

# SNL International Fuel & Water Cooperations

Amy Sun  
April 6, 2008

# The global security dimension

## ENERGY SECURITY

Beijing targets all crude producers, even the global pariahs

May 2006



Neighborhood bully

When it comes to energy, Vladimir Putin's Russia seems prone to loutish behaviour—despite constant claims that Russia is a reliable partner.

December 2006

Don't mess with Russia



## NUCLEAR FUTURES



Nuclear proliferation—How to get a handle on the axis

**North Korea** . . . looks like missing an April 14th deadline . . . to shut down and seal its Yongbyon nuclear reactor. . . . On April 9th, **Iran's President** Mahmoud Ahmadinejad announced to much ballyhoo and the strains of a “nuclear symphony” that its technicians could enrich uranium at its underground plant at Natanz.

April 2007

## SCIENCE



Singapore is investing heavily to transform itself into a knowledge-based economy

. . . [the] government has pledged to more than double the public sector's R&D budget to almost \$12 billion over the next five years . . .

November 2005

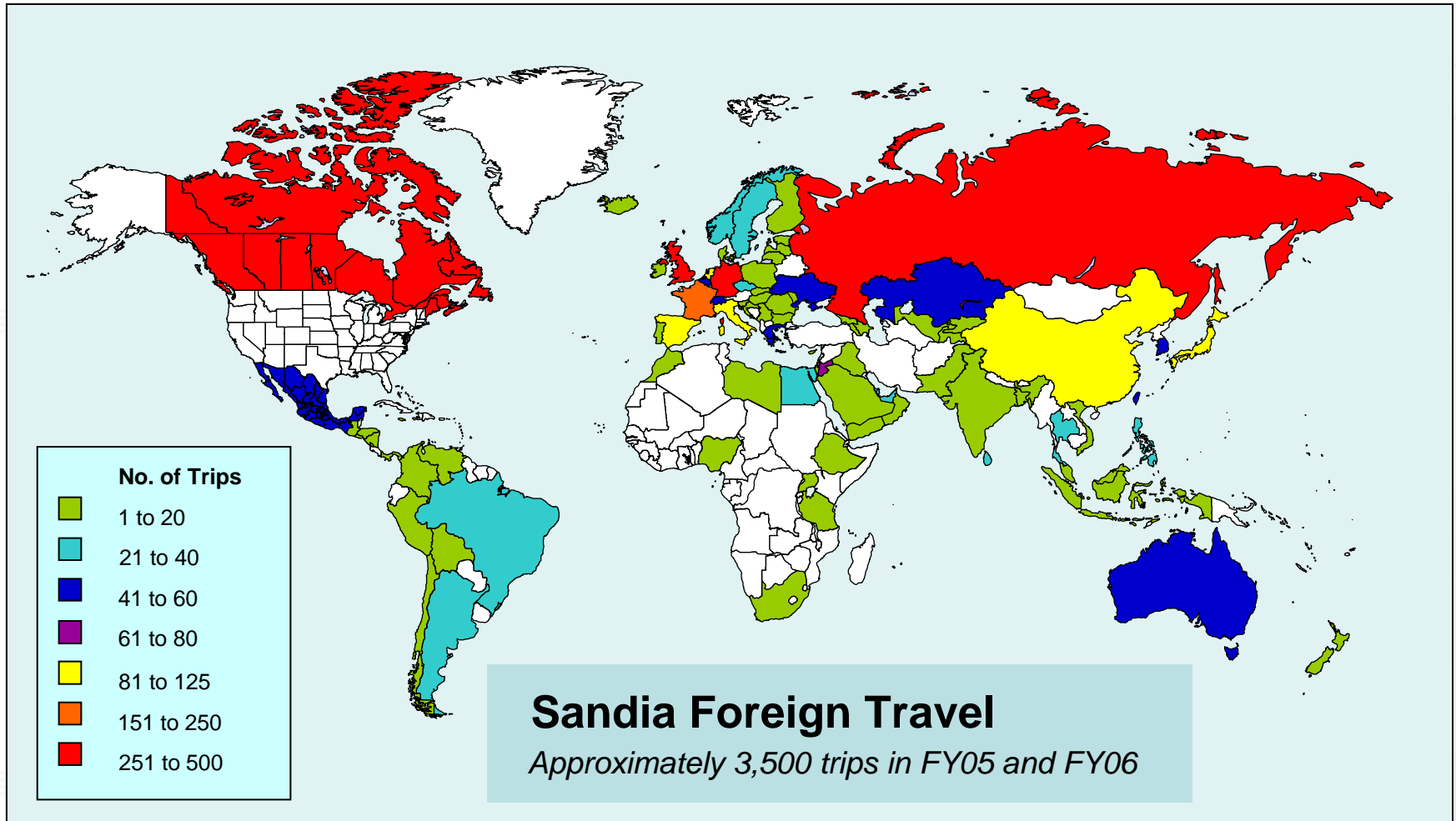
India attracts universities from the U.S.

