



***Panel: Venture Capital and Alternative
Energy Investment: Long Term
Commitment or Temporary Volatility***

Date:
November 16, 2006

Presented by:
John Balbach
Cleantech Group, LLC

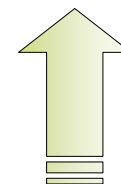
***NAESCO 23rd Annual Conference
Dallas, TX***

The Cleantech Group

Track Record



- Defined, introduced and popularized cleantech to investment markets worldwide
- Tracked \$12B in cleantech venture investments; \$94B in M&A transactions; 100 IPOs since 1999
- Identified, educated and relationships with more than 1200 cleantech investors worldwide
- Directly sourced over 1000 new deals for our members
- Facilitated \$500M in early and growth stage financings
- Launched Cleantech Venture Network, Cleantech Advisors, Cleantech Indices



Cleantech Venture Network Advisory Board Members



Citigroup Venture Capital Equity Partners



Cleantech Defined



Cleantech encompasses

knowledge-based technologies, products and services which:

- **Optimize use of natural resources,**
- **While reducing ecological impact and**
- **Adding economic value** by significantly lowering cost and improving profitability

Market Dynamics

- Similar to hightech and biotech as investment theme; investment returns on par with other categories
- Significantly larger market potential than IT and Biotech combined; trillions spent annually on power, fuel, water, housing, transport
- Rapidly moving from niche to mainstream: Cleantech now 3rd largest venture investment category, with over 13% market share in North America; 18% in Europe
- Recently surpassed telecommunications

Scalable Opportunities

Air

Water

Energy

Agriculture

Manufacturing

Transportation

Materials Recovery

Advanced Materials



Evolution

From Enviro to Green to Clean



'Enviro' & 'Greentech' 1970s - early 1990s



Cleantech 1999 – Today

- Regulatory driven market
- Compliance-based purchasing
- “End-of-pipe” tech, e.g. scrubbers on smoke stacks
- Chemical science
- Traditional engineering
- Slow growth markets, e.g. waste management
- “Save the world” mentality
- Low use of IT

- Economic market drivers
- Productivity-based purchasing
- “Front-of-pipe” tech, e.g. zero emission plants
- Biological & materials science
- Systems design & engineering
- Rapid growth markets, e.g. solar energy
- “Entrepreneurial” mentality
- High use of IT

Cleantech Examples



Agriculture - bio-based materials, farm efficiency technologies, micro-irrigation systems and natural pesticides

Energy - distributed and renewable energy generation and conversion (including fuel cells, geothermal, wind and photovoltaics); energy management systems; superconducting transmission; energy storage and power quality; key enabling technologies; and related Internet and information technology-based services

Manufacturing - advanced packaging; high value materials recovery; natural chemistry; sensors; smart construction materials; and precision manufacturing instruments.

Transportation - hybrid vehicles, lighter materials, smart logistics software

Water - water recycling and ultra-filtration systems (UV and membrane based systems), sensors and automation systems and desalination equipment



What is driving this market?

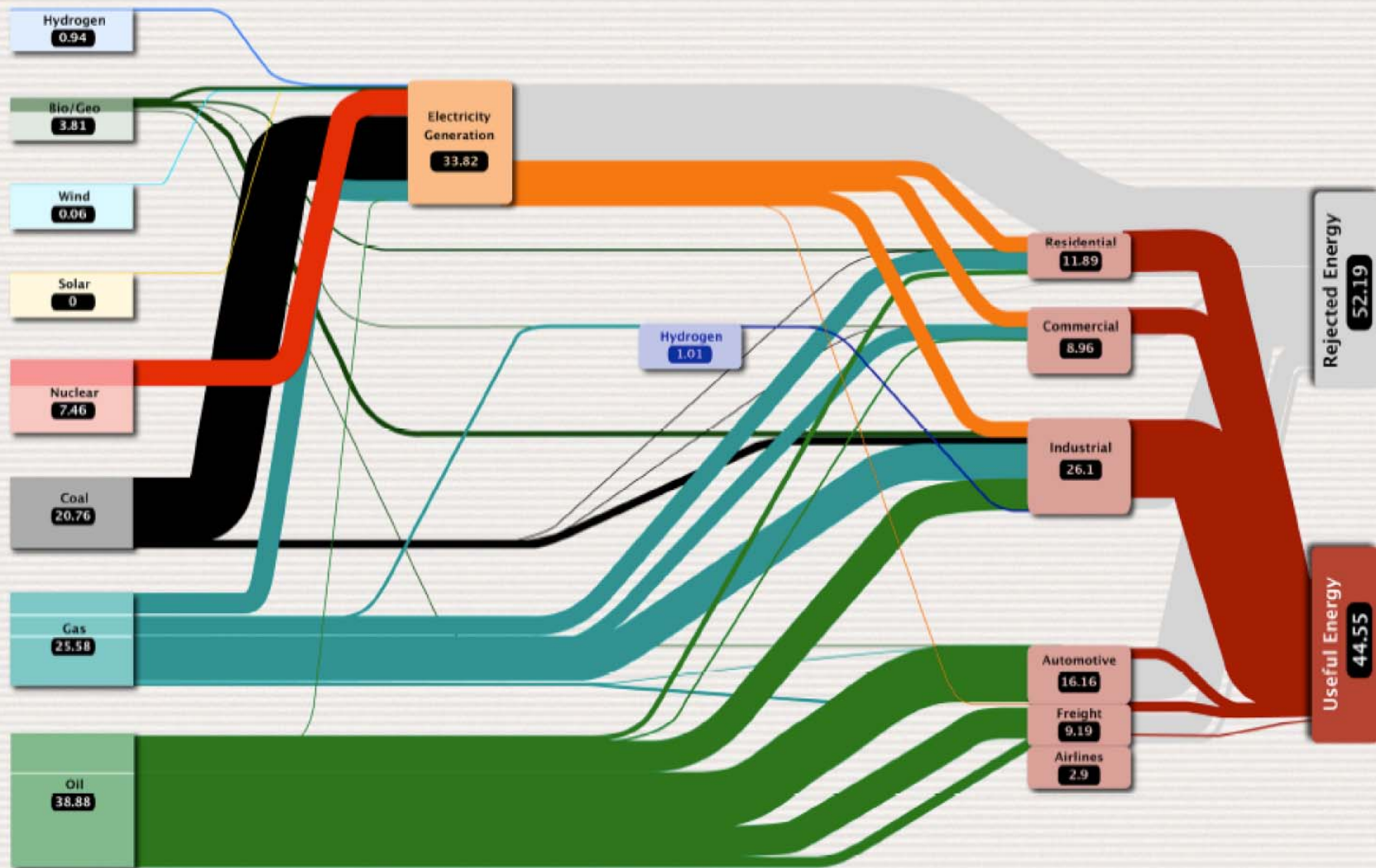
Few Key Drivers for Clean Energy



- **World energy consumption doubled between 1970 and 2002 with expectation for further 57% increase by 2025 (EIA 2005 and IEA 2006)**
- **Electricity demand in the US is expected to increase by 50% over the next 25 years from 4 trillion kWh in 2005 to 6 trillion kWh in 2030 (EIA 2006)**
- **Using current technologies, meeting this demand would require the building of 350 new powerplants**
- **Renewables currently meet only 6%**

U.S. Energy Flow Trends

Y: 2005 (units in quads)

