

# **Standards Development may benefit from systems approach**

## **National Idle Reduction Planning Conference**

Presented By:

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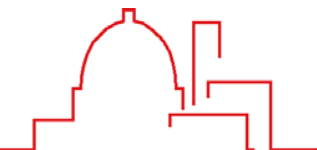
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# The Big Picture: Idling Reduction

- **Goal is to reduce emissions and diesel fuel consumption – resulting in cost savings**
- **10% of crude oil imports are used for vehicle air conditioning!**
- **Standards are necessary to assure equipment compatibility (plugs, voltage, etc)**
- **Quieter, emission free rest may improve comfort and safety**



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# Air Conditioning Dominates Truck Hotel Loads

**Air Conditioning Duty Cycle is Based on the following:**

- **40 Degree F Temperature Difference: 6700 BTU/h**
- **Solar Load through Windows: 3000 BTU/h**
- **Heat Rejection from Appliances: 700 BTU/h**
- **Sensible and Latent Heat of Occupants: 400 BTU/h**



**Total: 10,800 BTU/h**

Source: PACCAR



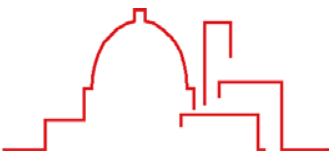
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# Lessons from on truck electric air conditioning systems:

- 7000 BTU per hour air conditioner is adequate –would benefit from added insulation
- Tested in 104 F weather, curtain closed
- Lots of heat from under truck
- Batteries give 6-10 hours of operating time
- reduces battery operating time
- 2500 W inverter or 120V 20 A runs microwave plus air conditioner



# NREL PNGV Study- reduce thermal loads to increase fuel economy

- Technical Elements:
- Insulate the cabin
- Use spectrally selective windshield glazing (PPG Sungate)
- Improve outer surface reflectivity
- Ventilate stationary vehicle
- Results: 32% reduction in AC power requirements
- Interior soaked temperature reduced 7.9 C



# Truck Glazing Tests show positive results

- **NREL Tests in Phoenix**
- **Two side by side Class 6 trucks**
- **One with Guardian IRR Silver Guard Glass**
- **Cabin Air temp reduction 5 C, dash 7C**
- **0.2-0.3 mpg fuel economy improvement over 11.3 mpg baseline**
- **More improvement possible if compressor down sized and given identical loads**



# Insulation greatly decreases power needs

- **Insulated Cab by Idle Free.net- Robert Jordan**
- **uses <40 A-h at 12V over night in freezing weather**



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# Summary

- **System design can minimize power requirements for heating and cooling**
- **Technologies include glazing, insulation, reflective coatings, insulated floor, double roofs**
- **Lower loads reduce both initial HVAC costs and operating costs (smaller, lighter, cheaper)**
- **Infrastructure cost for 120V 20 Amp is half 240 V 30 A systems**
- **Fuel economy savings result from including thermal management design**



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