AIRPORTS COUNCIL INTERNATIONAL

The voice of the world's airports

Airport GHG and Other Environmental Management

ICAO Environment Seminar
11 March 2015
Dubai, UAE

1. Airport Greenhouse Gas Emissions and State Action Plans
2. Noise
3. Local Air Quality
4. Water
5. Solid Waste
6. Other Issues

1 Airport Greenhouse Gas Emissions Management

1. ACI Guidance Manual
2. Inventory Tool - ACERT
3. Mitigation of Emissions Sources
4. Certification of achievements Airport Carbon Accreditation

1.1 ACI Guidance Manual

- Structure – Scopes 1, 2, and 3
- Inventory
- Goal Setting
- Reducing emissions
- Carbon Neutrality
- Reporting and Certification

(Also in Français and Español)

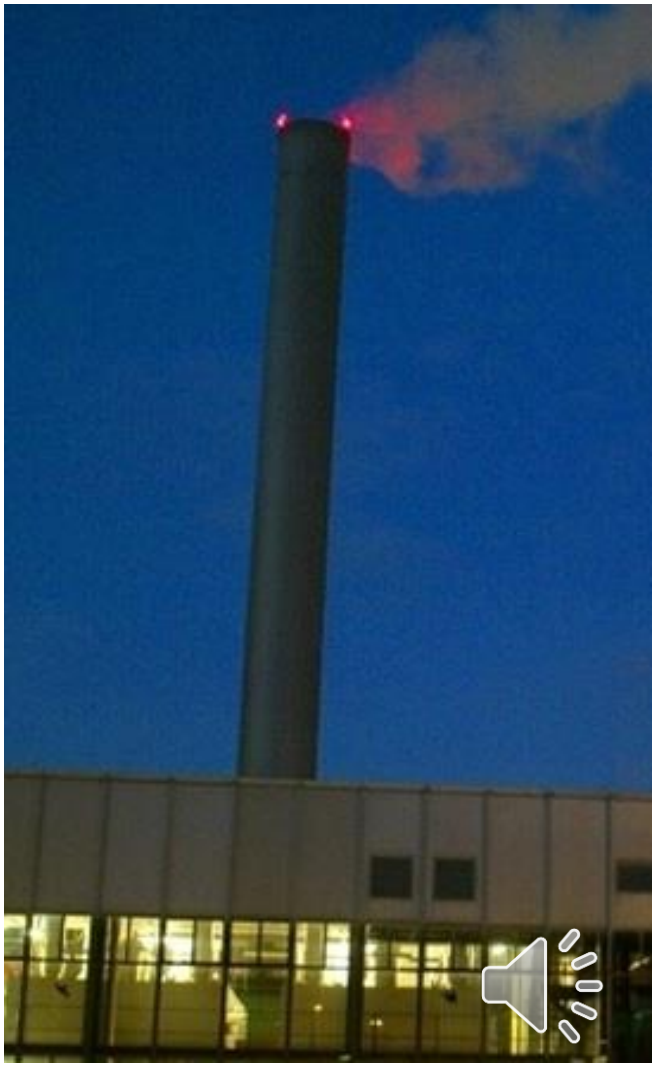
1.1 Categorizing Emissions based on Ownership

Scope 1 Airport owned emissions

- Power plant
- Emergency generators
- Airport fleet vehicles
- Airport maintenance/landscaping
- Fire training

Scope 2 Electricity emissions

- From the off-site generation of electricity (and heat) purchased by the airport



1.1 Categorizing Emissions based on Ownership

Scope 3 Airport-related emissions

- Aircraft engines (LTO , taxiing and cruise)
- Aircraft Auxiliary Power Units (APU)
- Airline/contractor GSE and airside vehicles
- Ground access vehicles (incl bus and rail)
- Corporate travel
- Construction
- Aircraft maintenance
- Off-site waste disposal
- and others…

1.2 Inventory – ACERT v3.0 – Do-It-Yourself

- Inventory - the first step to emissions management
- Airport Carbon and Emissions Reporting Tool ACERT
- Developed by ACI and Transport Canada
- No purchase cost
- No expertise required
- Operational inputs – fuel used, electricity purchased, aircraft activity, estimates of ground transport
- Report generated automatically

Output – Emissions table

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Airport Carbon and Emissions Reporting Tool
ACERT

SEA

Airport:	Seattle-Tacoma International Airport	Country:	United States		Aircraft mvmts:	314,947
Report Date:	18/6/2012	Default Ems Factor:	572.9	g CO2/kWh	Passengers:	32,819,796
Operator:	Ports of Seattle	EF Used:	31.3	g CO2/kWh	Traffic units:	35,142,986

				Greenhouse Gases (t)				
Entity	Source		Scope	CO_2	CH_4	N_2O	CO_{2e}	CO_{2e} %
Airport Operator	Airport	Airside Vehicles	1	1,212	0.2468	0.1011	1,249	0.21%
	Airport	Buildings (gas/oil/coal)	1	14,421	0.2571	0.0257	14,435	2.45%
	Airport	Fire Training	1	0	-	-	-	0.00%
	Airport	Emergency Generator	1	16	0.0008	0.0025	17	0.00%
	Airport	Glycol	1	0			-	0.00%
	Airport	Electricity Purchase	2	4,537			4,537	0.77%
	Airport	Heat Purchase	2	0	-	-	-	0.00%
						Airport Operator Sub-total	20,238	3.4%
Tenants (including airlines, government, shops etc.) and Employees	Tenant	Aircraft (LTO & taxi)	3	307,489	9.6639	27.8204	316,316	53.69%
	Tenant	Aircraft APU	3	42,149	1.3247	3.8135	43,359	7.36%
	Tenant	Aircraft Engine Run-ups	3	456	0.0144	0.0414	469	0.08%
	Tenant	Aircraft De-icing	3	0			0	0.00%
	Tenant	Airside Vehicles	3	8,947	1.7332	0.7355	9,211	1.56%
	Tenant	Buildings (gas/oil/coal)	3	2,827	0.0276	0.0314	2,837	0.48%
	Tenant	Electricity Purchase	3	-			-	0.00%
	Tenant	Heat Purchase	3	-	-	-	-	0.00%
	Tenant	Fire Training	3	48	0.0758	0.3884	170	0.03%
	Tenant	Emergency Generator	3	-	-	-	-	0.00%
	Tenant	Landside Vehicles	3	48,411	17.2212	4.0374	50,024	8.49%
	Airport	Employee Vehicles	3	3,142	1.1442	0.2600	3,246	0.55%
						Tenant Sub-total	425,634	72.2%
Public (including Passengers)	Ground Access Vehicles	Cars, taxi	3	126,643	40.71	10.57	130,776	22.20%
		Bus, shuttles	3	12,181	1.05	0.99	12,510	2.12%
		Rail	3	22	-	-	22	0.00%
						Public Sub-total	143,308	24.3%
TOTAL	Total emissions (tonne)			572,502	73.47	48.82	589,180	