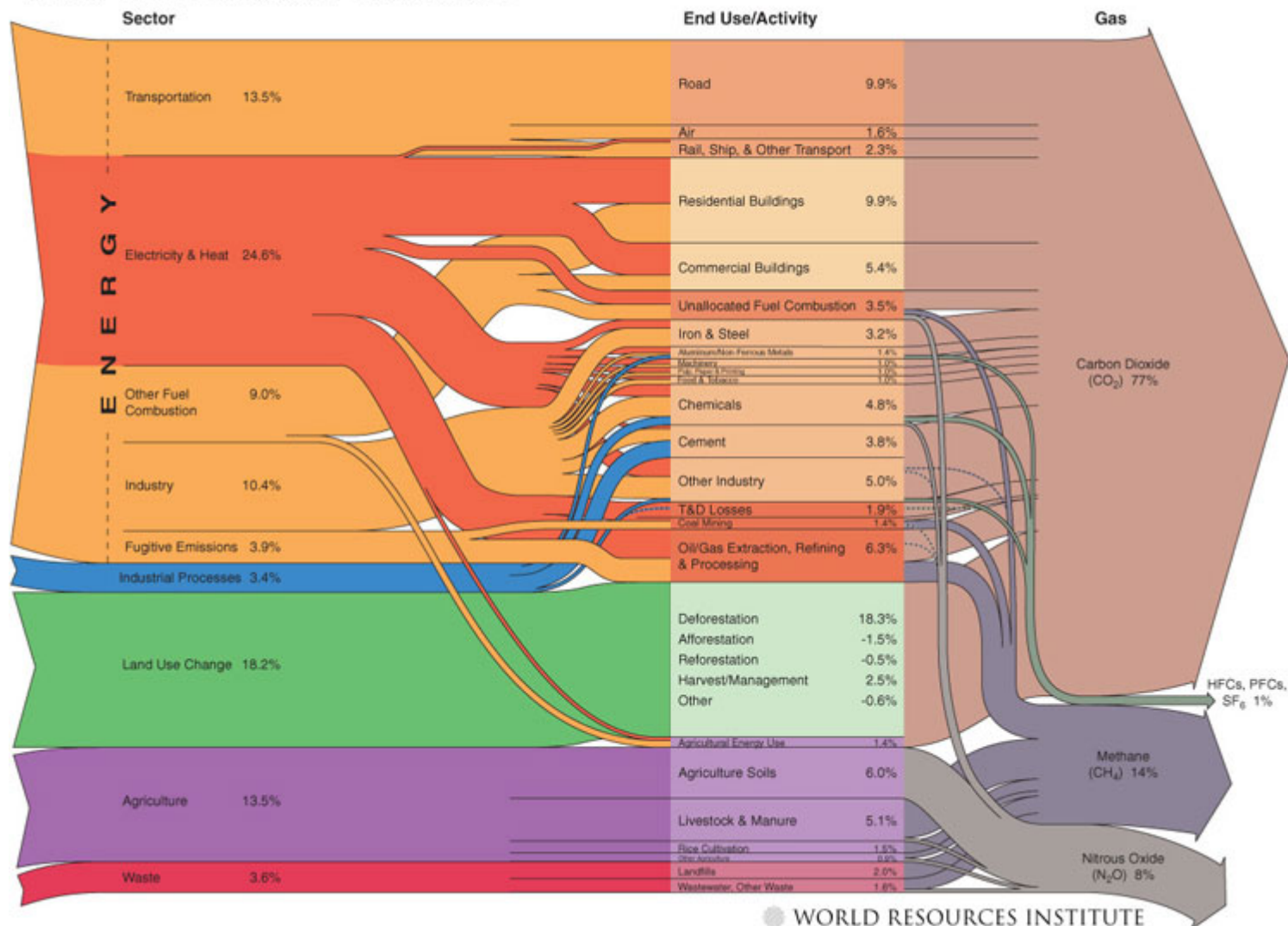


Source: Lawrence Livermore National Laboratory

Carbon as Currency

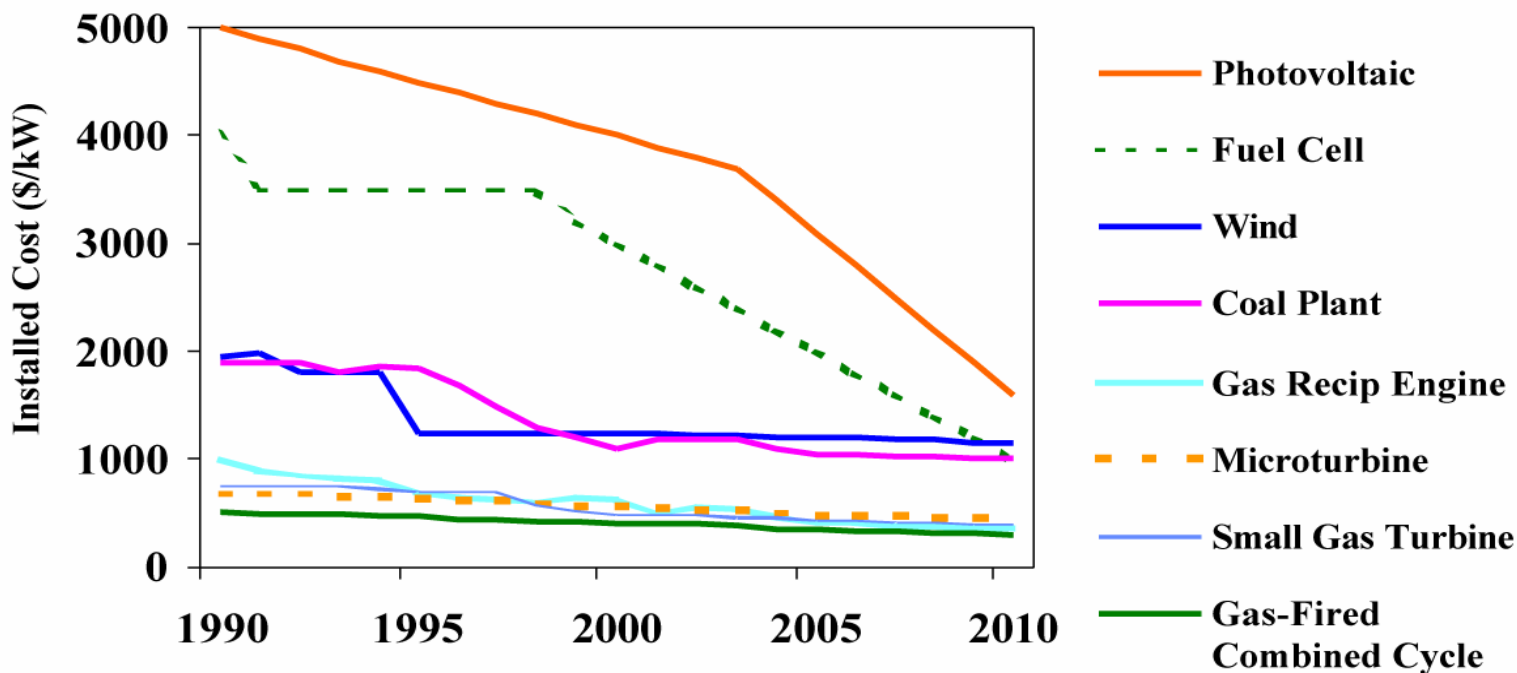


World GHG Emissions Flow Chart



WORLD RESOURCES INSTITUTE

Energy & Power Tech Becoming More Cost Effective



Improvements in technology and mass production will drive costs down further

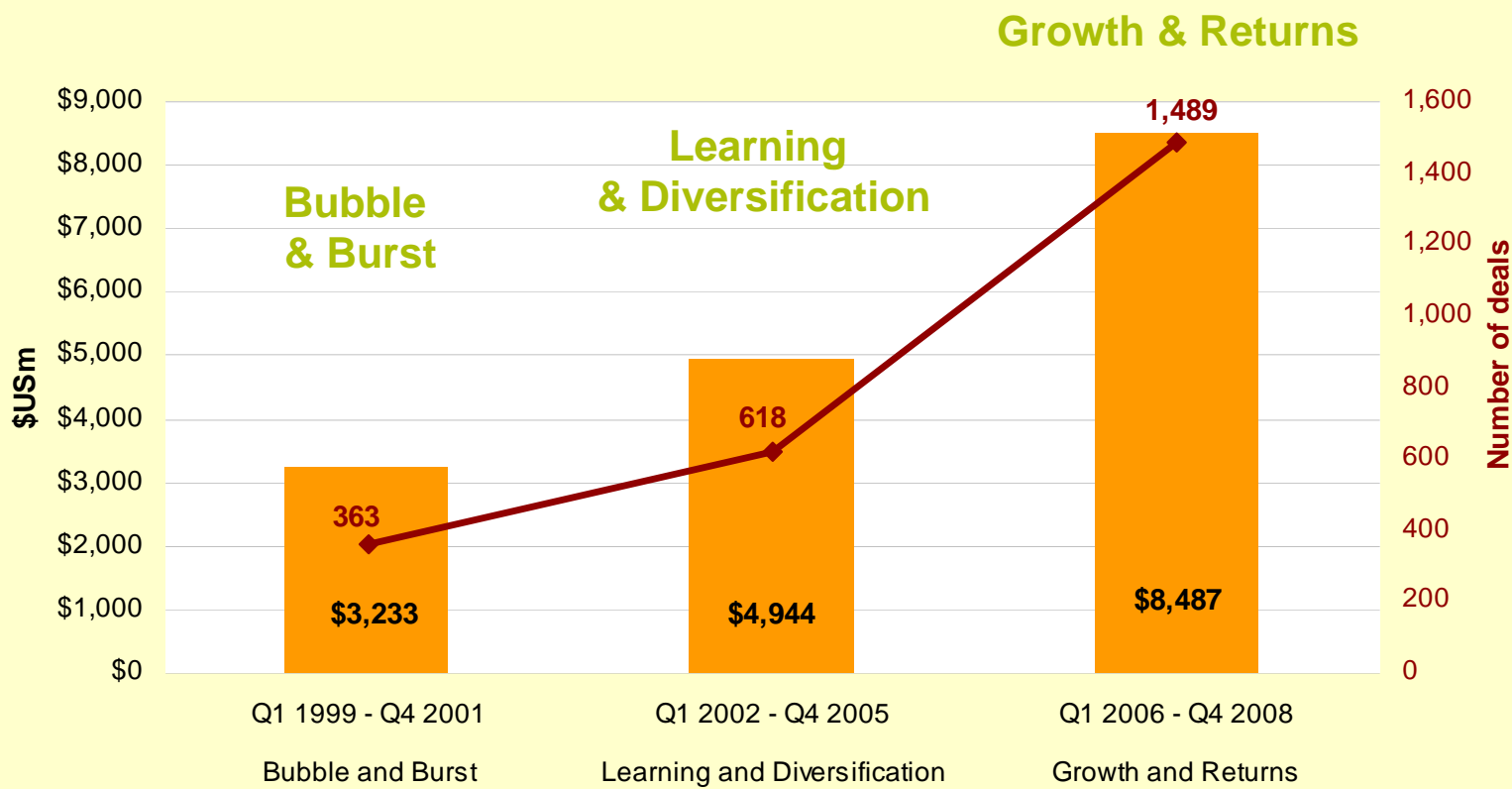


Cleantech Venture Capital

