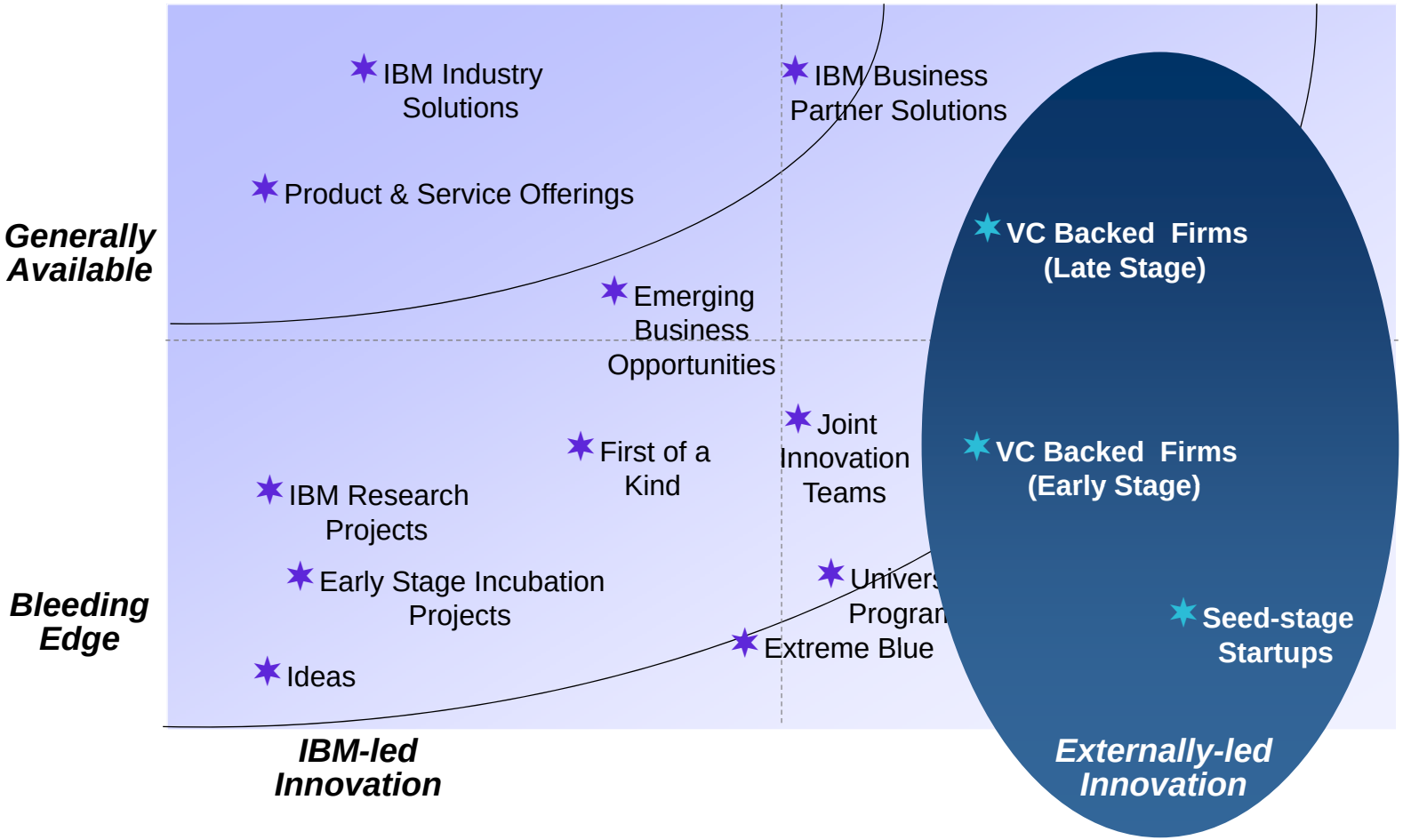
Innovation Ecosystem for a Smarter Planet

Andrew Clark
Director of Corporate Strategy
IBM Venture Capital Group

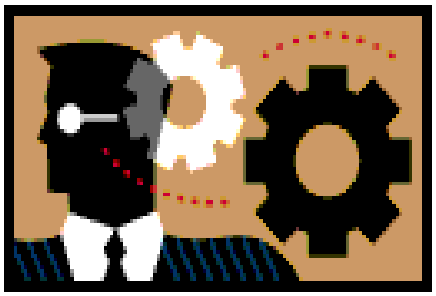
Innovation at IBM is a Spectrum of Activities