Summary	t CO_{2e}	CO_{2e} %
Airport Scope 1	15,701	2.66%
Airport Scope 2	4,537	0.77%
Airport Scope 3	568,942	96.57%

Total CO_{2e} Emissions (t)	589,180	100%
The aircraft emissions calculations were	based on detailed aircraft data.	
The landside traffic calculations were	based on estimated traffic data.	
A more detailed separate GHG inventory is also available for Year:	2011	

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ACERT AIRPORT CARBON AND EMISSIONS REPORTING TOOL

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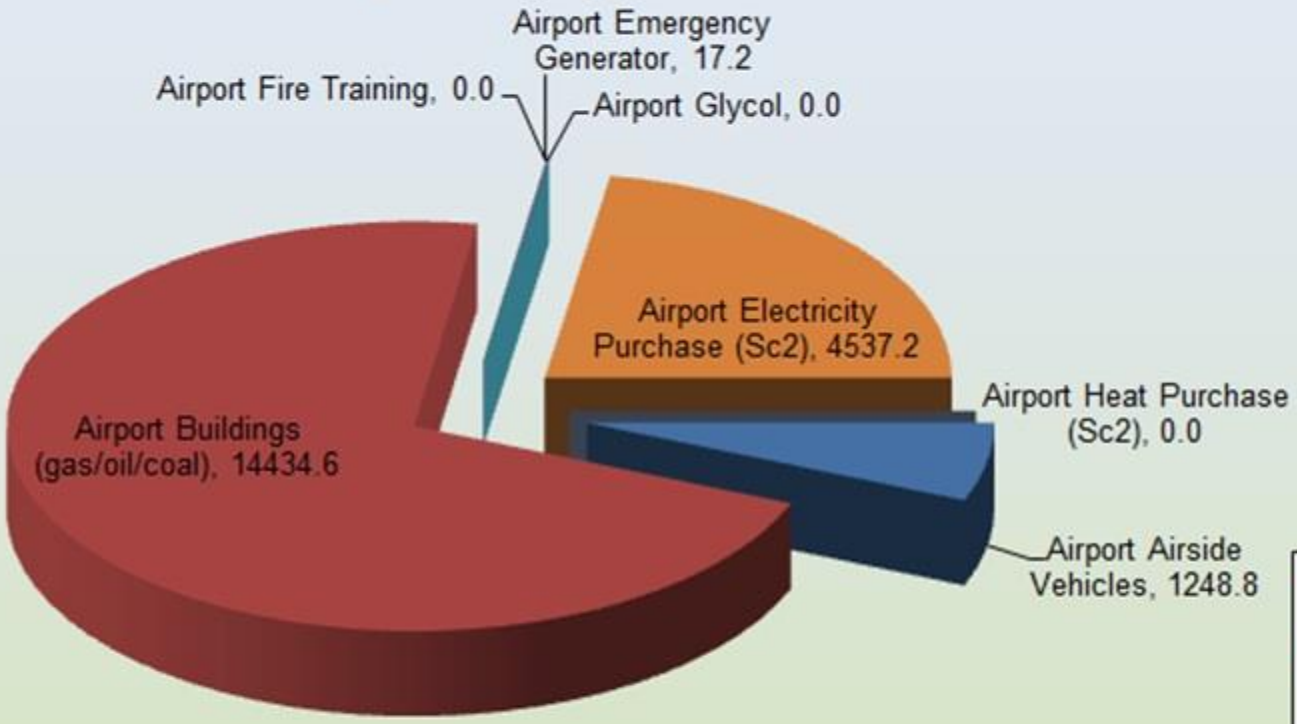
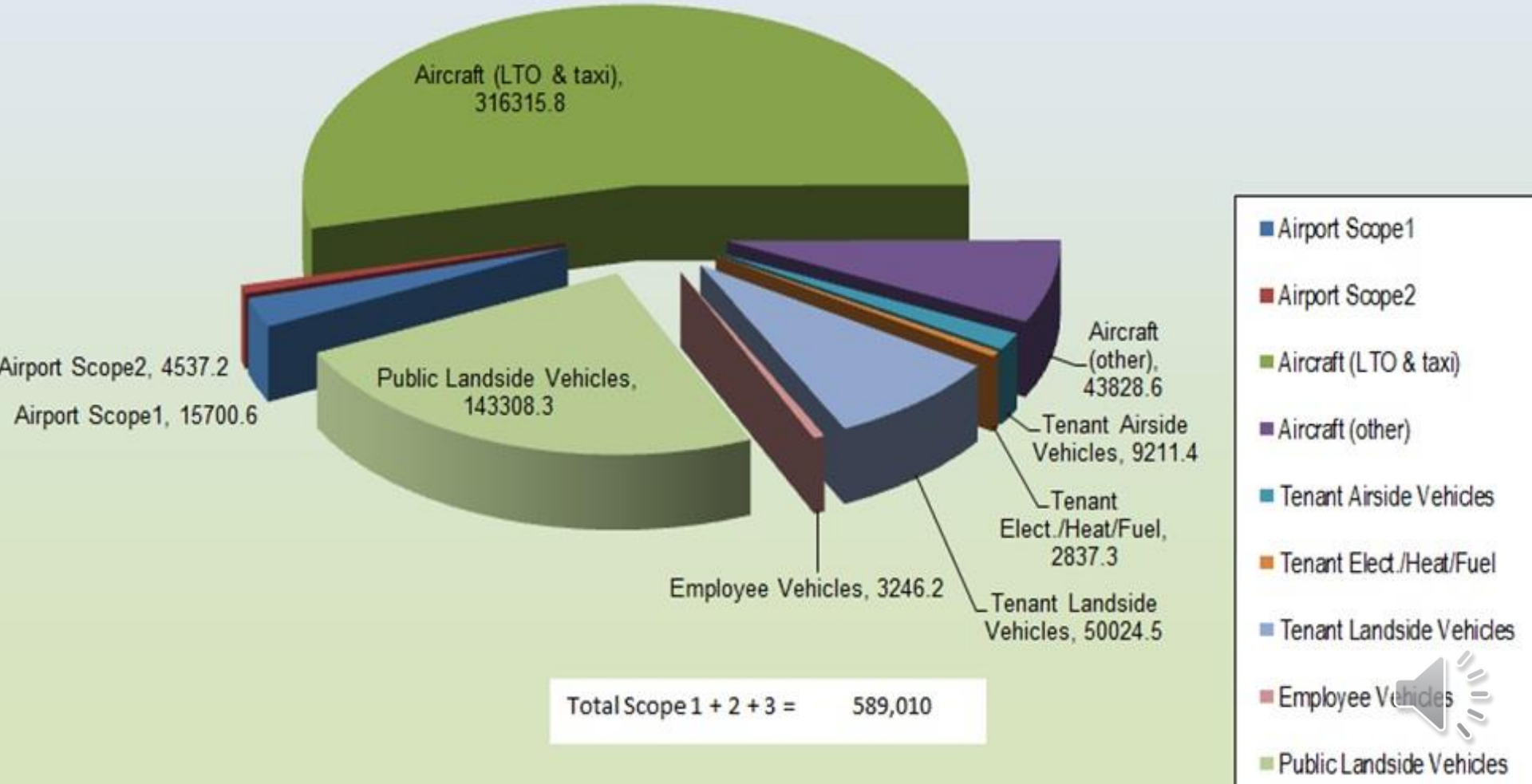
Figure 1: Airport GHG Inventory - Scopes 1 and 2 (t CO2 e)



