

AVIATION OPERATIONAL MEASURES FOR
FUEL AND EMISSIONS REDUCTION
WORKSHOP

Ground Support
Equipment
Emission Reduction
Options

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Ottawa, 5-6 November 2002

Presentation



- Overall strategy
- Applicability of technology to equipment types and operation
- Other initiatives
- Conclusion

Emission Reductions



- No single solution
 - ✧ Infrastructure requirements
 - ✧ Operational requirements
 - ✧ Equipment availability
 - ✧ Technology availability
- Cost considerations

Electric GSE



✈ Applicability

- ✧ Belt loaders
- ✧ Bag tractors
- ✧ Aircraft tractors *
- ✧ Forklifts
- ✧ Container loaders
- ✧ Cargo tractors

* Limited Basis

✈ Benefits/ *Challenges*

- ✧ Zero emissions
- ✧ Lower maintenance costs
- ✧ Increased equipment reliability
- ✧ *High infrastructure cost*
- ✧ *Additional ramp space*
- ✧ *Recharging*



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Compressed Natural Gas



✈ Applicability

- ✧ Bag tugs
- ✧ Belt loaders
- ✧ OEM type equipment
(Ford, GM Etc)
- ✧ Forklifts

✈ Benefits/ *Challenges*

- ✧ Lower emissions
(compared to gasoline - *higher for HC and CO compared to diesel*)
- ✧ *Infrastructure (limited availability, high cost for fill stations)*

Liquid Petroleum Gas



- ✈ Applicability
 - ✧ Bag tractors *
 - ✧ Belt loaders *
 - ✧ OEM type equipment (Ford, GM, Etc.)
 - ✧ Forklifts
 - ✈ Benefits/ *Challenges*
 - ✧ Lower emissions (compared to gasoline - *higher for HC and CO compared to diesel*)
 - ✧ Readily available
 - ✧ *Safety concerns (employee strains)*
 - ✧ *Tank location*
 - ✧ *Cost*
- * Limited use

Gasoline/Diesel Retrofit with 2 or 3 Way Catalytic Converters

✈️ Applicability

- ✧ Diesel and closed-loop gasoline engines where kits are available

✈️ Benefits/ *Challenges*

- ✧ Lower emissions
- ✧ Reduced fuel cost
- ✧ *Open loop systems*
- ✧ *Engine run times*
- ✧ *Installation location and space on GSE*
- ✧ *Many different engines (many sizes and Mfg)*



Diesel Retrofit with Particulate Traps

✈️ Applicability

- ✧ All current and older model diesels where kits are available

✈️ Benefits/**Challenges**

- ✧ > 85% particulate reduction
- ✧ *Installation location*
- ✧ *Cost*
- ✧ *Maintenance*
- ✧ *Life span*
- ✧ *Not certified for all equipment*
- ✧ *Run time*



Fuel Cells

Emerging Technology with Significant Potential



✈ Possible Applicability

- ✧ Bag tugs
- ✧ Belt loaders
- ✧ Jet tractors
- ✧ Cargo tractors
- ✧ Container loaders
- ✧ Chargers
- ✧ OEM type equipment

✈ Benefits/ *Challenges*

- ✧ Zero emissions
- ✧ No charge time, fueling could be similar to conventional fueling
- ✧ Less invasive infrastructure
- ✧ *Availability*
- ✧ *Technology, cost and timeline*

Solar Power

Developing Technology



✈ Applicability

- ✧ Fuel service carts
- ✧ Other GSE

✈ Benefits/Challenges

- ✧ Zero emissions
- ✧ No infrastructure required
- ✧ *Limited applicability*
- ✧ *Presently only used to assist other power sources*



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Other Emission Reduction Initiatives



- Tow-barless tractors
- Lavatory carts
- Fuel carts





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Conclusion



- No one solution fits all needs
- Technology is still developing
- Aviation industry is utilizing what is available
- Cost



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Thank you !



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