IBM's Venture Capital Group: Seeding Future Growth

Mission: *C*reate and manage relationships with venture capitalists and their portfolio companies to leverage external innovation for IBM's strategic advantage and revenue growth

Innovation Gearbox



- Drive early insights into IBM's strategy development
- Develop ecosystems for IBM's platforms
- Build strong partner foundations in emerging markets
- Develop solution partnerships
- Develop acquisition pipeline
- Advise IBM's clients with their innovation

Innovation Sourcing: Evolution of Corporate Venture Capital

- With greater globalization, innovation has become the new currency of competition. A robust innovation strategy includes both internal initiatives and mechanisms to access external innovation, including collaborations, partnerships, acquisitions, joint ventures, licensing and investments in emerging venture-backed companies.
- Corporate VC is a vital component of the innovation strategies of winning corporations around the globe. With the exception of more developed economies, corporate venturing in emerging market based corporations is practically absent.
- *Sourcing innovation* from start-up companies through a venture network or corporate VC business unit is one of the key success factors on the path to long-term value creation.

IBM's Approach: Innovation Networks

- Corporate innovation requires a more collaborative, flexible and open model with many innovation partners – including VC funds and their portfolio companies
- Benefits of this approach include an ability to combine internal and external sources of innovative ideas, increased efficiency in converting innovation into products and services and better risk management through partnerships and collaboration.
- Given their resource constraints, small companies naturally look for outside help to address challenges and maintain focus on core
- Emerging growth companies are increasingly among the key drivers of innovation as they maintain laser focus on important niches

Net: Large corporations need innovation; small companies need market access. Innovation networks provide a structure for them to combine strengths successfully in the marketplace

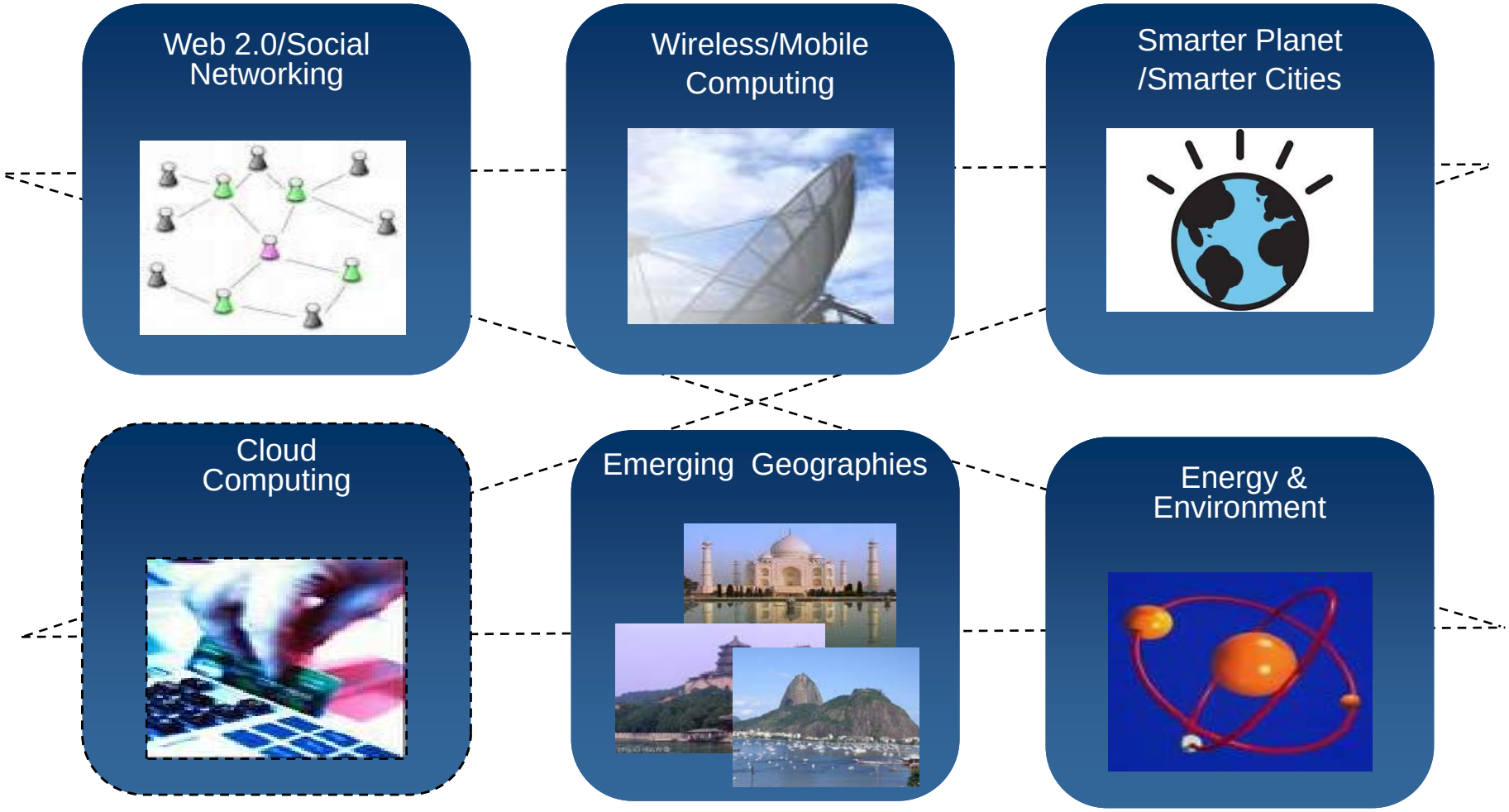
Example: IBM Greentech Venture Advisory Network

