

# LOCAL AIR QUALITY STUDY OSLO AIRPORT - GARDERMOEN

**N-ALM MEETING 57  
HELSINKI NOV. 15th – 16th**

# OSLO AIRPORT IN NUMBERS

- 
- An aerial photograph of Oslo Airport, showing the terminal building, runways, taxiways, and numerous aircraft parked at gates. The sky is bright with some clouds. The statistics are overlaid in white text on the right side of the image.
- 2 parallel runways (01/19)
  - 250 000 movements/year
  - 25 mill. PAX
  - 45/55 % Domestic/International flights
  - B 737 is the most commonly used jet
  - DHC-8 is the most commonly used TP
  - Approx 70 % travel by public transport to/from the airport

# LOCAL AIR QUALITY STUDY – OSLO AIRPORT



We are currently measuring  
 $\text{NO}_x$ ,  $\text{NO}_2$  and  $\text{PM}_{10}$   
in addition to wind speed, -direction  
and temperature

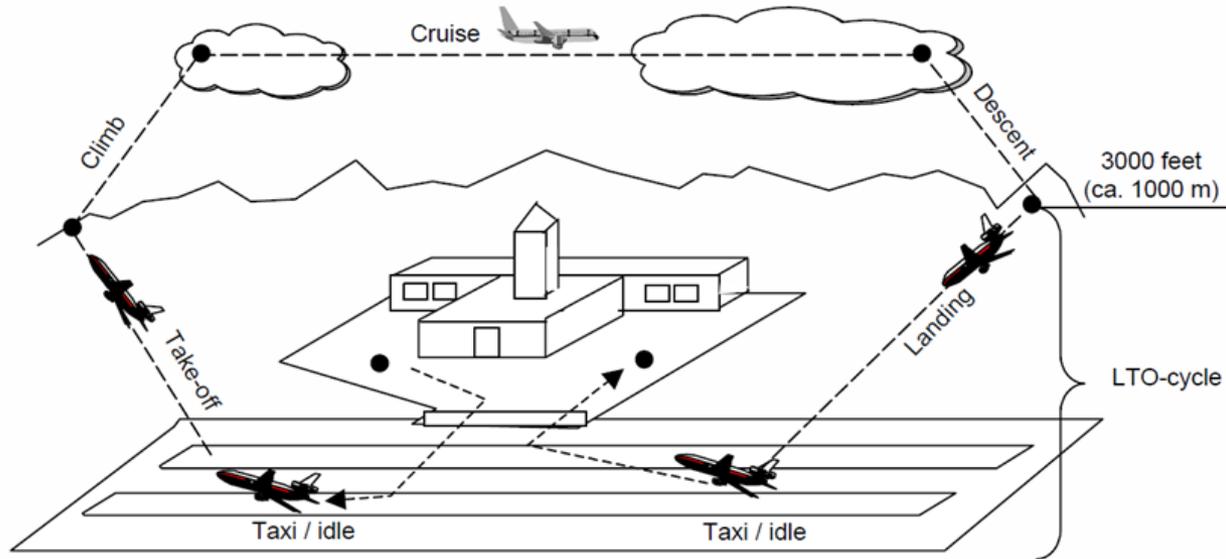
# LOCAL AIR QUALITY STUDY – OSLO AIRPORT

- Study performed by



- Previous study conducted in 2002
- Study based on today's activity and projected activities towards 2030

