Green Streets

7-8 September 2009

Policy Measures for Greener Urban Transport:

Balanced Policies for Alternative Fuels

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Clean Fuels CONSULTING

www.cleanfuelsconsulting.org

POLICY FOCUS FOR CLEANER TRANSPORT

- **Energy Security**
  - Less reliance on (imported) petroleum
  - Greater reliance on renewable energy
- **Environmental Improvement**
  - General air quality (exhaust emissions)
  - Combat climate change (CO2)
- **Reduced energy consumption** (i.e. energy efficiency)
- ***Economically competitive!?***

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NON-PETROLEUM-BASED ALTERNATIVE FUELS ARE VIEWED AS THE PRINCIPLE SOLUTIONS

ALTERNATIVE FUELS ('energy carriers') The Principal Players

- LIQUID **BIOFUELS** (blends, up to 85%..or more?)
  - Ethanol
  - Biodiesel
- GASEOUS **FUELS**

  Liquefied Petroleum Gas (LPG)

  Methane (CH4)

  - Natural gas (fossil)
  - Liquefied natural gas (-163º C)
  - Renewable biogas upgraded to bio-methane for vehicles

  Hydrogen (gas or cryogenic liquid)
- ELECTRICITY
  - Various hybrid strategies
  - 100% electric plug-in batteries

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THERE ARE NO FUEL PANACEAS

- Every fuel has its benefits and its challenges
  - Cost
  - Environmental quality & impacts
  - Energy availability & security
  - Availability of vehicle technologies
- The critical challenge is to find the right balance and mix of fuels in the marketplace

- Recognize that status-quo, petroleum-based liquids will be around for a long time

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KEY QUESTION FOR POLICY MAKERS

- **What can be done to develop a *balanced*, sustainable, and effective fuels policy (with measureable results) that fulfills the EU objectives of energy security and commitment to environmental protection?**

Factors for Clean, Alternative Fuel Vehicles to Achieve Commercial ‘Success’*

***10-25% market share**

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Policies must address the AFV success factors

- **Government Commitment**
- **Energy Industry Support**
  - Gas Industry (+Oil/Gas Industry)
  - Electricity industry
  - Hydrogen ‘industry’ (does not yet exist)
  - Farm industry (for liquid biofuels)
- **Availability of Vehicles (*Real*, & Not *Implied* with Support of Manufacturers)**
- **Favorable Economics**
  - Cost differential between the alternative fuel & petroleum (to balance higher vehicle costs)
- **Environmental policies driving lower emissions**

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THE INVOLVEMENT OF GOVERNMENT IS *ESSENTIAL** (Strategies Supported by Specific Actions!)

- Create Incentives (financial & others)
- Enforce Mandates (but *with* incentives)
- Develop Standards
- Fund Research, Development & Demonstration
- Leadership by Example
- PR & Communications

