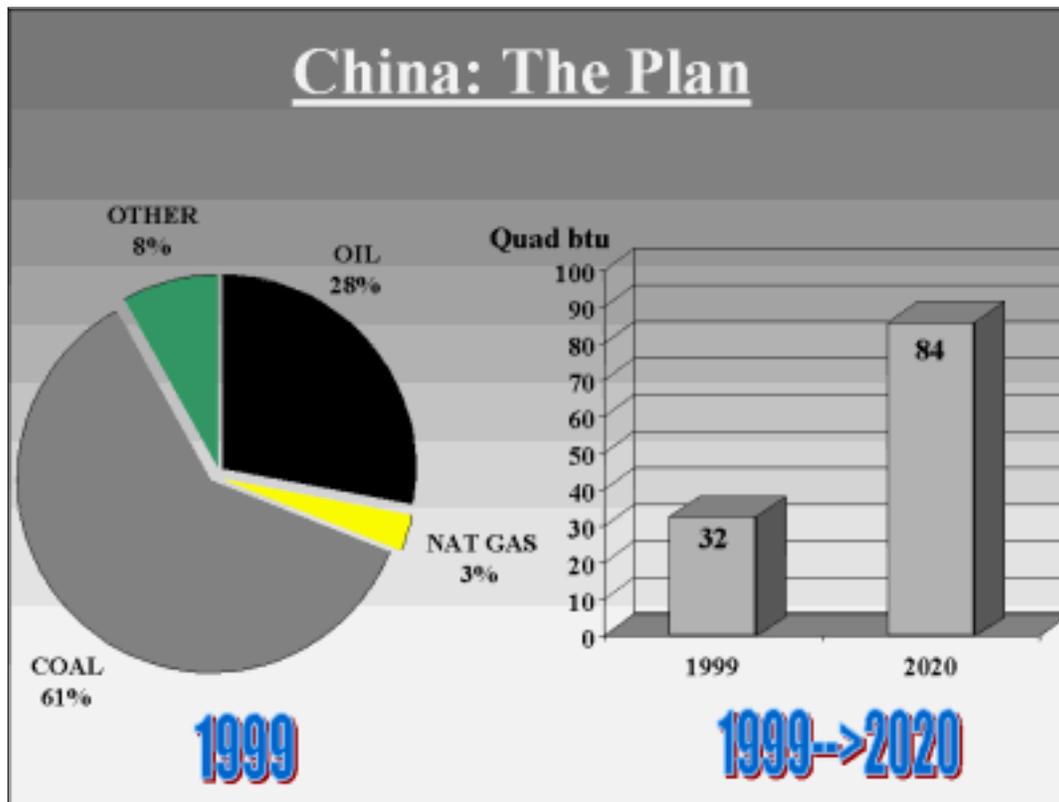
Many LNG import schemes are proposed for the country, and there are frequent announcements about them, but few are under construction or making concrete progress. To facilitate gas development, India needs and continues to pursue comprehensive policies for natural gas and, specifically, LNG. However, related policymaking and reform are proceeding slowly in India’s complex democracy.**

As regards coal, DoE notes that India is moving to deregulate its domestic production market, which up to now has been dominated by a single company, Coal India Limited. Projected long-term consumption is presumably expected to decline as prices increase.***

* *International Energy Outlook 2001*, p. 30.

* *International Energy Outlook 2001*, p. 59.

* *International Energy Outlook 2001*, p. 71.



Turning now to China, we encounter a high-carb profile in the extreme, as just under 90 percent of the country's energy needs are met with coal and oil (61% coal + 28% oil = 89%). Given the projected huge increase in overall energy usage by 2020 (163 percent), any reduction of that combined percentage share would require massive investment in energy infrastructure for natural gas, nuclear, hydroelectric (e.g., Three Gorges Dam project), and other renewables.

What complicates this picture even further is the projected five-fold increase in China's per capita motorization (i.e., ownership and use of cars). While this increase, if it occurs, would still leave China several times removed from the U.S.'s per capita rate (54 cars per 1,000 compared to 797 in the U.S.), the pressure it would place on the nation's poorly developed road network would be substantial, generating competition for scarce public funding that might otherwise be employed in energy.* This "motorization" of China's transportation system likewise creates certain pressures for more oil use.

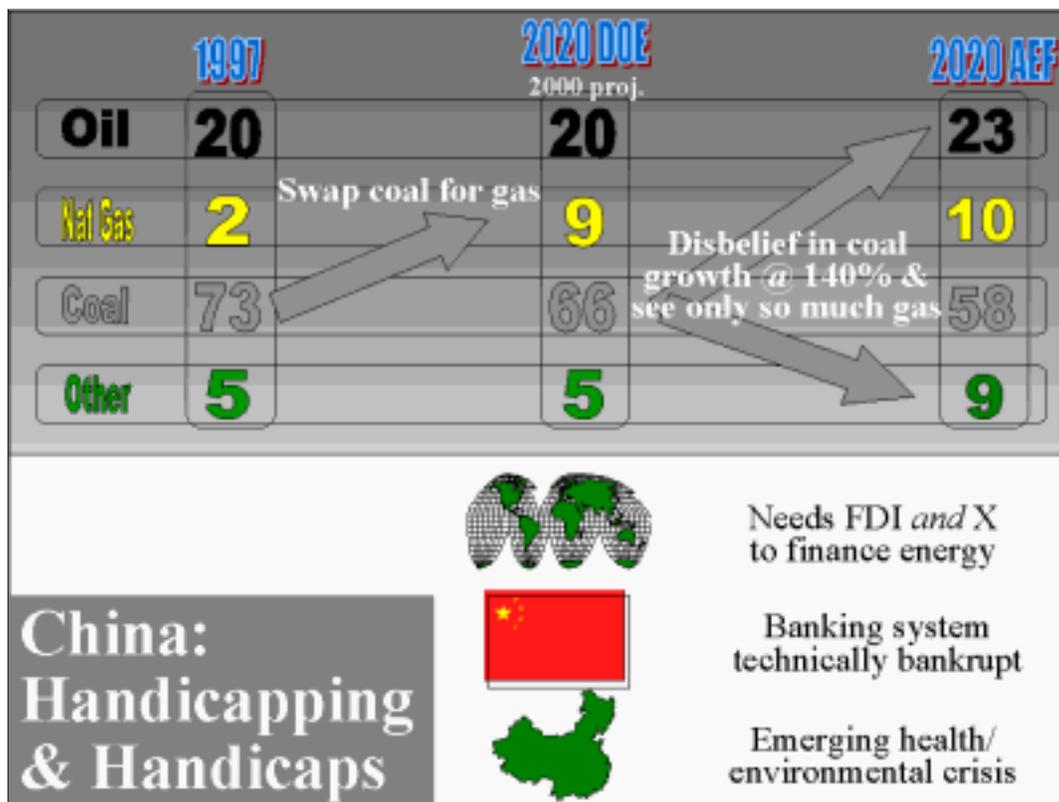
But the biggest driver by far for China over the next generation is the more than three-fold increase predicted in electricity consumption (1,084 billion kilowatt-hours in 1999 to 3,331 in 2020). By 2020 China will be consuming as much electricity as the U.S. is today.**

Foreign direct investment has, in the words of the EIA, "played a critical role in financing the expansion of China's electric power infrastructure and is expected to play an even more important role in the future," despite being restricted—for now—to strictly joint ventures involving less than 50 percent ownership.*** The question is whether such an approach can accommodate a three-fold increase in power generation requirements.

* EIA's *International Energy Outlook 2000*, p. 133.

** EIA's *International Energy Outlook 2001*, p. 184.

***EIA's *International Energy Outlook 2000*, p. 120.



On this slide, we will show you exactly the numbers we presented to our participants, which were based on the 2000-edition DoE *International Energy Outlook*. The next slide will contrast that year's projection with the 2001 edition.

In 2000, DOE predicted China would seek to swap coal for gas in very large absolute amounts, resulting in an 7-point percentage share decline for coal and an almost five-fold percentage share increase for natural gas (representing more than a *ten-fold* increase in trillion cubic feet). In discussion, our workshop participants displayed a hefty skepticism regarding China's ability to increase its use of natural gas so dramatically over a single generation, and yet arrived—*on their own*—at the same 2020 percentage share of 10 percent predicted by DOE.

Where our experts differed from DOE's projections is that they predicted an even steeper decline in the percentage share of coal. As the discussion unfolded, we discerned four rationales for this vote:

- Given China's already substantial environmental problem set connected to the burning of coal (to include individual burning for purposes of cooking), doubt that the country could increase its absolute consumption by 140% over the time period (e.g., social costs would simply be too high to ignore)
- Skepticism on China's ability to increase its consumption of natural gas limited their willingness to increase its 2020 percentage share beyond 10 percent.
- Appreciation of China's booming domestic transportation demand made them reticent to reduce the oil percentage share (they actually increased it by three points)
- Optimism that official Chinese pronouncements on wanting to better protect their environment and focus more on renewable energy sources were not just all talk.

In terms of handicaps, participants voiced much concern over a perceived "coming train wreck" between China's immense need for FDI and the reality of its technically bankrupt banking system. In short,

something's got to give, leading to an overall strong skepticism about China's ability to achieve the Quad Btu increase currently projected by DOE within the 2020 time frame.

China: DoE Projections Shift

	1997 DOE 2000 edition	1999 DOE 2001 edition.	2020 DOE 2000 proj.	2020 DOE 2001 proj.	2020 AEF
Oil	20	28 <small>Up 43%</small>	20	26 <small>Adds 0.9 mbbl; or 5%</small>	23
Nat Gas	2	3	9	8	10
Coal	73	61 <small>Down 30%</small>	66	56 <small>Drops 1,072 mscf; or 30%</small>	58
Other	5	8 <small>Up 60%</small>	5	10 <small>Adds 31% nuke & 47% hydro ren</small>	9

DoE gets closer!

SPECIAL REVISED EDITION ANALYSIS

DoE's 2001 *International Energy Outlook* not only drastically alters its 2020 projections for China, it details significant shifts in the country's energy profile in just the last two years (1997 to 1999).

The first two columns above detail the shifts that have occurred since 1997:

- Significant uptick of over 10 percent in oil
- Huge cut of 30 percent in coal
- Dramatic increases of almost a third in nuclear and other renewables.

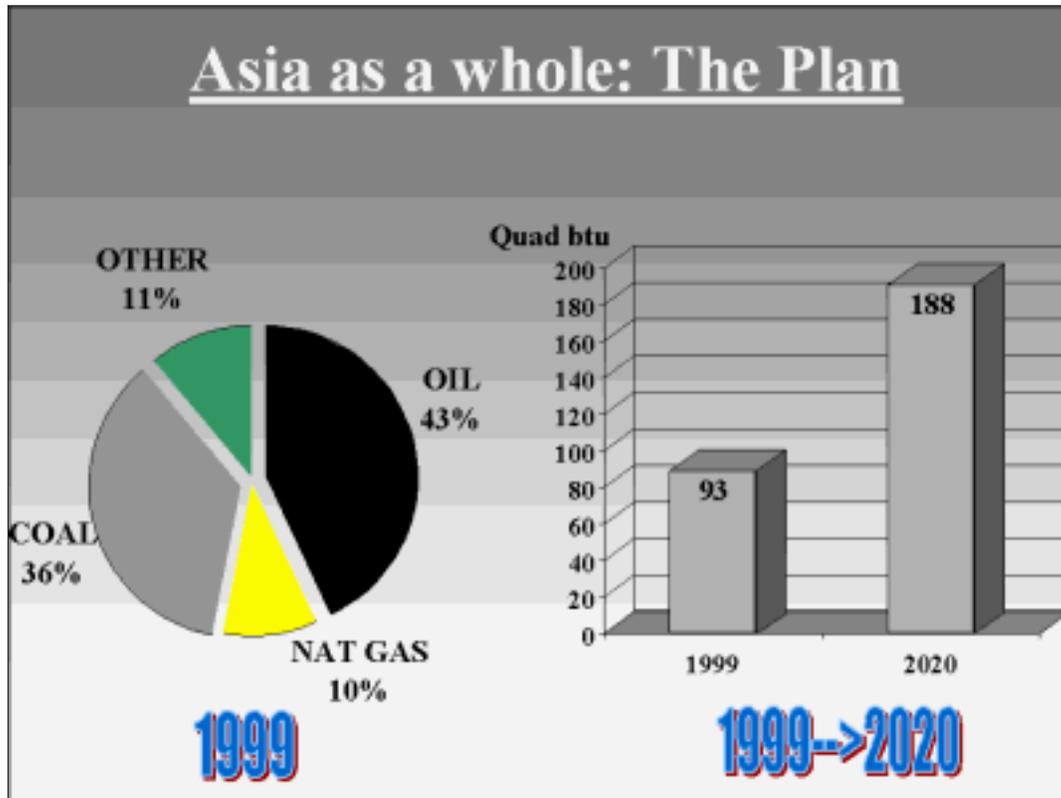
What these shifts say about China is that the country is very serious about weaning itself off coal, and that the impact of the emerging car culture is already being felt. Of course, we may be underestimating China's use of coal, as official statistics may not capture unsanctioned mining operations.