March 2007



Sandia National Laboratories

# Sandia Global Engagement



# Sandia – Hydrogen



*International Partnership for the Hydrogen Economy*

<http://www.iphe.net/>

- Material testing and demonstrations
- Hydrogen Safety
- Integrated Systems Evaluation
- Risk Management

Australia, Brazil, Canada, China, European Commission, France, Germany, Iceland, India, Italy, Japan, Republic of Korea, New Zealand, Norway, Russian Federation, United Kingdom, United States



# Sandia – Nuclear Energy



## JAEA – Japan Atomic Energy Agency

- Radiation science
- Nuclear safety
- Civilian Nuclear Fuel cycle
- International Fellowship program
- Remote monitoring
- Nuclear transparency
- Nuclear repository science

## Japan



# Sandia – Nuclear Energy



## Korea Atomic Energy Research Institute (KAERI) Korea Hydro and Nuclear Power Company

- Nuclear nonproliferation
- Nuclear waste & spent fuel management
- Nuclear safety

## South Korea



# DOE – China Energy Policy



***“...energy security of both countries will be advanced through international cooperation.”***

***K. Fredrikson, DOE-PI  
August 6, 2006***

12/12/2007 U.S. and China Increase Biofuels Cooperation Ahead of the Third U.S. – China Strategic Economic Dialogue <http://www.energy.gov/news/5770.htm>

9/20/2007 U.S. and China Continue to Increase Cooperation on Vehicle Efficiency <http://www.doe.gov/news/5518.htm>

9/14/2007 U.S. and China Sign Agreement to Increase Industrial Energy Efficiency <http://www.doe.gov/news/5495.htm>