Note: Scope 2 sources include only Airport Electricity and Heat Purchases (not on-sold to Tenants).
All others here are Scope 1.

Total Scope 1 + 2 = 20,238

Figure 2: Airport GHG Inventory - Scopes 1, 2 and 3 (t CO2 e)



Total Scope 1 + 2 + 3 =	589,010

1.3 Mitigating GHG (and LAQ) Emissions

Airport Scope 1 and 2 - Airport Operator Emissions

- Airport power plant, generating electricity and heat/cooling
- Airport fleet vehicles, including transfer buses and site machinery
- Building energy use – lighting, HVAC, machinery

Airport Scope 3 - Aircraft Emissions

- Aircraft engine emissions during LTO, taxiing and cruise
- APU emissions

Airport Scope 3 - Other Airport-Related Emissions

- Most Ground Support and Ground Handling equipment
- Landside (off site) ground access vehicles, trains

1.3 Mitigating Emissions

Airport Scope 1 and 2 - Airport Operator Emissions

- Airport power plant, generating electricity and heat/cooling
- Airport fleet vehicles, including transfer buses and site machinery
- Building energy use – lighting, HVAC, machinery

Airport Scope 3 - Aircraft Emissions

- **Aircraft engine emissions during LTO, taxiing and cruise**
- **APU emissions**

Focus of State Action Plans

Airport Scope 3 - Other Airport-Related Emissions

- Most Ground Support and Ground Handling equipment
- Landside (off site) ground access vehicles, trains

1.3 Mitigating Aircraft Emissions at Airports

Approach, Landing and Departure

- Sufficient airport and terminal capacity to minimise holding and queuing
- Air Traffic Management (ATM) efficiencies
- Continuous Descent and Continuous Climb Operations
- Slot management
- Departure management
- Arrival management – maximising gate availability

1.3 Mitigating Aircraft Taxiing Emissions

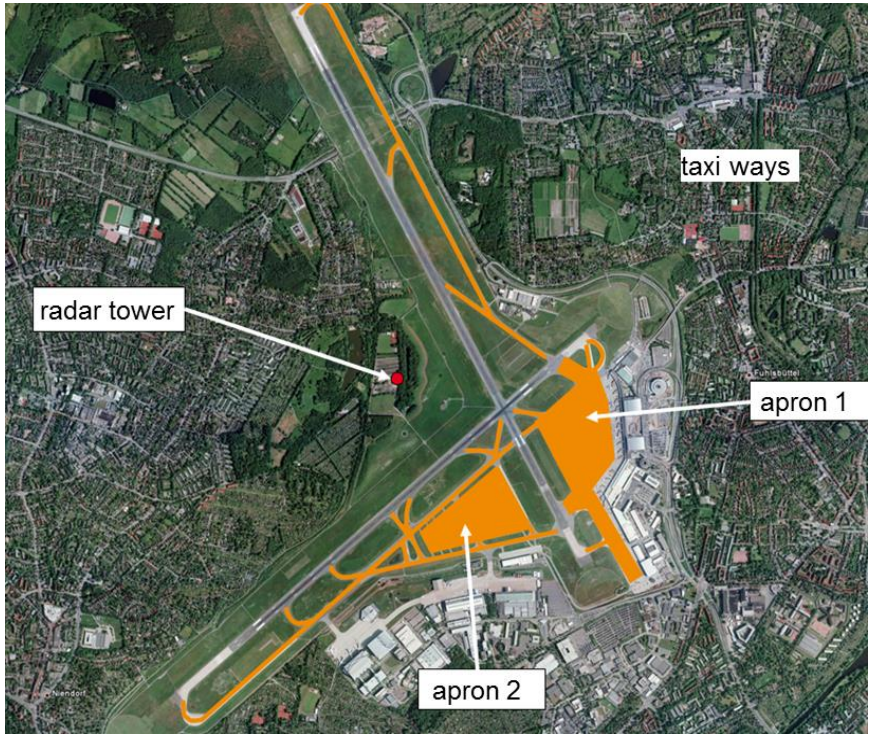
Provide efficient taxiway and airport layout

