



A Climate Neutral Company

Energy and Climate Change, June 20th November 2008



Climate Change a Priority with LFV

- LFV has identified the climate issue as one of the industry's most important challenges
- LFV reduces its GHG emissions at all levels
- Since 2003, LFV has reduced carbon dioxide emissions by 67 percent
- Remaining emissions are compensated for in CDM-certified projects
- With our GHG reductions and taking into account our projects in CDM – LFV has achieved climate neutrality



LFV – Swedish Airports and Air Navigation Services

- LFV Group is a state enterprise
- 16 airports
- All air-traffic control in Sweden
- Turnover of 670 M euros
- Approximately 4,000 employees



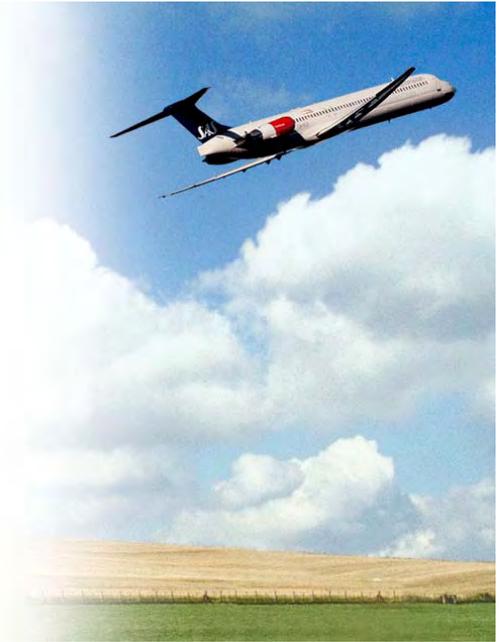
Our definition of being Climate Neutral

- **Target: Zero emissions** of carbon dioxide in our own business operations
- This is achieved by **gradual reductions**
- For remaining emissions we **compensate** by buying **CDM – certificates**, developed within the United Nations programme
- A Climate Neutral Company since 2005



The road to climate neutrality

- Our first priority - **reducing our own** carbon dioxide emissions
- We invest in projects with the greatest climate gains
 - Energy Efficiency
 - Bio fuel replacing oil
 - Purchase of green electricity
 - Clean vehicles are used
 - Biogas-powered buses
 - Green approaches

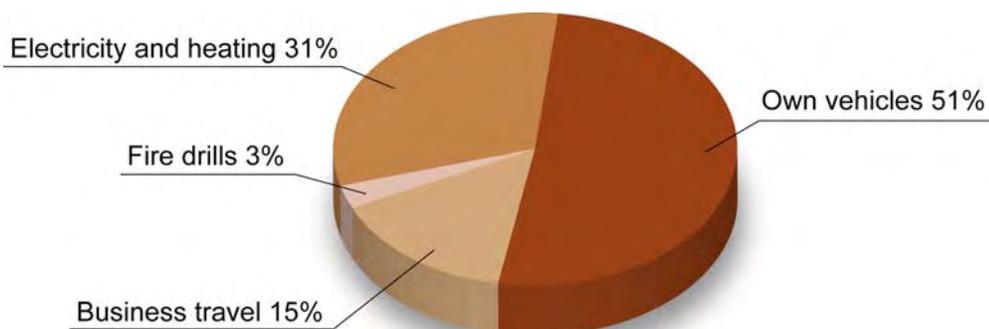


LFV carbon dioxide emissions

LFV own emissions of 11 700 tons of carbon dioxide are mainly generated by

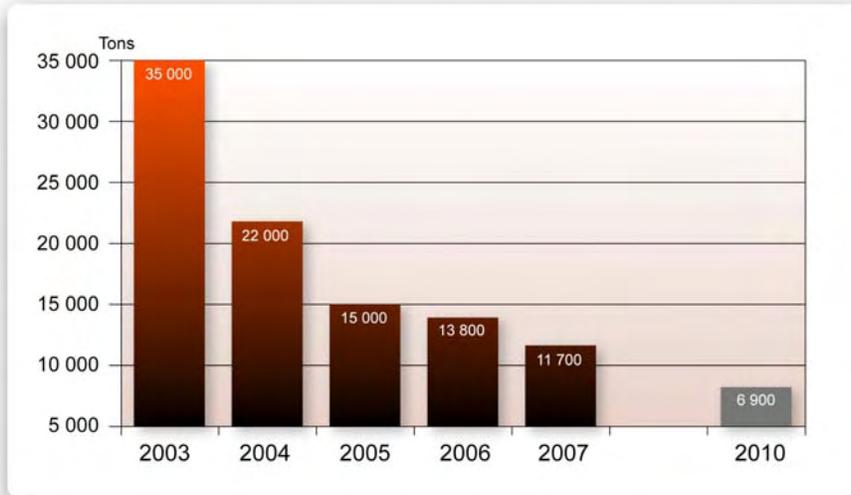
- Electricity and heating
- Vehicles at the airport