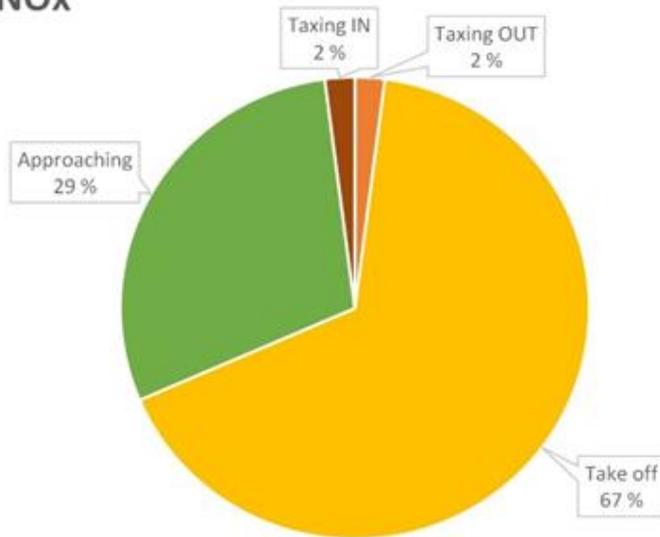
# LOCAL AIR QUALITY STUDY – LIMITATIONS



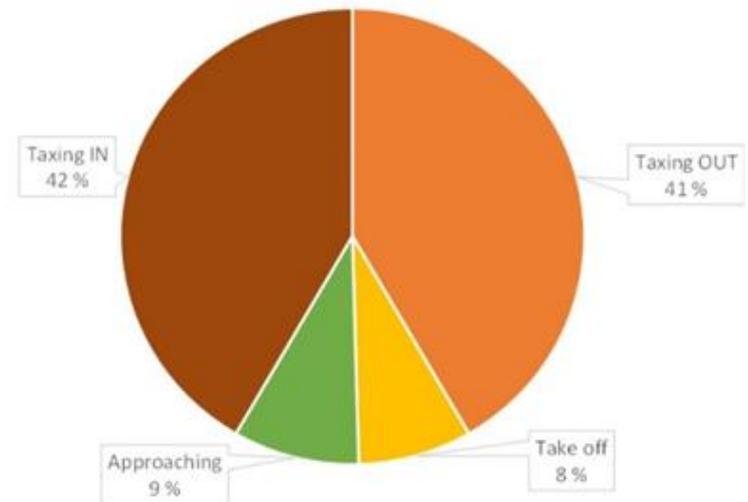
Calculations based on emissions from taxiing and LTO-cycle

# LOCAL AIR QUALITY STUDY – OSLO AIRPORT

NOx

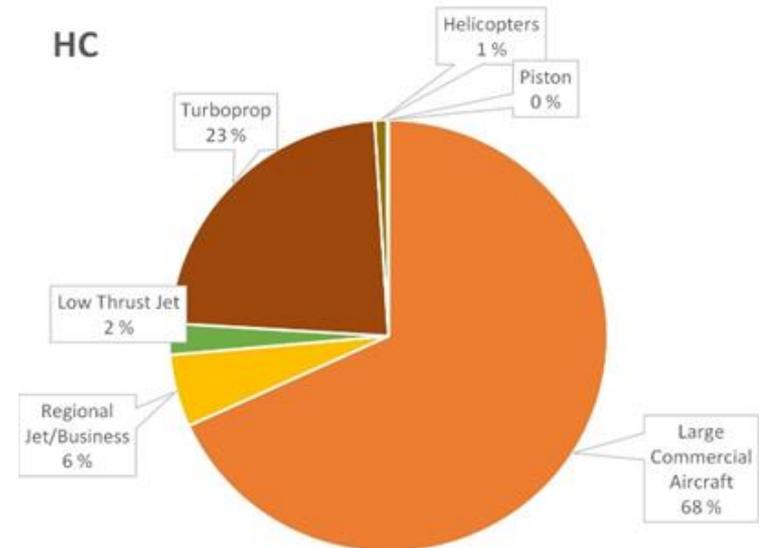
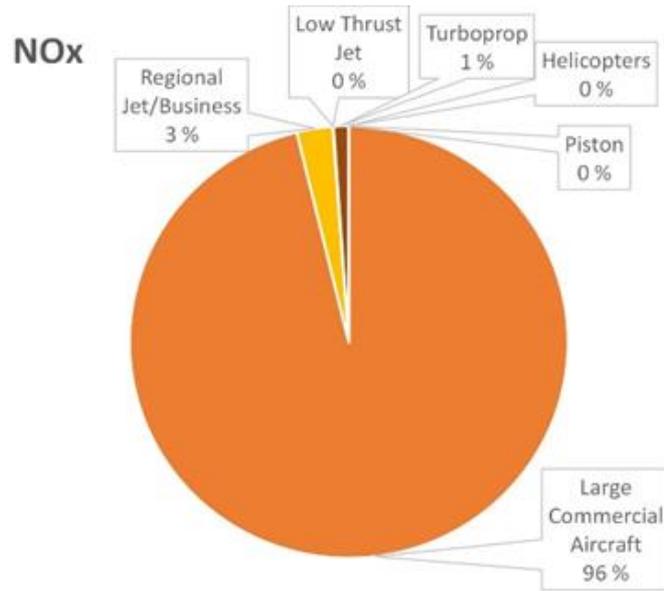


