

Equipment Manufacturers Institute

Presentation to the

EPA Nonroad Diesel Engine
Rulemaking

16 January 2001 Meeting

Alexandria, VA

Nonroad Issues

- **Diversity of Products and Low Volume Models**
 - Globalization - USA: Within and Between, Europe & Japan
- **Fuel**
 - Cost
 - Multiple Fuel Streams Impact
- **Market Elasticity**
 - Competition
 - Repair of Existing Machines
 - Substitution With Less Effective Systems
 - Farmers Have Global Competition

The Heavy Equipment Industry Mission

We, the Agricultural
and Construction
Machinery
Manufacturers,
build



the most applicable
the most durable
the most reliable
the most productive
the most powerful
the most repairable
the lowest emissions
the quietest
the safest
the most recyclable
the easiest to operate
the easiest to maintain



machines that the
customer will purchase.

Products and Models

- **Agricultural and Construction Machines Are Designed for Specific Uses**
 - Tractors, Harvesters, Loaders, Hauling Machines, Excavators, Etc.
- **Many Models Are Derivatives of Base Machines**
 - Derivative Models Are Very Specific Purpose
 - Design of These Is Not Changed Frequently
- **Global Harmonization Is the Only Way to Provide for the Limited Production**
 - Volume of a Global Market Needed to Sustain Viability

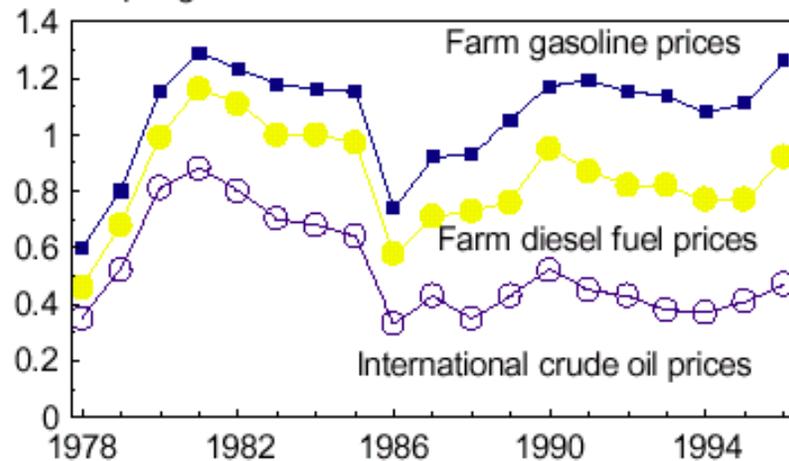
Fuel

- Agricultural and Construction Locations
 - Very Diverse Locations and Use of Multiple Fuels
 - Adding More Fuel Streams Adds More Complexity and Expense
 - Fuel Costs Are Major Expense for Farmers, Earthmoving and Mining

