FOUNDATION
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Cleantech Context

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- Demand for energy and natural resources is surging, in part due to rapid development in China and India, as well as steady growth in developed markets
- Supply of fossil fuels is finite and in many cases, controlled by insecure sources
- Energy price inflation and volatility
- Climate Change is a global issue

This is the biggest engineering challenge ever faced by mankind

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World Energy Flows

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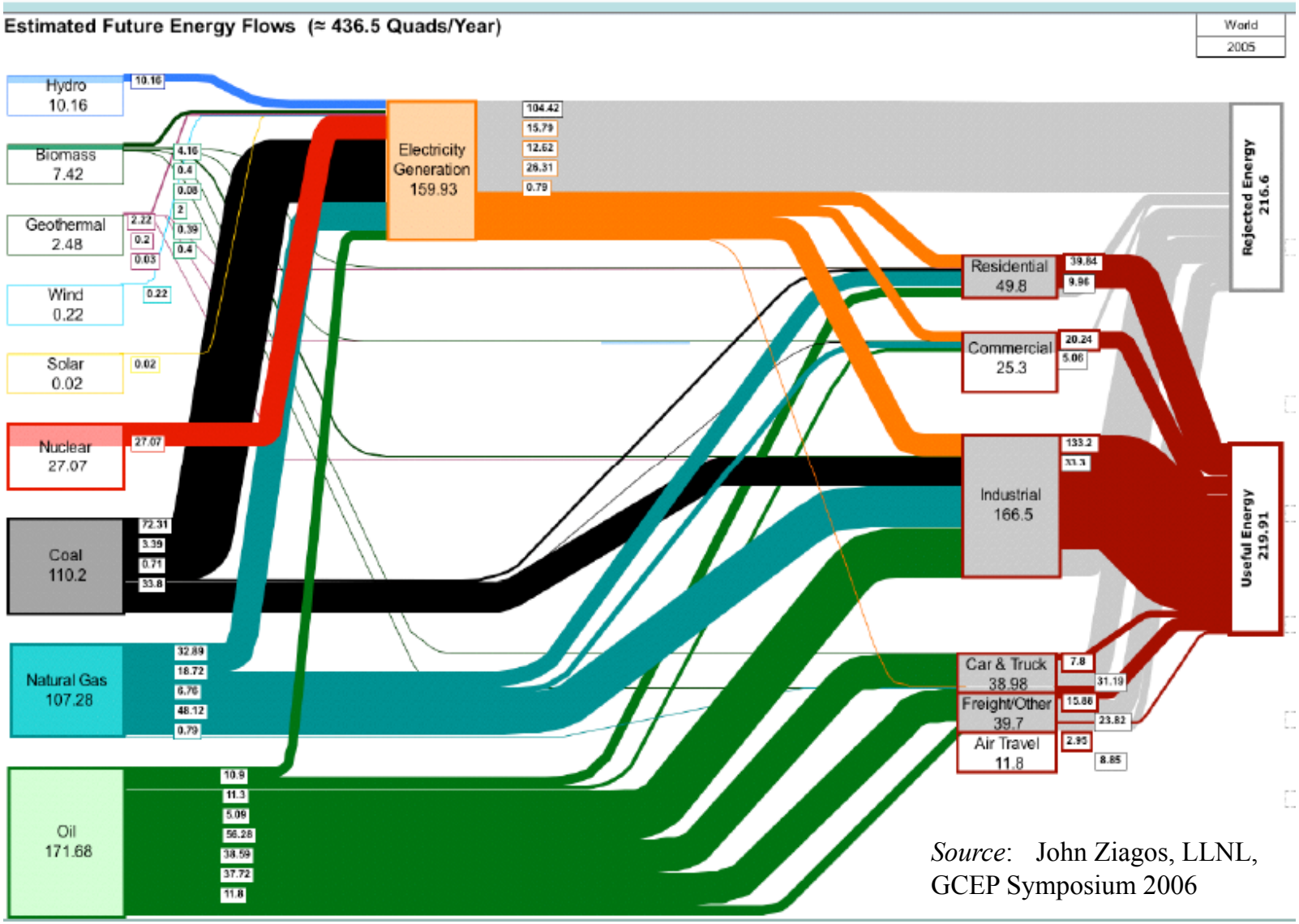

