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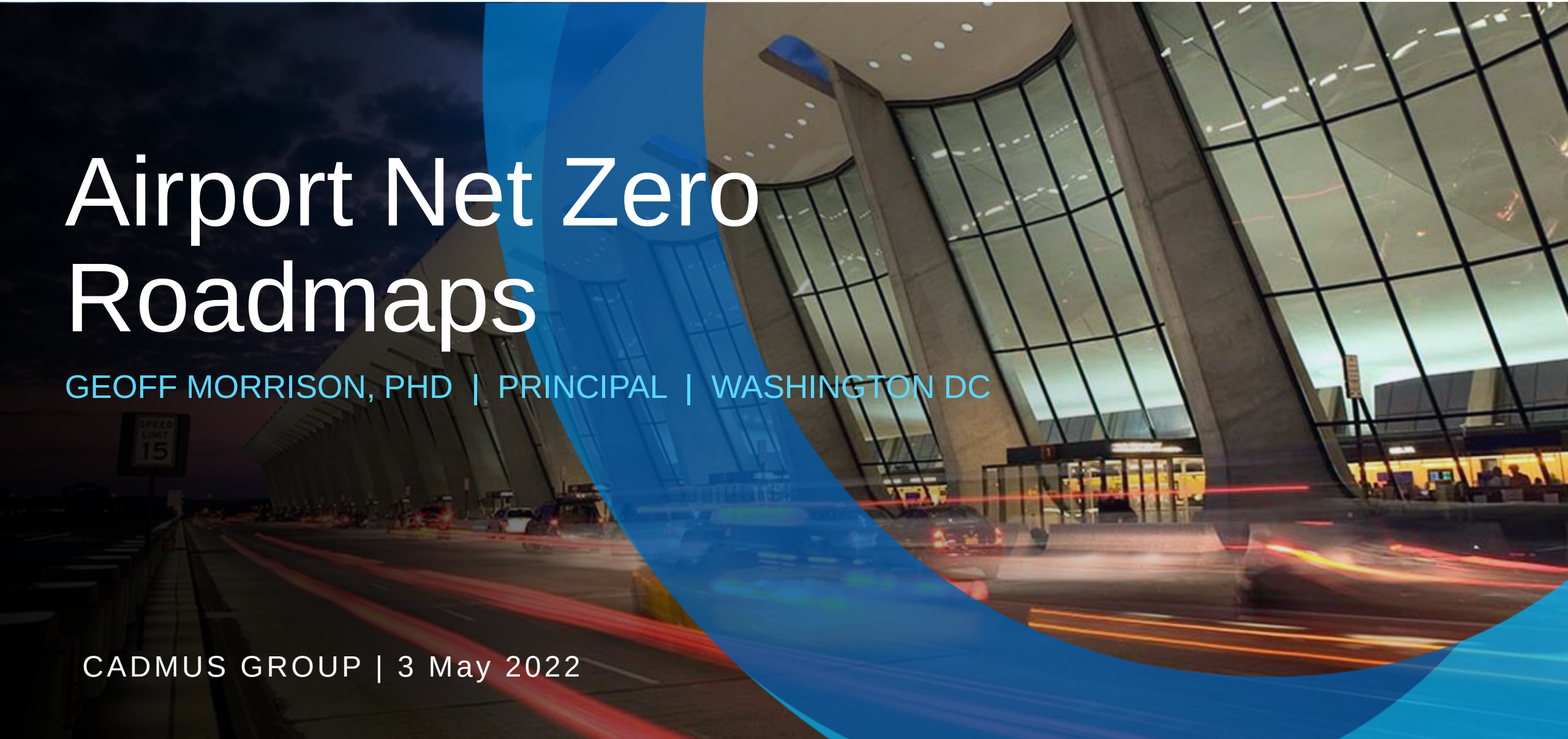


Airport Net Zero Roadmaps

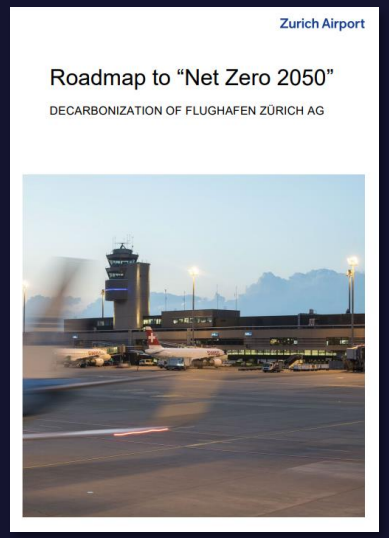
GEOFF MORRISON, PHD | PRINCIPAL | WASHINGTON DC