Single-engine taxiing

Aircraft towing

Advanced Surface Movement Guidance and Control System (A-SMGCS)

- New ground radar system for taxiways and aprons
- Improved guidance for taxiing aircraft.
- Up to 10% reduction in taxiing fuel usage



1.3 Mitigating Aircraft Auxiliary Power Unit Emissions

Provide fixed electrical ground power (FEGP) and pre-conditioned air (PCA) at terminal gates

Enforce APU restrictions

Ducting for Pre-Conditioned Air (PCA) – widely used many countries

1.3 Mitigating Emission

Co-Benefits of State Action Plans

Airport Scope 1 and 2 - Airport Operator Emissions

- Airport power plant, generating electricity and heat/cooling
- Airport fleet vehicles, including transfer buses and site machinery
- Building energy use – lighting, HVAC, machinery

Airport Scope 3 - Aircraft Emissions

- Aircraft engine emissions during LTO, taxiing and queuing
- APU emissions

Airport Scope 3 - Other Airport-Related Emissions

- Most Ground Support and Ground Handling equipment
- Landside (off site) ground access vehicles, trains

Co-Benefits of State Action Plans

1.3 Mitigating Airport Scope 1 and 2 Emissions

Reduce Electricity Use

- Energy efficient buildings and lighting
- Energy efficient operations


LED Threshold Light

LED Edge Light

Reduce Fuel Use

- Modernize power/heating plants
- Fleet vehicle modernization and use of alternative fuels/hybrid/electric

1.3 Mitigating Airport Scope 1 and 2 Emissions

Generate or purchase electricity and fuel from renewable sources - solar, wind, hydroelectric, biomass

Biodiesel

POWERED BY WIND ENERGY

1.3 Mitigating Airside Vehicle Emissions

Electric aircraft tug

Electric baggage tractor

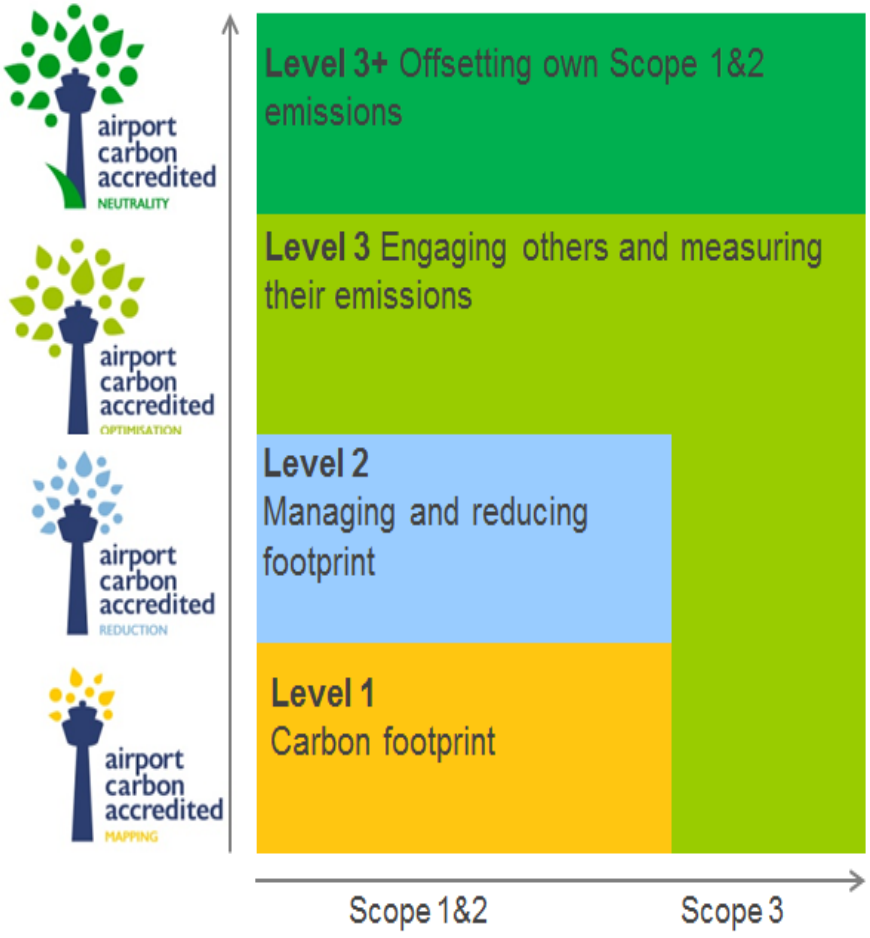
1.3 Mitigating Other Airport Scope 3 Emissions

- Enhance public transport services – buses and trains
- Hotel and car rental shuttle bus consolidation

Zurich public transit

Shuttle bus consolidation

1.4 *Airport Carbon Accreditation*



- Voluntary programme for active carbon management with measurable goals and reporting.
- Covers on-site airport operational activities that contribute the most to carbon emissions
- Enables airports to implement best practice carbon management processes and gain public recognition of their achievements
- 4 ascending levels of performance

1.4 *Airport Carbon Accreditation*

- ACI Europe, Africa and Asia-Pacific Regions
- 99 Participating Airports

Reported Benefits

- Raised sustainability profile & external credibility
- Reduction in exposure to climate change regulatory risks
- Efficiency improvements
- Knowledge transfer

1.4 ACERT and *Airport Carbon Accreditation*

- ACERT v2.0 approved for *Airport Carbon Accreditation* Level 1 (Mapping) and Level 2 (Reduction)

ACERT
AIRPORT CARBON AND EMISSIONS REPORTING TOOL

airport carbon accreditation
MAPPING | REDUCTION | OPTIMISATION | NEUTRALITY

2 Noise - Overview

Aircraft Noise Management

- Reducing actual noise levels using aircraft modernization and flight track management

Land Use Planning

- Reducing the number of people subject to high noise levels

Community and Communications

- Improving community understanding, attitudes and acceptance of airport activity