Cleantech Investment Periods



Three periods of cleantech, \$ amounts and numbers of deals invested Q 1999-Q2 2005 and projected for Q3 2005-Q4 2009

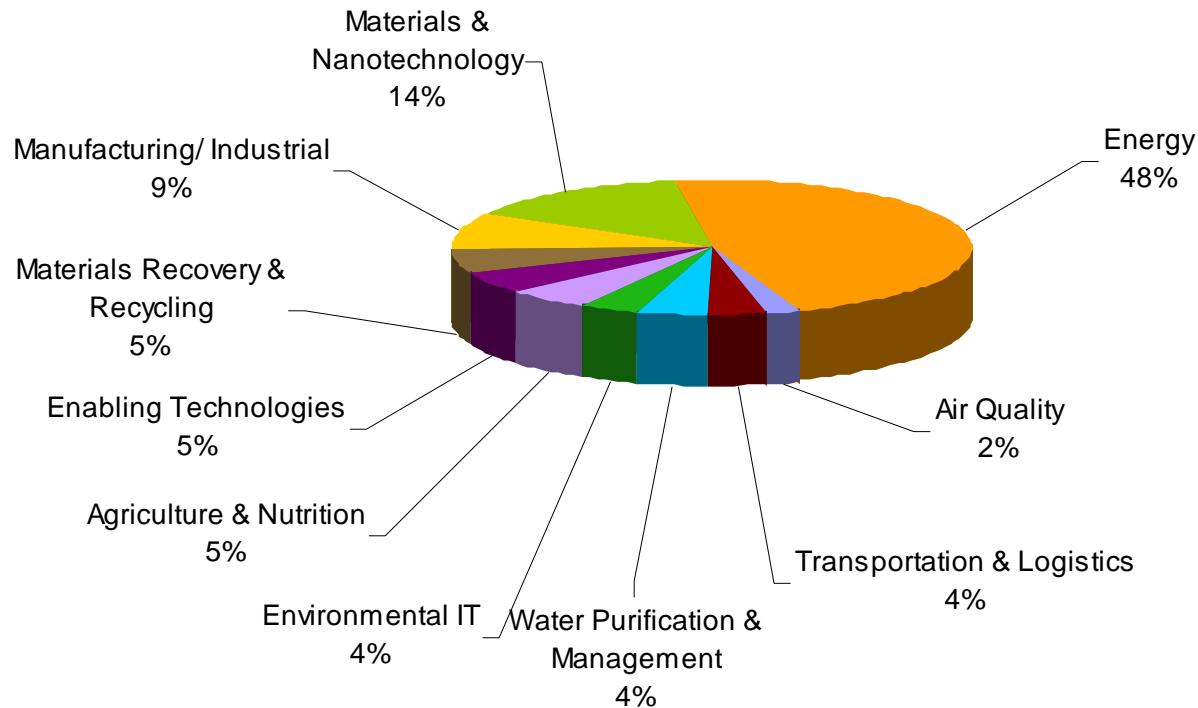


Investment by Segment

North America



Cleantech segments: by amount invested 1999 - Q2 2006

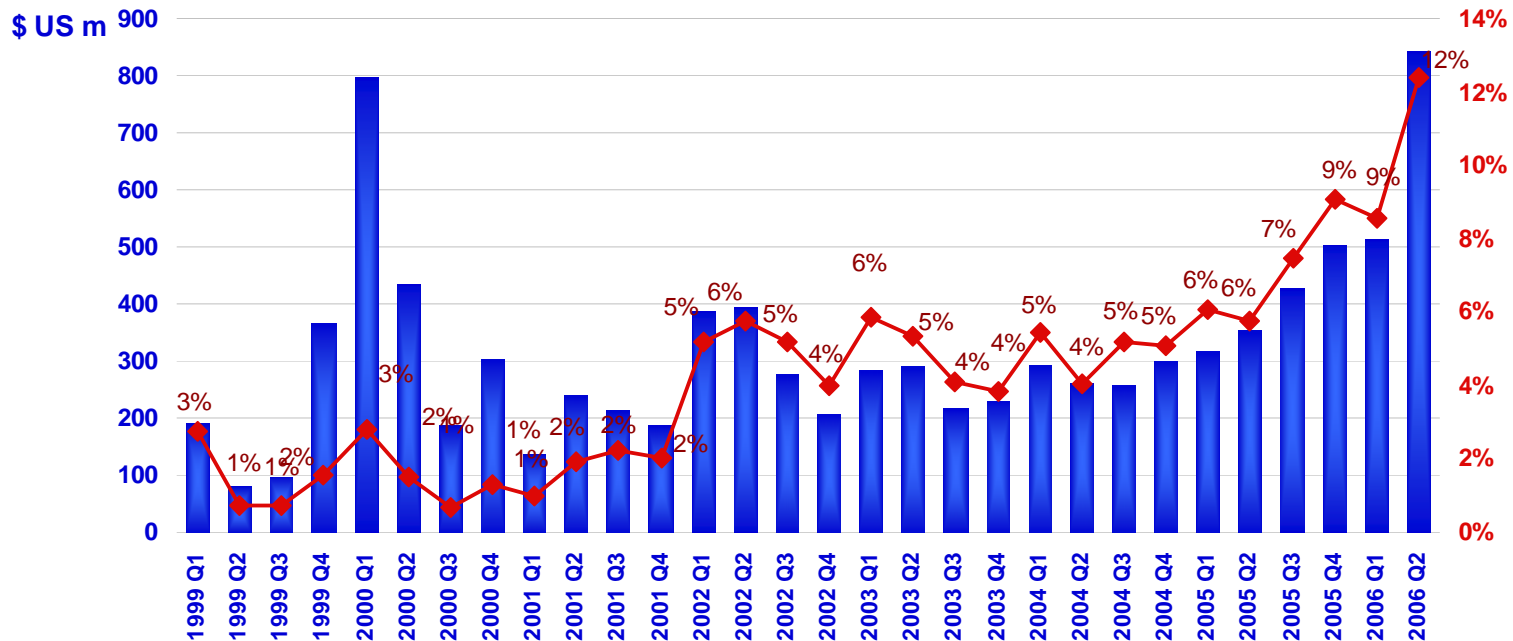


Energy-related deals are leading: 48% of total cleantech by amount.