*** What's good for one alternative fuel is good for them all!**

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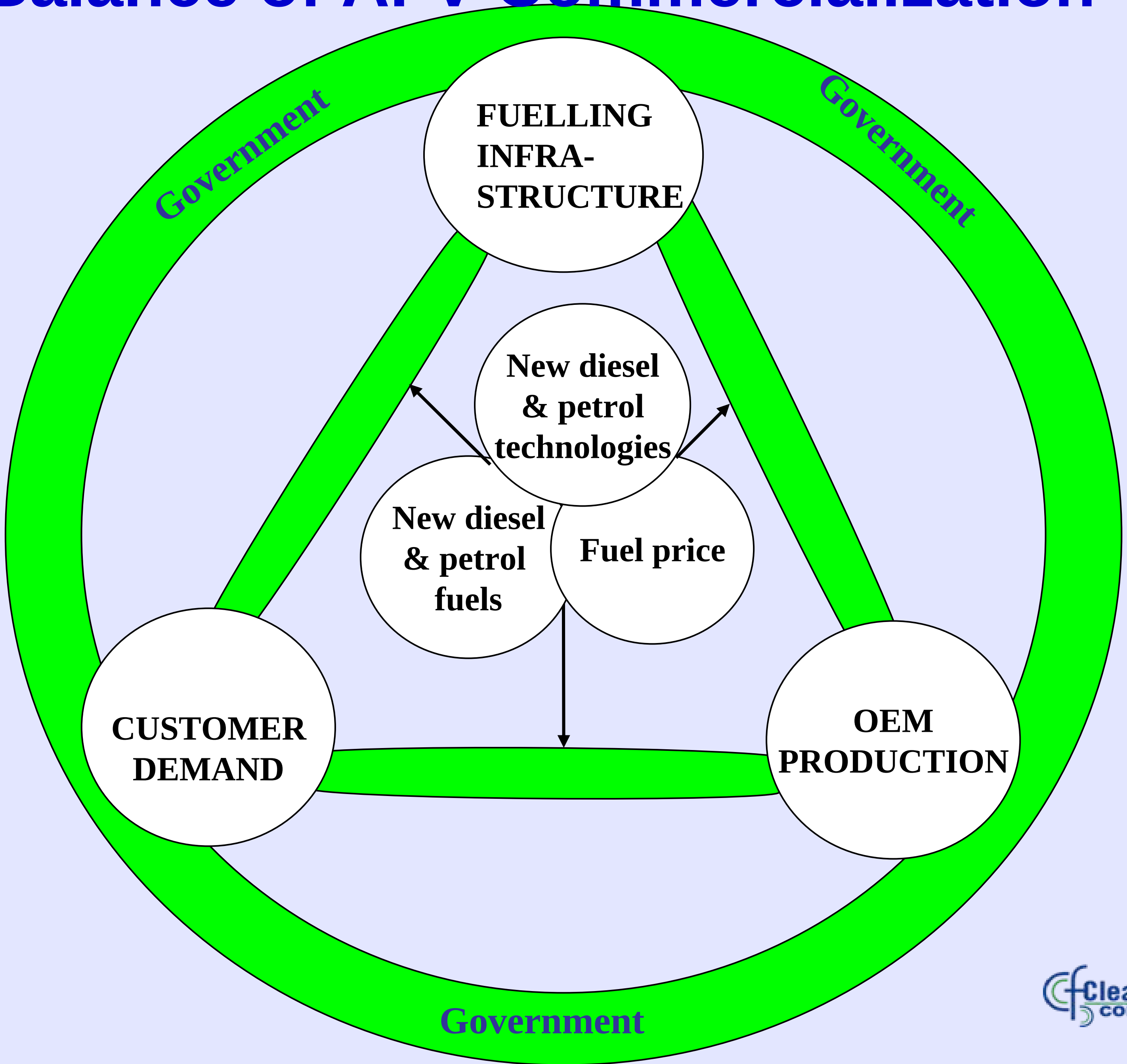
Balance of AFV Commercialization



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‘TYPICAL’ CHARACTERISTICS OF ALTERNATIVE FUEL POLICY MAKING

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ALTERNATIVE FUEL *FAVORITES* HAVE CHANGED OVER TIME

- **1980s: Electric batteries with the prospect of 'free energy' from solar & photovoltaics**
- **1990s into early 2000s: fuel cell mania and the prospect of 'cheap' hydrogen from renewable electricity (still a 'current' panacea and might remain the 'fuel of the future' for a long time)**
- **Early 2000s+: liquid biofuels (ethanol & biodiesel)**
- **2003+ : gasoline hybrids (15 years ago hybrids = 2^3: two drive-trains, too complicated, too expensive)**
- **2008+ …… back to electric vehicles (plug-in, etc.).**
- **Meanwhile: LPG & NGVs keep coming along…steady, improving, reliable AND, for biomethane, a *renewable resource***

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Characteristics of AFV Policy

- **Somewhat whimsical**
  - Popular fuel and technology choices change at any given time (and subject to the strength of a given fuel’s lobbying)
- **Disjointed**
  - What is the goal for each fuel & the market?
  - What is the appropriate, *balanced pathway* to reach the goal?
- **Incremental**
  - Innovation in transport technologies *creep, not leap*. Money spent can’t always speed technical developments.