This is why we concentrate our actions on **airport vehicles, electricity and heating**



Reduced carbon dioxide emissions (tons) _____

- Between 2003 and 2007, LFV's carbon dioxide emissions have been reduced by 67 percent



Reduction of carbon dioxide emissions - examples _____

<u>Projects:</u>	<u>Reduction in CO₂</u>
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- | | |
|--------------------------------|--------------|
| • Recycling material | -2 300 tons |
| • Replacing oil boilers | -3 000 tons |
| • Purchasing green electricity | -13 000 tons |
| • Energy efficiency | -11 000 tons |



Example: Pellet boilers at Malmö Airport

- Oil boilers are replaced with two new pellets burning boilers
- Carbon dioxide emissions from Malmö's heating is reduced from 3,500 tons per year to 500 tons per year
- More efficient heating and ventilation systems
- Solar energy



Example: Green electricity provides major emission reductions

- LFV has used only green electricity since 2004
- Result: Reduced emission of carbon dioxide equivalent to 13,000 tons per year



The world's first airport with biogas busses

- Six biogas buses have been purchased – Stockholm Arlanda is most likely the only airport in the world with biogas buses
- Only clean vehicles are purchased (excluding special vehicles)



Heavy Eco driving

- Educated employees
In Heavy Eco driving at Umeå Airport
- Reduced fuel consumption with 18 %
- Saving per year 10 000 Euro
- Will be implemented at other airports as well
- Training is paid for by decreased fuel costs



Compensation for remaining emissions

- CDM-certificates for three projects
- Tree-planting in Costa Rica
- Wind power in China
- Bio fuel-based steam production in South Africa
- The projects also contribute to social and economic development



Costs of CDM-certificates

- CDM-certificates gives LFV a clear indication of the costs of carbon dioxide emissions
- This increases the willingness to reduce emissions
- In 2006 LFV bought CDM-certificates for emissions equivalent to 15 000 tons
- Price tag 12 € per ton – 180 000 € in total



Why Carbon Neutrality is important for LFV

- Stockholm - Arlanda – Sweden's largest airport has environmental constraints (emission cap)
- LFV can and will achieve zero emissions for carbon dioxide in our own operations
- The problem is that we have no jurisdiction over road transports to and from Arlanda
- We intend to showcase Stockholm – Arlanda - reaching zero emissions in carbon dioxide from our business operations by 2012



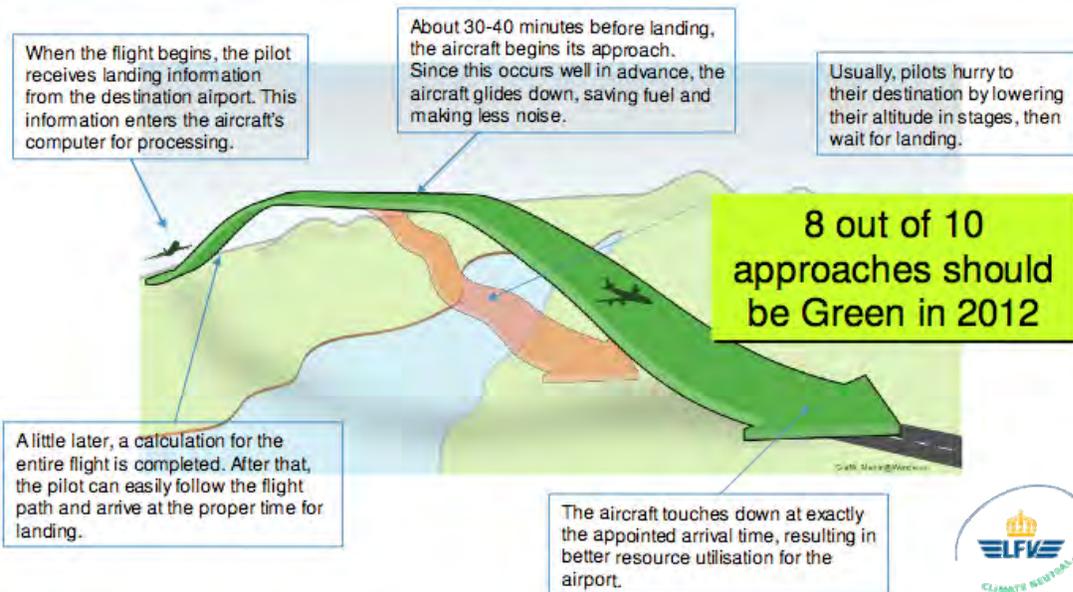
What we do at Stockholm – Arlanda

- 80 percent green approaches by 2012
- 100 percent environmental cabs by 2011
- 100 percent renewable energy in the Airport area by 2012
- Only renewable fuels and green electricity for heating by 2010
- Underground storage for heating and cooling