Cleantech % of total Venture (1999- Q206)



U.S. and Canadian Cleantech Venture Deals by Quarter and as a percentage of total VC (by amount), 1999-Q2 2006



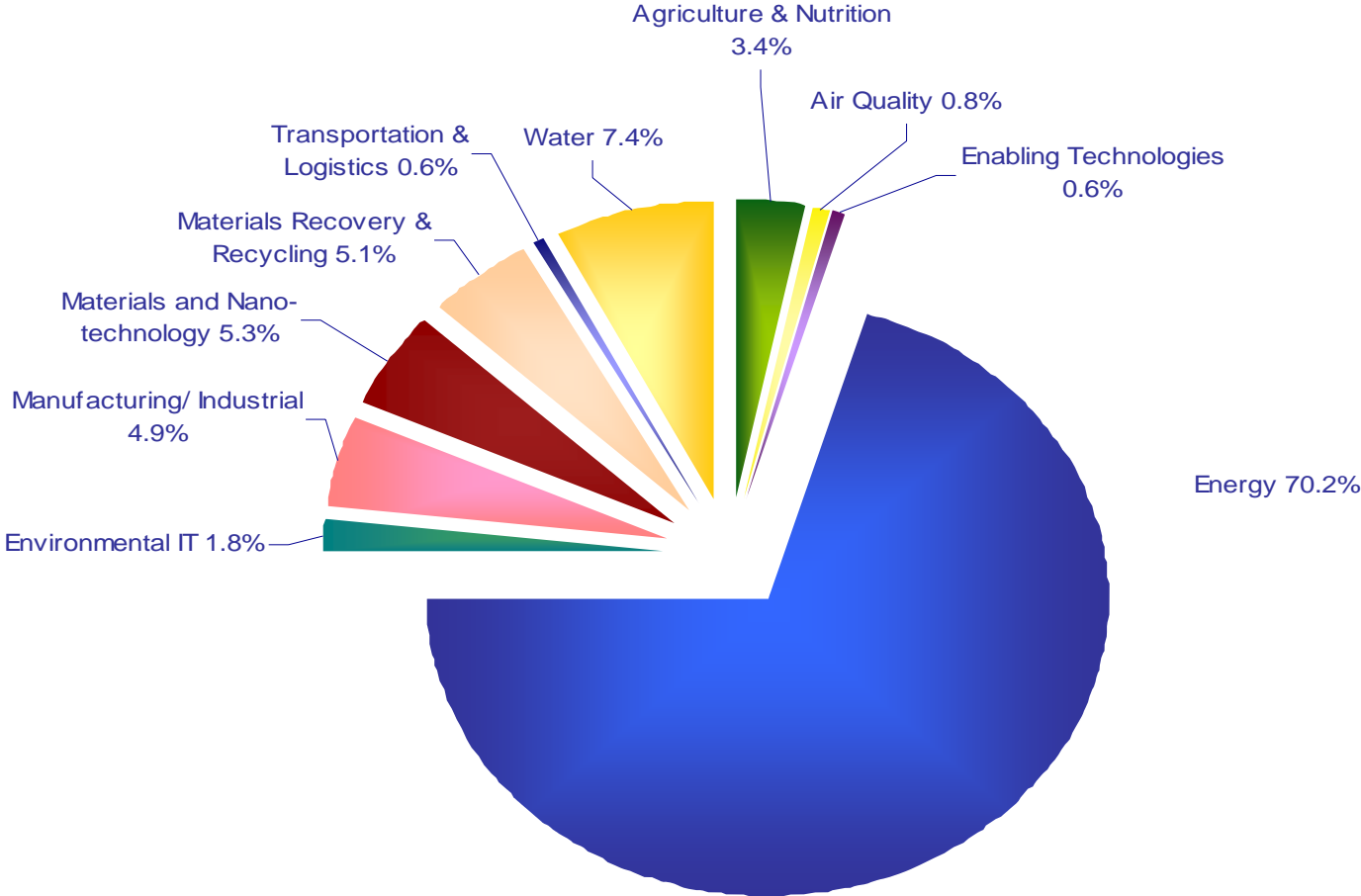
**Cleantech is growing as an investment category:
Now receiving 12+% of all VC in North America**

European Cleantech

Investment by Segment



2003-Q2 2006: Cleantech Venture Amounts Invested by Segment

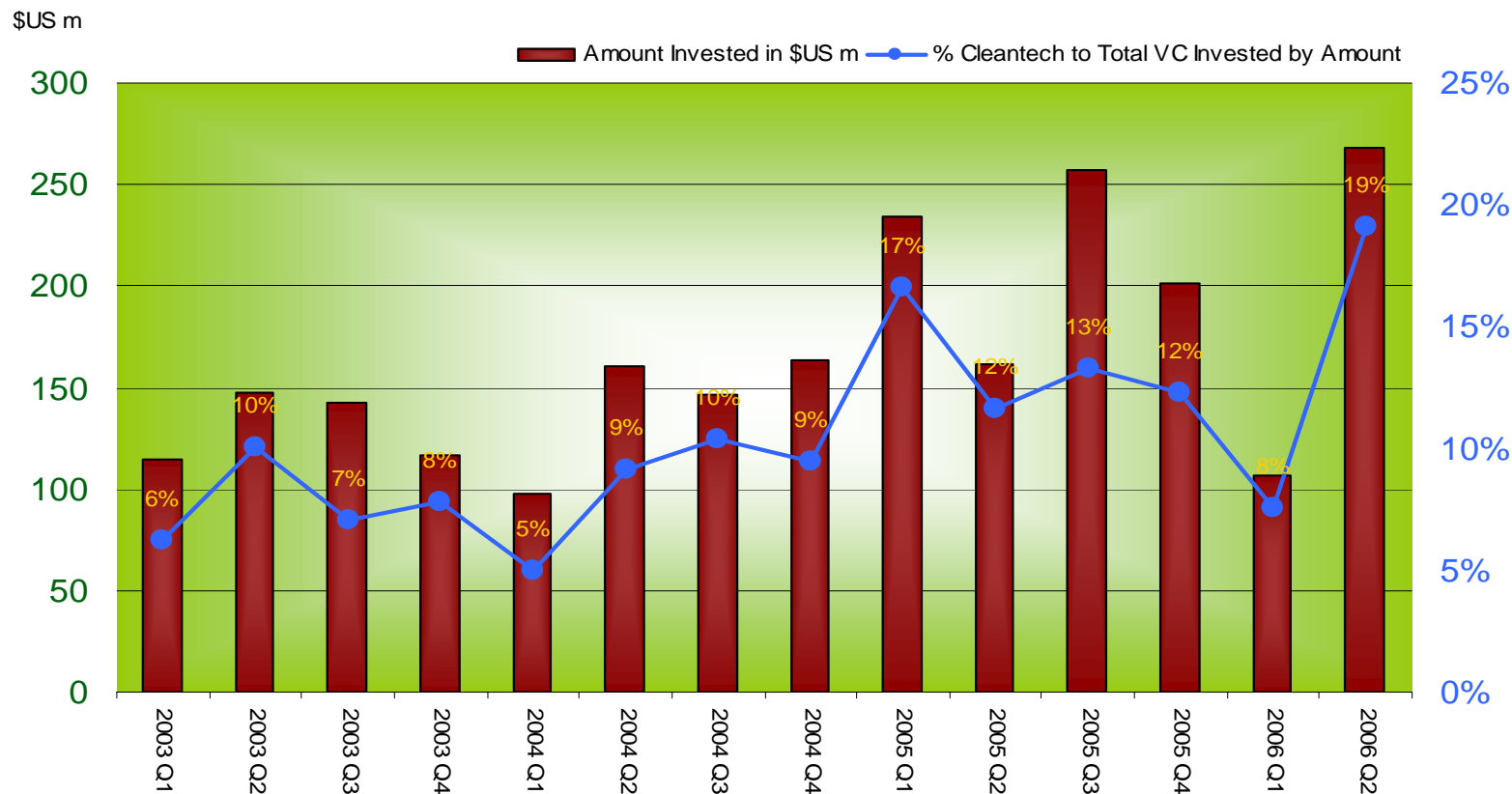


Energy-related deals are dominating with 70.2% of total cleantech by amount.