Looking to 2020, we see equally dramatic shifts in DoE projections that reflect the changes of the past two years:

- An additional million barrels a day of oil has been added.
- Just over 1,000 million short tons of coal has been cut from the 2020 total, or roughly the same amount as the rest of Developing Asia is expected to burn that year
- The projection for nuclear power (billions of kilowatthours) is increased by almost a third and the projection for hydroelectricity and other renewables is increased by almost half!

DoE offers no special explanations for these dramatic shifts in projections in the 2001 edition. In reality, these shifts just demonstrate how today's changes can be amplified over tomorrow's expected growth trajectory. But note this: DoE's projections are now much closer to those of our workshop participants,

who are looking far more prescient with time—at least on China.



Turning now to Asia as a whole, we see a high-carb quotient of 79 percent (36% coal + 43 % oil = 79%), although that coal number is largely a reflection of India and China alone, rather than the region as a whole. Asia's oil and "Other" ratios are roughly similar to that of the U.S. Asia's energy consumption is predicted to roughly double over the next generation, with electricity and transportation being key drivers.

As the EIA 2001 report states, "The most rapid growth in electricity use is projected for developing Asia, at 4.5 percent per year." At that growth rate, "Developing Asia" (not including Japan) will see it's share of global electricity consumption leap from 18 percent in 1999 to 26 percent in 2020. That represents a 250-percent increase in total electricity consumption, with coal expected to maintain its current 50+ percent share of generation input.*

EIA's take on transportation in Asia is equally bullish, stating that the sector's growth "is expected to be among the fastest-growing" through the 2020 time frame. While per capita motorization rates will skyrocket, most of the region's countries are starting at a very low baseline. Still, given that we're talking about roughly half the world's population, any sizeable per capita increase will, in EIA's words, "have an enormous impact on world fuel markets."**

As we noted earlier, the latest consensus predictions of Asia's oil import needs foresee an increase of roughly 12 million barrels a day by 2020. Factoring in EIA's estimate that total transportation energy use in Developing Asia will expand from 6 mbd to 16 (or an increase of 10 mbd),*** that transportation growth will account for the lion's share of Asia's increasing oil import requirement over the coming decades (understanding that oil is not much used for electricity generation anymore).

* EIA's *International Energy Outlook 2001*, pp. 119-22.

** EIA's *International Energy Outlook 2000*, p. 140.

***EIA's *International Energy Outlook 2001*, p. 137.

	1999*	2020 DOE 2000 proj.	2020 AEFW Pre-discussion: saw coal for gas	2020 AEFW Post-disc: much less so	2020 DOE 2001 proj.
Oil	43	31	37	38	40
Nat Gas	10	18	21	14	14
Coal	36	42	32	38	35
Other	11	9	10	10	11

In 2000 edition, saw oil swapped for gas & coal not dropping

New DoE proj.'s move much closer to our experts' final view

Asia: Handicapping & Handicaps



Don't see the rules for \$ to flow sufficiently



Japan is only real "democracy"; decision-making in rest won't support predicted energy growth



Key uncertainty is transportation demand

In the 2000 edition of the *International Energy Outlook*, DOE predicted a swapping of oil for gas through the 2020 timeframe, with coal's percentage share not declining (meaning a rough doubling in absolute terms).

We asked our workshop participants to vote on Asia's 2020 energy shares both pre- and post-discussion of the various subsets (Japan, India, China). Prior to these discussions, participants differed from DOE's take by emphasizing a strong coal for gas swap. As a result, our participants calculated no substantial shift in oil's percentage share, reflecting their oft-stated sense of uncertainty surrounding Asian transportation demand.

In post-discussion voting, participants enunciated the same basic shift, albeit a more muted one, with coal coming down less and gas going up less. This shift reflected the participants' growing appreciation of the challenges involved in increasing Asia's use of natural gas to the extent they originally imagined. When this final participant prediction is compared to DoE's latest (2001) projections, their reasoning seems more than sound.

The main challenge participants cited was the lack of sufficient rule sets throughout the Asian economies to attract the necessary amount of FDI. In short, the argument offered was that the region had not sufficiently "cleaned up its financial act" as a result of the Asian Flu of 1997-98.** As such, participants were openly skeptical of the Asian governments' ability to rationally allocate resources in the absence of better market mechanisms and greater financial accountability. In a word, there's not enough *transparency* to make FDI flow at rates commensurate with envisioned growth trajectories.

* The 1997 shares for Asia As a Whole were 38 percent Oil, 10 percent Natural Gas, 42 percent Coal, and 10 percent Other.

** At the beginning of the workshop, we asked participants (using GroupSystems) to give us the year of the next Asian financial crisis and tell us why it would occur. The consensus opinion was that one was *highly likely* within the next five years and that poor banking/financial market practices would be the main cause.



Having explored the dialectical tension between Asia's best laid plans and the realities these countries will likely encounter along the way to 2020, we now turn our attention to how these challenges could alter our perception of the roles played by these countries both within the region's political arena and on the international stage.

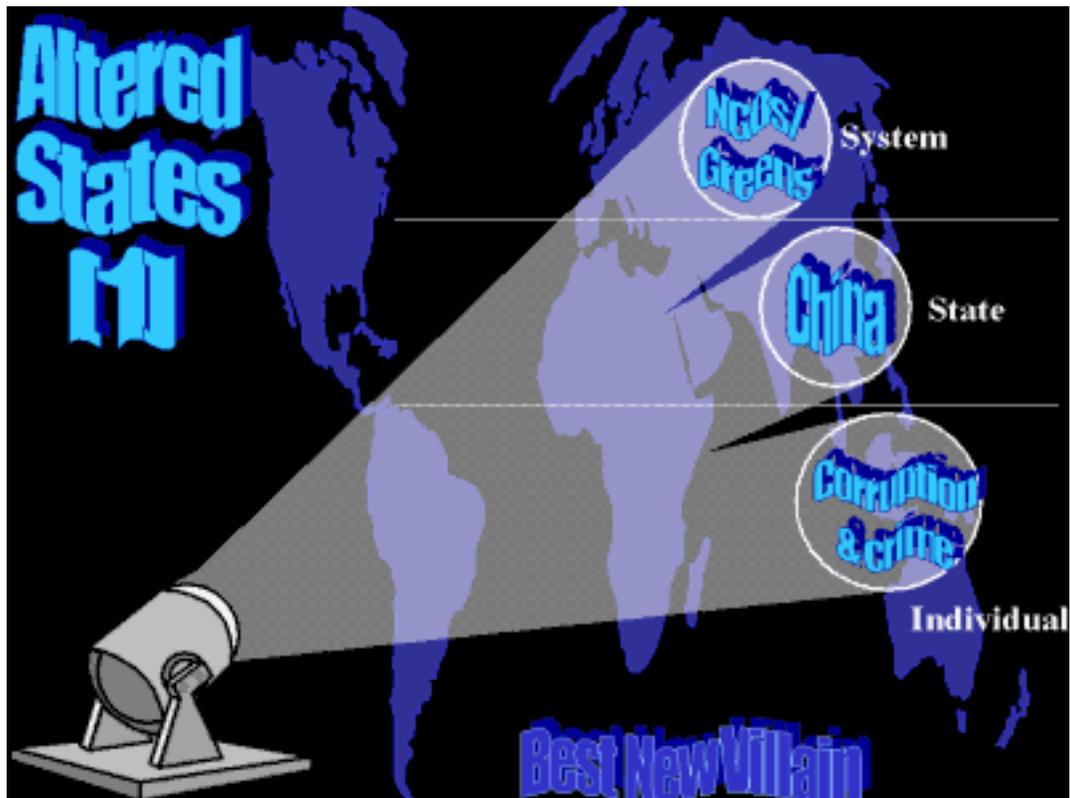
In this session, we played a variation on the theme of VH-1's late-night cable show, "The List":

1. First we asked the participants to nominate countries and/or non-state actors for six "best" awards in a GroupSystems brainstorming session.
2. Then we spent approximately 45 minutes in facilitated discussion exploring the various generated lists.
3. We wrapped up the session by having the participants revisit the six individual lists and vote for their favorite in each.

The six awards were as follows:

- Best New Villain—country or non-state actor most likely to prove disruptive to Asian energy markets/development
- Best New Ingenue—country or non-state actor most likely to seek U.S. security assistance/guarantees as a result of Asian energy developments
- Best New Odd Couple—unusual in-region country pairing that occurs as a result of Asian energy developments
- Best Long-Distance Romance—pairing of in-region country with out-of-region country that occurs as a result of Asian energy developments
- Most Likely to Get Hitched—countries most likely to erect cross-border pipelines
- Most Likely to Get Dumped—countries most likely to see energy market/development (either

production or consumption) disrupted.



In the category of Best New Villain, or the country or non-state actor most likely to prove disruptive to Asian energy markets/development, we received a trio of messages, which we categorize along Waltz's three-tier perspectives.

On the system level, the non-state actor most cited as likely to prove disruptive were NGOs, or non-governmental organizations. When we probed more deeply in discussion, what we heard tended to center on environmental groups, such as a World Wildlife Fund or a Greenpeace. In short, given Asia's burgeoning healthcare and environmental "bill" stemming from years of unrestrained economic and energy growth, our participants voiced the expectation that transnational advocacy groups would inevitably play a larger role in voicing green-based "public good" concerns regarding future economic development. Probably because Asia itself has few such groups with any real political weight, it was assumed that existing international groups would step into this arena from outside—thus the potential for perceiving them as "villainous," i.e., presumptive application of the West's post-industrial environmental concerns when Asia remains quite "industrial age."

On the nation-state level, China was cited as most likely to prove disruptive, in large part because of the consensus opinion that so much would be required on its part in terms of greater transparency to attract FDI, that natural tensions with the West would result from time to time.

On the individual level, corruption and criminality were the chief concerns, reflecting the oft-stated sense that Asia had not sufficiently "cleaned up its act" in banking and financial sector markets, allowing for still too much "crony capitalism" and the corruption that entails.



In the category of Best New Ingenue, or the country or non-state actor most likely to seek and/or receive U.S. security assistance or alliance, the biggest vote-getter by far was India. Based on the day's discussions and various GroupSystems inputs, we've strung together a variety of rationales for why so many participants foresee a significantly closer U.S.-India relationship in coming years:

- India as a strategic counterweight to China
- India as the more "moderate," or "reachable one" regarding the burgeoning nuclear stand-off with Pakistan
- India as a democracy in a region with few
- India taking a distant backseat to China in attracting FDI and U.S. Government attention, thus precipitating behaviors designed to get Washington to "notice it" more.
- India's naval build-up signals that it can play a serious stabilizing or destabilizing role in the all-important maritime SLOCs between the Mideast and Southeast Asia
- India as the obvious kingpin power in South Asia
- Compared to others in Asia, India is more likely to fail in its quest for planned energy development
- India is upwind of a lot of Asia, so the coal-burning issue looms
- India, like China, is simply too big to ignore, but, unlike China, there's no sense of an emergent peer-competitor relationship
- India, like the U.S., is a former British colony, so there are good historical reasons for closer ties
- India's burgeoning role as computer software powerhouse in the global IT economy, and the surprisingly large role of Indian ex-patriates in the U.S. IT sector, both of which inevitably lead to greater influence for India and Indian-Americans in U.S. foreign policy decision making.



In the category of Best New Odd Couple, or in-region pairings of states resulting from developments in Asian energy, participants focused on three dyad relationships involving three states. The most popular dyad was Russia and Japan, which makes a lot of sense when you think of it. Japan's energy future is greatly dependent on accessing natural gas, and Russia has more than anyone else. So it's a pairing of a state that has plenty to sell and needs the cash badly (Russia) with a state with plenty to buy and good credit (Japan).

The next most popular dyad was Russia and China, which make sense in the same way, although here the buyer's credit is somewhat suspect over the long term. An additional factor is the military sales relationship whereby Russia has become—once again—the significant source of major combat platforms.*

The third most popular dyad was China and Japan, and here the logic centered around three key interests:

- Japan as a key source of FDI in China
- China as a possible transit point for pipelines from Russia and/or Central Asia
- China as a key source of upwind pollution and acid rain.

Of course, in all three instances we're talking about dyad relationships that carry a great deal of historical baggage, which is why they're somewhat "odd," despite the underlying logic. In short, the economic rationales are clearly there, it's more a question of whether the politics can catch up.

As a side note, we point out that India was not selected by anyone for a significant pairing with another regional or bordering power. We found this odd given India's relative importance to the region as a whole, and yet, it dovetailed nicely with India's selection as Best New Ingenue.

* In recent years, China and India have accounted for 60 percent of Russian military exports, and deliveries to both countries are expected to double within the next two years, according to new Russian Deputy Prime Minister Ilya Klebanov, quoted in Nikolai Novichkov, "Russia's Deputy PM Reveals Rescue Plan," *Jane's Defense Weeking*, 19 July 2000, found online at <<http://ebird.dtic.mil/Jul2000/s200007109russias.htm>>.