CADMUS GROUP | 3 May 2022

Airport Net Zero Plans

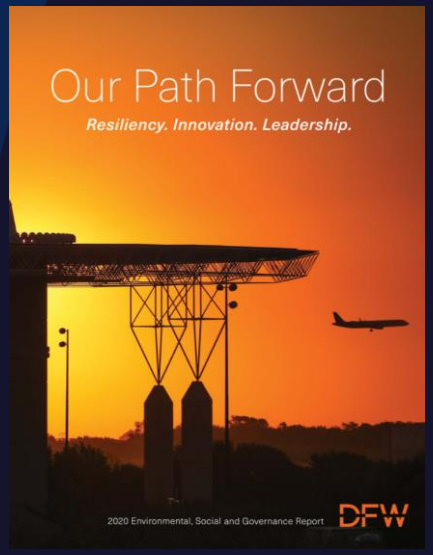
Airports worldwide (esp. in Europe) are increasingly publishing net zero plans and roadmaps

Dublin
2021



Zurich
2020

Heathrow
2022



Dallas Fort Worth
2021

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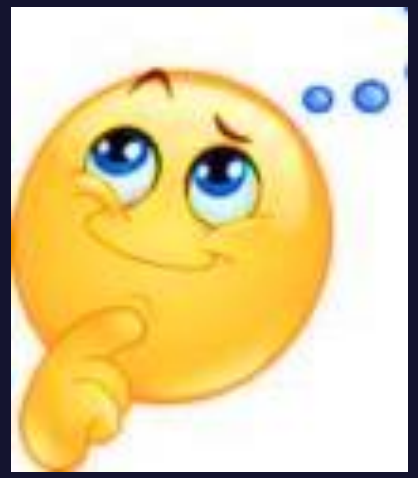
What is a Net Zero Plan?

The climate community uses a range of related terms to describe emission reductions



