Introduction

• Extensive cool chain principally in developed countries maintaining quality and minimising waste
• Around 4 million refrigerated vehicles
• Extensive air transport network
• 1.2 million refrigerated containers
• Regular dedicated train services carrying reefer containers
• Several hundred reefer ships
Transport Refrigeration Types

- Refrigerated Vehicles
  - Vans
  - Trucks
  - Semitrailers
- Refrigerated Air Cargo
- Refrigerated Containers
- Refrigerated Trains
- Refrigerated Ships
Refrigerated Vans & Trucks
Refrigerated Truck and Drawbar
Refrigerated Semi Trailer
Multicompartment / Temperature
Vehicle Carriage Split

- Vans = 55%
- Semi Trailers = 25%
- Trucks = 20%

- Chilled Setpoint Part Load = 56%
- Frozen Setpoint Full Load = 6%
- Frozen Setpoint Full Load = 24%
- Chilled Setpoint Full Load = 14%
Refrigerated Air Cargo
Refrigerated Containers
Refrigerated Containers
Controlled Atmosphere
Refrigerated Trains
Reefer Ships
Combi Carrier (R-717)
Container / Pallet carrier
### Refrigerant Options

#### Transport Refrigeration

<table>
<thead>
<tr>
<th>Types of transport</th>
<th>Current higher GWP refrigerants (GWP kg(\cdot)CO(_2))</th>
<th>Alternative lower GWP refrigerants (GWP kg(\cdot)CO(_2))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigerated containers, road transport, trains</td>
<td>HFC-134a (1360); HFC-404A (3920); HCFC-22 (1810)</td>
<td>R-744 (1), HFC-452A (1950); HFC-513A (573); HC-290 (5); R-717 (0)</td>
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</tbody>
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Thanks for Listening!

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