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EU HAS UNDERTAKEN MANY VALUABLE AFV INITIATIVES

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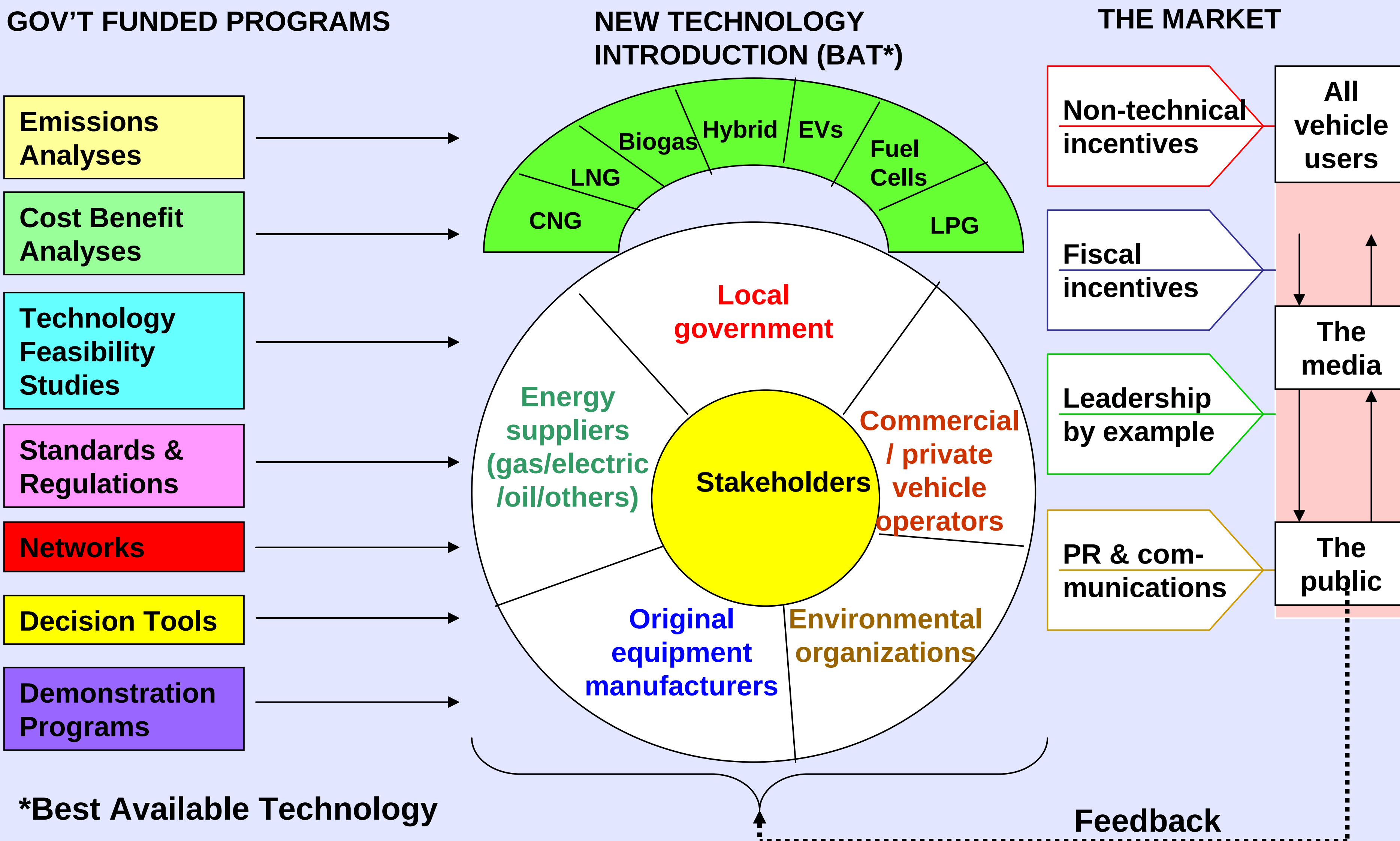
- **Incentives**
  - Framework Programs (esp. FPs 4-7)
  - Green Car Initiative (2008)
  - Subsidies for liquid biofuels
- **Mandates (hard & soft)**
  - Cars & CO_2 (2008)
  - Renewable Energy Directive (Targets) (2008)
  - Clean Efficient Vehicle Directive (2008)