An Innovation Network Focused on Cleantech/Energy

- **Ecosystem Wide.** A value-added offering to our global VC partners intended to help create a action-oriented dialog around Green technologies, while catalyzing and accelerating innovation to the marketplace.
- **Market-Driven.** The Network will give this select group of VCs the ability to share with IBM their most promising portfolio companies, while gaining faster-path access to key decision-makers across IBM's energy-related businesses as well as entrée to IBM's vast partner ecosystem.
- **Industry On-Ramp.** Member portfolio companies have preferred access to the SAFE industry framework, a standards-based software platform that streamlines integration with Utilities and the smart grid while providing a powerful go-to-market vehicle
- **Low Carbon.** While we do have in-person meetings, this a primarily a *virtual innovation network*, where much of the value is exchanged through Web-based collaboration and social networking capabilities.

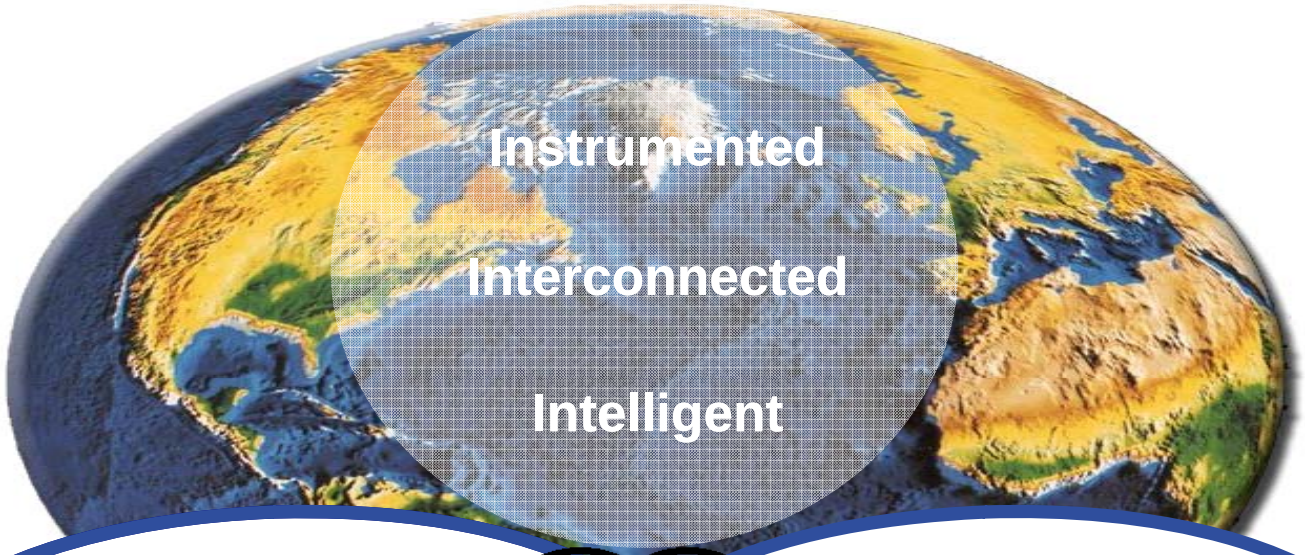
For IBM, the network becomes a sounding board for new ideas, as well as an efficient means of harnessing the best new technologies and business models