In the category of Best New Long-Distance Romance, or the pairing of an Asian state with some extra-regional power, we received two very incongruous pairings, suggesting a possible pivot point in U.S. relations with both Asia and the Mideast.

On the one hand, the most popular pairing involved China with either Iran or Iraq, or both. This was viewed primarily in terms of Chinese military sales in exchange for Iraqi and Iranian oil, with the former bringing instability to the Mideast and the latter energy stability to the Far East. If that sounds like a oxymoronic coupling of effects, then you're just starting to get warm, for the second-most frequently mentioned long-distance romance was China and the U.S., purportedly over Washington's growing interest in making sure Beijing feels confident about its future access to energy supplies.

Now, given the state of bilateral affairs between the U.S. and these two Persian Gulf powers over the very issue of that region's stability, it's clear we're looking at the beginning of a very complex trilateral relationship among these states and China. Some of the key issues in this triangle include:

- The continuing U.S.-Saddam Hussein stand-off regarding sanctions and WMD, and China's role in the UN Security Council regarding both
- The emerging thaw in U.S.-Iranian relations connected with the rise of moderate President Mohammad Khatami in Iran (begging the question, when does "Nixon" finally go to Teheran?)
- The U.S.-China trade relationship versus China's military ties to both Iran and Iraq
- The changing importance of Persian Gulf oil to both the U.S. and Chinese economies
- With regard to Middle East peace, there are the complicating roles played by Israel, the PLO, Syria, and Jordan (the last two featuring new, largely unknown young rulers)
- The emerging Israeli military cooperation with China.



In the category of Most Likely to Get Hitched, we see essentially a replay of the Best New Odd Couple pairings, with one key exception.

The two replays involve Russia-Japan and Russia-China, with both focused on north-to-south natural gas pipelines that would greatly deepen already existing trade in Russian LNG (currently moved by rail to China and by ship to Japan).

With regard to Russia and Japan, while many observers cite the lack of a World War II peace treaty and the continuing territorial dispute over the Kurile Islands as roadblocks, our workshop participants viewed neither as significant, and virtually everyone saw some pipeline relationship as inevitable given the economic incentives.

With regard to Russia and China, far more suspicion was voiced about cross-border infrastructural development due to:

- The relatively shaky finances of both states
- Their long-standing love-hate relationship that seems highly dependent on who's in power in both capitals.

The new element separating this award from that of Best New Odd Couple was the oil connection envisioned between China and the Central Asian states (aka, the "Stans"). Of the three pipelines cited, this was seen as being least likely to achieve full fruition due to the great costs involved (i.e., difficult terrain), the long distance covered (i.e., getting the oil to China's eastern coast), and the availability of cheaper sea-transit alternatives. As such, participants spoke of the likelihood of a modest pipeline relationship between western China and Central Asia, with the "spread" into China limited by the country's less-developed railroad and motor vehicle networks.



In the category of Most Likely to Get Dumped, or the country most likely to have either its production or consumption of energy disrupted, participants focused their concerns on three separate situations.

In terms of external disruptions to energy consumption or imports, Japan received by far the largest number of votes. This only makes sense given the fact that Japan is the world's largest importer of both coal and gas. Likewise, Japan accounts for about half of Asia's purchases of Persian Gulf oil, virtually all of which is shipped through the exceedingly narrow and busy SLOCs of the Indonesian archipelago, a country currently featuring significant levels of instability.

In terms of internal disruptions to energy supplies, Russia was cited as the state most likely to experience some sort of internal chaos leading to diminished capacity for export. Given the central role Russia could play in both Japanese and Chinese demand for foreign gas, this perception does not bode well for attracting foreign investment.

Finally, in terms of the actual threat of war, Pakistan and India were cited for their current nuclear stand-off, although much hope was also expressed for a market logic that would—in the end—bind these two countries economically with others in southwest, central and south Asia for the purposes of creating gas and oil pipelines that would take advantage of that combined region's significant energy resources. Along these lines, participants voiced the notion that India's security situation with Pakistan would likely push it in the direction of greater economic cooperation with Bangladesh to take advantage of that country's large natural gas reserves.

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Asian Energy Futures Event Report (V): The New Rule Sets of Asian Energy



Moving from the *Here and Now* of Asian energy to what we perceive to be its emerging *New Rule Sets*, we begin with a quick review of what we're calling the *Rules of the Road* for Asian energy development over the next couple of decades. We present these "rules" as a sort of inescapable reality with which all of the region's powers must grapple in the coming years, and to which any interested external powers must pay attention if they are to play a useful role in encouraging regional stability.

We present these "rules" in six paired couplings so as to suggest a ying-and-yang-like tension between trend lines that can often be viewed as both complementary and competing. The couplings are grouped according to Waltz's three-tiered perspective.

Asian Energy Rules of the Road	
能源	
	System
Decarbonization trend line pushes an iron logic	
	Kyoto pressure against cheap alternatives
Still lacks the rules for FDI to hit true potential	
	Needed transparency unlikely without serious pain trigger
Push for energy = push for infrastructure	State
	Tension: much public d-m, but almost all private \$
Asia still a place where military instability can hurt FDI climate	
	4 serious flashpoints must resolve in timeframe
Growth determines energy (electricity & trans)	Individual
	Gas versus coal = good times versus bad
Environmental damage is Achilles' heel of projections	
	Emergence of Asian Greens is inevitable

On the system level:

- We note the decarbonization trend line of human history, moving from wood to coal to oil to methane to hydrogen. Complementing that trend—in an aggregate sense—is the Kyoto Protocol on greenhouse gases, which encourages movement "down" that trend line, even as the CO2 regulatory regime allows some to trade "up" or "down," depending on assigned ceilings and means to purchase additional allowances from others.
- There is the perceived "catch 22" between Asia's need for large amounts of FDI and the resistance many countries display there regarding the transparency Wall Street and other super-markets require for the sort of long-term faith required in infrastructure investments.

On the nation-state level:

- We note the crux of the entire Asian energy problem set: all that infrastructure development will primarily entail private sector money, but too much of the decision making will be performed by government bureaucrats—never a great combination in Wall Street's opinion.
- It's also important to remember that Asia is a region still beset by powerful inter-state rivalries and some particularly complex political-military flashpoints that can sour the FDI climate with some alacrity. The four key sources of instability in the coming decade will be: Pakistan-India, China-Taiwan, the Koreas, and Indonesia.

On the individual or subnational level:

- We note that much of the predicted energy growth will depend on individual consumption and usage patterns connected to appliances, electronics, and car transportation. Moreover, the choice to fuel all that electricity demand is often a by-product of economic times, with gas being an easier choice when times are good and coal a last resort when times are hard.
- Finally, workshop participants, while disagreeing on the extent to which green movements would

arise in Asia over the coming decades, all agreed that environmental damage (especially health-related concerns from poor air quality) would prove to be an important constraint on many countries's energy ambitions—unless greater attention was paid to this collective good.



Having enunciated our sense of the rule sets connected with Asian energy developments, we now offer two competing decalogues: one that expresses the positive pathway of achievement according to the new rules (*Find Way*), and one that expresses a potentially vicious circle of failure (*Lose Way*).

Finding the Way: Decalogue

能源 能源

- 0 Global energy market has the necessary resources
- 1 But no stability, no market
- 2 No growth, no stability
- 3 No resources, no growth
- 4 No infrastructure, no resources
- 5 No money, no infrastructure
- 6 No rules, no money
- 7 No security, no rules
- 8 No Leviathan, no security
- 9 No U.S. military, no Leviathan—*so military-market connection must be understood*

How Asia achieves its ambitious energy development plans by 2020:

- The starting-point proposition is that the world possesses more than enough resources to accommodate Asia's energy growth requirements. There is enough coal, oil and gas to make all those projections come true, and they all exist in sufficient amounts right on the Eurasian continent. So it's not the resources themselves that are in doubt here, just the economic and political transactions required to move them from A to B.
- Along those lines, so long as the markets work, the resources will flow, but the markets require a certain amount of stability—a sense that economic relationships will pay off over the long haul.
- The biggest input to stability is continued economic growth across the Asian market. Populations have been placed on steep consumption trajectories, and expectations of "better days ahead" have been widely instilled. So long as things progress, no matter how slowly, stability is likely to remain.
- The energy resources are the key to future growth patterns. The only energy Asia has in abundance is coal, whereas oil and gas must come largely from out of region to accommodate future growth requirements.
- The movement of all this energy into the region will require great infrastructure development, especially as the region shifts ahead to greater natural gas use.
- All that infrastructure development will necessitate large amounts of foreign direct investment—of the long-term variety.
- That money will not flow in sufficient amounts unless Western financial institutions see sufficient transparency, accountability, and rule of law.
- That general transparency stems first and foremost from an overarching sense of security across the region. When countries feel threatened, they necessarily become more opaque to the world at large, erecting more firewalls between themselves and the outside they fear.
- Because serious rivalries still exist across the region, and because multilateral security arrangements are non-existent compared to Europe, the region's closest thing to a Leviathan is the bilateral security relationships most major players currently possess with the U.S.
- If you remove the U.S. military from Asia, you negate the U.S.'s ability to play Leviathan, and thus threaten the underlying security upon which all this development ultimately depends. Right now the U.S. provides the lion's share of the collective good of Asian security. *It is, in many ways, our main export to the region.*

Losing the Way: Decalogue

能源 能源

- 0 Int'l security based on a single global rule set
- 1 No regional security, no single global rule set
- 2 No internal stability, no regional security
- 3 No increased consumption, no internal stability
- 4 No energy growth, no increased consumption
- 5 No infrastructure, no energy growth
- 6 No money, no infrastructure
- 7 No rules, no money
- 8 No reform, no rules
- 9 No economic downturn, no reform—*and Asian downturn puts at risk the single global rule set*

How Asia fails to achieve its ambitious energy development plans by 2020:

- The starting-point proposition is that the current global security system is based on universal adherence to—or at least deference to—a single global economic rule set. For most of the last century, the world was divided into two competing rule sets, but that basically ended with the fall of the Soviet Bloc. Now, only a single rule set remains (capitalism), although philosophical struggles remain about the Anglo-Saxon model of capitalism.
- The single global rule set ends if Asia becomes truly insecure—either internally (state on state) or externally (region versus outside world). If Asia's regional security collapses, the global rule set collapses along with it, for once Asia's development path is seen as unique, then markets will work one way in Asia and another way elsewhere in the world.
- The internal stability of the region's major states (and key neighbors) is essential to the security of the region as a whole. Six major players—in addition to the U.S.—seek spheres of influence along largely overlapping definitions of national interest (Russia, China, Japan, India, Indonesia, Australia). Instability in a major regional power therefore invites the perception of vacuum, upsetting the region's sense of a balance of power.
- Increased consumption is a key component of the internal stability of states across Asia.
- Energy growth is required to fuel this consumption growth, defined increasingly by ballooning demands for electricity and transportation requirements. Most of this new energy demand will have to be met with outside resources.
- The movement of all this energy into the region will require great infrastructure development.
- All that infrastructure development will necessitate large amounts of long-term FDI.
- That money will not flow in sufficient amounts unless Western financial institutions see sufficient transparency, accountability, and rule of law.
- That level of reform is unlikely to occur in Asia without a serious pain trigger in the form of an

economic downturn of major proportions or a broad financial panic that crumbles years of economic advance. So long as countries can muddle through without real reform, they will.

- If such an immense pain trigger were to occur, the shock to Asia's body politic could be profound enough to call into question its ability to adhere to the concept of a global rule set. In short, major portions of the regional economy could—in effect—drop out of the rule set for indeterminate lengths of time—a sort of firewall capitalism. At that point, all bets would be off regarding the West's willingness to finance Asian energy developments.



We now turn to the *Scenario Dynamics Grid*, which is our "black box" model of sorts. Here we seek to arrange, in a systematic fashion, those broad scenario elements that we think—in aggregate—offer us the majority of the explanatory power we need to analyze how this huge process of change unfolds over the coming decades.

The scenario elements we cite here are obviously not the only ones in play, and we don't pretend that this 3X6 matrix encompasses the universe of change that will be Asian energy from here to 2020. Rather, we choose to focus on these 18 scenario elements because we think it's important to tackle the subject with both vertical depth (i.e., drilling down through Waltz's three levels) and horizontal breadth (i.e., our six global "lenses" of economics, politics, technology, culture, environment, and security*).

These 18 scenario elements are, so to speak, *signposts* directing us to where the change connected with Asian energy developments is most likely to be concentrated—in terms of causality. Naturally, the more we research the subject, the better our signposts become in terms of clarity, but for now, these are the best 18 scenario elements we can identify.

The scenario dynamics grid as a whole should be viewed as a sort of smorgasbord: we think all of these elements are potentially in play for all of the countries in question, but obviously each country's path will be a selection of sorts from the larger menu of possibilities. As such the grid is purposely defined in a

rather generic fashion, so as not to concentrate too much explanatory power on just one country to the detriment of others.

* The six global "lenses" roughly correspond to Thomas Friedman's notion of "six-dimensional" thinking about globalization, as expressed in his *The Lexus and the Olive Tree: Understanding Globalization* (New York: Farrar Straus Giroux, 1999), see the chapter, "Tourist With an Attitude," pp. 3-24.