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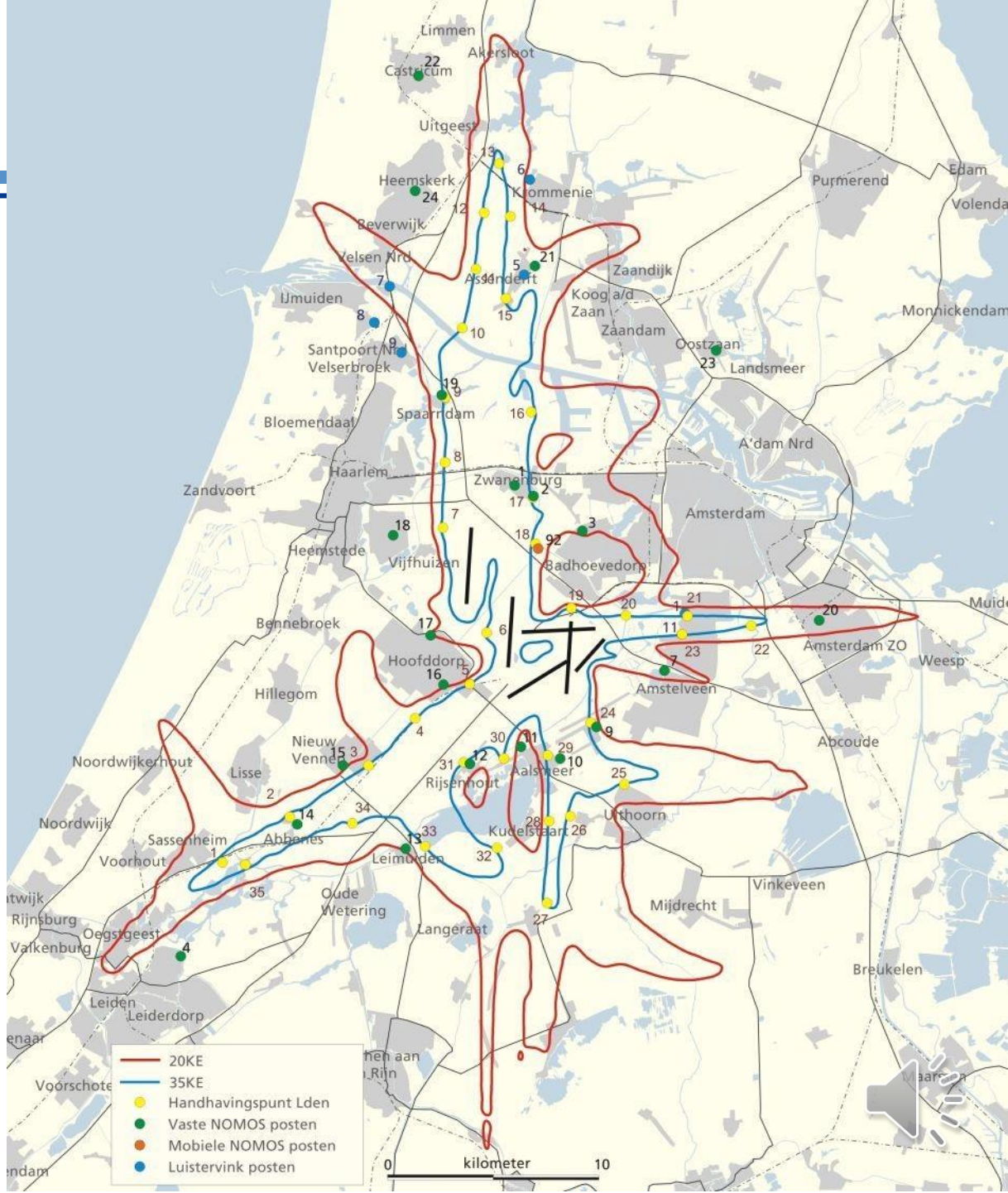
2 Noise

Managing noise

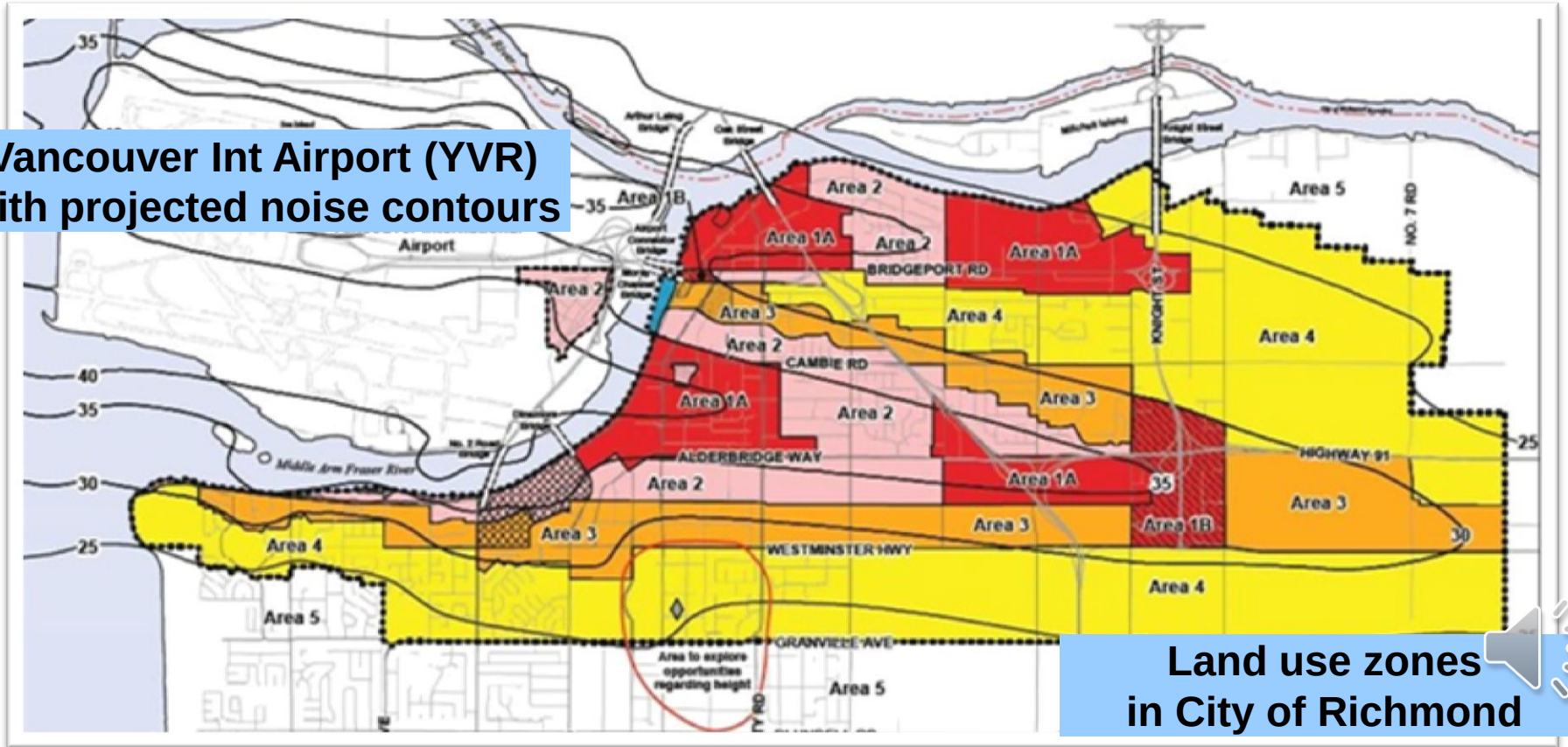
- Runway use
- Tracks to avoid urban areas
- Modern aircraft fleet