Cost and Usage of Fuel in Farming

Farm fuel and international crude oil prices, 1974-96

Dollars per gallon



Source: USDA, ERS, based on NASS and U.S. Dept. of Energy data

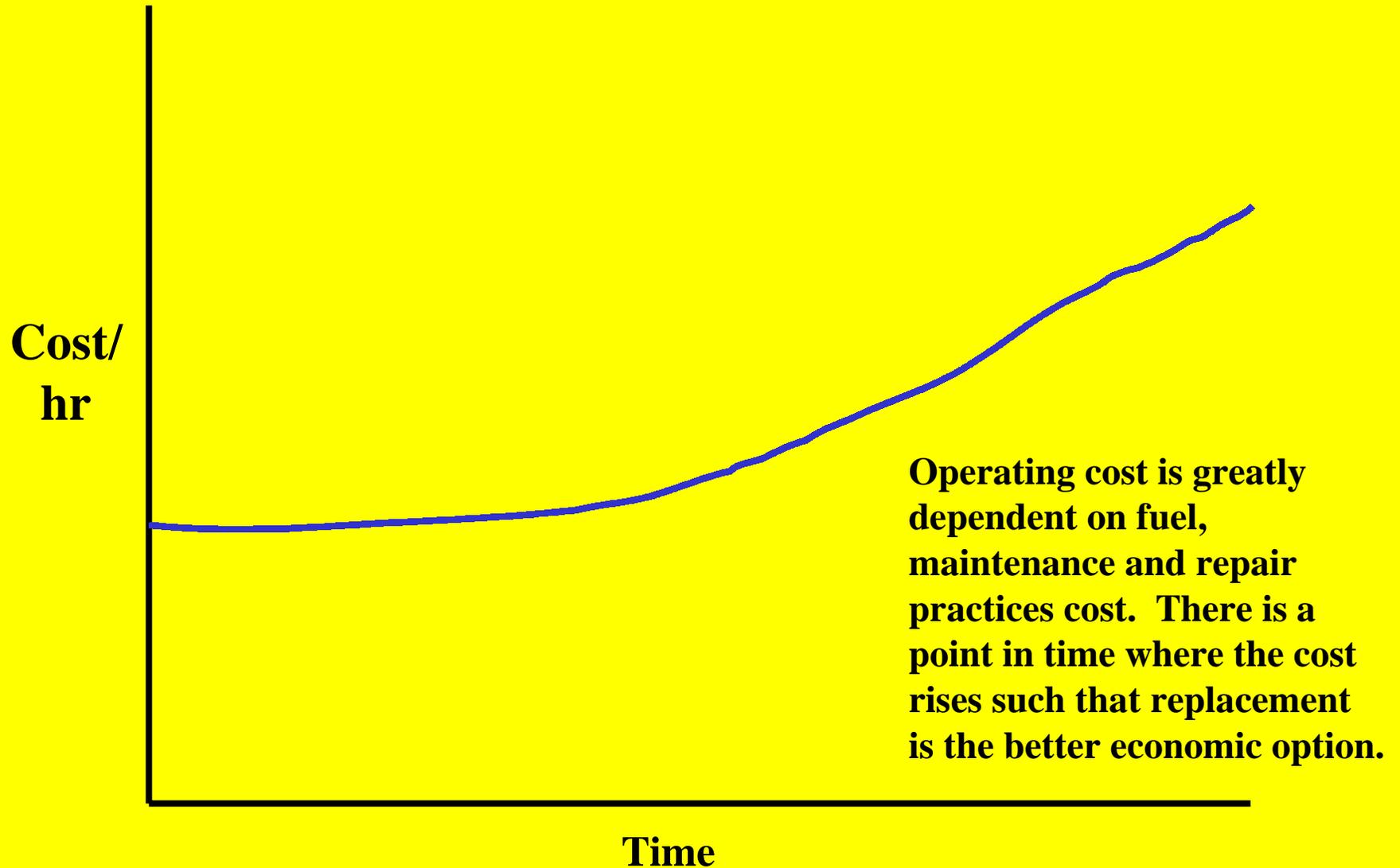
Table 1—Fuel purchased for farm use, 1974-95¹

| Year | Gasoline | Diesel | LP gas |
|-----------------|----------|--------|--------|
| Billion gallons | | | |
| 1974 | 3.7 | 2.6 | 1.4 |
| 1975 | 4.5 | 2.4 | 1.0 |
| 1976 | 3.9 | 2.8 | 1.2 |
| 1977 | 3.8 | 2.9 | 1.1 |
| 1978 | 3.6 | 3.2 | 1.3 |
| 1979 | 3.4 | 3.2 | 1.1 |
| 1980 | 3.0 | 3.2 | 1.1 |
| 1981 | 2.7 | 3.1 | 1.0 |
| 1982 | 2.4 | 2.9 | 1.1 |
| 1983 | 2.3 | 3.0 | 0.9 |
| 1984 | 2.1 | 3.0 | 0.9 |
| 1985 | 1.9 | 2.9 | 0.9 |
| 1986 | 1.7 | 2.9 | 0.7 |
| 1987 | 1.5 | 3.0 | 0.6 |
| 1988 | 1.6 | 2.8 | 0.6 |
| 1989 | 1.3 | 2.5 | 0.7 |
| 1990 | 1.5 | 2.7 | 0.6 |
| 1991 | 1.4 | 2.8 | 0.6 |
| 1992 | 1.6 | 3.1 | 0.9 |
| 1993 | 1.4 | 3.3 | 0.7 |
| 1994 | 1.4 | 3.5 | 0.9 |
| 1995 | 1.4 | 3.6 | 0.8 |