HC



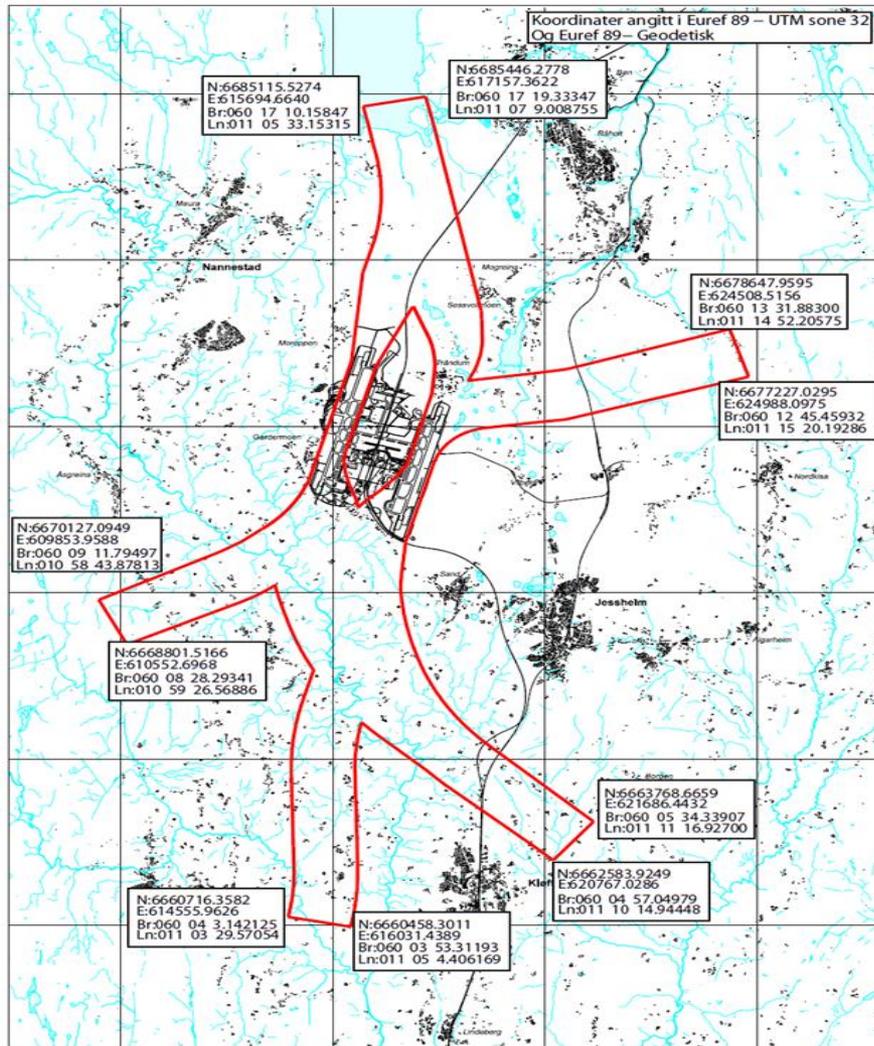
What operational mode is the largest contributor to the emissions?