Zero Emissions

Carbon Neutral

Net Zero

Carbon Free

Zero Carbon Footprint

Zero Carbon Growth

Climate Neutral

100% Renewable

Deep Decarbonization

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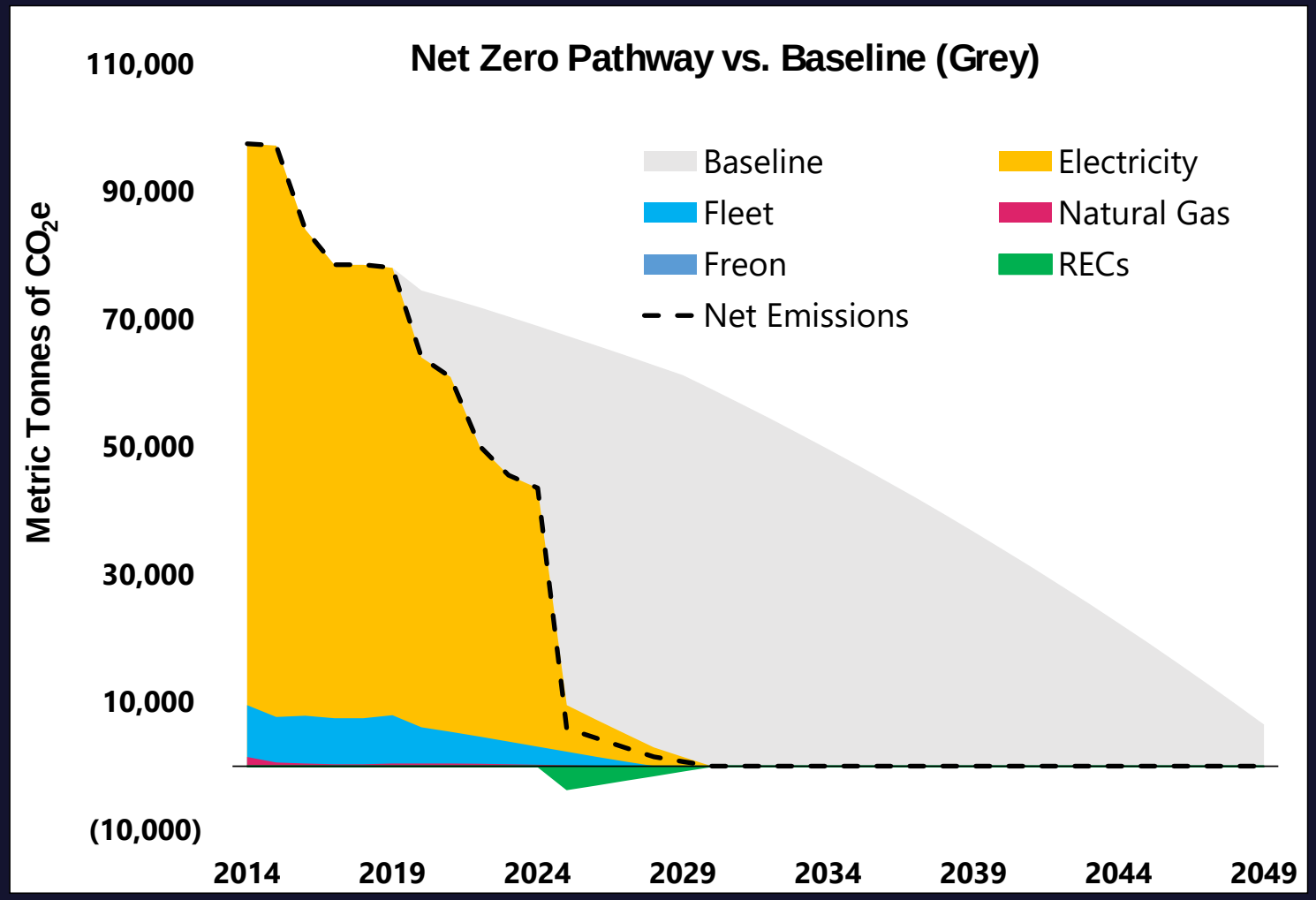
What is a Net Zero Plan?

Basic components of every net zero plan



1. **Emissions pathway** *(where we're going and by when)*
2. **Prioritized strategies** *(programs that meet timelines of #1)*
3. **Stakeholder plan** *(who we're involving)*
4. **Monitoring plan** *(how we will measure success)*

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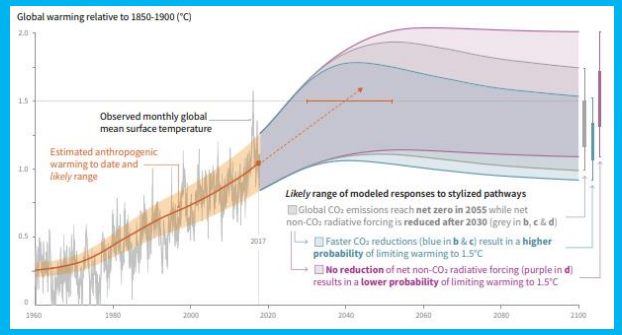
Why Airports Pursue Net Zero?

When asked, airports have several different reasons for pursuing net zero plans

Altruism

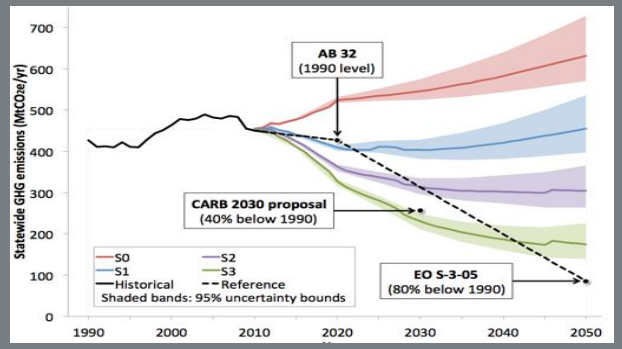


Good for bond ratings

Fitch Ratings

A+

Regulatory



Public Relations

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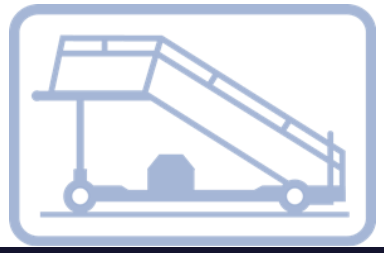
Which Emissions do Airports Track?