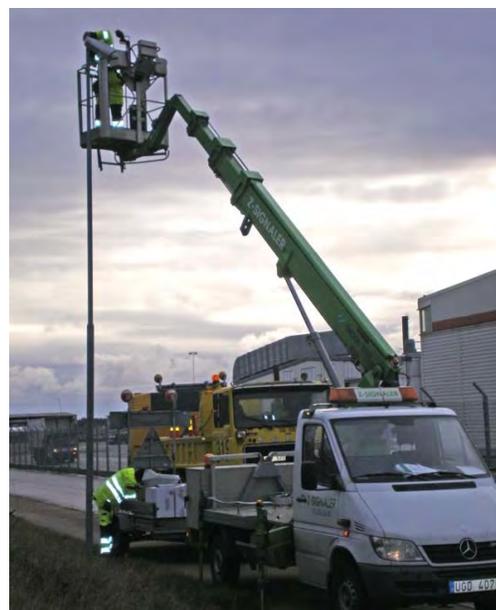
80 percent of all approaches green by 2012

- Noise, fuel consumption and emissions are reduced (reduction with 0,45 ton carbon dioxide/approach)
- Total reduction in carbon dioxide emissions - 40 000 tons/year



More efficient out door lightning

- Arlanda Energy has under 2007 decreased LFVs electricity use at Stockholm-Arlanda Airport with 10%
- One activity was to exchange 1 200 street lights on roads and parking places on landside
- With the new electric fittings maintenances and energy use was divided.
- **Saving of electricity** about 400 000 kWh, same size as electricity use for 80 houses.



Efficient Energy Management

- Employees in apron tower can manage lighting and adjust it to where aircraft is parked
- Pre-heating of engines can be planned after weather forecast.
- Employee at parking place can manage lightning after usage of parking places
- **Savings:** decreased use of electricity with 1 000 000 kWh/year



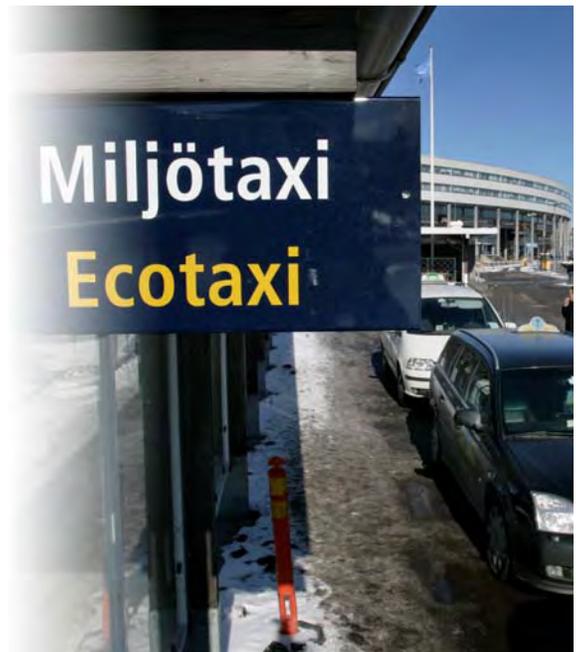
More Efficient Lightning LED

- LED Light Emitting Diod
- During 2008 will one level in parking house T5 at Stockholm- Arlanda Airport, change lightning to LED which gives a decreased energy demand with 60% = 100 000 kWh/år
- **Saving** when all levels in the parking house have new lights is 300 000 kWh/year



What we do at Stockholm – Arlanda Airport

- Taxis meeting environmental criteria will increase from today's 35 percent share to 100 percent by 2012
- Reduction in carbon dioxide - 9 000 tons/year
- Cost for LFV: none



