Alaska Forum on the Environment 2008

Business Solutions to Climate Change

15 February 2008

Anchorage, AK

Randy Armstrong, Environmental Issues Director

A Bridge to the Future of Energy

"Meeting the 'Energy Challenge' is Shell's largest contribution to Sustainable Development"

Jeroen Van Der Veer

CEO, Royal Dutch Shell

Present Energy Supply

- Hydrocarbon-based
- Underpins the Economy and Lifestyle of the Developed World

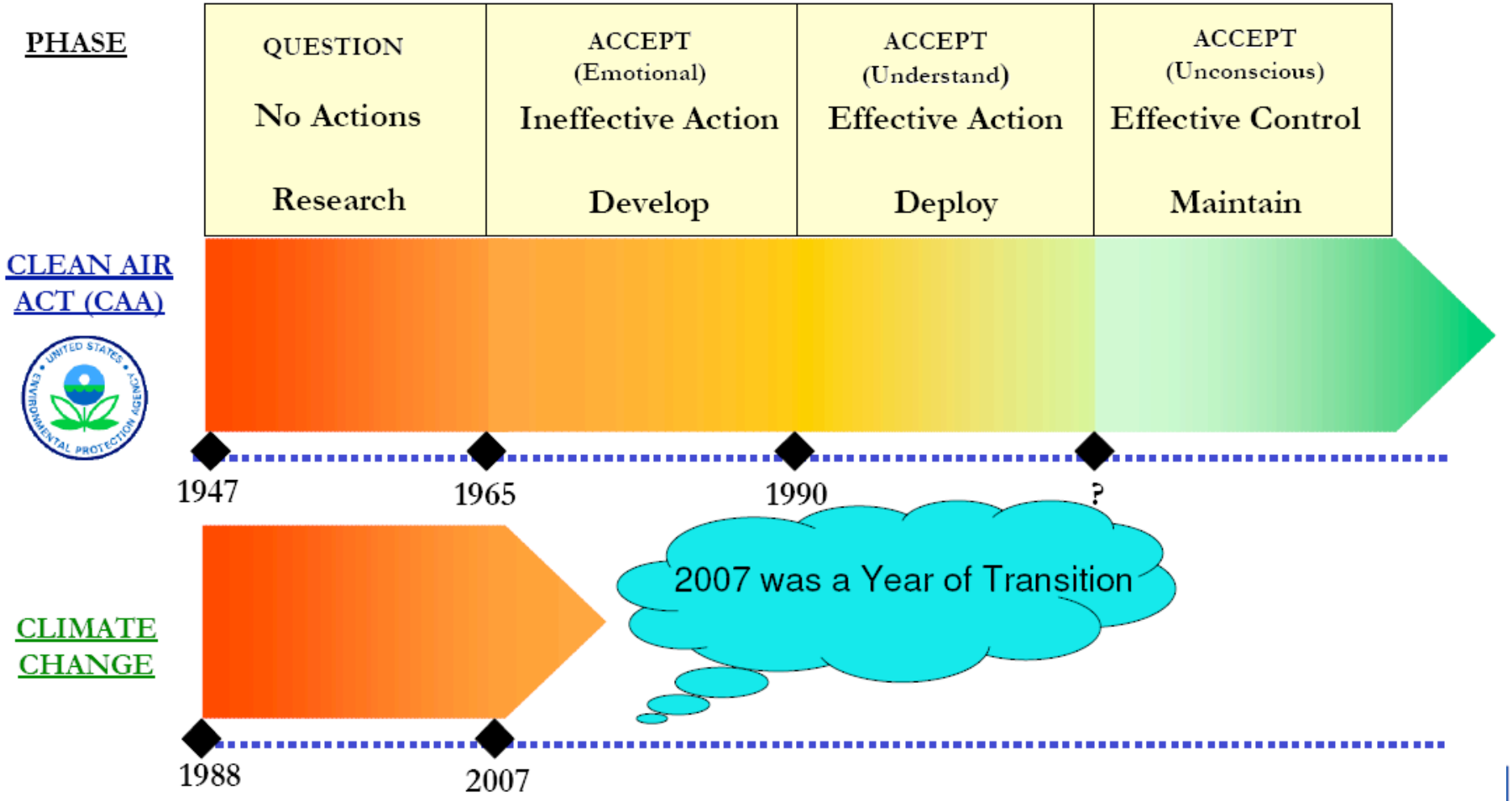
Future Energy Supply

- Increased Demand
- Conventional Energy More Difficult to Find
- Hydrocarbon Energy Sources Are More Carbon Intensive
- New Technologies Supply the Bulk of the New Demand

How long will it take us to get to the future?