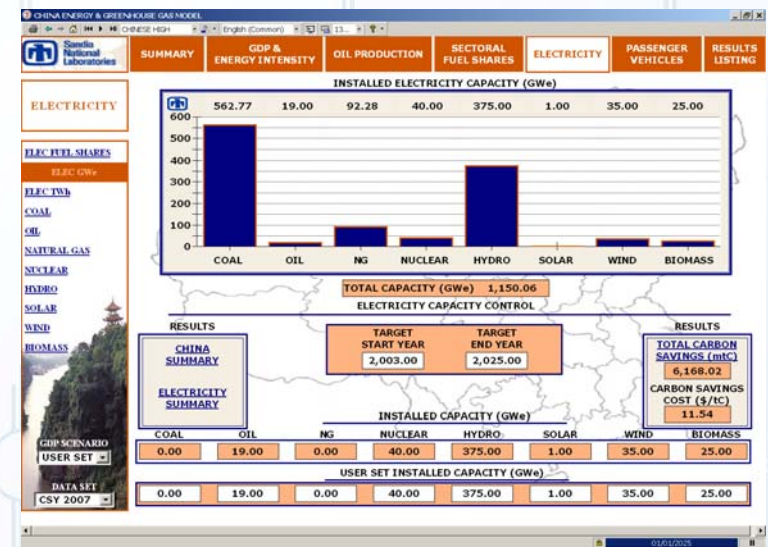
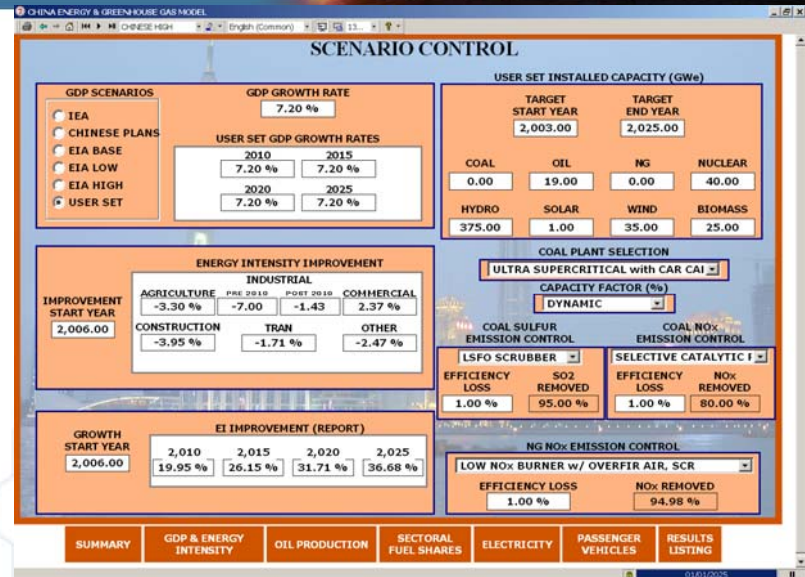
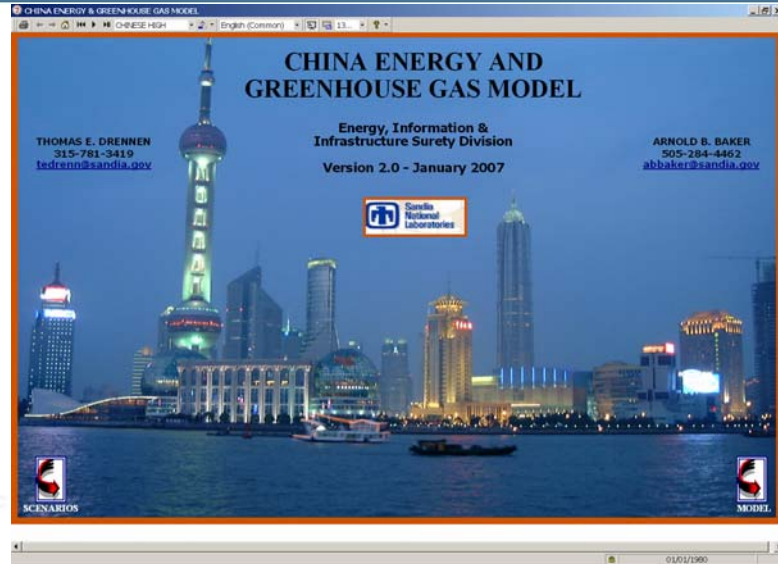
5/22/2007 U.S. – China Energy Cooperation <http://www.doe.gov/news/5080.htm>

12/15/2006 U.S. and China Announce Cooperation on FutureGen and Sign Energy Efficiency Protocol at U.S.-China Strategic Economic Dialogue <http://www.energy.gov/news/4535.htm>





# China Energy and Greenhouse Gas Model



Tom Drennen & Arnie Baker, 2007



# Comparative energy projections for the US and China, 2005 – 2025

	2005	2015	2025
Energy Demand (Quads)			
China	62	106.9	139.9
U.S.	100.2	112.3	124.4
Electric Generating Capacity (GW)			
China	463	912	1030
U.S.	960	960	1076
Carbon Emissions (mtCO <sub>2</sub> )			
China	4515	7668	9910
U.S.	5945	6589	7425
Per Capita Carbon (tCO <sub>2</sub> )			
China	3.4	5.4	6.5
U.S.	20	20.4	21.2
Oil Imports (mbd)			
China	4.3	9.8	13.6
U.S.	10.1	10.5	12.2
GDP Index (2005 = 100)			
China	100	202	308
U.S.	100	133	177

# Sandia - Water

## *Middle East*

- First technical meeting of Euphrates-Tigris Initiative for Cooperation (ETIC) members, SNL, UNESCO and United Nations University for 1<sup>st</sup> workshop in 2006
- Iraq National Water Systems Modeling: collaboration between Iraq Ministry of Water Resources (MoWR), US DOS Iraq Transition Assistance Office (ITAO), and SNL



# Sandia - Water



- *Singapore*: collaboration in water security
- *China*: UNESCO-Peking University water ethics working group