(Schiphol AMS)



2 Noise - Land Use Planning

- Local government authorities zone the land.
- Need to avoid residences, schools and hospitals in noise affected areas.



2 Noise - Community and Communications

- Informing and interacting with communities
- Airport website
- Managing complaints and noise forums
- Focus on Sustainability elements – Impacts and Benefits on Environment, Society and Economics
- Noise-tracking web sites
- Clear, transparent and up to date information

2 Noise Tracking Websites

WebTrak

PRINT

Airports are increasingly realizing that community engagement is more and more important to the operations of the airport. The growing challenge is how to manage this continuous engagement to realize the best results for both the general public and the airport.

Lochard has launched the first in a series of low-risk subscription services aimed at improving and maintaining valuable dialogue with the airport's external stakeholders. This takes the pressure off your operations team and eases the pressure for your management team.

WebTrak provides live aircraft movements. It gives the community access to flight and noise data and reduces the need and time for airport employees to explain where aircraft actually fly, how often, who they are and where they go.

Read more...

Visit WebTrak Sites

Heathrow

Gatwick

Seattle

Sacramento

San Jose

Stansted

3 Local Air Quality (LAQ) - Overview

Regulations/Guidance

- Permitted air quality pollutant levels

Inventory

- Identify sources and quantities of emissions

LAQ Assessment

- Monitoring pollutant concentrations
- Modelling dispersion – source to receptor

Mitigation of Sources

- Actions to reduce emissions

3 LAQ – Regional Regulation

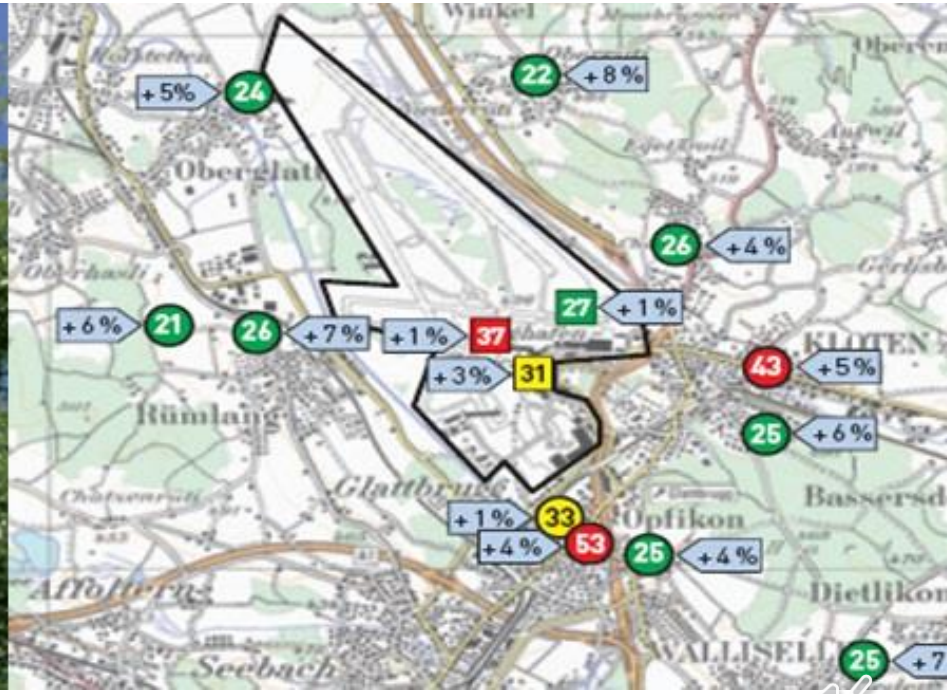
Example limits on local pollutant concentrations – µg/m3

	SO_2		NO_2		CO		PM10	
	1 hr	1 yr	1 hr	1yr	1 hr	8 hr	1 d	1 yr
WHO	125	-	200	40	30	10	-	-
EU	350	20	200	40	-	10	50	40
Australia	520	50	220	50	-	10	50	-
Brazil	-	90	320	100	40	10	150	-
Canada	900	60	400	100	35	15	-	-