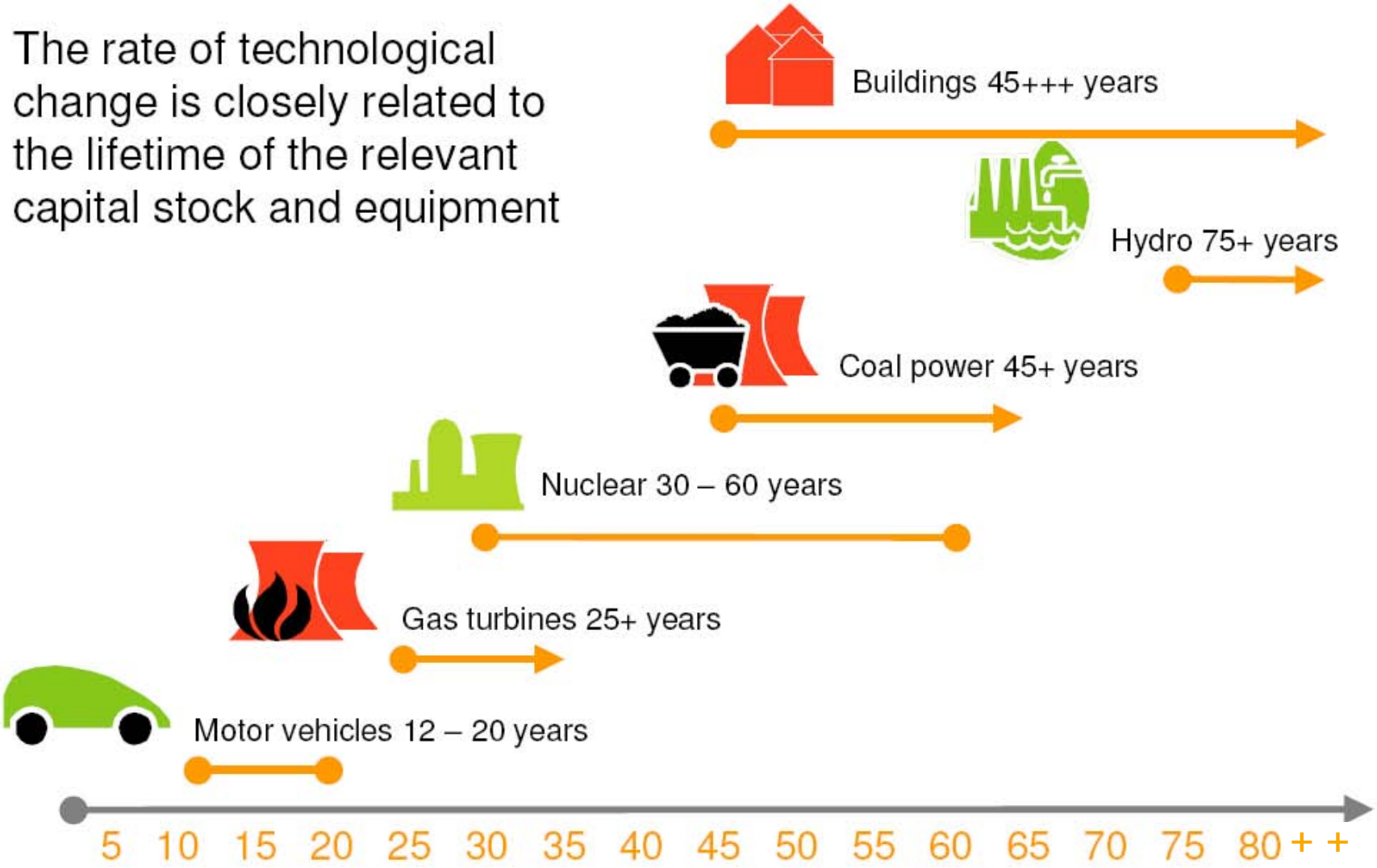
U.S. Environmental History

Phases of Development for Environmental Regulations