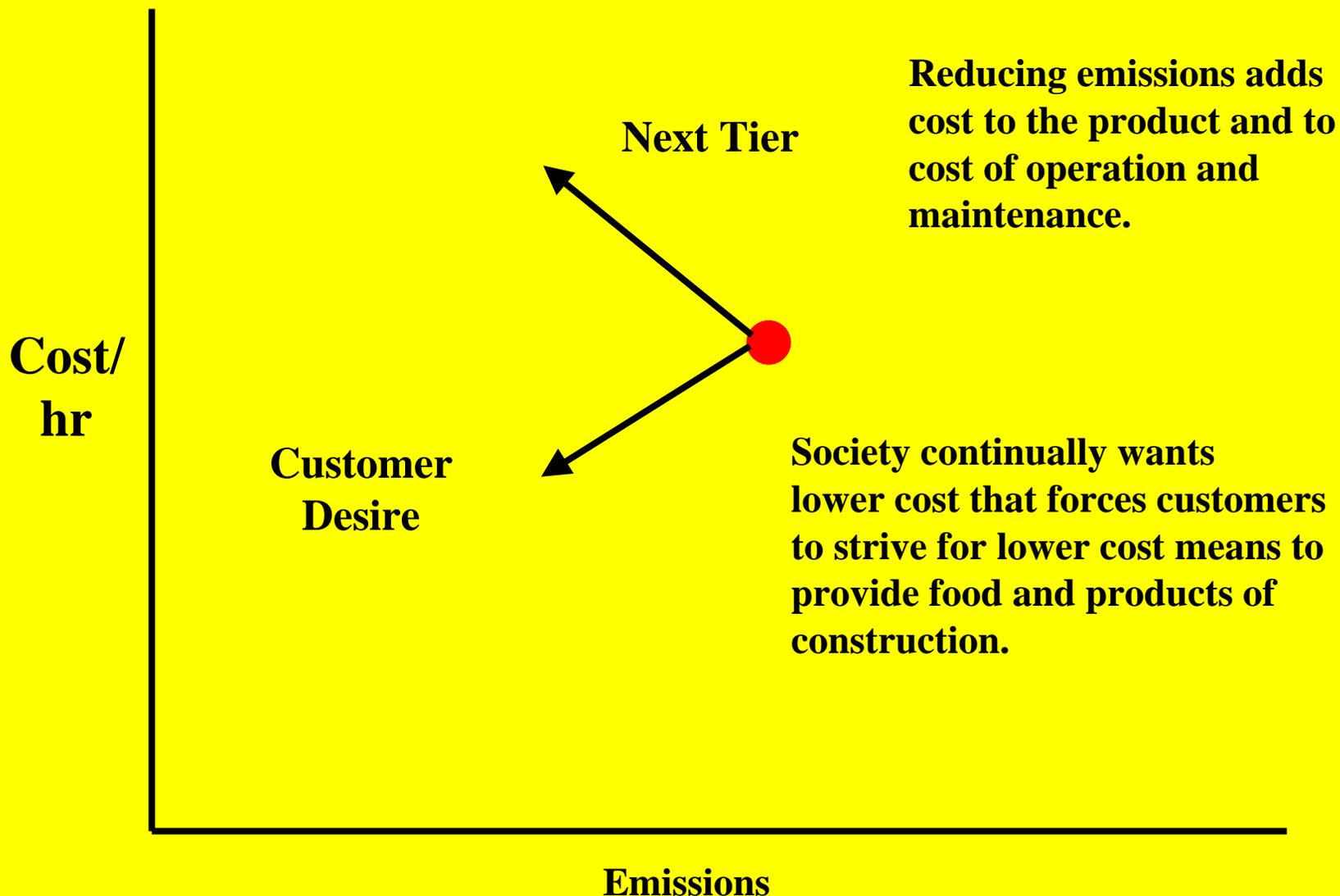
¹ Excludes Alaska & Hawaii and fuels used for household and personal business.