Capturing and Driving Insights into IBM

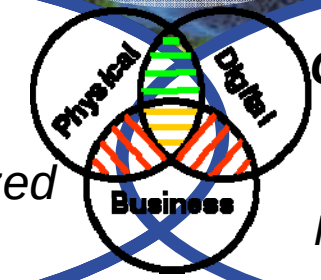


VC Investment Themes Across Smarter Planet

Energy and Environment | **Government** | **Healthcare Life Sciences** | **Financial Systems** | **Manufacturing and Electronic Supply Chains**



New Cloud Computing Model
Open, Flexible, Virtualized and Services Based



Globally Connected "Flat" World
China, India, Brazil, Russia … plus 25 more

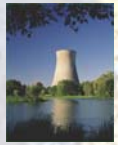
Smarter Planet Examples – Where IBM and VCs are Aligned

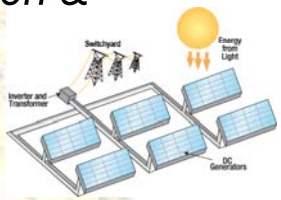
Intelligent Transportation Systems

Sustainable mobility solutions

Intelligent Utility Networks

Efficient energy transmission & distribution networks





Energy Efficient Technologies and Services

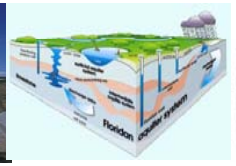
Green Systems/Data Centers

Carbon Management

Enterprise Carbon Footprint Management and Cap-and-Trade Schemes

Advanced Water Management

Sustainable Water Networks



China VC: Target Areas for Cleantech Investment

- Renewable energy including wind, solar, bio-fuels
- Energy efficiency
- Smart Grid and Smart Buildings
- Water resources and Water treatment
- Clean Development Mechanism/ Certificate of Emission Reduction
- New Materials
- Food and agriculture
- Clean production
- Waste management
- Resource management
- Environmental information management systems

Source: Tsing Capital, China Environment Fund (C

中国环境基金 CHINA ENVIRONMENT FUND

Energy and Environment

- China is the largest clean technology market in the world, with a market value of over $200 billion in environment protection and renewable energy industries alone,
- Cleantech in China has "gone from niche to mainstream" since 2006, and is growing at a rate of more than 20 percent annually.
- Since most of the vast cleantech market in China remains untapped, the country's policy incentives, such as the latest environment tax, are attracting a lot of investment.
- Statistics from Cleantech China Research show that cleantech venture capital (VC) grew from a bit over $400 million in 2006 to more than $550 million in 2007, and is expected to reach over $720 million in 2008.
- Energy generation will become the most popular segment of cleantech VC in the 2007-2008 period, followed by water and then energy efficiency segments.
- Government spending on cleantech is snowballing.
  - China has tripled its government investments on cleantech to 1.35 trillion yuan in the past decade, and boosted the share of cleantech spending in gross domestic product (GDP) from 1.3 percent to 1.5 percent.
- As for the areas of cleantech investment, $172 billion has gone to environmental protection - 37 billion for desulphurization, 25 billion each for industrial waste water treatment and vehicle exhaust gas, and 22 for municipal waste water treatment
- In the renewable energy sector, $2.8 billion has been invested in wind, $8.1 billion on solar thermal energy, $1.7 billion on solar PV, $3.1 billion on ethanol, and 1.3 billion on biodiesel
- For its Five-Year Plan (2006-2010) period and in the long term, China has set two targets. The first is achieving at least 10 percent of total energy consumption from renewable energies by 2010, and the second is boosting the proportion of renewable energy consumption against primary energy consumption from 10 percent to 16 percent by 2020.
- Meanwhile, the government wants to reduce energy consumption per 10,000 yuan of GDP