EU HAS UNDERTAKEN MANY VALUABLE AFV INITIATIVES

- **Standards**
  - Environmentally Enhanced Vehicle (EEV) standard (1999)
  - Fuel Quality Directive 2008
  - Other CEN & United Nations ECE initiatives
- **RD&D**
  - Multi million €s for H2V/FC & Electric
  - Well-to-wheel analysis
  - Various transport sector analyses (TRANSvisions scenarios (2009); *Market Development Alt Fuels (2003)*; & other studies)

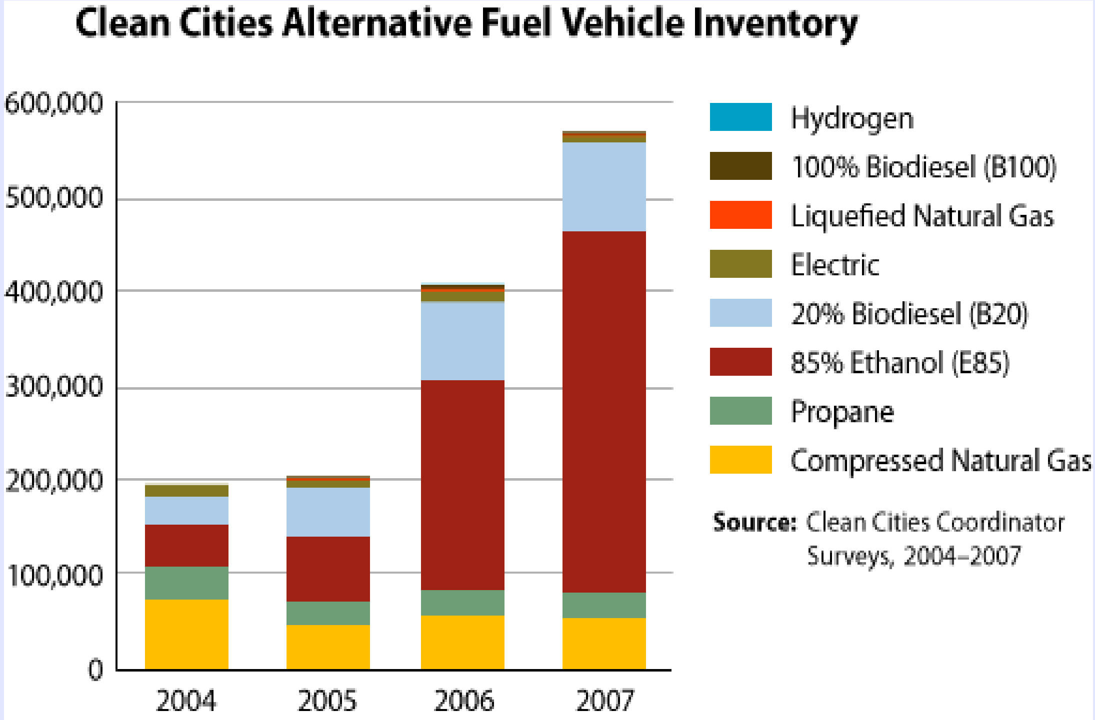
ALTERNATIVE FUELS IN URBAN TRANSPORT

A Blue Print for Implementation (Civitas/Europe : Clean Cities/USA)