# LOCAL AIR QUALITY STUDY – OSLO AIRPORT



What type of aircraft contributes the most to the total emissions?

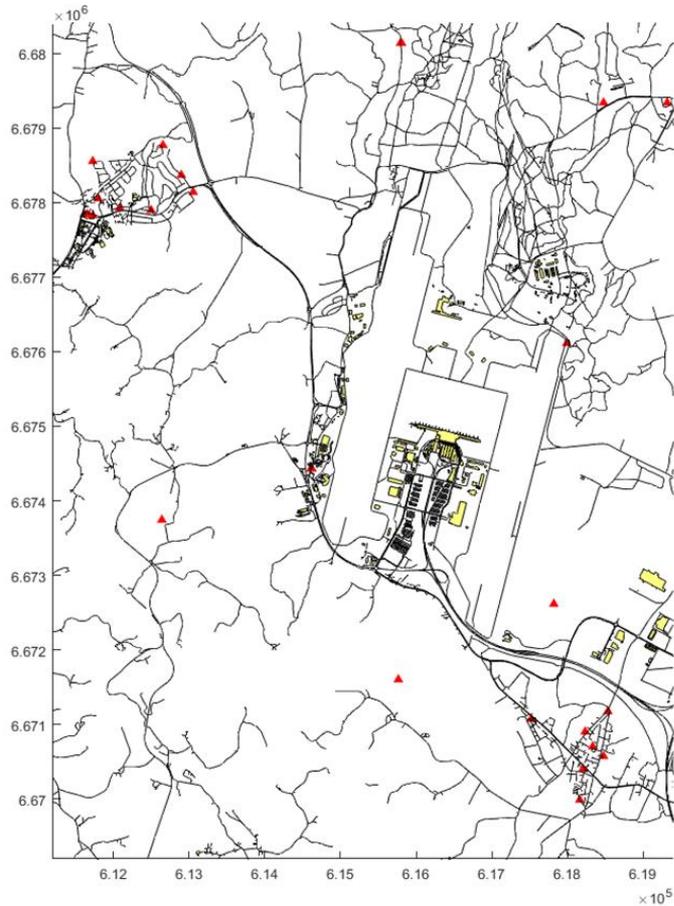
# LOCAL AIR QUALITY STUDY – OSLO AIRPORT