Source: USDA, ERS, based on data gathered by NASS

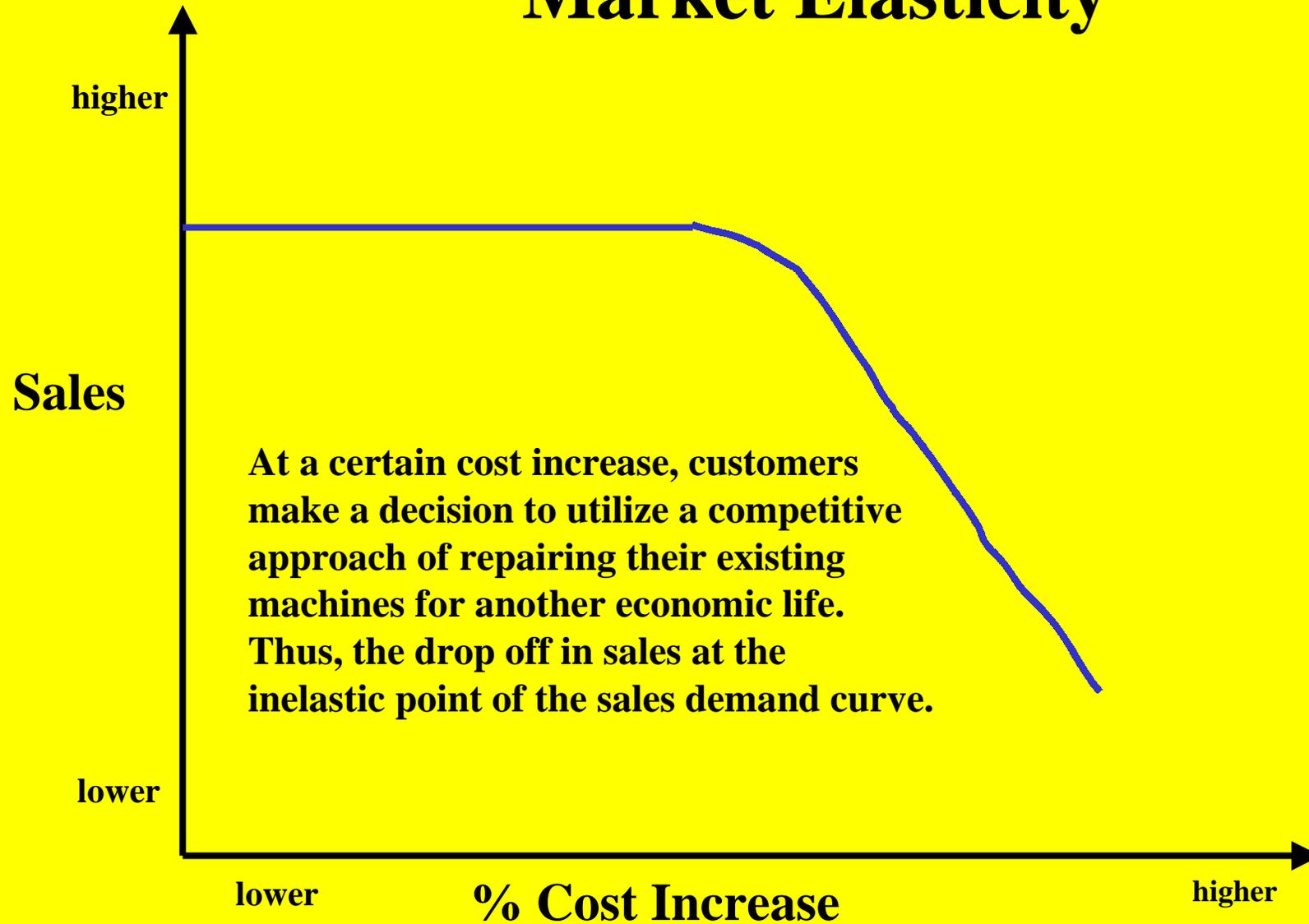
Operating Cost



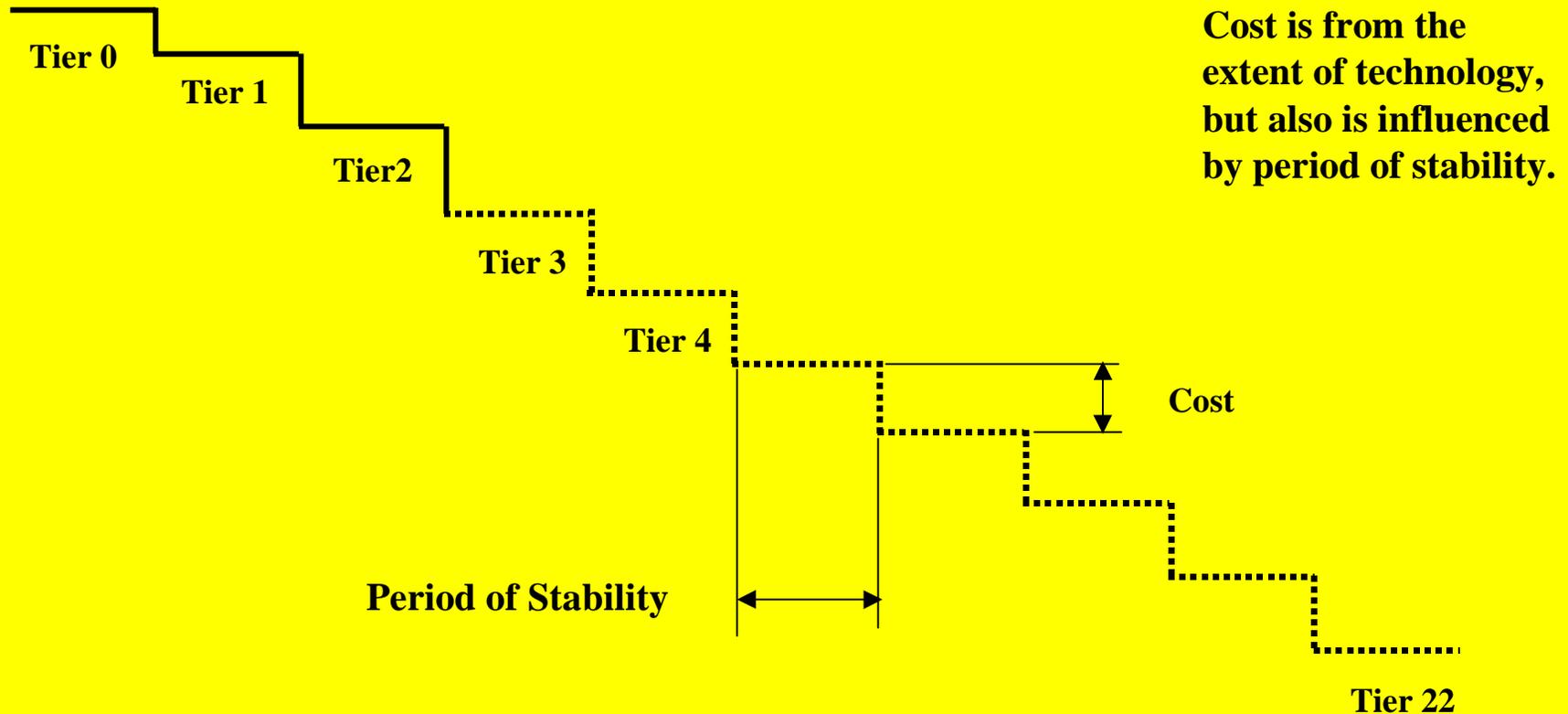
Emission Tradeoffs



Market Elasticity



Emissions Reduction Steps



Cost is from the extent of technology, but also is influenced by period of stability.

Period of stability is a necessary facet because manufacturers must have some time to develop and design products and then amortize the technology and facilities involved. Also, there needs to be stability at the marketing level and with customers.

Tier 22 used to denote that we must consider the long term and recognize that there will be many steps to achieve the desired emissions reduction.

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machines that the customer will purchase.

Customer Drive of the Market Process on Emissions

Market Elasticity

Sales

Sweet spot

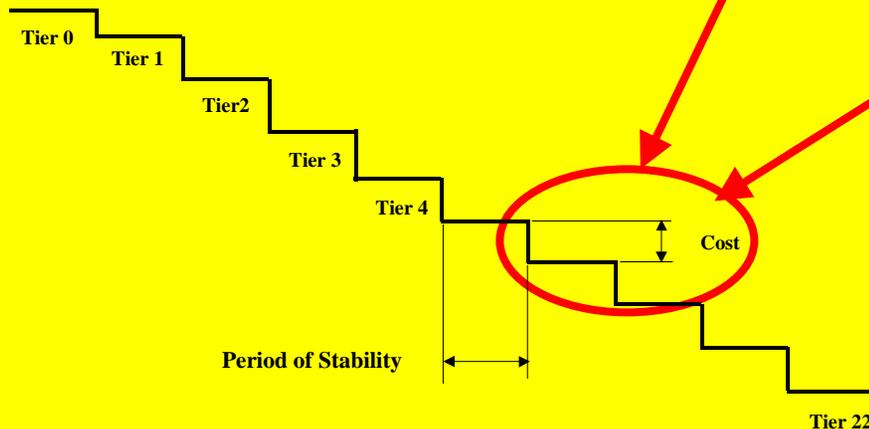
higher

lower

% Cost Increase

higher

Emissions Reduction Steps



The customer stops buying at the inelastic point. This point is established by the cost of the reduction step. Small steps are needed to stay in the elastic part of the market curve. This sweet spot must be found for the regulation.

Conclusions

- Customers Must Continue to Purchase New Machines
 - Only Way to Get Lower Emissions Machines Put to Use
 - Manufacturers Need Continued Revenue to Develop Successive Tiers
- Lead-time and Periods of Stability Are Required
- Flexibility - Balance Tier Effectivity With Design Cycle of Machines - Including Derivative Models
 - Averaging, Banking, Phasing, Staggering, etc.
- Global Harmonization Is an Imperative Because of the Global Market & Global Competition
- System Aspects of Engine, Machine and Fuel Technology Must Be Worked Together
- Any regulation must truly add value

Cooperation Between Developed Regions

- Participate in a Forum Where the Issues Can Be Presented and Concluded
 - TABD Recommendation
 - Timeframe – End of March / Early April
 - Venue - Brussels
- Developed Regions of the Globe Work Together for Harmonization of Requirements for Same Engine / Machine Design
- Transparency of Certification Requirements to Enable Trade Between Regions