Source: John Ziagos, LLNL, GCEP Symposium 2006

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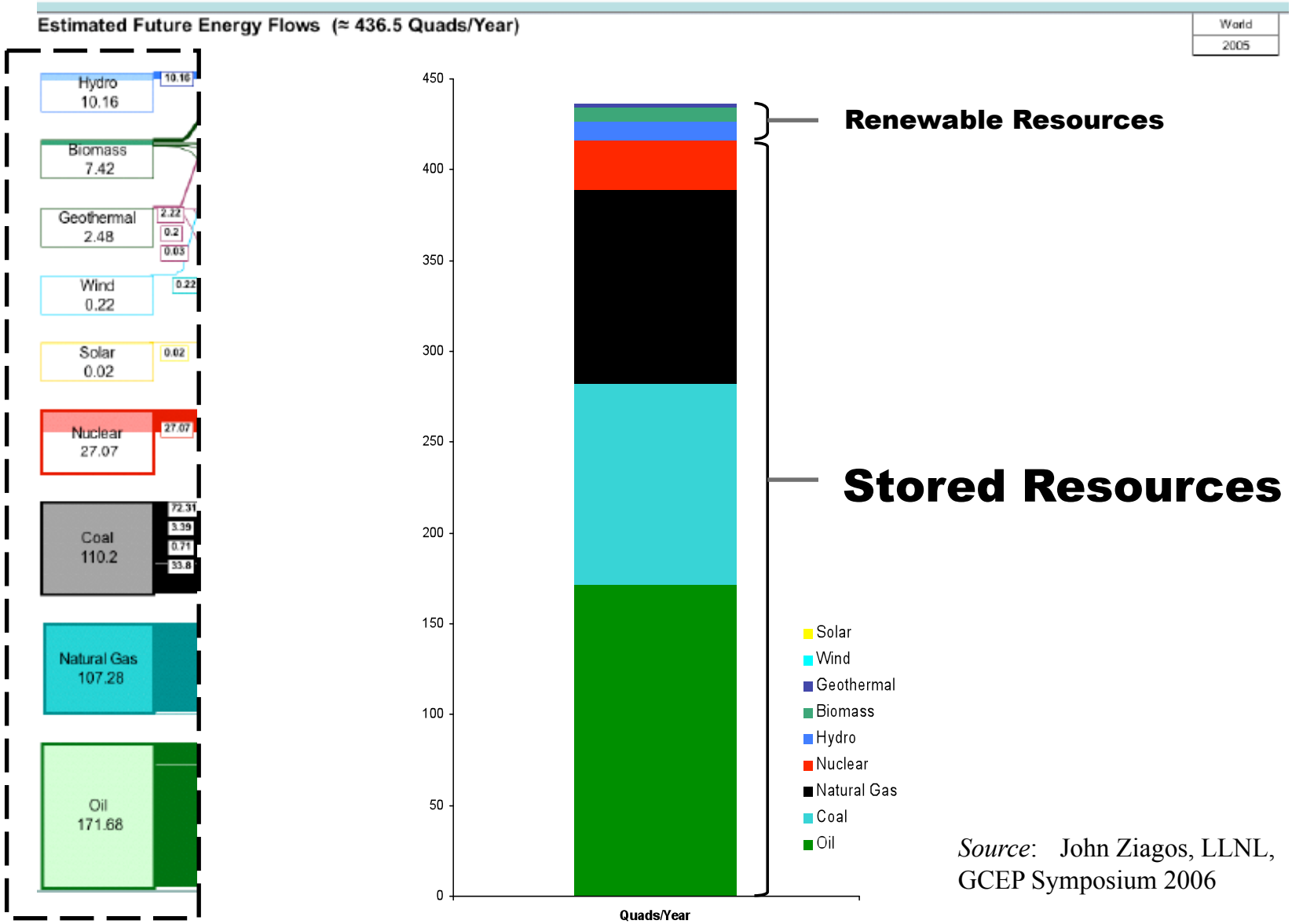
World Energy Flows – Supply