Scenario Dynamics Matrix							
	Economics	Politics	Technology	Culture	Environment	Security	
System 	Foreign Direct Investment	WTO Impact on Asia	Extraction Capacity	Clash of Civilizations?	Global Warming	Connections to Mideast	
State 	Growth: Energy Elasticity	Cross-Border Pipelines	Public Works Projects	Energy = Security Paradigm	Acid Rain	South China Sea Claims	
Individual 	Urbanization Rates	Green Movements	Transportation Patterns	Demographic Pressures	Health Issues	Strategic Energy Reserves	

ECONOMICS

Beginning with the economic lens and focusing first on its nexus with the international system, we note that foreign direct investment is the preeminent scenario element for Asia's energy future. To the extent the region seeks to move off coal (the past) and into natural gas (the future), FDI will be the most important constraining and enabling factor provided by the global economy. To the extent it flows, we see a virtuous circle whereby greater transparency yields greater FDI, which yields more energy infrastructure, which yields greater economic interdependency with the outside world, which yields even more transparency, and so on and so forth. In short, Asia can seek economic autonomy from the global economy only by remaining in the past (coal).

At the level of the nation state, we note the all important question of what sort of energy elasticity the countries exhibit as they seek to roughly double their energy consumption over the coming generation. As a rule of thumb, an underdeveloped country grows one percent of GDP at a "cost" of one-plus percent of increased energy consumption, a developing country exhibits an elasticity of roughly 1:1, and a developed economy 1:<1. The question of Asia's actual elasticity is a tough one because the official statistics of one of the region's largest economies, China, leave many experts feeling quite skeptical (i.e. China claims the elasticity of a developed economy, but most Western experts believe it's far closer to 1:1 or worse). The elasticity question is huge because any slight movement up or down that scale significantly alters the region's overall energy demand. It also signals the extent to which the region is graduating from extensive to intensive economic growth.

Finally, at the individual level, we note urbanization rates. Asia as a whole is rapidly urbanizing, and this is important on two levels with regard to energy. First, concentration of population increases the need for energy infrastructure (e.g., gas pipelines, electrical grids). Second, urbanization actually leads to less overall energy consumption due to the economies of scale.

POLITICS

Turning to politics and focusing first on its nexus with the international system, we note the World Trade Organization and its future potential impact on how Asia interacts with the outside world. Does Asia adhere ever more to the notion of a single global rule set? Accepting the concepts of accountability, transparency and rule of law that that adherence represents? Or does the WTO become a political battle ground pitting the Anglo-Saxon model against the "Asian values" model, or a capitalism "with Chinese characteristics?" A lot depends on whether or not the WTO is viewed by the world as an imposition of Western values (like many view the IMF), or a venue through which the broad forces of globalization (often viewed as "Americanization") and localization can reach compromises.

On the level of the nation-state, we cite the dynamic of pipelines as a measure of genuine acceptance of cross-border interdependency. It's one thing to buy LNG on the spot market and ship it to your ports, but it's a far different thing to commit to a permanent pipeline and the bilateral market relationship it entails. It is our simple proposition that "good pipelines make good neighbors." We think this has been proven in East Central Europe over the 1990s, and we think it can be proven yet again in Asia in the next decade.

Finally, at the level of the individual, we focus on the emergence of local green movements and the redefinition of environmental issues as a public good worthy of great political attention. We frankly scoff at the notion that such movements are not "the Asian way of doing things," for we heard similar notions about Russians, for example, under Soviet rule, only to see environmental groups spring up with a vengeance once they were given the political freedom to make their voices heard. In short, we expect Greens to become a potent political force in Asia over the next generation, as is already being seen—in embryonic fashion—in Japan on the issue of nuclear power.*

* For a good example of this sort of grass roots environmentalism, see Elisabeth Rosenthal, "Pollution Victims Start to Fight Back in China," *The New York Times*, 16 May 2000, p. A1.

TECHNOLOGY

Turning to technology and focusing first on its nexus with the international system, we note the extractive capacity of the global energy market, meaning our collective capability to keep finding and exploiting—at bearable cost—new supplies of oil and natural gas. Pessimists have long predicted the "end of cheap oil" (or even the end of oil, period), only to be proven wrong decade after decade. So long as these Cassandras continue to be proven wrong, we stick to our essential assumption that more than enough gas, oil and coal exists to fuel Asia's growth over the coming generation. In fact, the wild cards here tend not to be about future shortages, but the possibility of future abundances, as in the case of methane hydrates, which some experts think will eventually dwarf natural gas reserves once a cost-effective method is found for extracting these reserves from the sea bed.

Dropping down to the nation-state level, we cite the importance of a government's choice in public work projects, such as China's Three Gorges Dam or Japan's recent scaling back of plans for future nuclear plant construction. By these choices, governments not only stimulate research and development into particular technologies, but they also reduce the likelihood of other options simply by the fiscal "space"

they occupy (e.g., what else could China have done in terms of exploring renewable resources if they hadn't spent so much money on Three Gorges?). In short, while hardly encompassing the breadth of the market potential for energy development, government choices on energy infrastructure investment generate a strong legacy effect.

Finally, on the individual level, we note the importance of transportation patterns, or more specifically, the choices involved in adopting a car culture. For example, with its low per capita motorization level, it's possible that Asia could: (a) follow America's "power car" culture, (b) leap over that to a hybrid culture that deemphasizes all-combustion engines, or (c) focus on mass transit.

CULTURE

Turning to culture and focusing first on its nexus with the international system, we highlight the potential for *Kulturkampf* along the lines suggested by Samuel Huntington in *The Clash of Civilizations and the Remaking of World Order* (New York: Simon & Schuster, 1996). This is not to say that we predict great power conflict as a result of Asian energy trends. Rather, we think it's important to realize how Asia's growing energy needs can only draw closer together the two civilizations of the world which are the least Western and, conversely, most resistant to the homogenizing process of globalization (seen in the oft-heard question, "Does globalization mean we all have to become Americans?"*). Does this necessarily mean more global conflict? No. Does it complicate the process of globalization? We say yes.

Dropping to the nation-state level, we focus on the culture of a country's leadership. How do leaders view the energy:security paradigm? Do they, like the U.S. in the 1970s, feel they need to "own the barrel?" Or have they "matured," if we can be so bold to say, to the point where they, like the U.S. in the 1990s, understand that "it's the price, stupid!" In short, do they still view energy security primarily in terms of bilateral strategic relationships designed to secure access, or do they trust the global markets to always deliver the goods, albeit at a fluctuating price? Is risk defined as disruption or high cost? Much depends on the outlook of the leadership in question. For example, a China led by Li Peng favors the classic security perspective, while a China led by Zhu Rongji clearly belongs to the market school of thought.

Finally, on the individual level we cite the importance of demographic pressures in determining energy futures. With China and India, you're already talking about the bulk of the world's future population growth, so small changes in these trajectories have huge implications for the planet as a whole.

* Thomas Friedman quotes a Cairo professor asking this in his article, "One Country, Two Worlds: Egypt Between Nile and Net," *The New York Times*, 28 January 2000, p. A27.

ENVIRONMENT

Turning to the environment and focusing first on its nexus with the international system, we zero in on global warming and the more specific subject of greenhouse gases. The Kyoto Climate Change Protocol on Greenhouse Gas Emissions, while still not ratified by any of the industrialized, "Annex I" states, does put in place a CO2 trading regime that could have profound implications for the future of global environmental regulation. If it succeeds in fostering a fluid and transparent market for carbon credit trading under a solid global ceiling, then global warming's potential for generating inter-state tensions may be greatly obviated. More importantly to Asia, the success of such a regime would point to a future of market-based regimes for limiting CO2 emissions, a global subject-area that will inevitably target such coal-intensive emerging economies as China, India, and Indonesia.

Descending to the nation-state level, we note the issue area of acid rain, which is intimately connected to rising demand for electricity and the tendency of most states in the region to fuel such plants with coal. For example, coal-fired electricity plants in northwest China generate substantial amounts of acid rain for Japan's northern forests. By choosing to rely so heavily on coal, China only "converts energy insecurity into environmental insecurity," in the words of workshop participant Dennis Eklof.* Eventually, this environmental insecurity provides additional inter-state pressure to shift into heavier dependence on natural gas.

Finally, on the individual level, we cite the obvious health issues connected to the region's relatively heavy reliance on coal, not only for electricity generation but also for cooking.** In combination with high smoking rates, Asia is staring at a huge health care bill over the coming generation.

* See Eklof et. al, "Fueling Asia's Recovery," p. 41.

** According to a recent study published in the Proceedings of the National Academy of Sciences, 800 million of China's 1.2 billion people use coal in their homes. Cited by the Associated Press, "Study: Coal Fumes Poisoning Chinese," The New York Times on the Web, 30 March 1999, <<http://www.nytimes.com/aponline/I/AP-Coal-Poisoning.html>>.

SECURITY

Turning to security and focusing first on its nexus with the international system, we cite the growing network connectivity between East Asia and Southwest Asia, meaning first and foremost the far heavier use of sealines of communication to move all that oil and—increasingly—all that natural gas by tankers. With regard to the SLOCs of Southeast Asia, there are predictions of a rough tripling or more of ship traffic through the various straits, all of which are straddled by an Indonesia now wracked with fragmenting civil strife. These waters also feature some of the highest frequency of piracy seen in the world today, not to mention significant naval build-ups by two of the largest powers—India and China. In short, the region's maritime system is undergoing significant stress at this time, only to be assured of even greater amounts given the region's burgeoning requirements for Middle East energy exports.

Dropping to the nation-state level, we focus on the long-standing issue of overlapping territorial claims in the South China Sea. Although many-sided maritime disputes exist throughout the region (e.g., from the Arafura Sea between Indonesia and Australia all the way up to the Northern Sea of Japan bordering Russia), the South China Sea dispute, centering on the Spratly Islands, receives by far the most international attention due to the confluence of hydrocarbons and sea-lane defense. Military forces from Vietnam, China, Taiwan, the Philippines, and Malaysia currently "occupy" various portions of this island chain, and minor military skirmishes have occurred over the past two decades.* But the bottom line remains: no serious exploitation of the area's oil reserves will occur without multilateral resolution of the dispute.

Finally, on the individual level, we note the general lack of significant strategic energy reserves across the region. Japan is the most notable exception, and China has recently made moves in this direction. We place this issue on the subnational level because this is where the impact is most acutely felt during times of disruption.

* See Mark J. Valencia, "Energy and Insecurity in Asia," *Survival*, Autumn 1997, pp. 85-106.

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Asian Energy Futures Event Report (VI): The There and Then of Asian Energy 2020

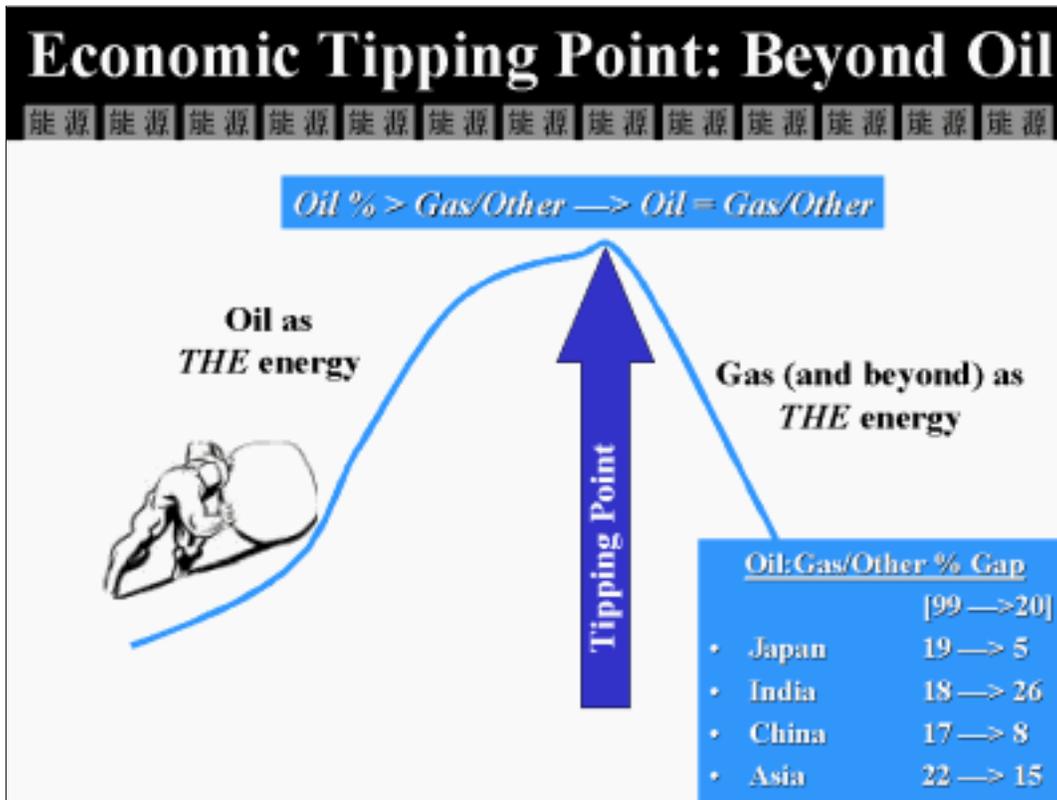


Moving into the third and last of our "diamond dialectics," we now turn to the subject of *Tipping Points*, a concept we borrow from Malcolm Gladwell's recent book by the same name.*

In a nutshell, we're employing the term tipping point to mean a pinnacle moment in the adoption of a new understanding or perception (i.e., a paradigm shift), beyond which we can speak about a "new rule set" becoming thoroughly embedded in a country's (or region's) political and economic culture.