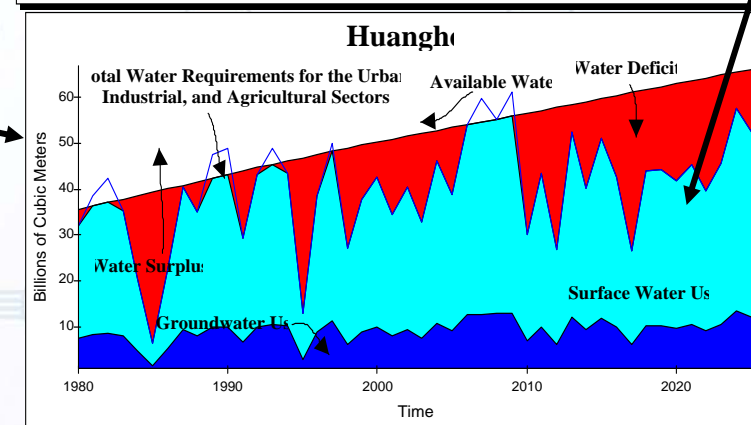
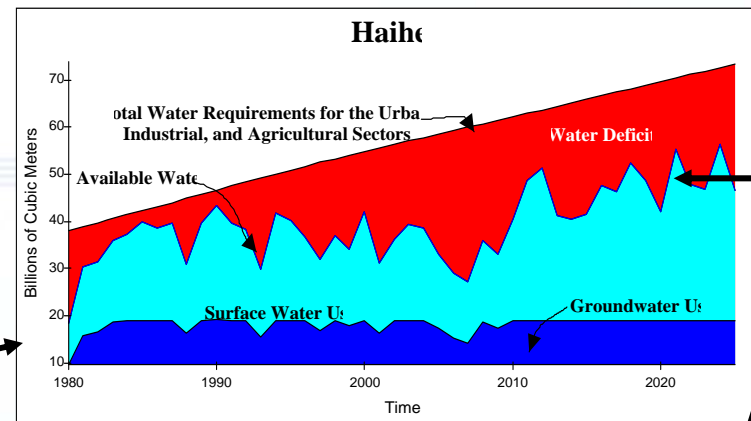
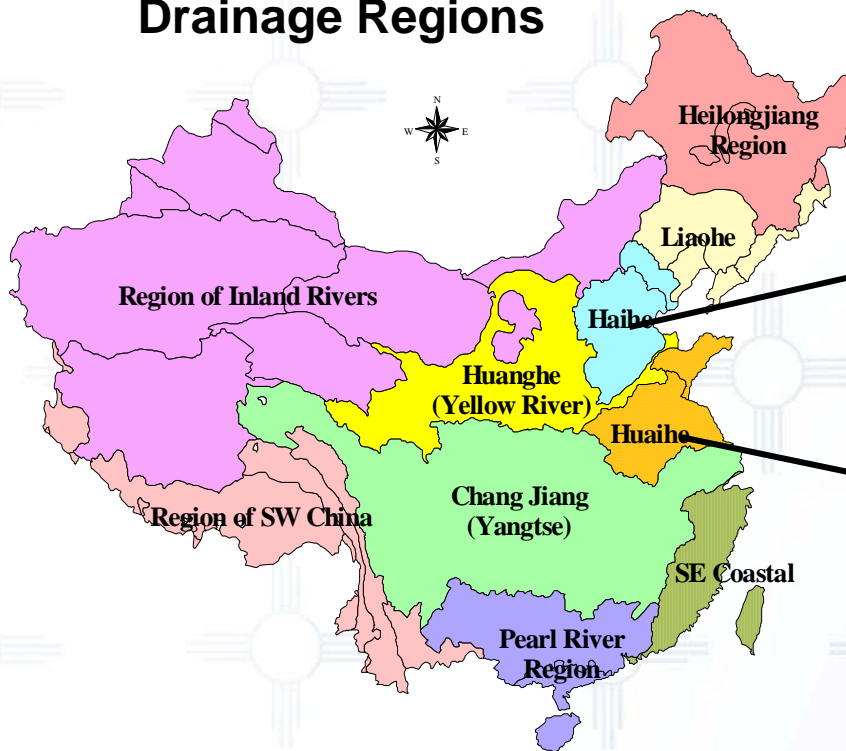
East Asia

# China Water & Agronomic Model

*“China may soon emerge as an importer of massive quantities of grain -- quantities so large that they could trigger unprecedented rises in world food prices.”*

excerpt from ***Who Will Feed China?* by Lester Brown, 1995**

## Drainage Regions




**Water Deficit**



*New York Times, September 28, 2007*

## **“Beneath Booming Cities, China’s Future Is Drying Up”**



SHIJIAZHUANG, China — Hundreds of feet below ground, the primary water source for this provincial capital of more than two million people is steadily running dry. The underground water table is sinking about four feet a year. Municipal wells have already drained two-thirds of the local groundwater.

