

Enhanced Vapor Recovery

January 19, 2000 Workshop

Preliminary Cost Impacts Analysis

California Air Resources Board
California Environmental Protection Agency

www.arb.ca.gov/vapor/evr/evr.htm

Agenda

- Goals
- Methodology & assumptions
- Results: Cost-effectiveness, consumers
- Future activities

Goals

- Overall cost-effectiveness & per-gallon cost increase
- Individual cost-effectiveness & per-gallon cost increases by:
 - Proposed Module
 - Throughput of gasoline dispensing facility (GDF)

Methodology

New GDF
Equipment Cost

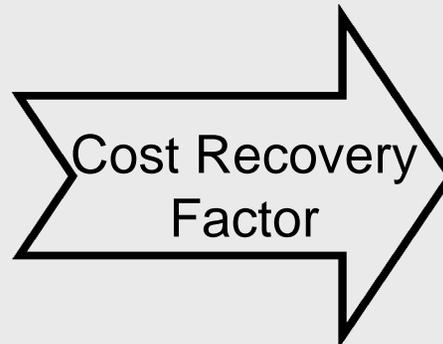
+

R&D Costs

+

Certification
Costs

X



$$\frac{i(1+i)^n}{(1+i)^n - 1}$$

n = 3 yrs (nozzles)
= 7 (dispensers), 10 (all others)
i = 10%

**Annualized
Costs**

Methodology (cont.)

Cost-Effectiveness

Annualized
Costs, \$/yr

-

Value of
Gasoline
Saved, \$/yr

**Annual Emission
Reductions, lb/yr**

Methodology (cont.)

- Adapted USEPA Model GDF approach (1991 Phase II Technical Guidance) to include proposed modules.
 - 5 Model GDF classes represent entire range of GDFs in State
- Updated Model GDF inputs to reflect current California market.

Model GDF Input Values (cont.)

Model GDF	1	2	3	4	5
Gal/Month	13,233	37,500	75,000	150,000	300,000
%CA Facilities	4.7%	14.1%	45.7%	31.3%	4.2%
#GDFs	531	1,586	5,136	3,522	475
#Dispensers	2	3	6	9	12
#Nozzles (wtd-avg)	2.5	3.25	6.5	9.75	16.25

Conservative Assumptions (Equipment Purchase)

- All GDFs would buy new equipment with no “core” trade-in discounts (can be 30%+)
- “List” prices applicable
- ORVR+ Liq. Retention + Spillage modules would add 75% premium above baseline Phase-II compliant nozzle costs
 - (e.g., \$162 above baseline cost of \$216 per nozzle)

Conservative Assumptions (R&D Costs)

- Phase II & ISD certifications would each cost about \$563,000
 - assumed 80 certifications, incl. 16 new ISD systems & all 64 existing Phase II certs.
- Phase I certifications would each cost about \$183,000
 - assumed all 14 existing Phase I to be recertified

Conservative Assumptions (Certification Costs)

- ARB fees would increase by 400%
- Manufacturers' per-Phase II certification costs \$170,000 each
 - would double under staff's proposal
- Manufacturers' per-Phase I certification costs \$17,000 each
 - would double under staff's proposal



Results

Overall Results

■ For the entire regulation:

- Annual cost = \$31 million per year
- Cost-effectiveness = \$1.70 per lb ROG red.
- Cents per-gal increase = 0.23 cent

Cost-effectiveness by Module (across all GDFs)

<u>Module</u>	<u>Cost-Effectiveness, \$/lb</u>
1 (Phase I)	\$0.50
2 (Phase II)	\$7.50
3 (ORVR Compatibility)	\$0.55
4 (Liquid Retention)	\$10.00
5 (Spillage/Dripleless)	\$0.30
6 (In-Station Diagnostics)	\$1.60

Cost-effectiveness by Model GDF (across all modules)

Model GDF	Cost-Effectiveness, \$/lb
1 (13,233 gal/mo)	\$10.70
2 (37,500 gal/mo)	\$3.80
3 (75,000 gal/mo)	\$2.25
4 (150,000 gal/mo)	\$1.25
5 (300,000 gal/mo)	\$0.65

Cost Effectiveness of Recent ARB Regulations

ARB Regulation	Cost-Effectiveness \$/lb Reduction
Proposed EVR (as of 1/2000)	\$1.70
Consumer Products Mid-term 2(10/99)*	\$0.40
Consumer Products Mid-term 1 (7/97)*	\$0.25
On-Road Motorcycles (12/98)**	\$5.60
Small Off-Road Engines (3/98)**	\$9.63
Marine Engines and Personal Watercraft (12/98)**	\$3.57

* per pound of VOC or HC, ** per pound of HC+NOx

Per-Gallon Increase by Model GDF (across all modules)

Model GDF

Cost Increase, cents per gal

1 (13,233 gal/mo)

1.5

2 (37,500 gal/mo)

0.5

3 (75,000 gal/mo)

0.3

4 (150,000 gal/mo)

0.2

5 (300,000 gal/mo)

0.1

$\bar{X} = 0.23$

Per-Gallon Increase by Module (across all GDFs)

Module	Cost Increase, cents per gallon
1 (Phase I)	0.013
2 (Phase II)	0.126
3 (ORVR Compatibility)	0.019
4 (Liquid Retention)	0.011
5 (Spillage/Dripleless)	0.006
6 (In-Station Diagnostics)	0.056

$\Sigma = 0.23$

Future Activities

- Refine analysis as new information becomes available
- Present business impacts analysis
 - Change in profitability
 - Impacts on employment, competitiveness, expansion
 - Impacts on consumer
 - Impacts on local or State agencies

Conclusions

- Proposal is cost-effective overall (\$1.70/lb ROG reduced)
- Cost increase to consumers less than 1/4 penny per gallon