To illustrate this point, we employ the imagery of Sisyphus (see following slides), the legendary king of Corinth who was condemned, according to Greek myth, to roll a heavy rock up a hill in Hades only to have it roll down again as it nears the top—*ad infinitum*. While not wanting to insinuate that these tipping points are, by any stretch of the imagination, unachievable, we do want to impress upon the reader our sense that these "journeys" will not be easy ones.

We will propose six tipping points, corresponding to our six global lenses.

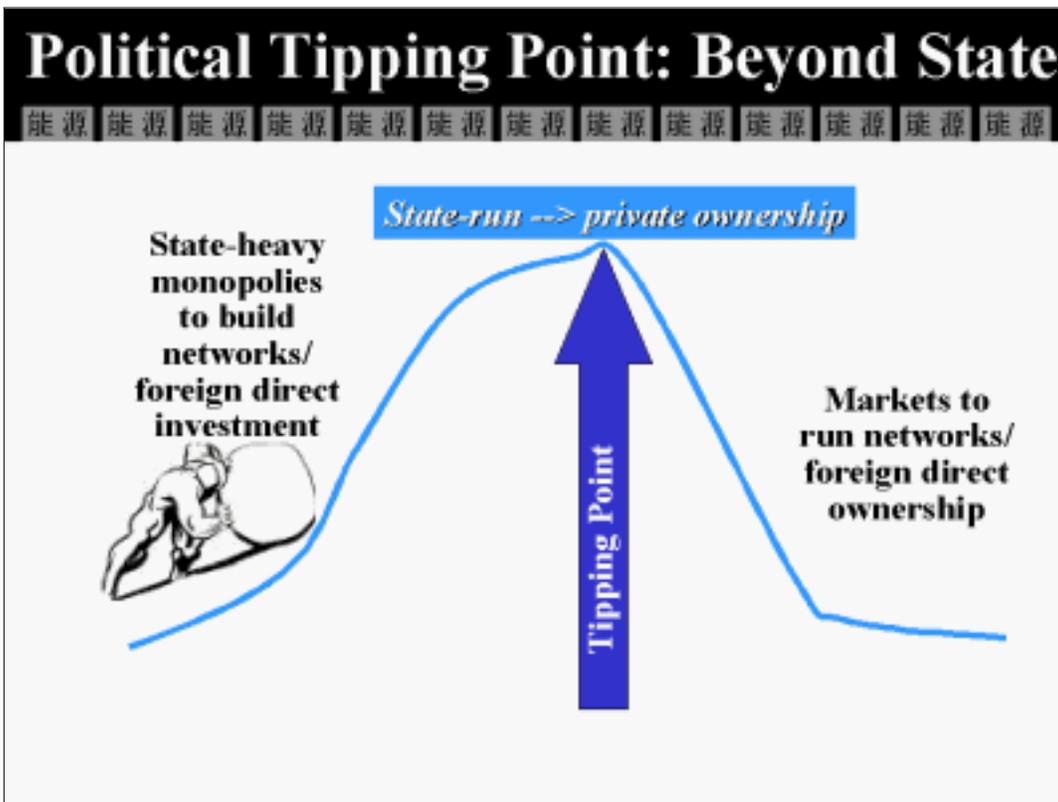


Our first tipping point involves the perception of oil's dominant standing in the economics of global energy markets, when in reality, the current struggle across Asia is between coal (the past) and natural gas (the future). Oil as a percentage of energy source is predicted to decline across most Asian states through the 2020 timeframe. This is because oil's importance to the economy is increasingly limited to transportation, which, as a whole, is rather underdeveloped in Asia compared to the West. The biggest driver for energy growth in Asia is electricity, and there we're talking about the choice between coal-fired and gas-fired plants, since oil is little used in this regard anymore.

As a tipping point, we thus propose the pinnacle moment when Asia (and the world) moves from thinking of oil as THE energy to thinking about natural gas as THE energy. We consider this shift important not only in signaling the planet's further progression down the "decarbonization chain," but likewise in highlighting the first half of the 21st Century as the Age of Gas.

The measure we choose to express this shift from "medium carb" oil to "low carb" gas is to note the point at which a country's percentage share of oil is equaled by the combined share of gas and "Other" low-carb (or no-carb) renewables such as nuclear, hydroelectric, solar, and wind. The U.S. is already close to achieving this tipping point, as DOE data from 1999 displays: oil's 41 percent share is only slightly higher than "gas + other" (23 + 15 = 38%).* As shown in the inset above, most of Asia (India is a notable exception) will experience a similar shift away from oil to lower-carb energies, with the "gap" for Asia as a whole dropping from 22 percentage points in 1999 to 15 in 2020.

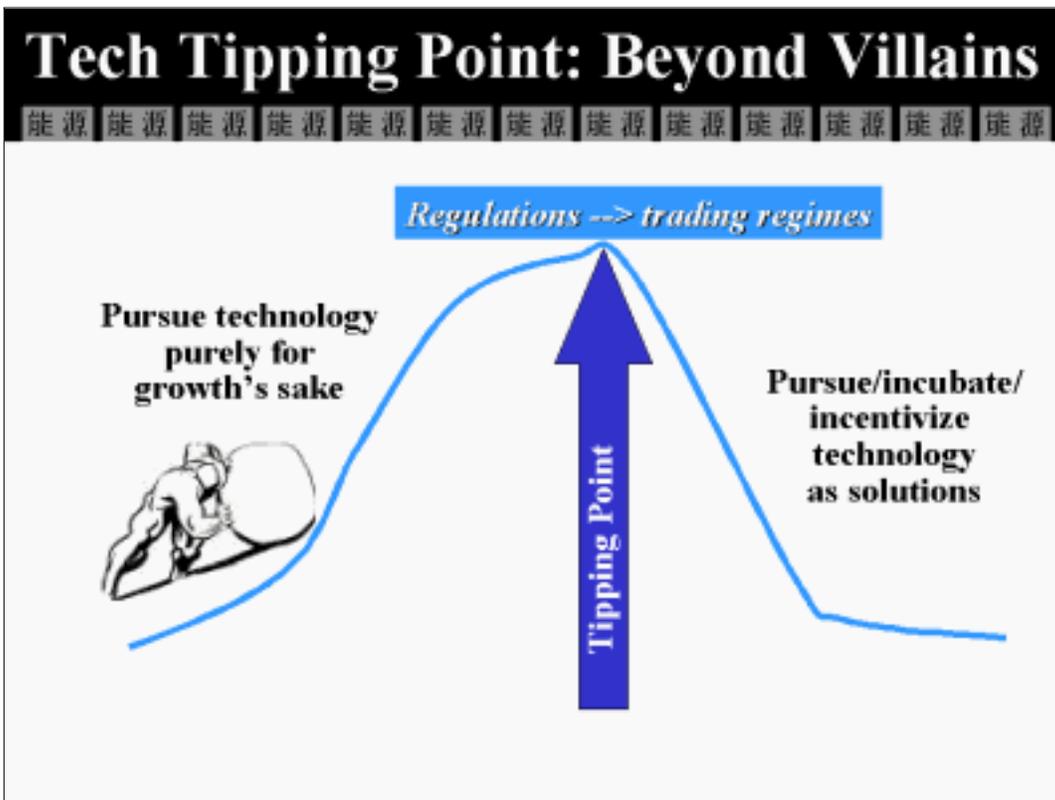
* The vast majority of new electricity generation plants planned in the U.S. will be fueled by natural gas.



Our second tipping point involves the perception of the state’s dominant standing in the politics of national energy infrastructure development. Here we’re talking about a shift from a less-mature market environment where state-directed monopolies are required to build network grids to a more-mature market environment where private-sector firms step in to run these grids more efficiently than any state can. In short, we see a natural historical progression here: monopolies are often needed to build grids, but competitive markets should later run them.

As a corollary, we see Asia’s political climate changing from a less-mature market environment where foreign direct investment is limited to minority-share ownership in joint ventures to a more-mature market environment where FDI can involve majority ownership of private-sector energy generation and distribution firms, if not the networks themselves.

Therefore we chose as our pinnacle moment the complete privatization of state power networks, for once power grids reach a certain level of maturity in terms of reach and market saturation, market competition then offers the best chance for maximum long-term service efficiency.

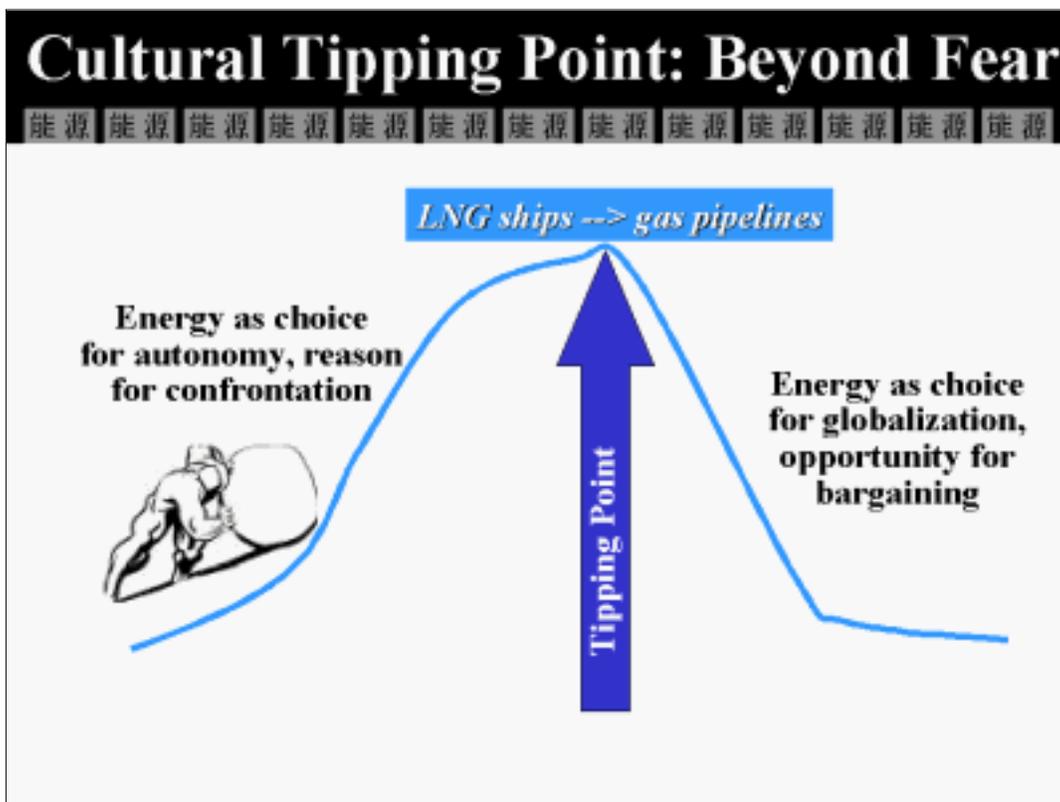


Our third tipping point involves the perception of technology as a source of environmental problems versus technology as a solution for environmental problems.

It is said that the U.S. government in general, and the Environmental Protection Agency in particular, underwent a paradigm shift on the technology:environment nexus over the past generation. Where, for example, in the 1970s, EPA sought to tame technology and its environmental damage through regulations, sanctions, and prohibitions, by the 1990s EPA has come to view technology as less the question (How do we tame it?) and more the answer (How do we employ it?). A big part of this is shifting from regulatory regimes to trading regimes, or from rules against undesirable behavior to markets that reward desirable behavior by allowing players to bank their efficiencies (e.g., my factory stays under my emission ceiling and so I can sell my unused credits to a less-efficient factory).

Asia, unfortunately, hasn't advanced much even up the regulatory chain, tending to pursue technology purely for growth's sake and let the environment be damned. But bills are coming due, especially in terms of healthcare, water, and damaged forests, so that even a vigorous pursuit of regulatory regimes wouldn't—at this late date—prove decisive in and of itself.* Leap-frogging ahead to a new paradigm that lets markets reward firms for technological advances in defense of the environment must become a large part of Asia's "green growth" solution set. So we choose as a pinnacle moment the shift from ineffective and poorly enforced regulatory regimes to market-incentivized trading regimes that allow efficiencies to be monetized.