*Best Available Technology

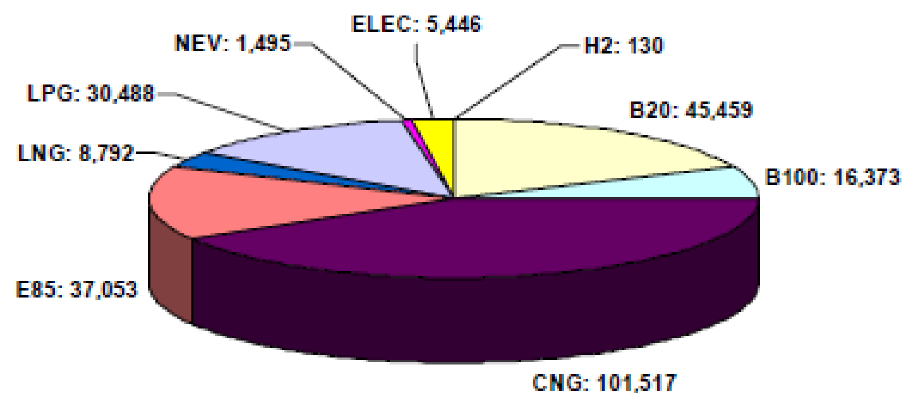
J. Seisler .revised 9.2009 from clean cities network.9.2002.



US Clean Cities Program (2007)

579,000 AFVs added

375 million gallons petrol replaced
(2 billion since 1993 inception)



Petroleum fuel replaced by vehicle type

Clean Cities Annual Metrics Report 2008

THERE ARE MANY OPPORTUNITIES TO IMPROVE EU POLICIES FOR ALTERNATIVE FUELS & VEHICLE TECHNOLOGIES

EU TRANSPORT POLICY OPPORTUNITIES

- **RD&D funding:** More balance funding alternatives; liquid biofuels, H2/fuel cells, & electrics/hybrids have been the ‘cash cows’
- **Credits to vehicle manufacturers:** to produce & sell low CO2 ***non-petroleum*** vehicles
- **Broader ‘systemic view’:** multi-faceted problems need multi-faceted solutions

  - Create biogas infrastructure for waste & sewage management to create low-CO2 fuel for transport &/or electric generation

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RENEWABLE BIOGAS-to-BIOMETHANE

The Environmentally ‘Closed Loop’