Focus Area: Smart Buildings

- The US DOE has estab;lished a research partnership with China making buildings more energy efficient.
- MOU between DOE and China's Ministry of Urban-Rural Development calls for the two to share expertise on efficient building technologies, including high-performance HVAC, insulation, lighting, cold storage, geothermal heat pumps, building-integrated photovoltaics and solar thermal systems.
- US and China will commit an initial $15 million for the clean energy research center, focused on efficiency for buildings, clean vehicles, renewable energy and cleaner coal-fired power plants, including carbon capture and storage technologies.
- Result is a possible joint project in China to build green buildings, in support of China's "eco-cities" integrated green cities that are sustainably designed, use renewable power and have efficient and modern transportation systems.
- Together, China and the United States are responsible for about two-fifths of the world's greenhouse-gas emissions, and China recently surpassed the U.S. to become the world's top emitter. With its dependence on coal-fired power generation, China will have to make big strides to reduce its energy-related greenhouse-gas emissions to move the planet toward an overall reduction in global warming.
- Given that China is expected to build the equivalent of the United States' entire building stock in the next 15 years, it's a market worth focusing on,
- The Chinese opportunity is not going unnoticed by the bigger players in the industry. U.S. utility Duke Energy is working on developing deals with Chinese companies on renewable energy, smart grid and cleaner coal-fired power generation projects
- IBM has projects underway in China related to building energy efficiency systems and smart grid efforts
- Protecting intellectual property could be a concern for U.S. companies seeking Chinese green business opportunities. The U.S. Chamber of Commerce in May formed a coalition aimed at protecting IP on clean energy and other technologies in the context of global cooperative research such as that the DOE is championing in China.

It Takes an Ecosystem…Collaboration is Key to Solving Global-Scale Energy Issues

- Top companies in China and the U.S. plan have been collaborating for about six months on a plan that would push the two countries in the forefront of adopting clean technologies
  - The effort has included companies like Boeing, GE, Suntech, and BYD.
- Capital from the two nations and private sector IP would be used to massively expand China's solar, wind, carbon capture and smart-grid markets in a move that could be as groundbreaking as the commercialization of the Internet
- Likewise, IP and know-how from China will be exported and licensed to US and Europe to help those countries meet the challenges they similarly face
- The technologies would look to make use of the coal dependence of the two countries be investigating coal gasification and carbon capture and storage.
- China’s biggest electric utility China Huaeng Group built China’s first carbon dioxide capturing demonstration facility and has a carbon dioxide capturing facility under construction at one of its coal-fired power plants in Shanghai, expected to capture carbon for $40 per metric ton, compared to $100 at a similar facility in the U.S.
- Britain is also trying to get in on the action. UK's Carbon Trust launched a £10 million low-carbon technology investment joint venture to help British firms develop clean technologies in China, according to the Guardian.