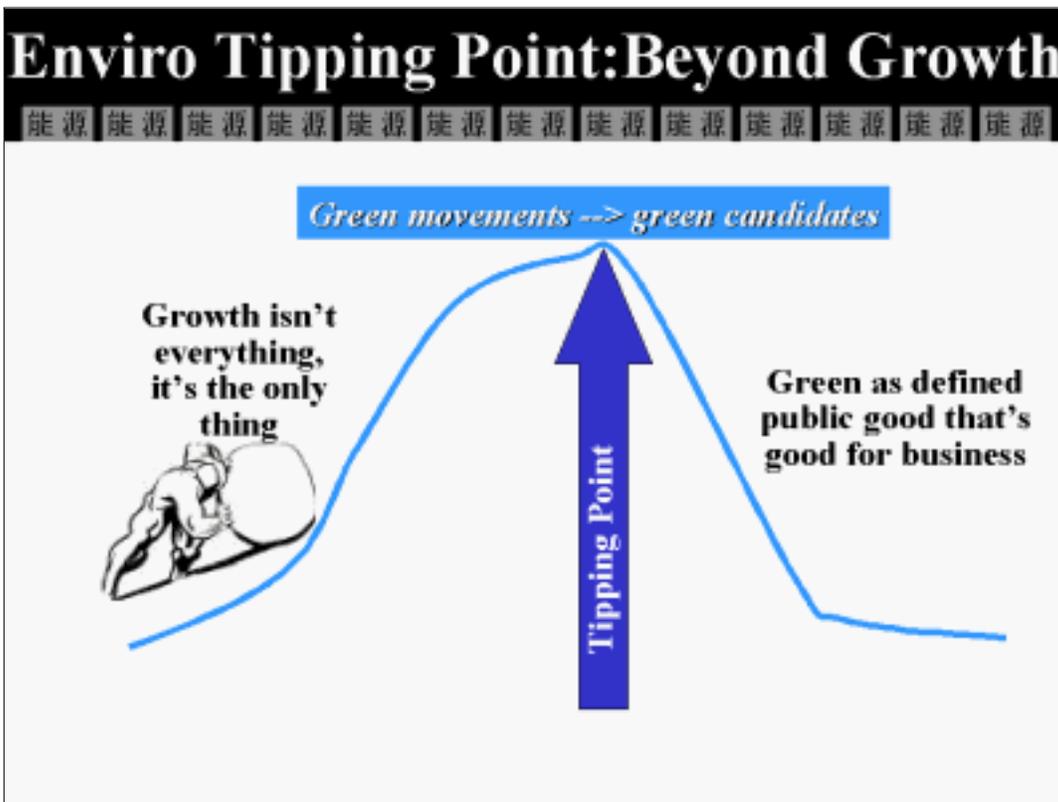
* For an example of such attempts, see Clay Chandler, "Hong Kong Acts to Reduce Rising Pollution: Taxes, Regulations Aimed at Keeping Both Residents and the Economy Healthy," *The Washington Post*, 10 May 2000, p. A21.



Our fourth tipping point involves the perception of energy as a key component of national security. Throughout the Cold War, energy security was pursued by most states in terms of strategic bilateral relationships where both amounts and price were largely a function of government negotiations. Markets were, in many respects, rather closed affairs where the drives of demand and supply took a back seat to definitions of national security. In sum, to feel secure, most states wanted to "own the barrel" the second the oil came out of the ground.

In the post-Cold War era, advanced economies have largely come to realize that oil is now bought and sold under truly global market conditions, where price—and not state relationships—determines access. Risk is redefined from disruption of supply to "disruption" of cost. This paradigm shift is an enormous one, for it takes a key commodity that for decades has been viewed by state governments as a choice for autonomy and a trigger for confrontation and turns it into yet another medium through which market-based interdependency spreads, transforming oil into "just another commodity" that is traded on a daily basis all over the world.

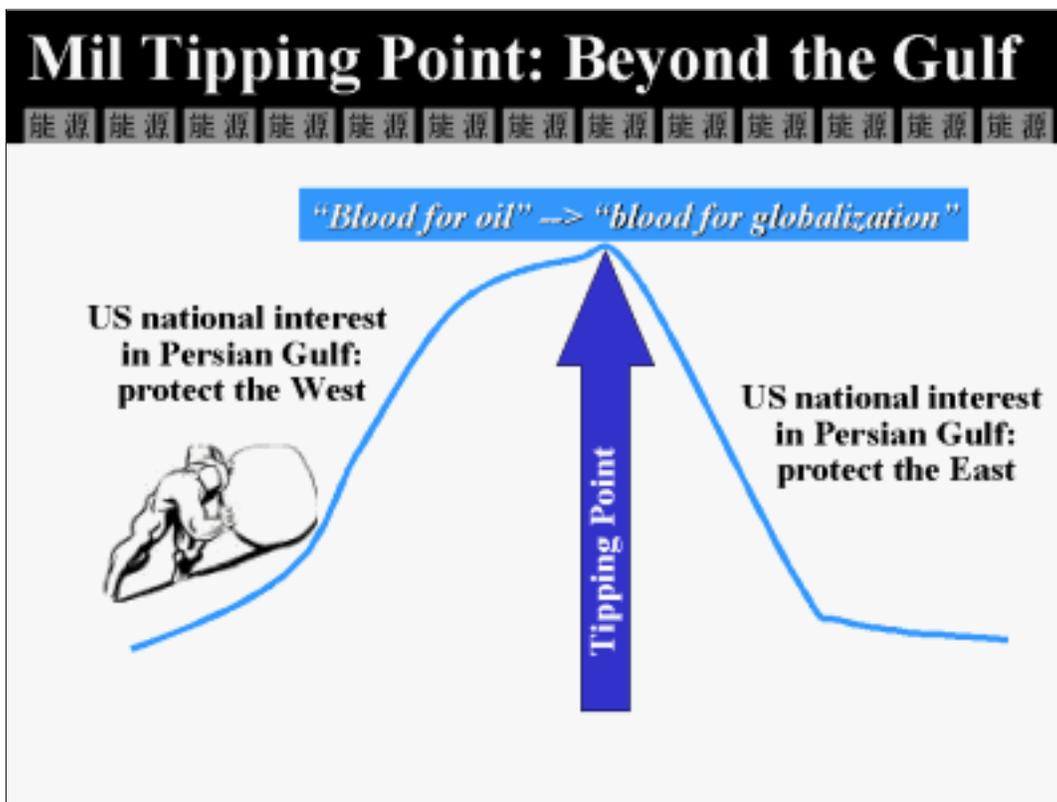
Asia's tremendous expansion of energy demand over the next two decades will force key regional powers such as India and China to accept far greater levels of cross-border energy dependency, and this will constitute a new cultural mindset for leaders long accustomed to viewing energy primarily as a security vulnerability. As such, we choose as our pinnacle moment the shift from buying natural gas via LNG ships to erecting permanent pipelines that create long-term energy interdependencies.



Our fifth tipping point involves the perception of the environment as a defined public, or collective good that's worth preserving in and of itself, not only in terms of quality-of-life issues for the society as a whole, but because it is perceived—in a long-term sense—as an essential input to continued economic growth and sustainable development.

Much of Asia's economic development of the past several decades has focused on extensive growth, meaning more resource inputs and outputs, increased infrastructure, and an increased percentage of the population working. In this model, the environment is viewed as a relatively inexhaustible source of material, to be exploited to the full extent possible. Shifting to intensive growth means a greater focus on more efficient use of resources, more sophisticated and responsive infrastructure, and a smarter, more productive labor pool. In this post-industrial model, the environment is something to be sustained like a trust, whereby the "principle" is maintained at all cost so that the "interest" can be drained off in a dependable fashion. The definition of risk, therefore, shifts from environmental fall-out (and clean-up) to loss of principle stock (i.e., that which is defined as required for sustainable use).

Asia cannot achieve the economic or energy growth currently envisioned while treating the environment as a bottom-of-the-list lesser-included. Green issues must rise to the level of defined public goods, for which political leaders are willing to spend political capital in exchange for assuring long-term economic growth potential. Therefore we choose as our pinnacle moment the shift from green movements (which are often fairly non-partisan) to green candidates (who define their partisanship by these issues), and we point to the experience of Western Europe over the past generation as proof that green parties can have substantial impact on a country's political and economic agenda (e.g., Germany today, where environmentalism is the consensus).



Our sixth tipping point involves the perception of energy as a key component of U.S. national interest in the Persian Gulf. Of the six tipping points, this is the only one that focuses on a paradigm shift within the U.S. government vice those in Asia, and that's because, as we noted earlier, the U.S. military truly plays the role of regional Leviathan in Asia via its bilateral security ties with all of the major players.

U.S. national security policy began a slow but pronounced shift of geographic focus from Southeast Asia to Southwest Asia following the end of the Vietnam Conflict in 1975. By the time Central Command was established in the early 1980s, U.S. deployments and crisis response activity had been dramatically concentrated around the Eastern Mediterranean, the Arabian Sea, and the Persian Gulf, with a key instigator being tanker escort operations connected with the lengthy Iran-Iraq War (Earnest Will being the most well-known operation). By the end of the 1980s, for example, the U.S. Navy was spending three out of every four "crisis" operation days in the Mideast theater, meaning the underlying "oil equation" accounted for roughly three-quarters of our global security interest.* Soon after we went to war with Iraq in 1991 to protect Western access to Gulf oil, opening us up to the charge of "blood for oil."

Moving into the future, however, we see that such a presentation of U.S. security interests in the Gulf will become largely untenable—at least in a direct sense. The next war in the Gulf will not be about protecting Western economies, but those of the East, and while there are still very good rationales for doing so, the causality chain will not only grow longer in explanation, but far more complex. As such, we choose as our pinnacle moment the shift from the "blood for oil" charge to one of "blood for globalization."

* For detailed analysis of this shift, see Thomas P.M. Barnett and LCdr. Linda D. Lancaster, USN, *Answering the 9-1-1 Call: U.S. Military and Naval Crisis Response Activity, 1977-1991*, Center for Naval Analyses Information Memorandum #229, August 1992.



Shifting from *Tipping Points* to signs of what life might be like in the *There and Then* of Asia's energy future as the region approaches the year 2020, we present on the following slide a series of paired examples (*Good Signs* plus *Bad Signs*) of newspaper headlines we might encounter in downstream scenario pathways.

These headlines were generated by the workshop participants as a way of populating a series of outcome scenarios (to be presented subsequently). Of the several hundred notional headlines provided, we selected twelve that we felt captured the lion's share of our participants' concerns and/or desires regarding Asia's future energy paths.

I got good news and bad news . . .	
能源	
<u>Good News</u>	<u>Bad News</u>
China Joins Japan in Opening Gas Markets to Foreign Competition	Japan Starts Massive Conversion of Power Plants to Coal
Con Edison & CONSOL Coal Announce Breakthrough on Coal-Burning Power Plants & CO2 Emissions	Cleaner Coal Killing Government Drive To LNG, Pipelines in Asia
China's Coal Deaths Reach New Level; Leaders Promise Radical Solutions on Energy Usage	China and India Announce Coal Consortium; Joint Government Bonds Promote Foreign Investment
Mitsubishi Sets 2010 Target For 50-50 Hydrogen/Gas Blend Autos For Asian Market	20 Years Later, Hong Kong Car Culture Conquers Mainland China; SUV Shares Rival U.S.
Last California Condor Dies Day Before President Signs Omnibus Enviro-Alternative Energy Bill	Japan's "Chernobyl" Still Haunts Energy Sector Ten Years Later As Last Nuclear Plant Shuts Down
Japan Buys Chinese Coal Fields; Radical Greens Vow More Bombings If Mining Resumes	China and Iran Announced Extension of Oil-For-Arms Deal; U.S. Sanctions Said to Hurt Both

Starting at the top and working our way down:

- The first pair (*China Joins Japan ...* and *Japan Starts Massive ...*) speaks to the dynamic between free-market competition and the focus on the bottom line. We speak of Asia needing to privatize its energy sectors in order to attract FDI, and yet all that competition will bring enormous pressures to bear on costs, which ironically can lead to greater reliance on older, dirtier energies such as coal.
- The second pair (*Con Edison ...* and *Cleaner Coal ...*) speaks to a similar sort of "be careful what you wish for" dynamic, whereby technological breakthroughs in using older, dirtier energies can retard movement to newer, cleaner ones.
- The third pair (*China's Coal Deaths ...* and *China and India ...*) speaks to the fear that these two large, relatively poor economies will be sorely tempted to rely on indigenous supplies of coal to remain cost competitive in global markets, but, by doing so, only generating environmental-security tensions in the region.
- The fourth pair (*Mitsubishi Sets 2010 ...* and *20 Years Later ...*) speaks to the uncertainty surrounding what sort of car culture ultimately prevails in Asia. Certainly a Honk Kong or Singapore proves that Western-style auto gridlock and smog are easily reproducible in Asia. But the opportunity also exists for Asia to leap-frog over American-style car culture directly to a post-combustion (hybrid for now) auto future.
- The fifth pair (*Last California Condor ...* and *Japan's "Chernobyl ...*) speaks to the collective sense that, while alternative energies are bound to play an increasingly significant role in Asia's future needs, the nuclear sector is expected to atrophy over the long run.
- The last pair (*Japan Buys Chinese ...* and *China and Iran ...*) speaks to the concern that, short of a miracle technological breakthrough, the sheer numbers involved with China's ballooning energy requirements will inevitably translate into difficult international political issues.