Potential to replace 20% transport sector petroleum by 2030

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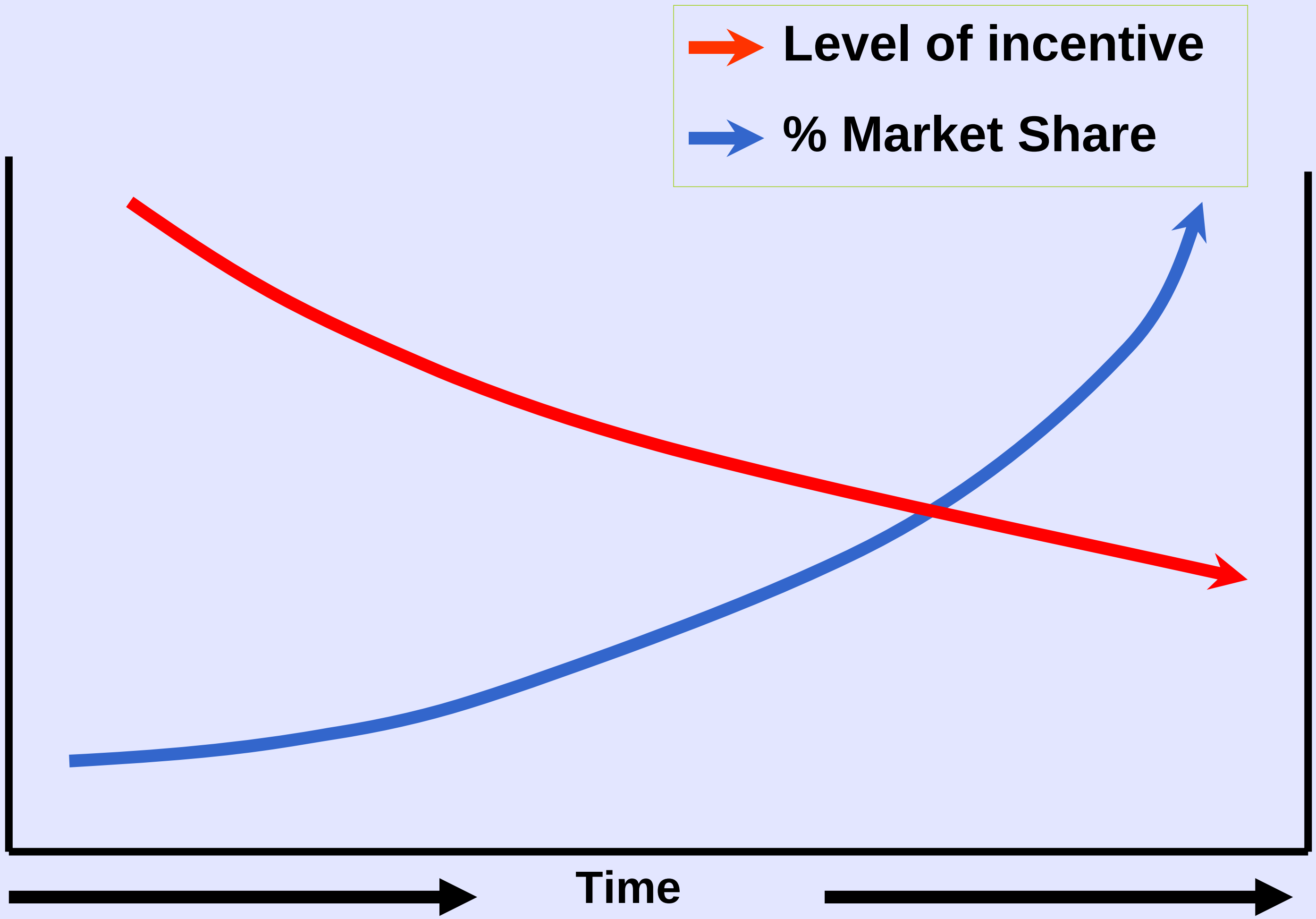
INCENTIVES FOR CLEAN FUELS & ENVIRONMENTAL TECHNOLOGIES BASED ON MARKET SHARE
(not necessarily time-limited)



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EU TRANSPORT POLICY OPPORTUNITIES

- **Data collection to validate policy impacts**: European Commission needs to better-identify cost-benefits via fuel replaced; fuelling infrastructure expansion; liters equivalent renewables added; etc., etc.
- **Expand EC/EP use of AFVs.**
- **Create European Alternative Fuels Directive.** Help reduce disjointed policy aspects & consolidate/coordinate more effective, long term transportation vision to fit other policy objectives (energy security, CO2, etc.)

Visions of the Future for Alternative Fuels

- **The Ultimate Goal: The *'commercially successful'* alternative fuels should become *fuel alternatives* (to petroleum).**
- **How to achieve the goal? AFV proponents must be *'partners in politics'* and let customers decide which fuel they prefer.**
- **The future is a big place. It will take a long time to get there.**

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Clean Fuels Consulting (CFC) is dedicated to facilitating the commercialization of clean fuels and technologies. CFC addresses the complex, multi-dimensional needs of commercial sector, public sector, and not-for-profit-based clients on a global basis.