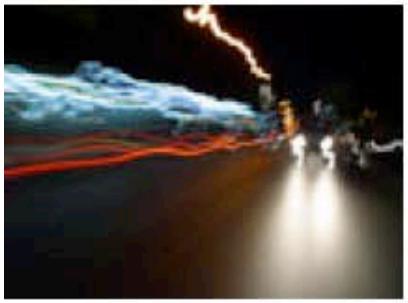


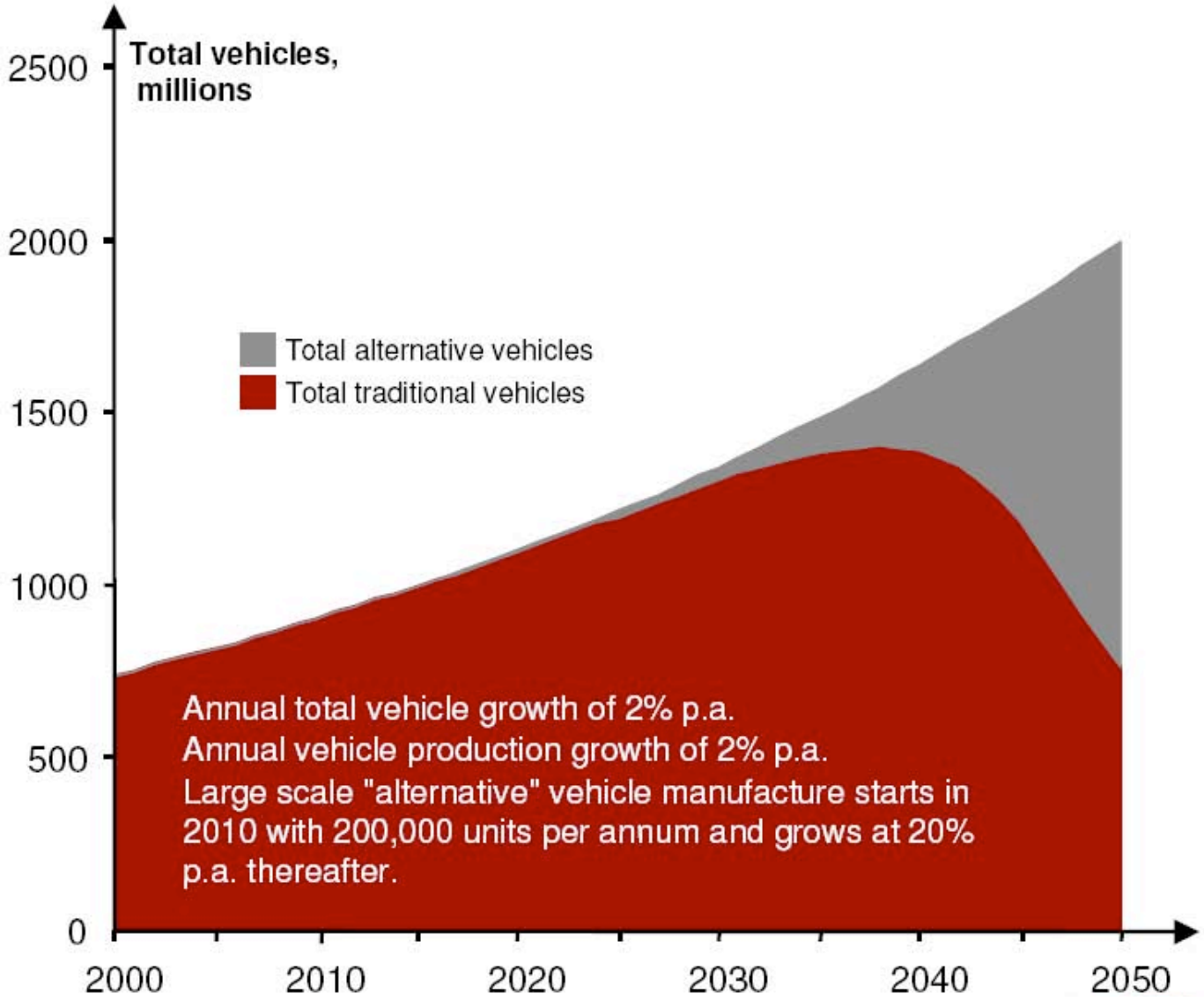
Size and Lifetime Matter!