None of these notional headlines represent predictions of any sort, but are presented merely to illustrate the various fears and hopes presented by our workshop participants regarding long-term outcome scenarios.



We'll now examine a quartet of rudimentary outcome scenarios for Asia's potential energy future. We'll call them "rudimentary" because we won't present any great detail as to the alternative futures they portend. Rather, we'll offer them up more as a way to capture the varying degrees of skepticism exhibited by workshop participants regarding the likelihood of each pathway's unfolding.

The scenarios were framed in the following fashion:

- We constructed the X-Y axis beforehand and presented it "ready-made" to the workshop participants at the beginning of the "Outcome Scenarios" session
- The participants then spent several minutes brainstorming—via GroupSystems—notional headlines for each of the four scenarios
- Following facilitated group discussion of the four scenarios, participants were asked to propose—via GroupSystems—which Asian nations would end up in which scenarios (the *Kto Kovo*, or the "who ends up where?" segment to follow).
- Following more facilitated group discussion, participants nominated—via GroupSystems—titles for each of the four scenarios, and then voted for their favorites.



The X-Y axis is constructed of two simple questions:

- What is the balance of the overall energy content?
 - High-carb diet = more weighted to coal and oil
 - Low-carb diet = more weighted to natural gas and renewables.
- What is the balance of the overall decision-making mechanism?
 - State-based strategies = more decision-making control is left to public entities
 - Market-based strategies = more decision-making control is left to private entities.

The four resulting scenario titles are as follows:

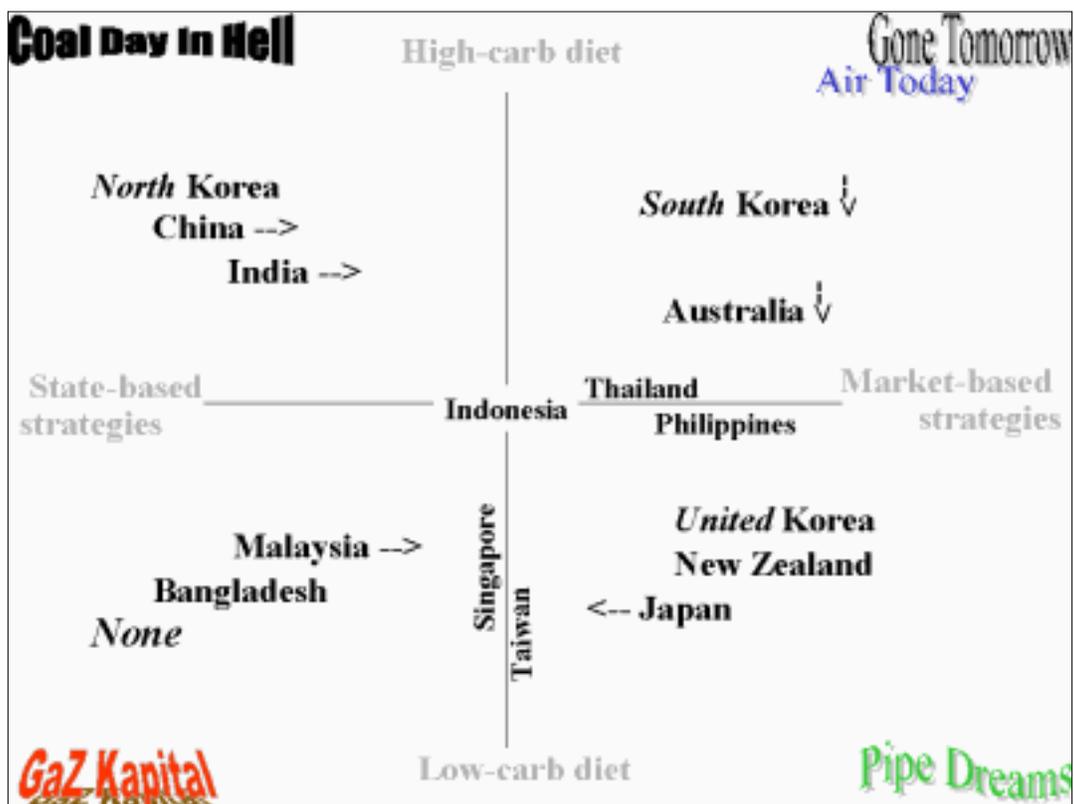
- *Pipe Dreams* (Low-carb diet + Market-based strategies) reflected the participant's strong skepticism about such a positive outcome combination. It also captured the consensus opinion that gas pipelines would signal movement in this direction. The skepticism stemmed from the participants' sense that too much cultural change was needed (and too quickly) to achieve the transparency that would, in turn, trigger a sufficient FDI flow for this outcome to unfold.
- *Air Today, Gone Tomorrow* (High-carb diet + Market-based strategies) reflected the concern of many participants that an unfettered free-market approach would lead to a spoiling of the "commons"—most notably the air. In short, markets promote cost-cutting behavior and Asia's path of least resistance here is coal-fired electricity.
- *Gaz Kapital* (Low-carb diet + State-based strategies) reflected the opinion of most participants that, in many instances, it'll take a strong state to force the sort of monopolistic approach to infrastructure building that a gas-heavy future would require. So, in effect, participants cited this scenario quadrant as a possible transition stage prior to achieving the preferred *Pipe Dreams* outcome.
- *Coal Day in Hell* (High-carb diet + State-based strategies) reflected the pessimism most

participants held concerning state-dominated economies with large domestic coal supplies. In effect, they believed the temptation to "burn your own" would be too great for power-consciousness bureaucracies to resist. Naturally, this was seen as the worst possible environmental outcome for states with limited political freedom, since no strong venues would exist to promote the public good.



Having outlined the four outcome scenarios, we now present how our participants' voted in terms of *Kto Kovo*--or, to loosely paraphrase, who ends up where?

Again, these calls are far from predictions, and need to be considered within the context of the day's events. In short, they represent the participants' gut reactions after a long day of debating a very wide range of issues.



Our participants displayed a real sense of differentiation in their calls--to wit, their treatment of the Koreas question:

- North Korea was definitely viewed as falling into the *Coal Day in Hell* scenario, given its repressive regime and seeming total disregard for environmental cost.
- South Korea was voted into the *Air Today, Gone Tomorrow* scenario, displaying the participants' concern about a state that perhaps places too strong an emphasis on growth. [The arrow represents the second-most voiced opinion.]
- But a *United Korea* was proposed as falling into the *Pipe Dreams* scenario, to a certain extent because a reunified Korea might attract greater attention as a transit venue for pipelines from mainland Asia to the Japanese islands.

Of the major powers in the region:

- Japan was the only one considered a likely candidate for the *Pipe Dreams* scenario quadrant.
- Australia was associated with the *Air Today, Gone Tomorrow* scenario due to its reputation as a frontier economy with a less-than-stellar approach to the environment, and its large coal reserves.
- No major powers were considered likely to end up in the *Gaz Kapital* scenario. Indeed, one of the proposed scenario names for this quadrant was "Not Enough Lee Kuan Yews to Go Around."*
- China and India were considered shoe-in's for the *Coal Day in Hell* scenario, due to a combination of state-dominated economies, large coal reserves, and insufficient FDI to achieve anything more than a marginal reduction of their long-term dependency on coal.
- Indonesia was considered to be a complete wildcard, with votes evenly distributed across all four scenarios, reflecting the great uncertainty about the archipelago's political integrity and the fact that the country as a whole possesses significant energy resources in all three major categories. In short, much depends on whether the country stays together or not, and how that issue plays out in

the exploitation of the country's indigenous resources, which some experts considered ill-utilized up to now.**

* Lee Kuan Yew was prime minister of Singapore for 31 years (1959-1990). Following his resignation in 1990, he remained in the government as a senior minister in the premier's office. Many Asian experts believe he is still the "power behind the throne."

** On Indonesia, see Brian Barry, "A Survey of Indonesia: The Faltering Firefighter," *The Economist*, 8 July 2000, pp. 1-16.

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Asian Energy Futures Event Report (VII): Cosmic conclusions about the future(s) of Asian energy



Having worked our way through our conceptual model and presented the output from the Asian Energy Futures event, we'd now like to wrap up this report with a handful of what we call "cosmic conclusions" about the future(s) of Asian energy development.



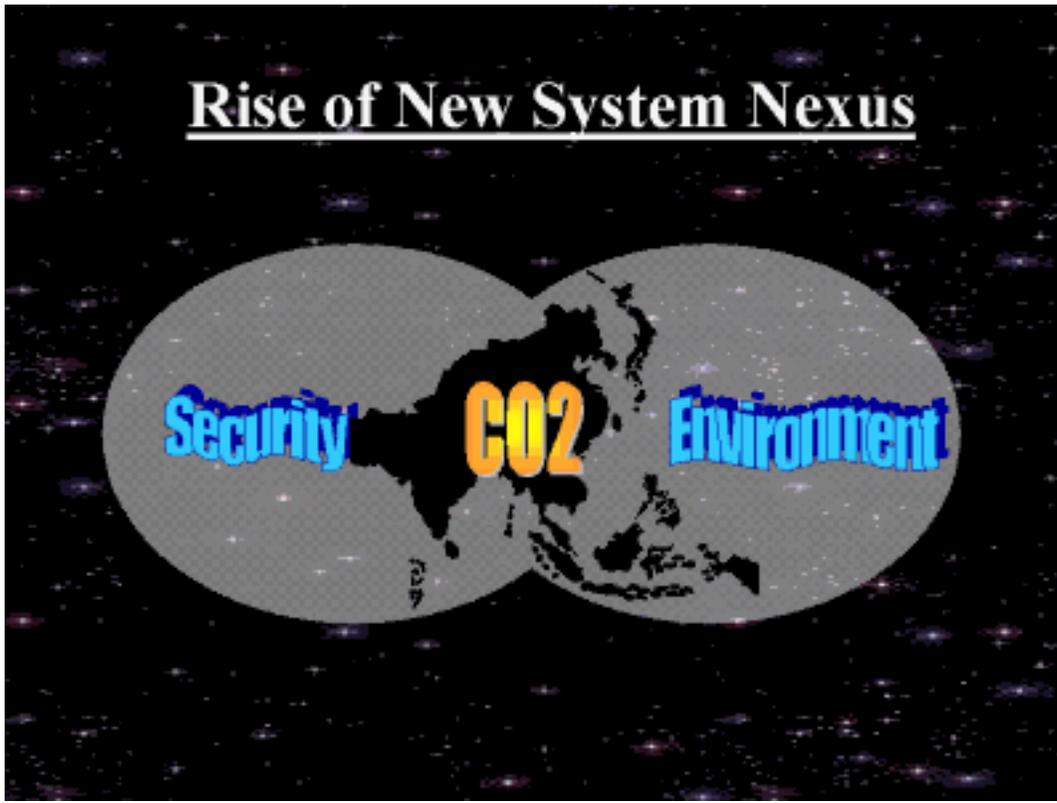
The first cosmic conclusion concerns the high SWAG (scientific wild-ass guess) factor involving any predictions of Asian energy development over the next two decades. Frankly, the numbers are simply too huge for the region to swallow without something giving first. Four issues complicate our ability to predict what's going to happen in Asia on energy, and all four find good expression in China, which accounts for the bulk of Asia's energy growth:

- First off, there is the issue of economic growth indicators. Financial accounting in Asia is simply not up to Western standards in many instances, rendering not only current and past statistics on growth a little suspect, but calling into question many of the ambitious state pronouncements on what lies ahead.
- Secondly, there is the potential swing factor of population growth, where Asia accounts for a very significant portion of future global increases. China, for example, has long had a one-child policy that has—by official accounts—dramatically slowed the number of new births, and this data goes a long way to explaining recent revisions of predictions for global population growth through the first half of this century. And yet, as a recent New York Times article demonstrated, once you get out of the main cities, where Chinese officials are far more strict in enforcing this regulation, you find the countryside littered with families of several kids.*
- Third, there is the question of how dysfunctional Asia's banking systems still are as a result of the superficial reform undertaken by too many states following the financial crisis of 1997-98. As we noted earlier, China's banking system is essentially bankrupt, having taken in huge sums of money from individuals in the form of pensions, only to lend those funds back out to state-run enterprises that teeter on the edge of bankruptcy. This is essentially a shell game designed to forestall the massive unemployment that would result if these enterprises failed, and yet, this dubious practice only delays the inevitable pain.
- Finally, there is the question of how the region moves ahead on transportation, which includes air travel but is mostly about the nature of the car culture that will inevitably unfold over the coming

generation. For example, General Motors predicts that China will develop into the world's largest auto market within two decades.**

* See John Pomfret, "China Losing 'War' on Births: Uneven Enforcement Undermines One-Child Policy," *Washington Post*, 3 May 2000, p. A1.

** Cited in Clay Chandler, "GM's China Bet Hits Snag: WTO (Car Shoppers Await Discount From Trade Deal)," *Washington Post*, 10 May 2000, p. E1.