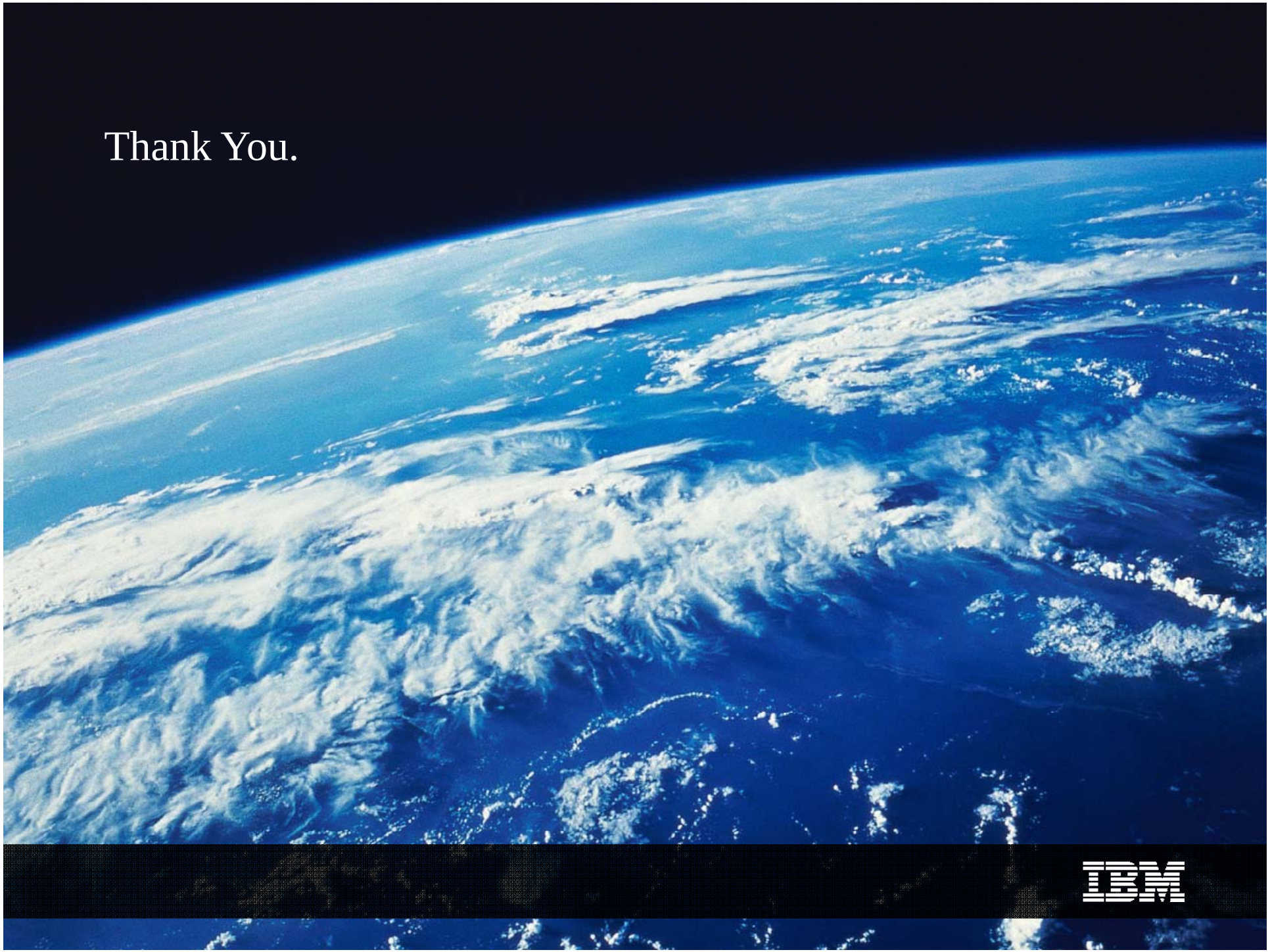
Key Focus Area: Coal Gasification

- Charlotte, N.C.-based Duke Energy Corp. and Beijing-based China Huaneng Group are comparing notes regading generating electricity from gasified coal, wind and other resources.
- A focal point of the discussions will be technologies that capture and sequester carbon dioxide -- the main heat-trapping gas that contributes to global warming -- from coal power plants. China and the United States rank as the world's top two CO2 emitters, respectively, and use coal to generate most of their electricity.
- Huaneng operates China's first carbon-capturing demonstration project in Beijing and plans to bring a larger-scale carbon-capturing facility online in Shanghai later this year.
- Huaneng is also building the "GreenGen" project -- a 250-megawatt integrated gasification combined cycle (IGCC) power plant near the port city of Tianjin -- which would produce electricity more efficiently than a conventional coal burner. Huaneng's GreenGen Co. subsidiary plans to more than double the IGCC plant's capacity and capture and sequester about 80 percent of its CO2 emissions.
- The project would be capable of capturing between 1 million and 1.5 million tons of CO2 annually
- Duke and Huaneng will be able to mitigate climate change and drive down the cost of "clean energy" technologies by working together.

"We both have the scale and mass to push the global industry forward in the development of clean technologies,"

Summary - The Need for an Innovation Ecosystem

- Given the present world economic crisis, the need for partnerships between emerging growth companies and large multinational corporations has become even more critical for both sides
- External innovation, shared risk, availability of capital, access to markets and faster development, and deployment of technology based products are some of the key drivers
- The current challenges in certain sectors, such as Energy and Environment, have created the need not only for partnerships, but a true *innovation ecosystem* that spans VCs, startups, academia, enterprises, industries and governments


Thank You.
IBM