3 LAQ – Assessment - Measurement for Compliance

Monitoring (measuring) pollutant concentrations

- Compliance with regulated limits

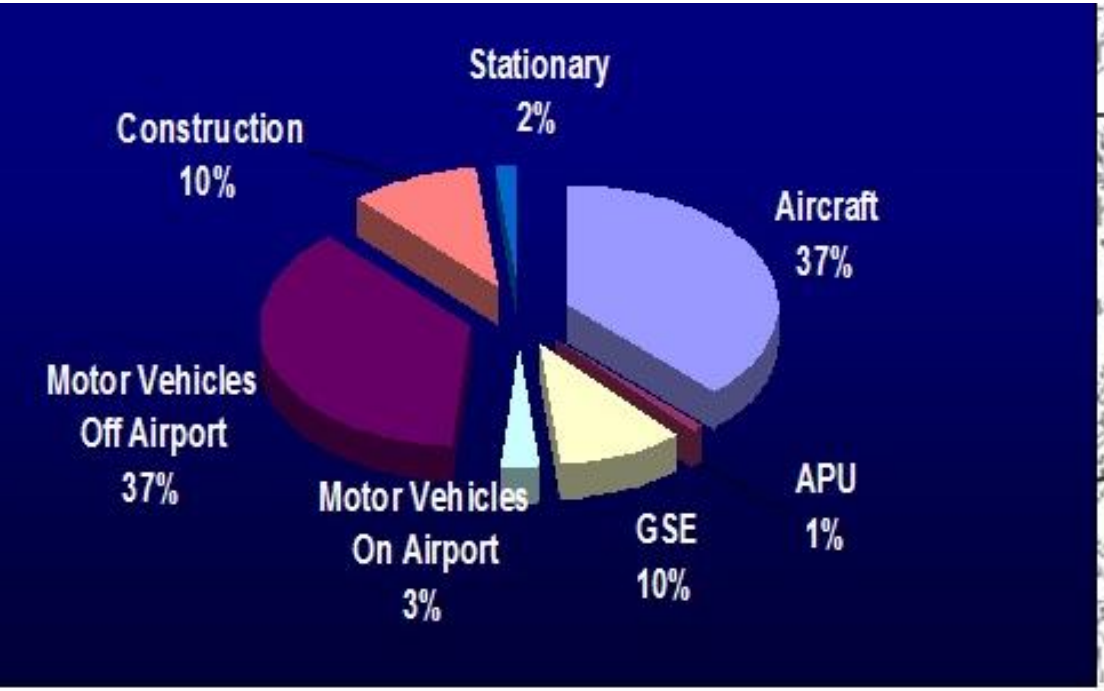


Red = points of non-compliance

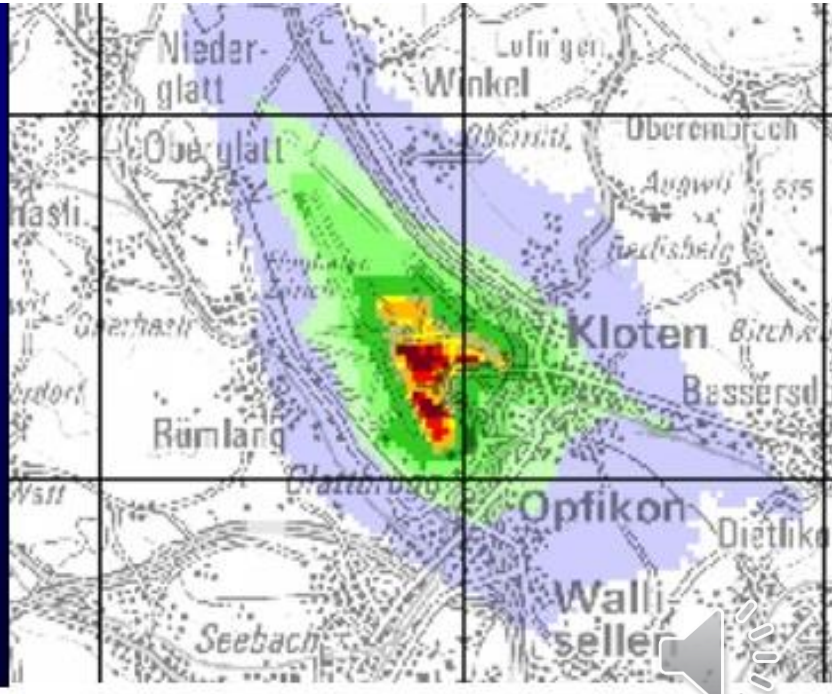
3 LAQ – Modelling and Source Apportionment

Modelling (calculating) pollutant concentrations

- Inventory of emissions sources
- Calculating physical and chemical dispersion
- Source apportionment