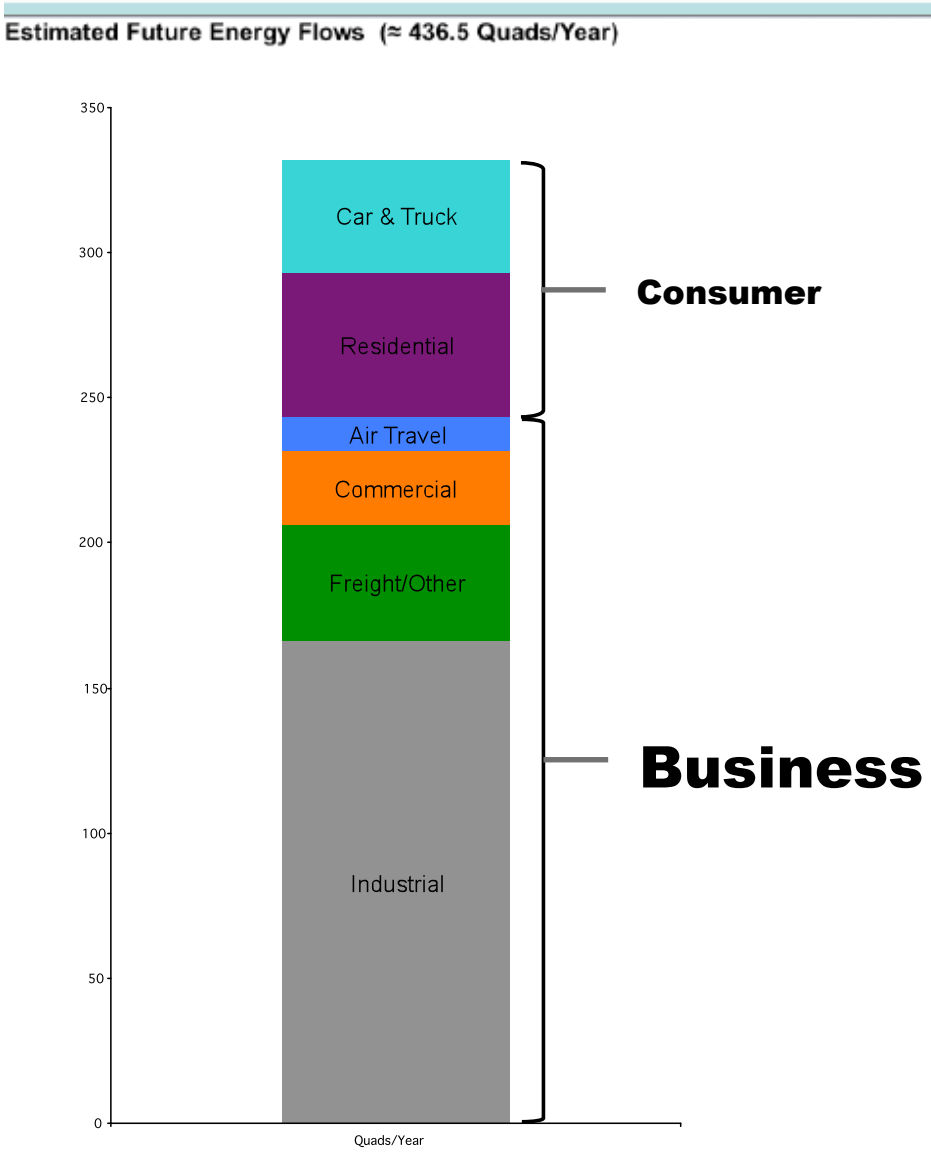
FOUNDATION CAPITAL

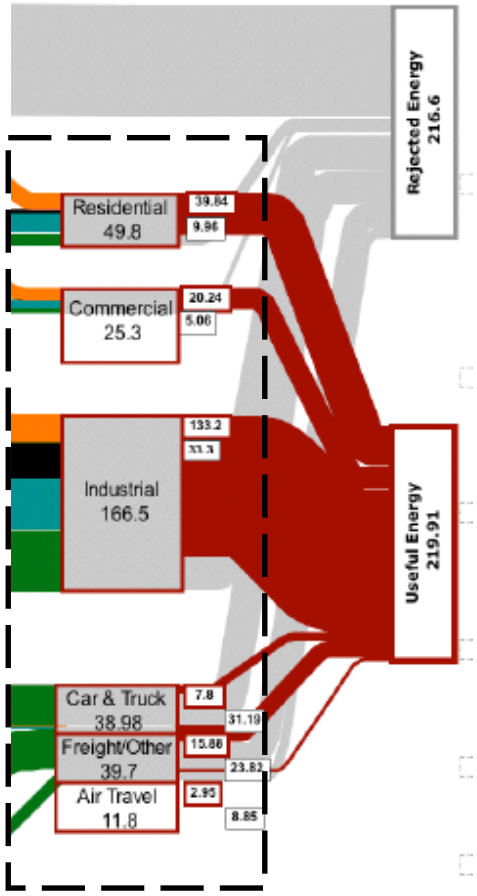


Source: John Ziagos, LLNL, GCEP Symposium 2006

World Energy Flows – Demand

FOUNDATION CAPITAL





Source: John Ziagos, LLNL, GCEP Symposium 2006

Cleantech Landscape

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- **Energy Management & Efficiency**
  - Demand response
  - Smart Grid and advanced metering
  - Behavior modification
- **Energy Generation**
  - Renewable energy
  - Alternative fuels
  - Next-gen Nuclear
  - Clean coal
  - New financing models
- **Energy Storage**
  - Advanced batteries
  - Flywheels, Ultra capacitors
- **Built Environment**
  - Advanced materials and processes
  - Dramatic reductions in embodied energy
  - Lighting
  - LEED
- **Industrial Processes**
  - Water purification & reclamation
  - Food safety
  - Recycling
- **Transportation**
  - Enhance efficiency
- **Emissions Reduction**
  - Monitoring & management
  - Carbon capture & storage