European Cleantech Investments & as a Total of European VC



2003-Q2 2006 European Cleantech Venture Investment/ Percentage of Overall VC

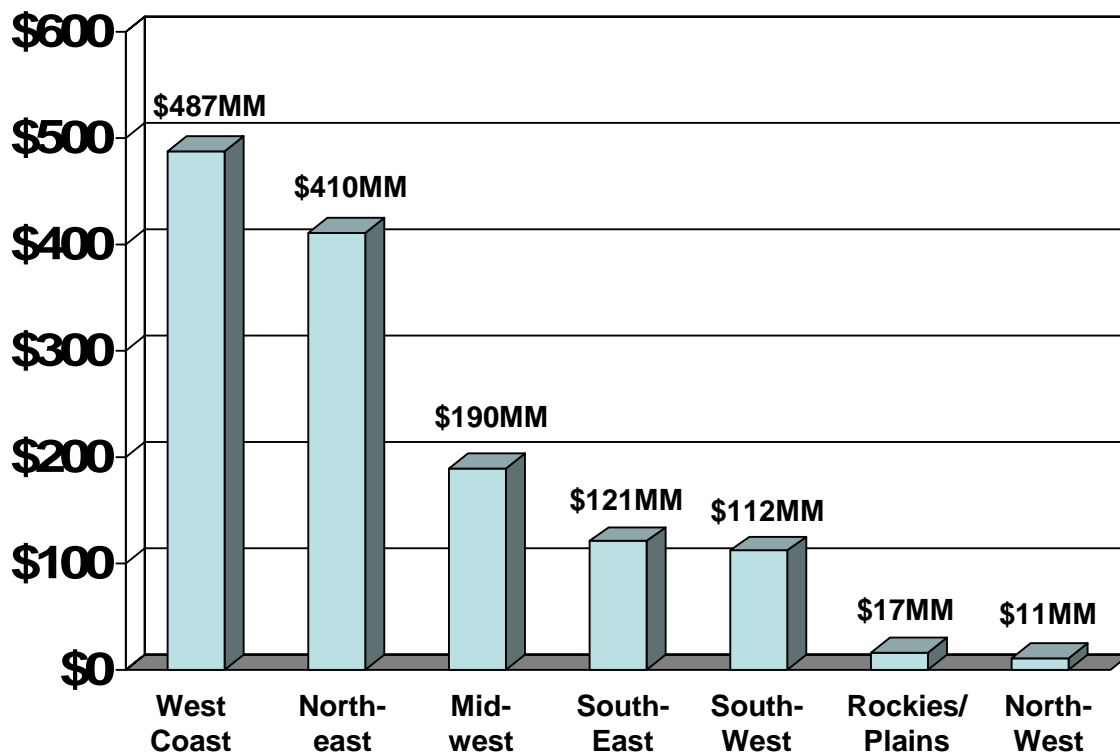


Cleantech attracts an average of 10% of all VC in Europe, with a high of 19% in Q2 2006

US Cleantech Clusters



Investments by Region 2005

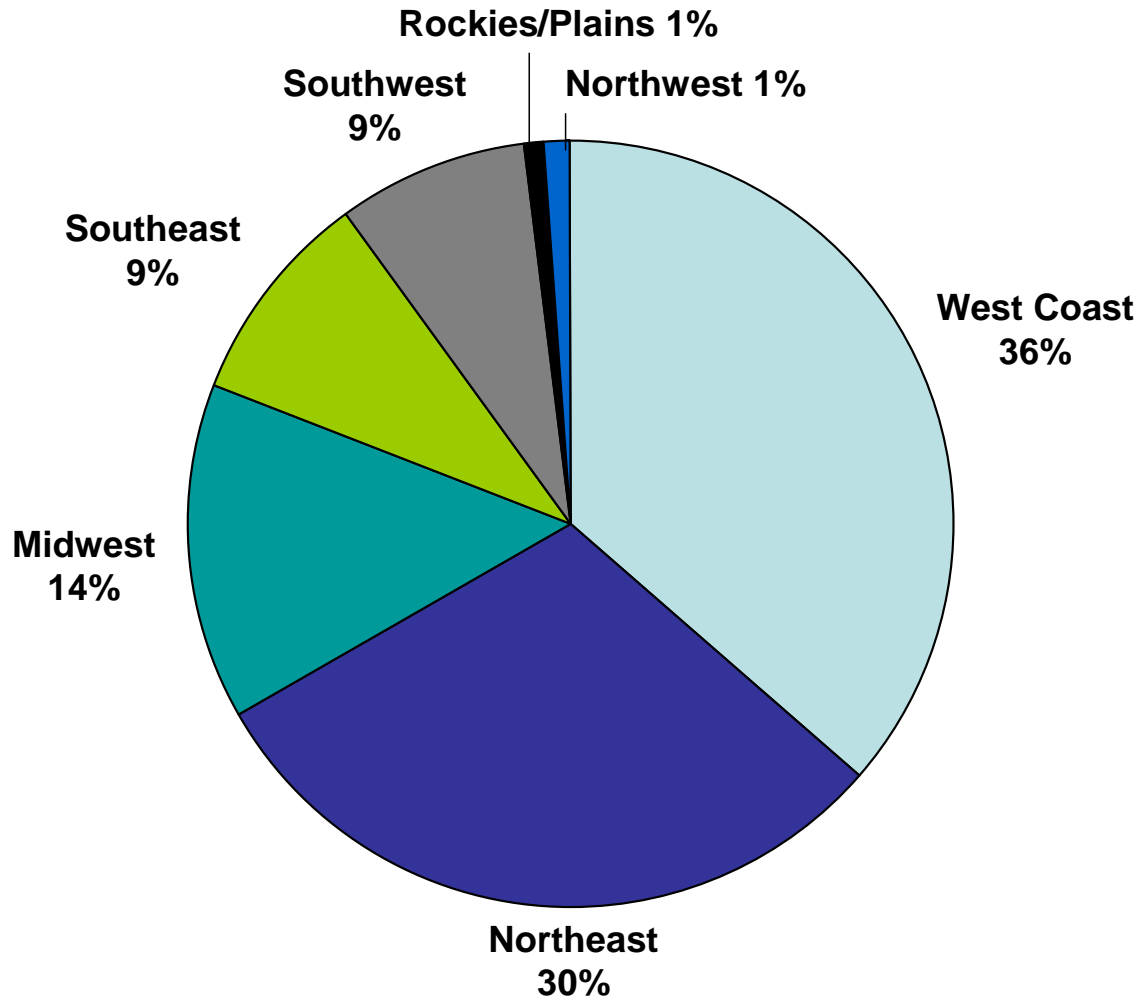


Two primary U.S. cleantech regions have formed: California and the Northeast.

A third cleantech region appears to be emerging in the Midwest.

Source: Cleantech Venture Network

Share of VC Funding by Region



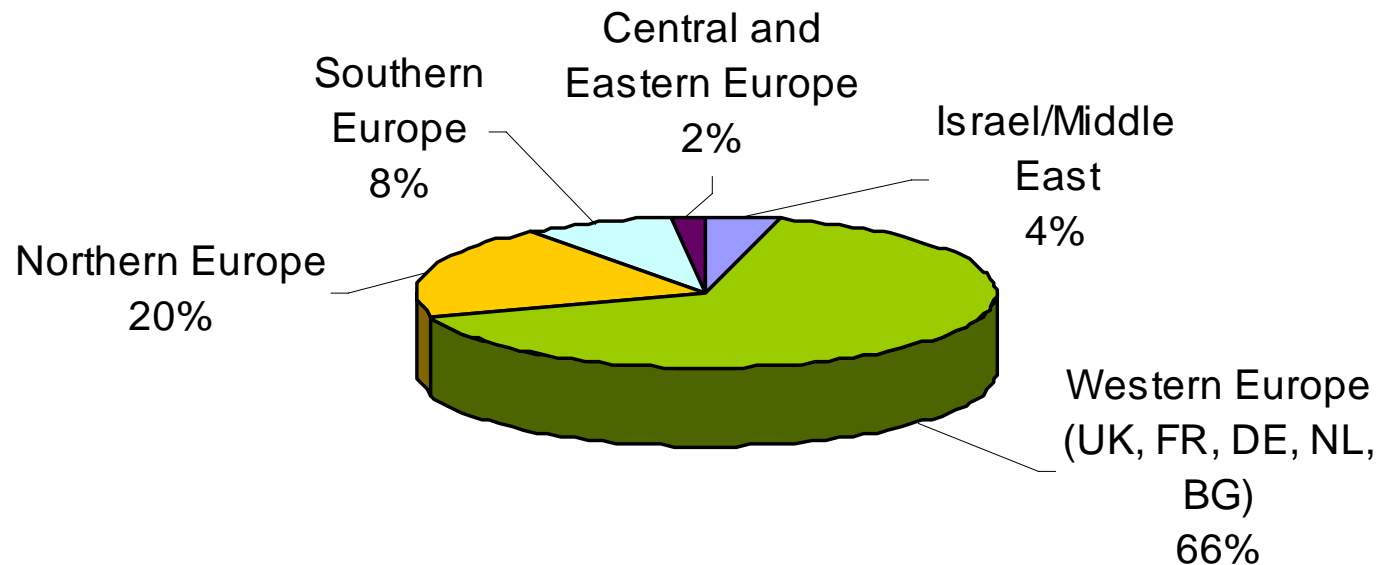
Source: Cleantech Venture Network

European Cleantech Investment

by region



Regional spread of European Cleantech Investments - By amount invested, Q1 2003-Q1 2006