The rate of technological change is closely related to the lifetime of the relevant capital stock and equipment



Even very rapid change can appear slow!





Solution Boundaries

- Energy supply must meet demand (available & secure)
- Real costs of energy must constantly decrease (e.g. the cost of heating your home)
- Solutions to the “Energy Challenge” must be acceptable to society

Mandatory GHG Regulations are Needed

"… we need a national approach to greenhouse gas management and how that would work across our industries,"

John Hofmeister

President, Shell Oil Company

Shell is a Member of USCAP, an alliance of major businesses and leading climate and environmental groups that have come together to call on the federal government to enact legislation requiring significant reductions of greenhouse gas emissions.

Key Potential Regulations That Impact the Oil And Gas Industry

- Low Carbon Fuel Standards
- Fixed Source Reductions
- Carbon Capture and Storage
- Monitoring and Reporting
- Access to Transmission Lines
- Trading
- Taxes, Fees and Credits Held for Others
- Research, Development and Deployment
- Renewable Fuel Standards

Shell Activities Related to Low Carbon Fuel Standards

- Largest Marketer of Biofuels – 2 Billion Gallons/Yr
- Partnerships to Develop 2nd Generation Biofuels
  - Iogen – Cellulosic Ethanol
  - Choren – Biomass synfuels
  - HR Biopetroleum – Ethanol from Algae
  - Codexis – Enzymes
- Participating with California Air Resource Board and EPA to Develop a Lifecycle Carbon Intensity Model for Transportation Fuels
- Two Hydrogen Fueling Stations in the U.S. (with plans for a 3rd in 2008)

Shell Activities Related to Carbon Capture and Storage (CCS)

- Operated CO2 Pipeline for 17 years from Colorado to Texas
- Injected CO2 for Enhanced Oil Recovery Since mid-1970s
- ZeroGen Project in Australia
- Working with West Coast Carbon Storage Project and CO2 Capture Project in US to Develop Science and Methodology
- Working with various associations to better understand how to make CCS a viable option in the portfolio of carbon mitigation strategies.

Shell Activities Related to Fixed Source Reductions

- Refinery Efficiency Improvement Targets of 1% per year
- Cost of Carbon Included in Financial Decisions
- Technical Studies to Identify Projects Necessary to Meet Potential 2020 – 2030 Mandated Reductions
- Clean Coal Technology: sold 21 licences globally.
  - Coal gasification offers a 10 to 15% improvement in the CO2 footprint versus more conventional coal-fired power generation.

Shell Activities Related to Monitoring and Reporting

- Reported Company Emissions Since 1997
- Participated in Developing WRI/WBC Protocol
- Participated in Development and Use API Compendium for Calculation of GHG Emissions from Oil and Gas Operations
- Member of the California Climate Action Registry (California Emissions Certified for 2006)
- Founding Industry Member of The Climate Registry

Shell Activities Related to Renewable Energy Standards

- Shell has 10 wind operations in the U.S. and Europe (total wind capacity of 843 MW, Shell share of 415 MW).
- Currently constructing an additional 164 MW of wind capacity (Shell share 82 MW) with our NedPower Mount Storm project in West Virginia.
- Shell is ranked number 20 in the world in the Emerging Energy Research (EER) list of wind plant owners (December 2007)
- Together with our joint venture partner Saint Gobain, we continue to develop the next generation of CIS based thin-film solar technology.
  - 20 MW Demonstration Facility in Saxony, Eastern Germany

Shell Activities Related to Trading

- Active Trader on EUETS
- Established CO2 Trading Desk in US
- Working with Various Organizations on the Design of a Carbon Trading System for the US

Technology is Key

"Meeting the world's growing energy needs in an environmentally responsible manner is a tremendous challenge. Technology is essential to answering that challenge."

Jeroen Van Der Veer

CEO, Royal Dutch Shell

Keys to Designing Effective Regulations

- Do Not Pick Winning Technologies
- Encourage Innovation
  - Research
  - Development
  - Deployment
- Allow Time for Innovation and Economical Turn Over of Capital Stock

Shell Activities

- Exploration
- Liquefied Natural Gas (LNG)
- Heavy hydrocarbon production (tar sands/shale oil)
- Efficiency improvements
- Gas to Liquids (GTL)
- Wind
- Solar
- Hydrogen
- Clean coal
- Storage