Basic components of every net zero plan

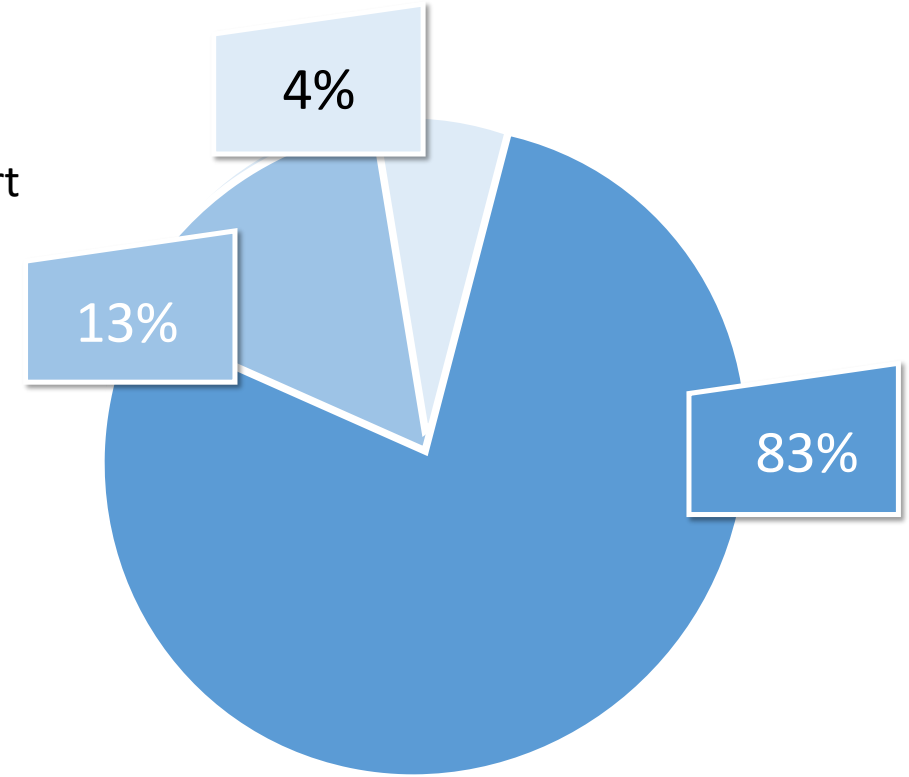
Scope 1

Direct emissions associated with airport activities



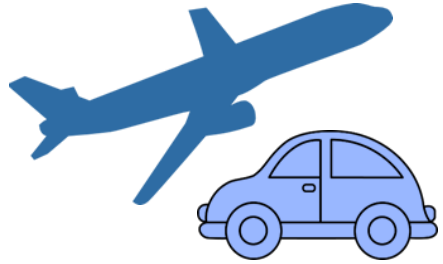
Scope 2

Indirect emissions from purchased energy



Scope 3

Indirect emissions as a consequence of the airport's activities



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Challenges to Airports in Net Zero Roadmaps