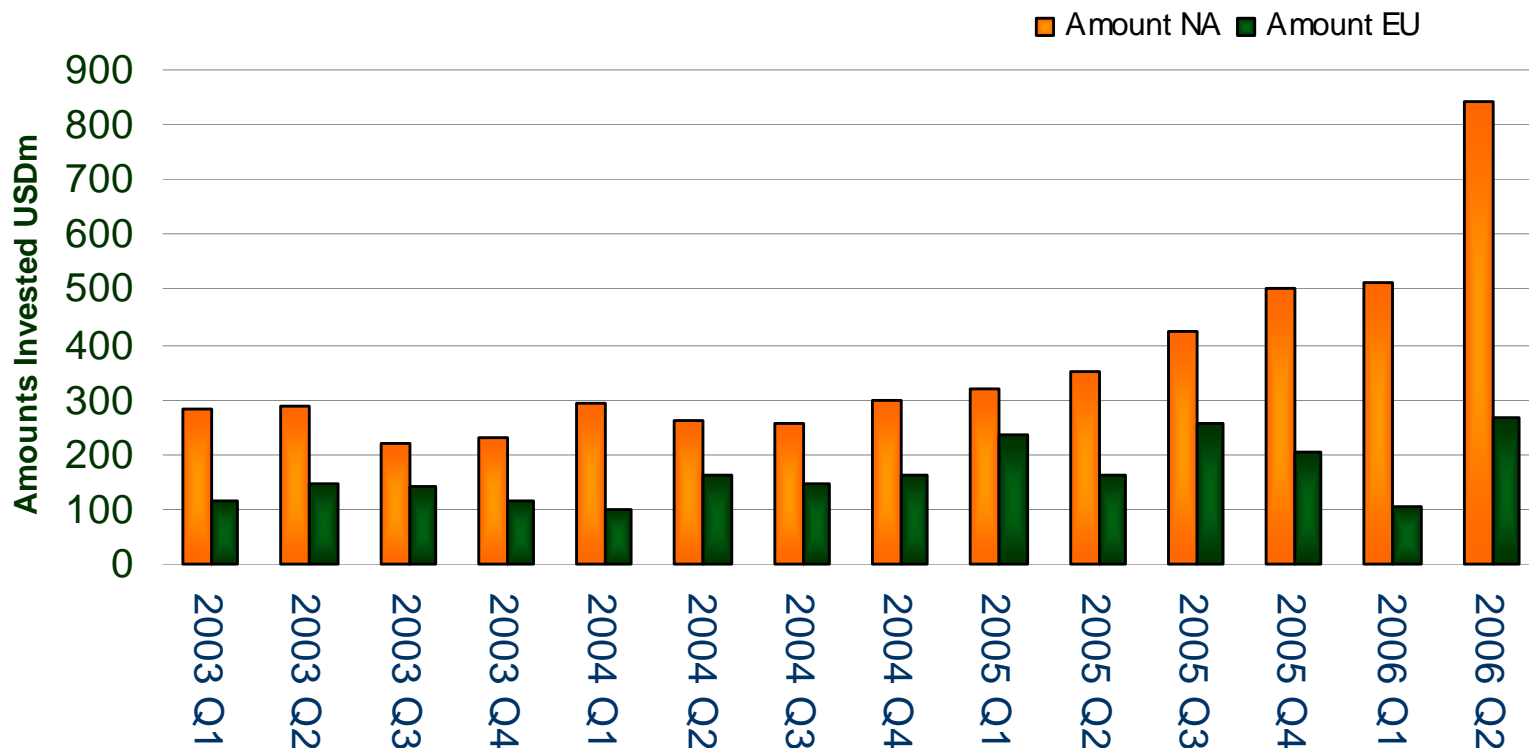


Western Europe receives over 66% of all cleantech venture capital: UK alone is 40%. Northern Europe takes 20%.

North American and European Cleantech Investments



North American and European Cleantech Investment: 2003-Q2 2006



European Cleantech VC investing averages 46% of North American investing.

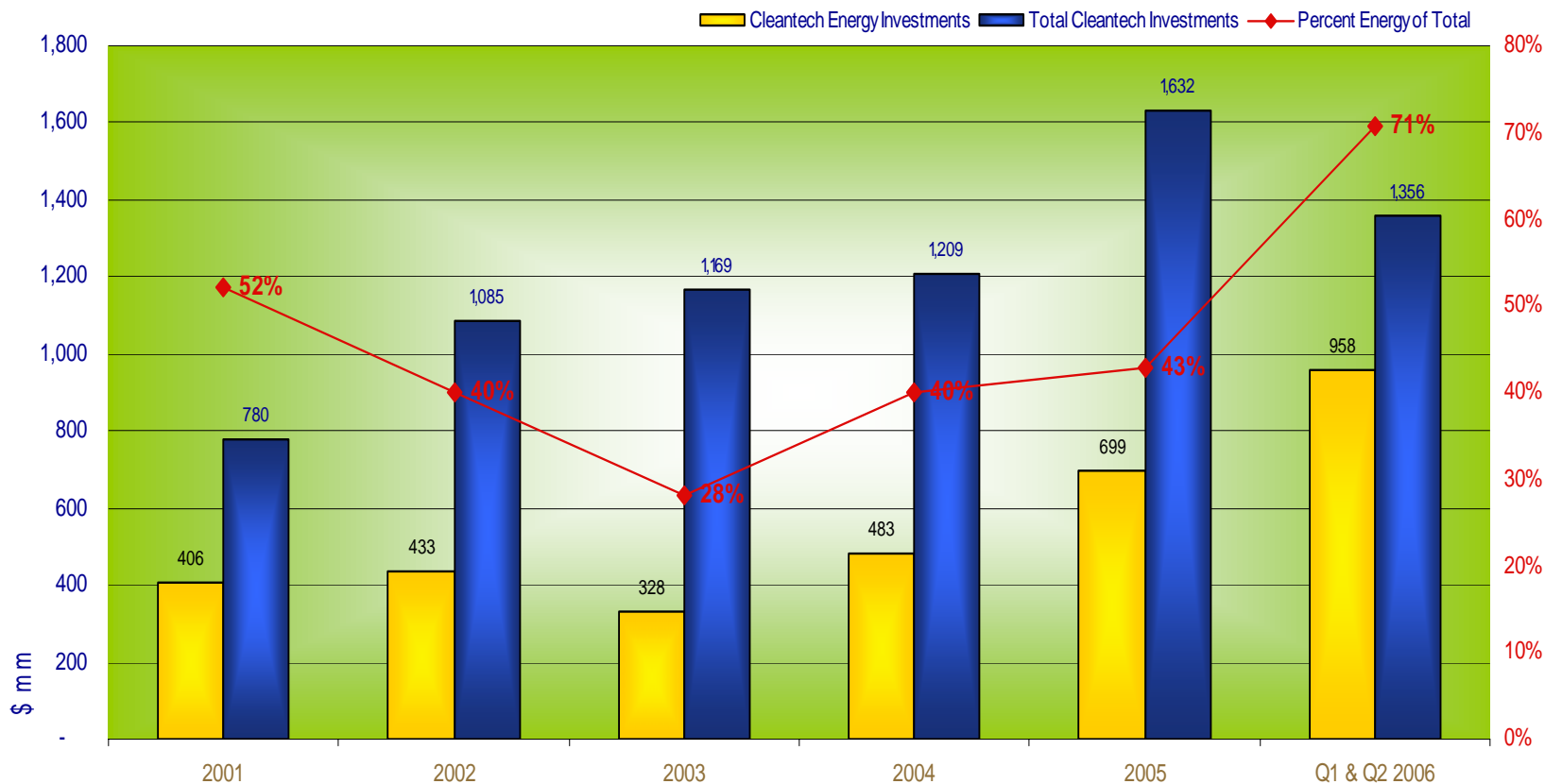


Clean Energy...