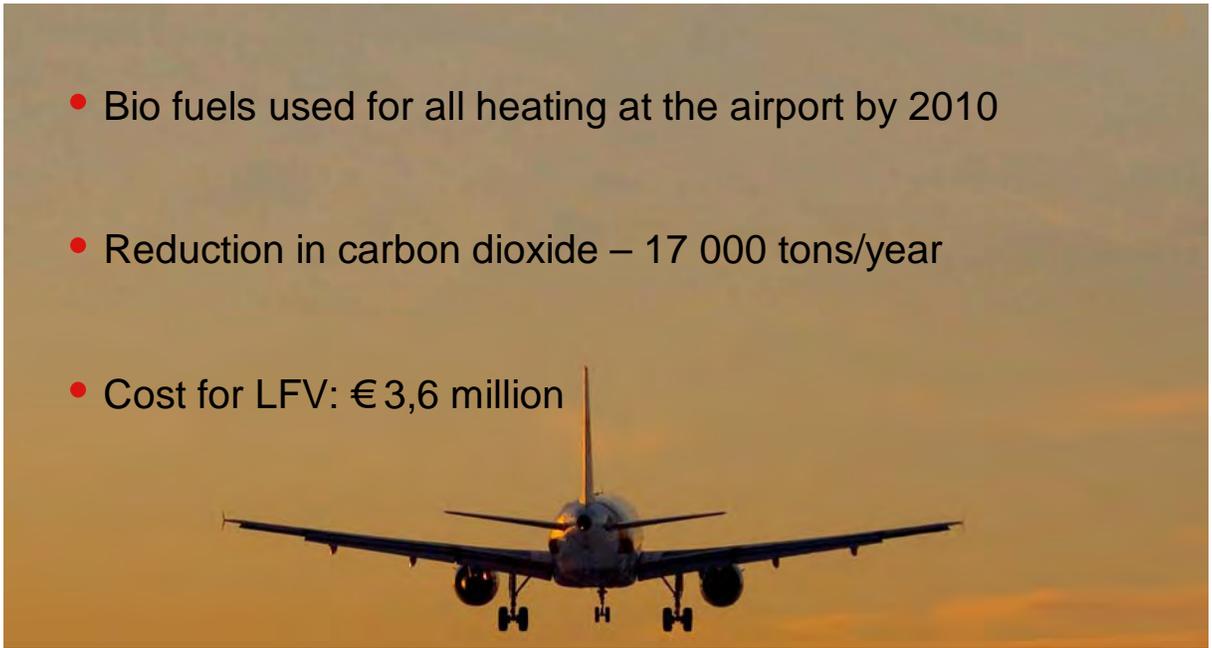
What we do at Stockholm – Arlanda Airport

- Renewable fuels for all vehicles used by LFV in the airport area by 2012
- Reduction in carbon dioxide – 6 000 tons/year
- Cost for LFV: €2,2 million (does not include vehicles)



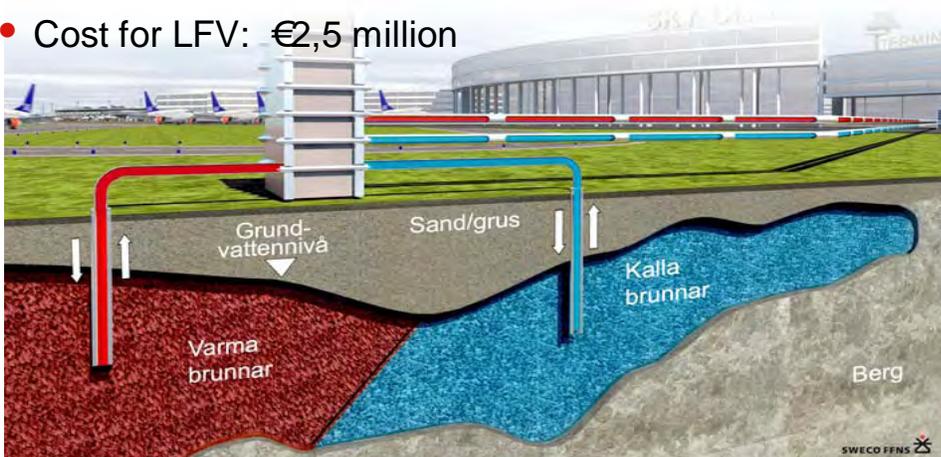
What we do at Stockholm – Arlanda Airport

- Bio fuels used for all heating at the airport by 2010
- Reduction in carbon dioxide – 17 000 tons/year
- Cost for LFV: € 3,6 million



What we do at Stockholm – Arlanda Airport

- Ground water storage for heating and cooling (world's largest of it's kind)
- Reduction in carbon dioxide – 7 000 tons/year
- Reduction in use of energy 3-4 GWh and heating 10-15 GWh
- Cost for LFV: €2,5 million



SWECO FFNS



Climate Neutrality – the Road Forward

- Continuing the work to reduce our own carbon dioxide emissions
- We use vehicles and machines that run on renewable fuel
- We work for green approaches in flying
- We offer air passengers the use of climate compensation
- We encourage other companies in air travel to reduce their carbon dioxide emission and to become Climate Neutral



Conclusions from LFV Climate Neutrality work

- Doing it step by step works, we have succeeded in decreasing our carbon dioxide emissions constantly
- Internal focus and motivation is crucial
- Our airports will reach zero emissions target – but we need to involve the rest of the air traffic industry in this
- Road traffic to and from airports are still an unsolved issue



Thank You for your attention!

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