

# The future drivers of energy in sustainability: resource, economy, environment and society

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The power to think bigger.



# Energy

- A critical currency
  - It drove the industrial revolution
  - It allows urbanisation
- Fundamental to society
  - Gather around sources of energy, water, food
  - Trade based on transfers of energy or energy-produced products
- Clean and perpetual energy
  - The currency of the 21<sup>st</sup> Century?





# Sustainability of resources

- Fossil fuels
  - Are not created at the rate they are being used
  - Likely have unique long-term place if conserved
  - Are tied-up in recent (75yr) trade and political relationships
  - May not be accessible to improve/modernise energy systems
  - Not available to the 2 billion without any or adequate energy





# Sustainability of resources

- Focus on long-term solutions
  - Avoid trapping in “traditional” energy pathway by expedient decisions
  - Recognise political and cost uncertainties in fossil fuels
  - Work toward solutions that can work indefinitely
    - What resources are/will be available locally
    - Be creative about merging existing and future energy systems
    - Skip the traditional and go straight to future energy in developing systems (think mobile phones in Africa!)
    - Give trade access to renewable energy a priority





# Sustainability of economy

- Avoid/deal with the either/or discussion
  - The transition has to come within 85 years
  - The clean energy industry can evolve out of the fossil fuel economy
- Pay now or pay later
  - Cheaper: transitional or crisis investment?
  - Late investment likely coincides with extreme escalation in fossil fuel prices
  - Economists like smooth transition!





# Sustainability of economy

- Clean energy economy opportunity
  - For the existing energy industry and leaders, or
  - For leading adopters to be new winners, but
  - Economic activity for someone
- Existing energy-dependent industry/economy
  - Will have to face energy supply and price challenges, or
  - Begin renewing infrastructure, processes – for *Future Energy*
- Community
  - Need protection from energy price and supply risk, or
  - They will not be able to drive the economy





# Sustainability of society

- Health
  - Climate, weather, air and water quality, food and medicine
- Education, infrastructure and services
  - Dependent on a functioning economy
  - At risk with infinitely escalating cost
- Lifestyle
  - Continues to evolve, but affordable energy is central
  - Inequality of access becoming issue of stability





# Sustainability of society

- Energy as required
- Affordable energy, now and in future
- Energy independence
- Industrial/economy structure
  - 21<sup>st</sup> C industrial revolution, not 19<sup>th</sup> C







# Issues

- Avoid drift
  - Coal > oil > natural gas > resource shortage/competition
  - Deepwater oil and shale “saviours” – problem over!
- Focus on the 21<sup>st</sup> Century industrial revolution
  - Efficient industry
  - Transition to renewable energy

“Skate to where the puck will be”

- Avoid following, go directly ahead
- Anticipate the future
- Get ready to take advantage of it