Clean Energy & Cleantech



Cleantech Energy Investments Compared to Total Cleantech Investments: 1999-Q2 2006

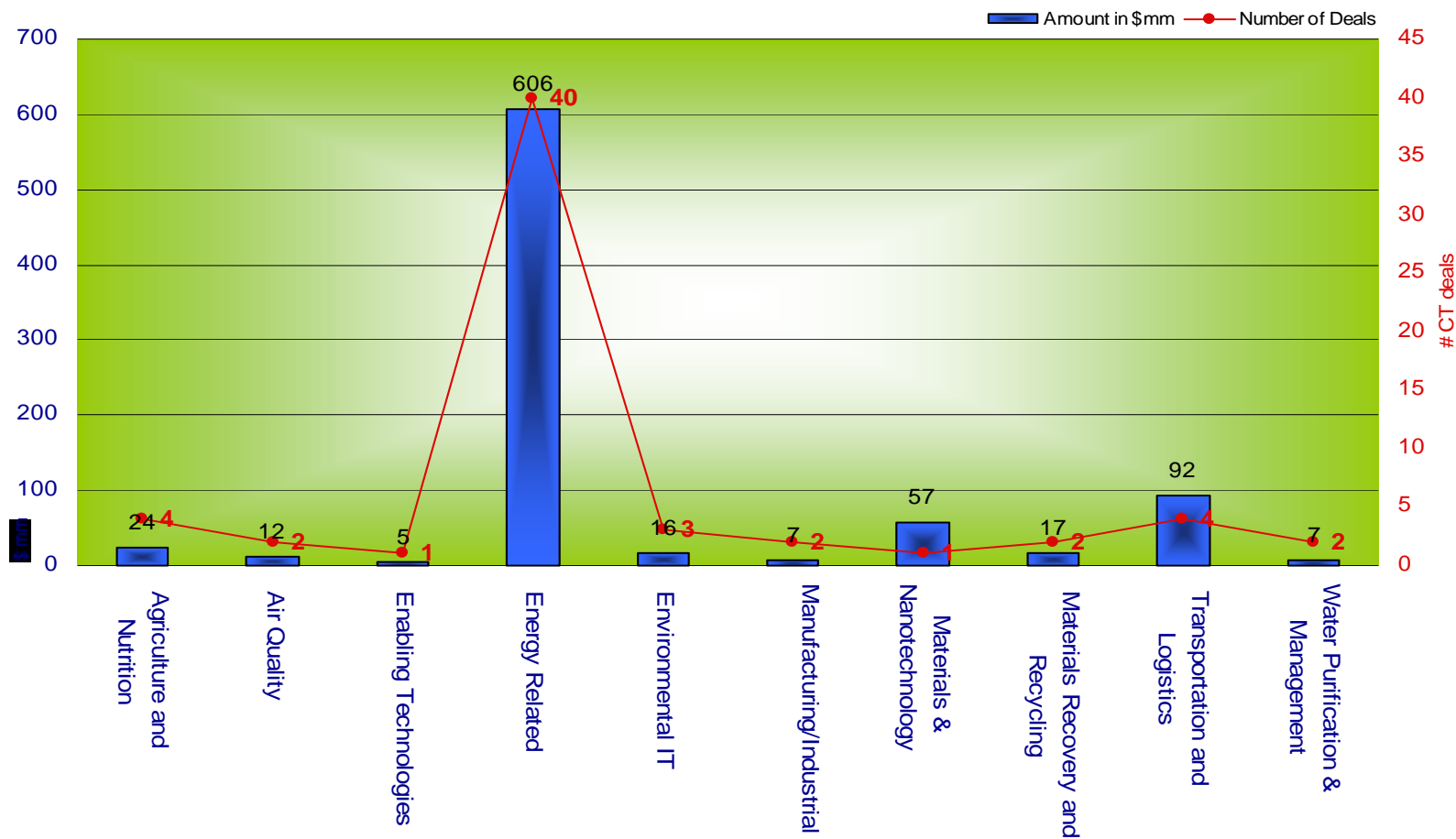


Investments Q206

Biofuels Driving Energy Sector



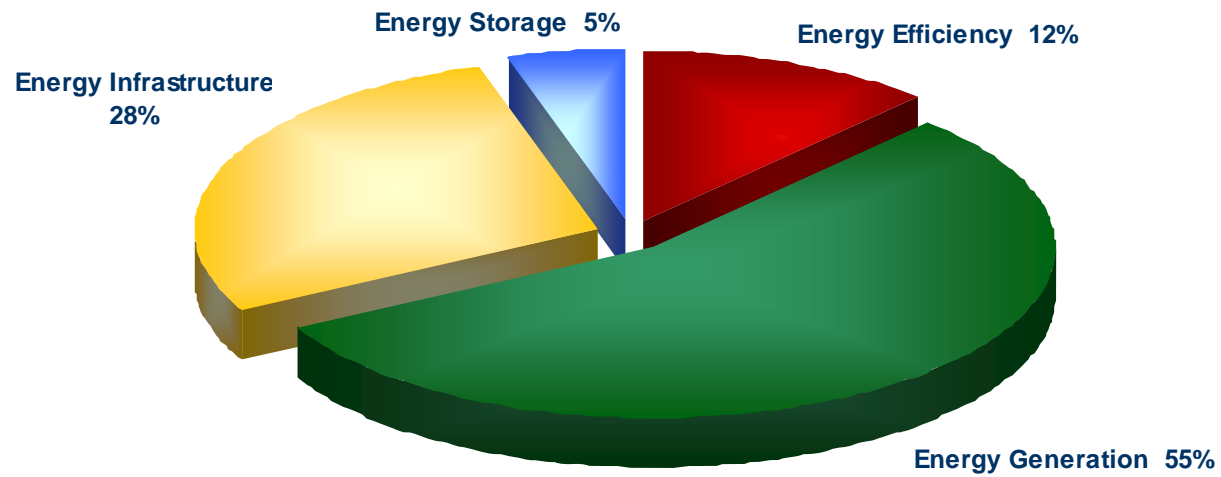
Cleantech Segments and Number of Deals: Q2 2006