Departure paths at  
Oslo airport

Taxiing time average  
13 minutes out  
3 minutes in

# LOCAL AIR QUALITY STUDY – OSLO AIRPORT



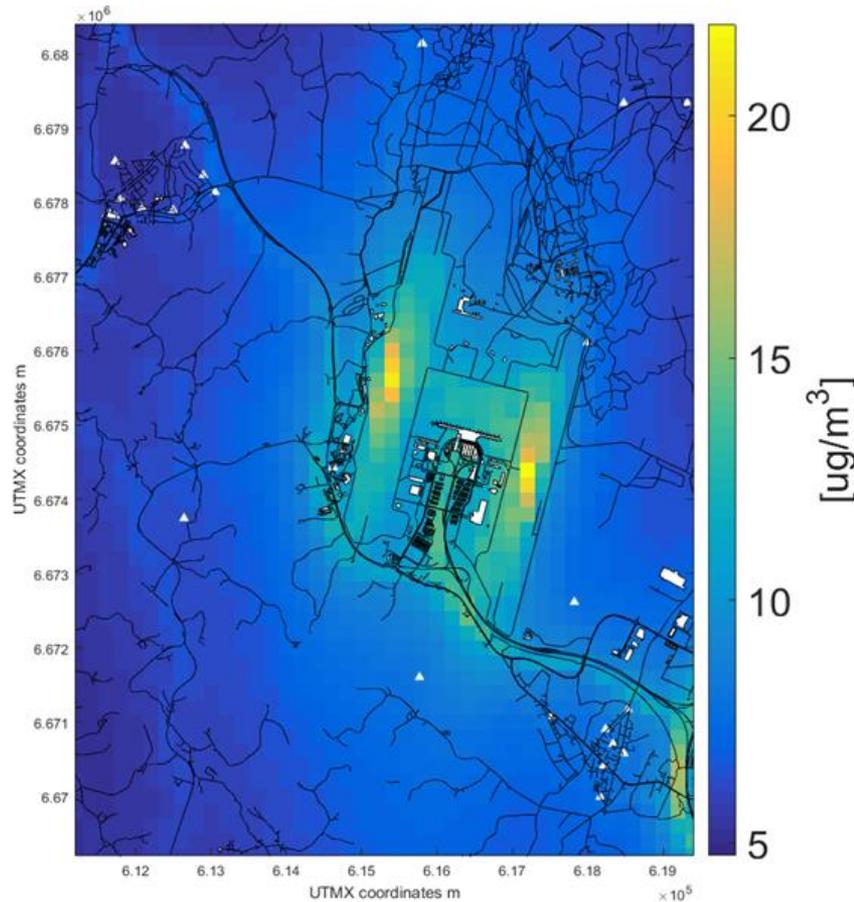
Calculation area around  
the airport

2 parallel runways (01/19)  
250 000 movements/year  
(334 000 in 2030)