Our second cosmic conclusion concerns the rise of a new system nexus, one that's likely to recast our appreciation of what constitutes international stability in the 21st Century. Just about everyone who participated in the workshop came away from the day's discussions deeply impressed by the potential for environmental stress to lead to inter-state tension and even conflict. While none were so bold as to predict future wars over resources, all were certain that a new definition of security would inevitably emerge in Asia over the coming decades: that of environmental security.

The reasons for this growing awareness are several, but the bottom line is basically this: you can't combine that much population increase with that much economic growth and rising energy consumption and not end up with some serious environmental difficulties in a space that tight (in terms of population density).*

Carbon dioxide (CO₂) emissions become a lightning rod subject due to the combination of the Kyoto Protocol (which, although it does not involve many of the Asian economies, portends a future where international agreements will increasingly target environmental issues) and the reality that so much of the region's future energy growth will inevitably be achieved through coal.

On an international scale, the CO₂ issue becomes a divisive point between the post-industrial West (which, in effect, has already burned it's way through its "high carb years") and the emerging economies of the South and East (which face many more years of such a "bad diet." Will the U.S., which will still burn more coal over the next two decades than anyone in the world save China, scold the region on this subject? You bet, and therein lies the rub. In short, the subject of environmental stress will become part and parcel of international security debates in the 21st Century, and Asian economic growth will drive

much of this discussion.

* For an influential article on the subject of environmental stress leading to conflict, see Thomas Homer-Dixon, "On the Threshold: Environmental Changes as Causes of Acute Conflict," *International Security*, Fall 1991, pp. 76-116.



Our third cosmic conclusion centers on the central role played by China's energy choices in how the Era of Globalization unfolds over the next decade. To put it succinctly, the decision of how much China adapts itself to the global economy (vice Beijing's preferred approach of asking the global economy to adapt to it) will be largely driven by the choices the country makes on energy.

If China chooses to remain, as much as possible, in the "past" with coal, this decision will essentially delay its full-fledged absorption into the global economy. This is clearly the path of least resistance for Beijing, and there lies the temptation, for the perception of autonomy afforded by coal allows China to remain more opaque to outside scrutiny, to retain more control over its energy future, and to continue the more easily top-down directed path of extensive growth.

If China chooses to move—as much as possible—into the "future" with natural gas, this decision will essentially speed up its full-fledged absorption into the global economy. This is obviously a far more difficult path, because it opens the country up to greater interdependency with the outside world, forces more transparency upon its financial systems, asks it to trade control for calculated risk (nothing is guaranteed in the free market), and demands of it a far greater push for intensive-style economic growth.

Make no mistake, this decision will not occur one afternoon, but unfold over the course of many years, and will involve many internal debates and struggles within the Chinese leadership.* Staying in the past allows China to enjoy the illusion of its own rule set (capitalism "with Chinese characteristics") and indulges its historical tendency toward parochialism (the "Middle Kingdom" mindset). Striving for the future means acceptance of the one global rule set and all that the New Economy entails. In the end, then, China's choice on energy is largely a referendum on how it feels about globalization.



Our fourth cosmic conclusion concerns international energy markets and the emerging reality of quasi-hemispheric market patterns. As we noted earlier, what Asia needs in terms of future energy requirements is entirely available either in-region (e.g., coal) or from the central portion of the Eurasian landmass (gas and oil from the Persian Gulf, Central Asia and Russia). These distances are all feasibly conquered by pipelines, and most of the involved SLOCs lie within the reach of what naval forces the major regional powers are likely to possess by 2020.

Meanwhile, the West, which has come to rely less and less on Persian Gulf oil, is likewise becoming more regionally-focused in its energy trade patterns. The U.S., for example, imports more energy supplies from Canada than any other nation, and gets the bulk of its imported oil from North and South America.

None of these statements are meant to suggest that East-vs.-West energy "blocs" are forming. In reality, the regionalization of energy trade occurs *precisely* because the commodities in question are behaving more and more as one would expect of a globally-traded, highly-fungible good. If price determines all, then reducing transportation distance makes sense.

In the end, all of this regionalization (to the extent it is meaningful to even make this distinction) comes about because energy trade is no longer confined to the sort of strategic bilateral relationships of the Cold War era, so the "new rules" of energy are nothing more than that sector's joining up with the global marketplace and losing its special status as a strategic asset.

Having said all that, the U.S. government (and the U.S. military in particular) faces a different security environment in the 21st Century, whether or not it yet realizes the change: our national security interests in the Persian Gulf, while still preeminently important for the *global* economy, no longer hold the same immediate importance to our *national* economy—and that makes for a more complex strategic

environment.

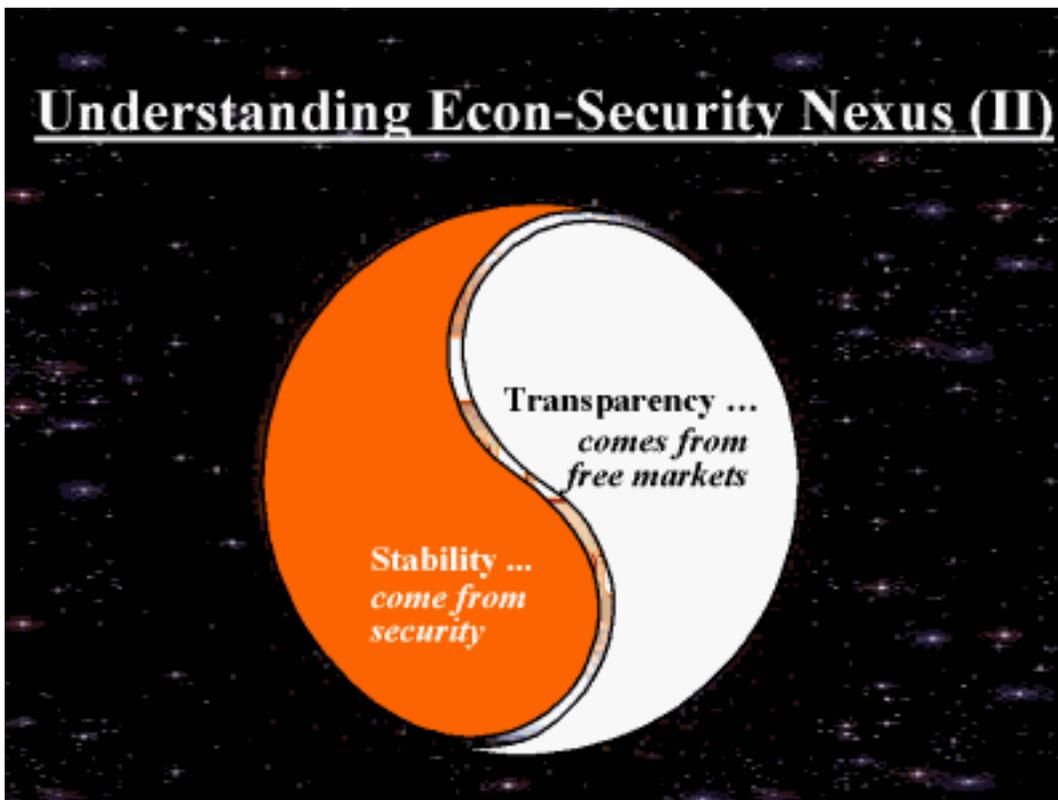


Our fifth and final cosmic conclusion is, in many ways, a larger argument (and advertisement) for the *NewRuleSets.Project* as a whole.

After each of the Economic Security Exercises we've conducted over the past four years, participants walk away from the experience speaking excitedly about a new sense of understanding of the connectivity between the military and economic worlds—namely, how the two work in tandem to provide international stability.

We like to describe this combination effect as the global rule set we've come to understand as the ultimate international peace dividend arising from the end of the Cold War. As stated earlier, the collapse of the Soviet Bloc and its long-standing challenge (or rejection) of the Western economic rule set made possible, really for the first time in human history, a truly worldwide rule set for how military power buttresses and enables economic growth and stability.

How so? For the first time in human history we have a true global military Leviathan in the form of the U.S. military, and no peer competitor in sight—not even a coherent alternative economic philosophy (although one is clearly brewing in the anti-globalization protests witnessed recently in such places as Seattle and Washington DC). This unparalleled moment in global history both allows and compels the United States to better understand the military-economic nexus, in large part because of its complete reversal of priority from the Cold War era. During the strategic stand-off with the Soviet Union, economic might was seen as supporting military power, but now that situation is completely reversed: to the extent that the military matters, it matters because of the stabilization role it can play in the global economy.



How do we define this ying-and-yang relationship between the military and economic worlds?

First we speak of stability, which comes from military security, and then we speak of transparency, which is both demanded by, and engendered by, free markets. These two underlying pillars form the basis of the single global rule set that now essentially defines the Era of Globalization.

Within those two pillars, the U.S. clearly plays a crucial role:

- The U.S. Government, through the U.S. military, supplies the lion's share of system stability through its Leviathan-like status as the world's sole military superpower.
- The U.S. financial markets, which lead the way in fostering the emergence of a truly global equities market that will inevitably operate 24-7-365, play the leading role in spreading the gospel of transparency, in large part because it's any country's best defense against the sort of financial currency crises that have periodically erupted over the last decade (Mexico 1994, Asia 1997, Russia 1998, Brazil 1999, Turkey and Argentina 2001).

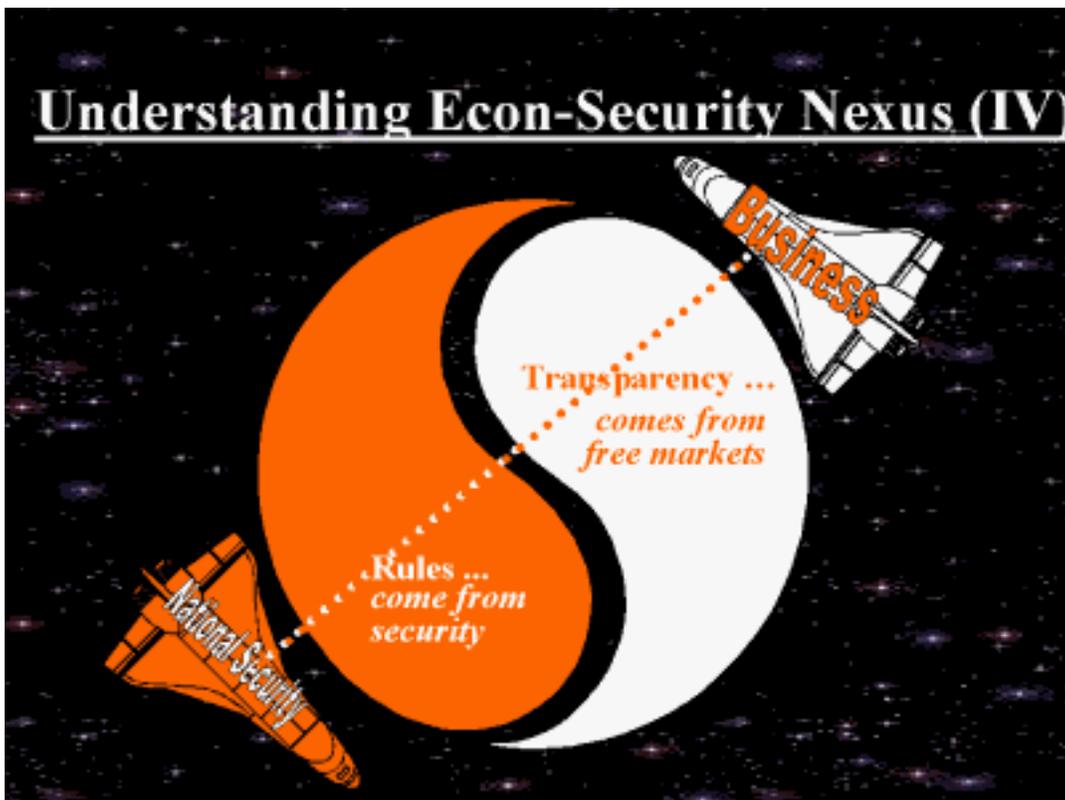
As such, it is essential that these two worlds—military and financial—come to better understand their interrelationships across the global economy.



Uncovering and better understanding this fundamental relationship is especially important because—the vast majority of the time—the military and business communities operate in oblivious indifference to one another.

One's tempted to counter, "So what? They don't need to be aware of one another on a day-to-day basis."

And in a basic sense, that's true. But if you consider the rise of system perturbations as a new form of international security threat in the 1990s, and if you understand that most of these perturbations come in the form of financial crises that can engender serious subnational violence (e.g., Indonesia today), then perhaps this connectivity seems more pertinent. Because ultimately the global economy operates on trust, which is based on certainty, which in turn comes from the effective processing of risk.



In the end, the military and financial markets are in the same business: the effective processing of risk. For the military, it's the risk of conflict and the disruption of normal life by large-scale violence, while in the financial world, it's the risk of bankruptcy (insolvency) and the disruption of normal business by large-scale panics or failures.

Invariably, these two problem sets merge in the increasingly interdependent, IT-driven, globalizing New Economy, so understanding the military-economic connection isn't just good business, it's good national security.

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