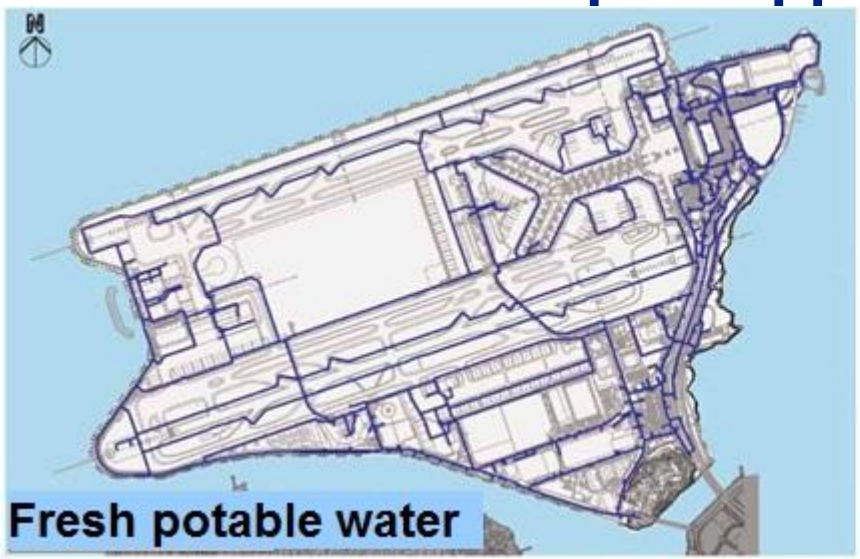


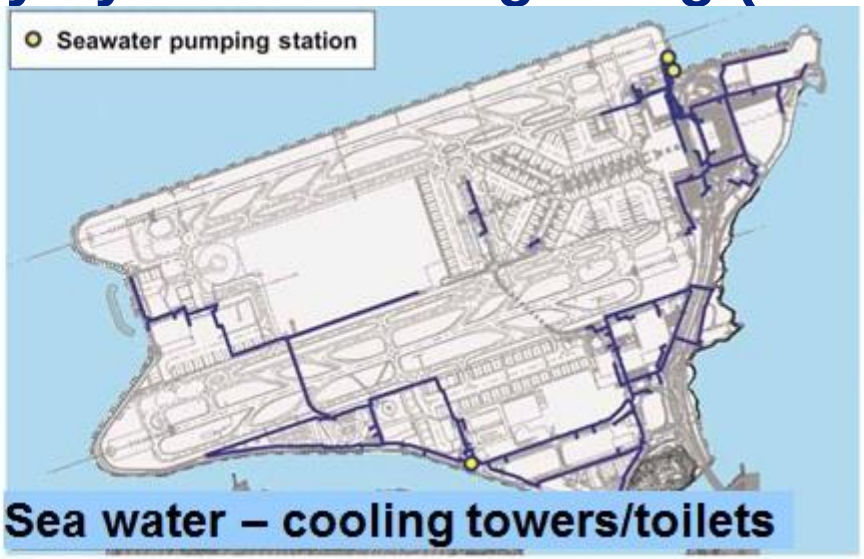
Inventory of NOx Emissions

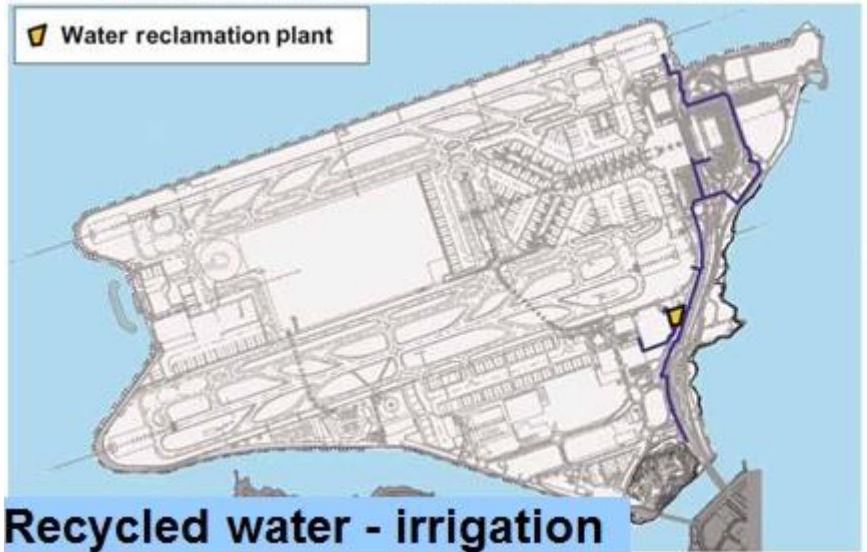


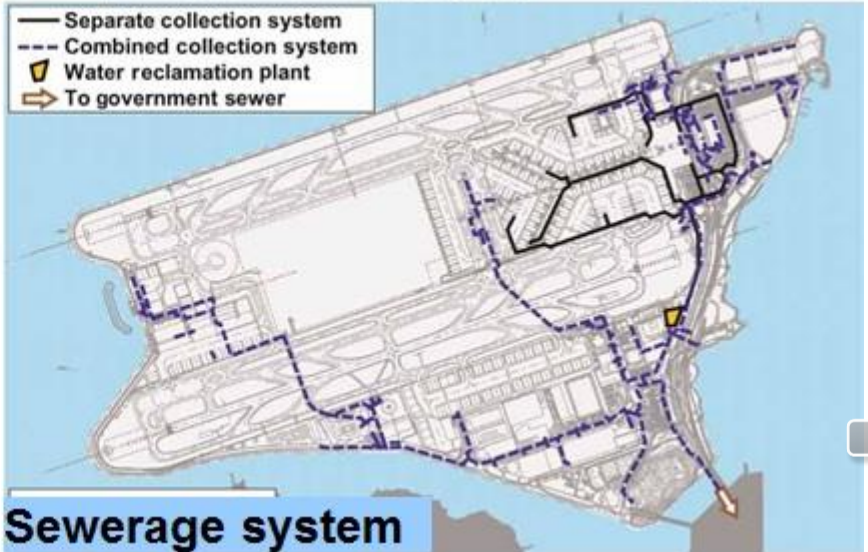
Calculated NOx Concentrations (ZRH)

4 Water - Use - Triple supply system at Hong Kong (HKG)



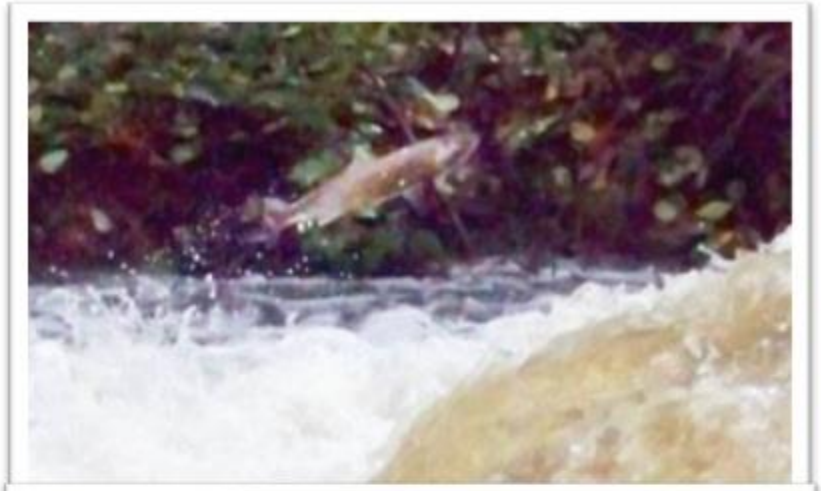






4 Water – Storm Water Management – SeaTac (SEA)

- Capture
- Storage
- Treatment
- Outflow control



5 Waste Management

Identifying waste streams

- Terminal, deplaned, office, maintenance
- Hazardous materials

Reducing waste production

- Awareness



5 Waste Management

Waste Hierarchy
Reuse Recycling

- Paper, cardboard, aluminium, composting

6 Other Environmental Matters

Planning and Development

- Wildlife and habitat
- Historical and archeological issues

Emergency Planning and Response

- Hazardous Materials
- Spill Management
- Soil and water contamination

Proactive Environmental Initiatives

- Operating and life-cycle costs
- Occupational Health and Safety

Merci
Thanks

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