9 km x 12 km influence  
area  
200 m x 200 m grid

Point calculations in  
populated areas

# LOCAL AIR QUALITY STUDY – OSLO AIRPORT



**2015**

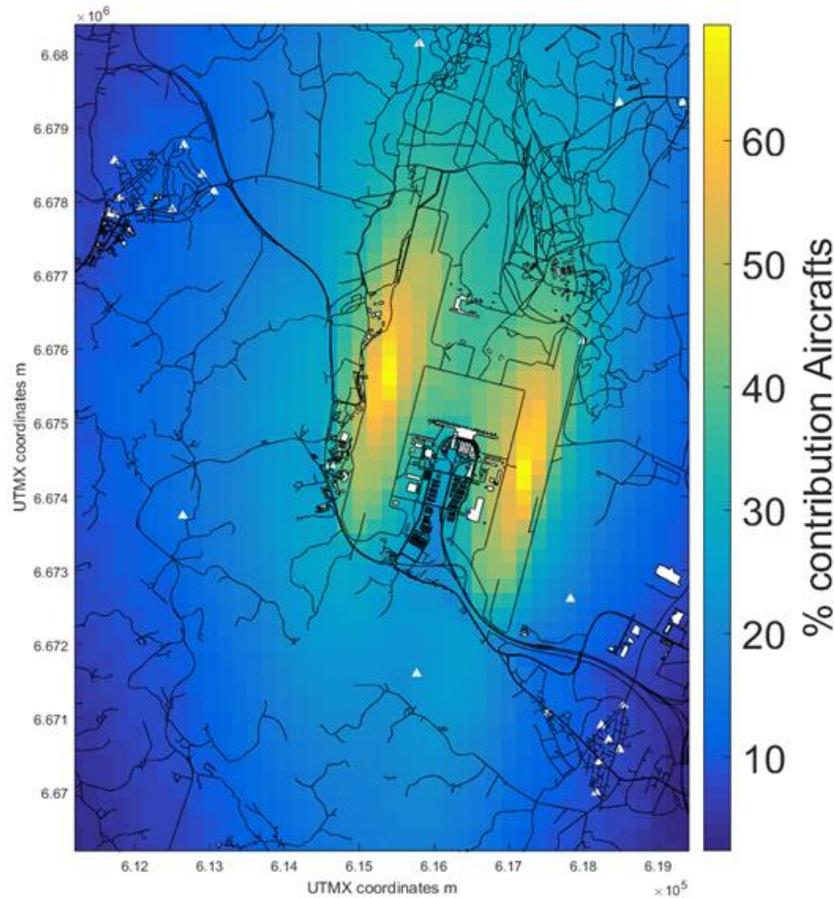
Yearly average –  $\text{No}_x$

Calculations show  
more than 80 %  $\text{NO}_2$  in  $\text{No}_x$

National limit  $\text{NO}_2$   $200 \mu\text{g}/\text{m}^3$

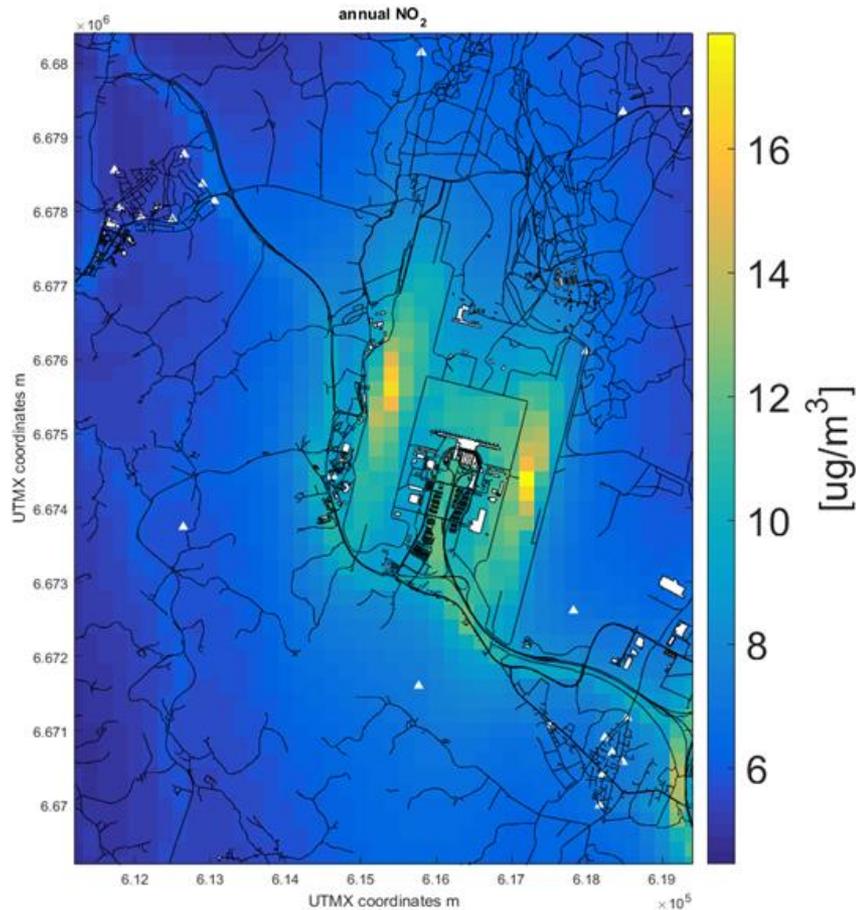
National goal  $\text{NO}_2$   $150 \mu\text{g}/\text{m}^3$