Investment Breakdown



Cleantech Energy Breakdown: Q2 2006



Q306 Breakdown

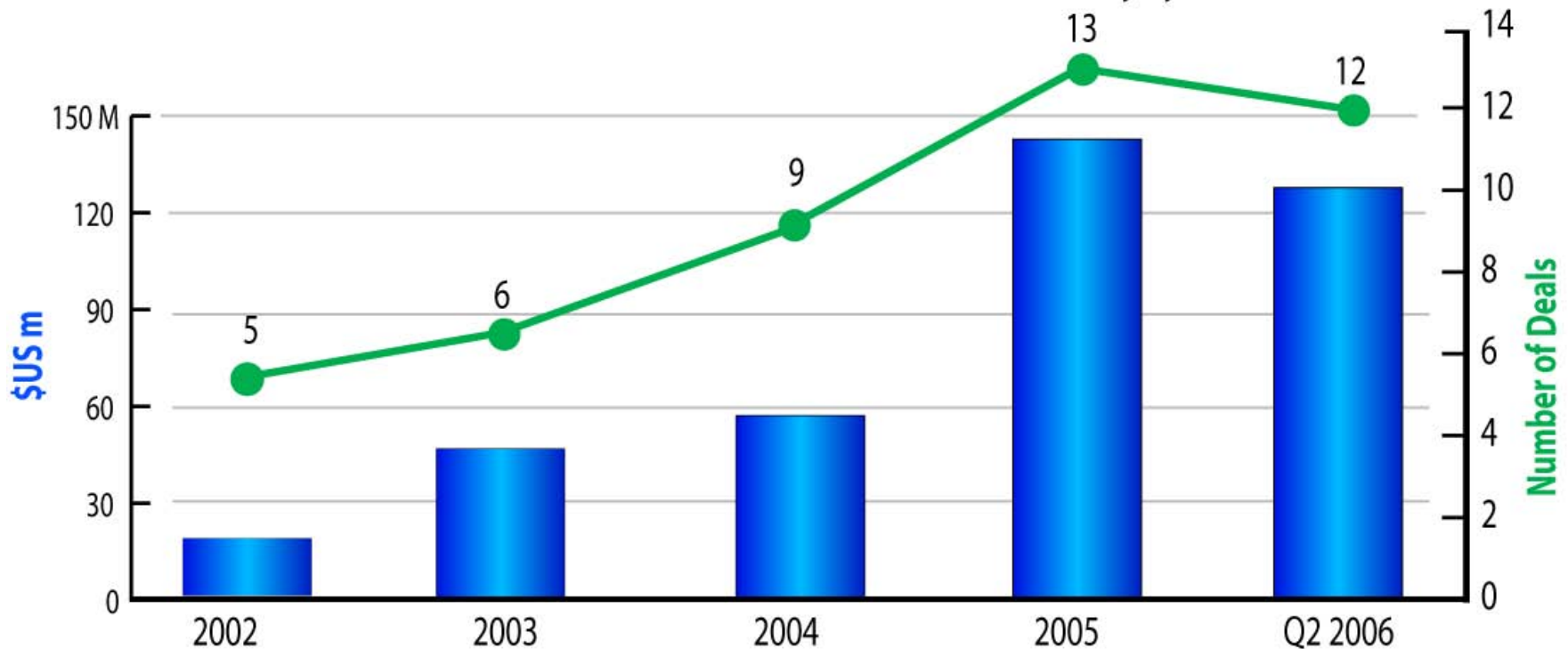


| SEGMENT | Venture Funding |
|------------------------------|------------------------|
| Energy Generation | |
| Biofuels | \$513M |
| Solar | \$69M |
| Hydrogen | \$11M |
| Energy Storage | |
| Fuel Cells | \$135M |
| Advanced Batteries | \$49M |
| Energy Infrastructure | |
| Management | \$28M |
| Quality | \$12M |
| Lighting/Efficiency | \$18M |

Illustrative: the Solar Trend



Cleantech Solar Deals total investments and # of deals by year



Source: Cleantech Venture Network®



But, can we make money....

The Cleantech Megatrend

Trends & Projections⁽¹⁾



Robust Pipeline and Exit Valuations

- Global cleantech revenues at \$150 billion and growing
- Solar, wind, industrial water purification, desalination and bio-pesticide markets, among others, already multi-billion dollar markets experiencing double-digit growth
- Expecting 250+ venture-backed cleantech company exits during the 2007-2009 period
- Global cleantech M&A activity tripled in 2005 to 162 transactions

The Venture Landscape

- \$12 billion venture capital invested in cleantech since 1999
- Additional \$17 billion expected to be invested in cleantech venture by 2010 (\$10B in US, \$5B in EU and \$2B in Asia)
- ~100 cleantech VC funds under development and over 300 active managers worldwide
- 12% of VCs indicate they currently focus on cleantech; interest jumps to 21% when looking to the next five-year period
- VC interest in traditional sectors (IT & biopharmaceuticals) may show marginal decreases going forward

Source: Cleantech Venture Network®

Size of Cleantech Markets



| <u>Technology</u> | <u>Market in 2000</u> | <u>Market in 2012</u> |
|---|------------------------------|------------------------------|
| <i>Wind</i> | \$5.5 billion | \$49 billion |
| <i>Solar</i> | \$3.5 billion | \$27.5 billion |
| <i>Power Quality</i> | \$5.0 billion | \$15 billion |
| <i>Industrial Water Purification</i> | \$5-6 billion | \$20 billion |
| <i>Desalination</i> | \$4-5 billion | \$75 billion |

Invention of Internet and Microchip lead to commercial markets & products: cleantech innovation developing in response to major global problems and now searching for technology.

Federal RD&D Starting to Mature



US Federal Funding of Energy RD&D (\$ Billions in 2003 Dollars)

| TECHNOLOGY | 1948 – 1972 (25 Years) | 1973 - 2002 (30 Years) |
|-------------------------|-----------------------------------|-----------------------------------|
| Nuclear | \$ 24.3 B | \$ 49.1 B |
| Fossil Fuels | \$ 5.5 B | \$ 24.8 B |
| Renewable Energy | | \$ 14.2 B |
| Energy Efficiency | | \$ 11.1 B |
| Total Investment | \$ 29.8 B | \$ 99.2 B |

Source: Congressional Research Service

Proven PE Returns⁽¹⁾



Cleantech Venture Exits

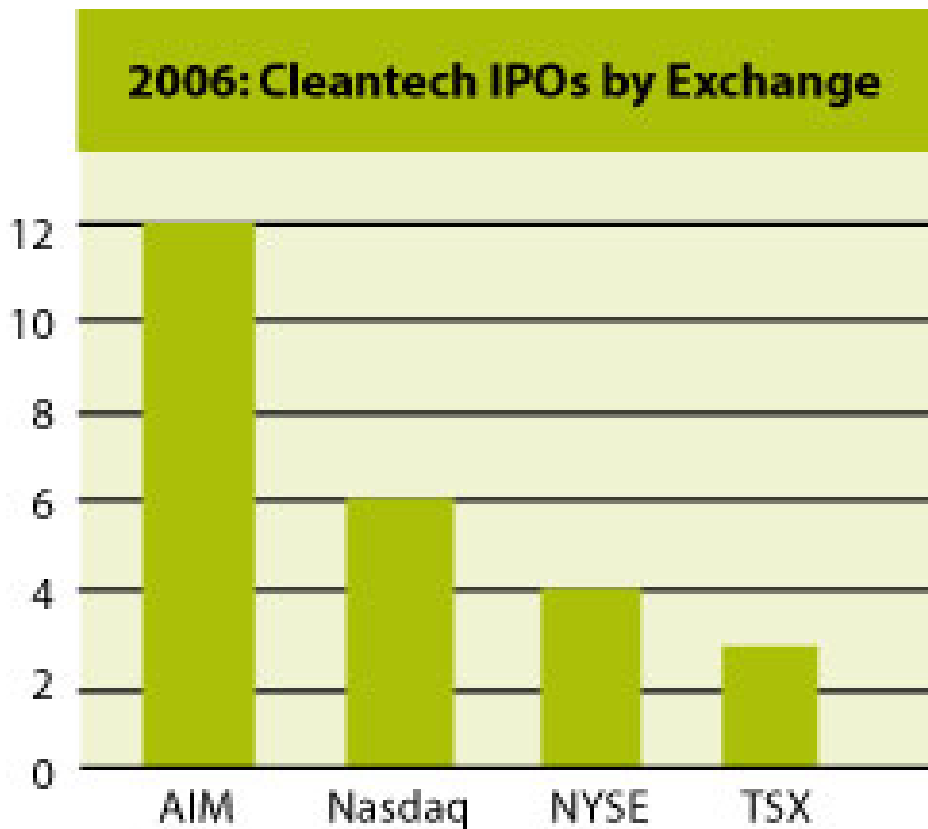
- In 2005, the Cleantech Venture Network™ analyzed 67 initial public offerings and 730 M&A transactions in 30+ countries:
 - Estimate Cleantech **IPOs yielded returns to pre-IPO investors of 5.5x**, while European venture-backed IPO generated returns of over 8x.
 - Estimate overall **returns on cleantech M&A transactions were 4.3x** on invested equity, based on more than \$94 billion in transactions tracked over the past 2 decades

Cleantech IRR

- A hypothetical portfolio of cleantech venture investments delivered **an estimated IRR of approximately 30%**. (Assumed 40% of the portfolio's investments were written off and an average holding period of five years.)

(1) Source: Cleantech Venture Network report, May 2005: 'Cleantech Patterns and Performance'

Public Markets Receptive



Only exchanges with 3 or more IPOs are listed in this chart.

Source: Cleantech Venture Network®

- 3 of top 10 IPOs in 2005 were Cleantech
- ETFs launched in 2006
- Wall Street establishing cleantech banking and analyst divisions (Citigroup, Goldman, Jefferies, PiperJaffray)

Some Challenges



- Building big-small business partnerships
- Building linkages between different capital suppliers (eg project finance, venture capital and equipment leasing)
- Encouraging appropriate public policies
- Bringing cleantech to emerging market economies – BOP + BRICs
- Turning public R, D & D into commercial business
- Institutional support for venture capital

Closing Thoughts



- **\$12 billion VC invested to date**
- **Aware of ~100 cleantech VC funds under development and over 300 active managers worldwide**
- **Project an additional \$17 billion will be invested in cleantech venture by 2010**
- **Investors will be looking to exit some 250+ cleantech investments during the 2007-2009 period**
- **12% of VCs indicate they currently focus on cleantech**
- **Interest jumps to 21% when looking to the next five-year period**
- **VC interest in traditional sectors (IT & biopharmaceuticals) may show marginal decreases going forward**

Thank You!



- **Join** the Cleantech Venture Network
- **Attend** the Cleantech Forum in San Francisco February 19-21, 2007
- **Access** our leading edge research, including bi-weekly and quarterly industry reports
- **Invest** in the Cleantech ETF and related offerings

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