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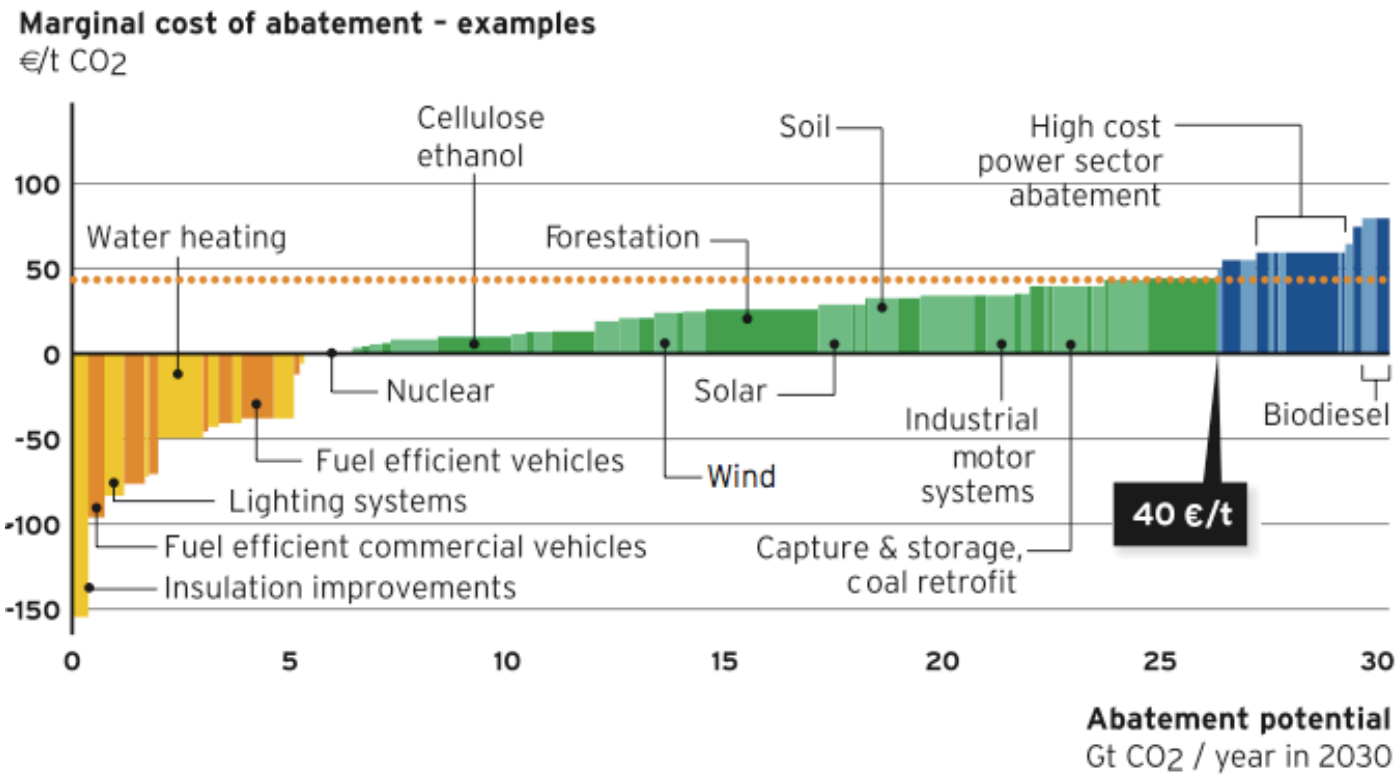
Global Cost Curve



Source: Vattenfall, McKinsey

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Why Invest in Efficiency?

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- Typically economic out of the gate – no subsidies required.
- Capital efficient – don't require hundreds of millions of dollars to develop or implement.
- Can be delivered today – we're not waiting on new technologies, materials, or processes.
- Massive upstream impact – 1 Joule of energy conserved means 3 to 5 Joules saved at source.
- Efficiency investments are irreversible – you don't rip out your more efficient infrastructure when the price of oil drops below $90 a barrel.

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