# LOCAL AIR QUALITY STUDY – OSLO AIRPORT



Percentage of NO<sub>x</sub>  
originating from AC.  
Result per grid section

# LOCAL AIR QUALITY STUDY – OSLO AIRPORT

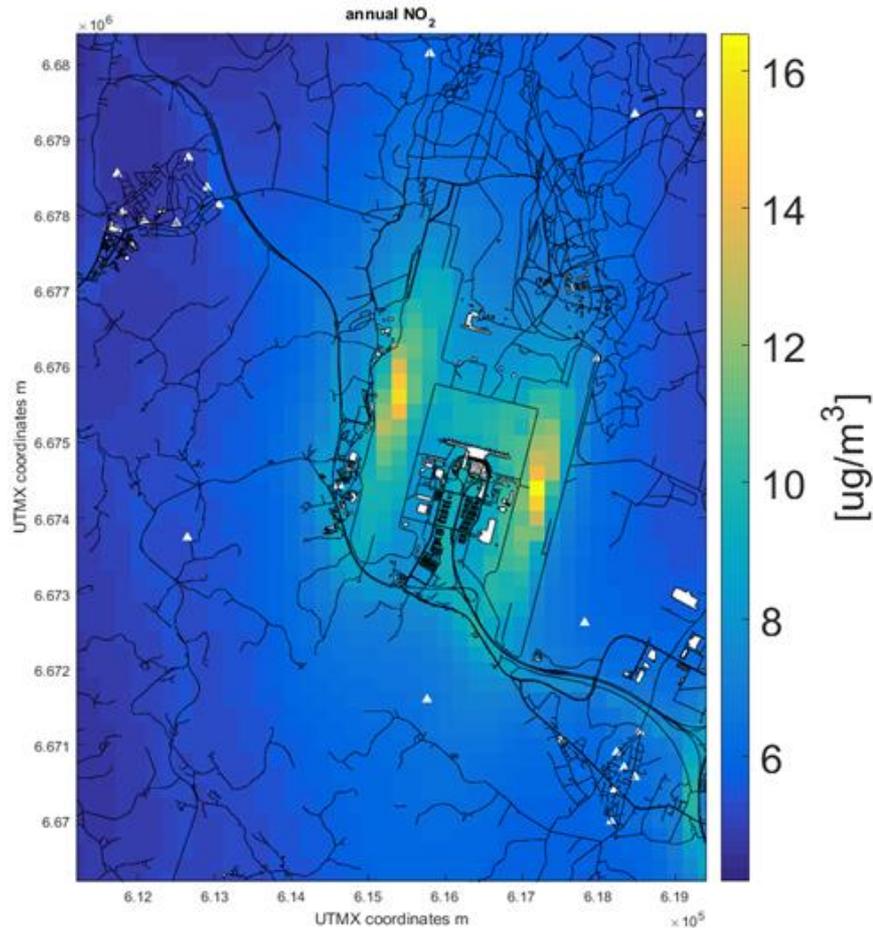


**2015**

Yearly average – NO<sub>2</sub>

National limit NO<sub>2</sub> 200 µg/m<sup>3</sup>  
National goal NO<sub>2</sub> 150 µg/m<sup>3</sup>

# LOCAL AIR QUALITY STUDY – OSLO AIRPORT



**2030**

Yearly average – NO<sub>2</sub>

National limit NO<sub>2</sub> 200 µg/m<sup>3</sup>  
National goal NO<sub>2</sub> 150 µg/m<sup>3</sup>

# LOCAL AIR QUALITY STUDY – OSLO AIRPORT

Tabulated results 2015

Sources	Tons / year				Relative contributions (%)			
	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2,5</sub>	HC	NO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2,5</sub>	HC
Airborne AC	1073	8,1	8,1	18,1	81,1	17,2	20,7	16,3
AC on ground	45,9	0,7	0,7	90,7	3,5	1,5	1,8	81,6
Ground activities	13,7	0,076	0,076	2,4	1,0	0,2	0,2	2,1
Road traffic	190,6	19,5	11,6	-	14,4	41,4	26,6	
Heating dwellings	-	18,7	18,7	-	-	39,7	47,7	
Total	1323,2	47,1	39,2	111,2	100	100	100	100

Same levels inside the airport area as for a medium-sized Norwegian city

# LOCAL AIR QUALITY STUDY – OSLO AIRPORT

## CONCLUSIONS

- Modelling of emission and dispersion show that the largest emissions of  $\text{NO}_x$  is caused by airplanes during take-off and final approach
- The emissions have little impact on ground level concentrations.
- The highest modelled concentration levels are located within the airport area, and are of similar size as concentrations modelled in central areas of Norwegian medium sized city areas