Challenge #1: Quantifying emissions by individual action

Challenge #2: Defining role of traditional offsets and carbon removal

Challenge #3: Planning in an uncertain environment

Challenge #1: Quantifying emissions by action

Source		Entity	Group	Greenhouse Gases (tonnes) CO_2	CH_4	N_2O	CO_{2e}
Scope 1: Direct Emissions Airport Operator							
Vehicles (incl. airside transport, machinery,GSE)		Airport Operator	Mobile	-	-	-	-
Buildings (gas/oil/coal)		Airport Operator	Stationary	-	-	-	-
Emergency Generator		Airport Operator	Stationary	-	-	-	-
Fire Training		Airport Operator	Stationary	-	-	-	-
De-icing/Glycol		Airport Operator	Process	-			-
On-site waste treatment		Airport Operator	Process	-	-	-	-
On-site waste water treatment - Include		Airport Operator	Process				-
Any other processes		Airport Operator	Process	-			-
Refrigerants		Airport Operator	Process				-
Subtotal	**Airport Scope 1**			**-**	**-**	**-**	**-**
Scope 2: Airport Operator Net Energy from External Supplier							
Electricity purchased, Country Default		Airport Operator	Energy	-			-
Heat purchased		Airport Operator	Energy	-	-	-	-
Subtotal	**Airport Scope 2**			**-**	**-**	**-**	**-**
Airport Operator Sub-total (Scopes 1 & 2)							**-**
Airport Operator Carbon Offsets				-			-
Net Airport Operator Sub-total (Scopes 1+2, staff business travel, offsets)							**-**
Scope 3: Emissions related to the Business Activities							
Aircraft LTO from 2. Detailed aircraft data (Best)		Tenant/3rd party	Aircraft	-	-		-
Aircraft full flight (incl. LTO)		Tenant/3rd party	Aircraft	-	-		-
Aircraft APU		Tenant/3rd party	Aircraft	-	-		-
Aircraft Engine Run-ups		Tenant/3rd party	Stationary	-	-		-
Vehicles (incl. airside transport, machinery,GSE)		Tenant/3rd party	Mobile	-	-	-	-
Buildings (gas/oil/coal)		Tenant/3rd party	Stationary	-	-	-	-
Electricity purchased, Country Default		Tenant/3rd party	Energy	-			-
Electricity Transmissions & Distribution losses		Tenant/3rd party	Energy	-			-
Heat purchased		Tenant/3rd party	Energy	-	-	-	-
Emergency Generator		Tenant/3rd party	Stationary	-	-	-	-
Fire Training		Tenant/3rd party	Stationary	-	-	-	-
De-icing/Glycol		Tenant/3rd party	Process	-			-
Off-site/3rd party waste treatment		Tenant/3rd party	Process	-	-	-	-
Off-site/3rd party waste water treatment - Include		Tenant/3rd party	Process				-
Any other 3rd party processes		Tenant/3rd party	Process	-			-
Refrigerants		Tenant/3rd party	Process				-
Airport Constructions (contractors)		Tenant/3rd party	Process	-			-
Tenant Staff/Visitor Vehicles		Tenant/3rd party	Landside	-	-	-	-
Airport Operator Employee Commuting		Airport Operator	Landside	-	-	-	-
Cars, taxi		Public	Landside	-	-	-	-
Bus, shuttles		Public	Landside	-	-	-	-
Rail		Public	Landside	-	-	-	-
Ferry (maritme)		Public	Landside	-			-
Airport Operator Staff Business Travel		Airport Operator	Business	-	-	-	-
Subtotal	**Airport Scope 3**			**0**	**0**	**0**	**0**
Total gross CO2e Airport Emissions (tonnes)							**-**
Total net CO2e Airport Emissions (tonnes)	**[after any offsets]**			**-**	**-**	**-**	**-**

- ACERT Tool allows user to quantify today's emissions
- Future emission reductions require detailed energy system modeling by technical experts
- No tool yet exists for quantifying future emission reductions

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Challenge #2: Defining Role of Traditional Carbon Offsets versus Carbon Removal

Not every jurisdiction defines net zero in a consistent manner. Carbon removal is an important component of carbon management but has not fully integrated into airport lexicon.

CARBON REDUCTION	TRADITIONAL OFFSETS	INFLUENCE SCOPE 3	CARBON REMOVAL
Projects that lower airport emissions through energy efficiency, fuel switching, and conservation.	*Traditional offsets that reduce future emissions elsewhere compared to a baseline.*	*Projects that influence others to reduce an airport's Scope 3 emissions.*	*Projects that remove carbon from the atmosphere and store it durably in geological, terrestrial, or ocean reservoirs, or in products.*
Energy efficiency	*Renewable energy*	*Sustainable aviation fuels*	*Direct air capture & sequestration*
Fleet electrification	*Avoided deforestation*	*Decarbonized concrete*	*BECCS*
Grid decarbonization	*Restoring grasslands*	*Electric vehicle charging*	*Afforestration and restoration*
Energy conservation	*Conserving wetlands*	*Embedded emissions*	*Soil carbon mineralization*
Building electrification	*Low smoke stoves*	*Decarbonizing supply chains*	*Biochar*
Onsite renewable energy	*Energy efficiency*	*Aircraft taxiing efficiency*	*Enhanced weathering*
PPAs and RECs	*Water to energy*	*Tenant commute programs*	*Carbon mineralization*
			Ocean alkalinity enhancement

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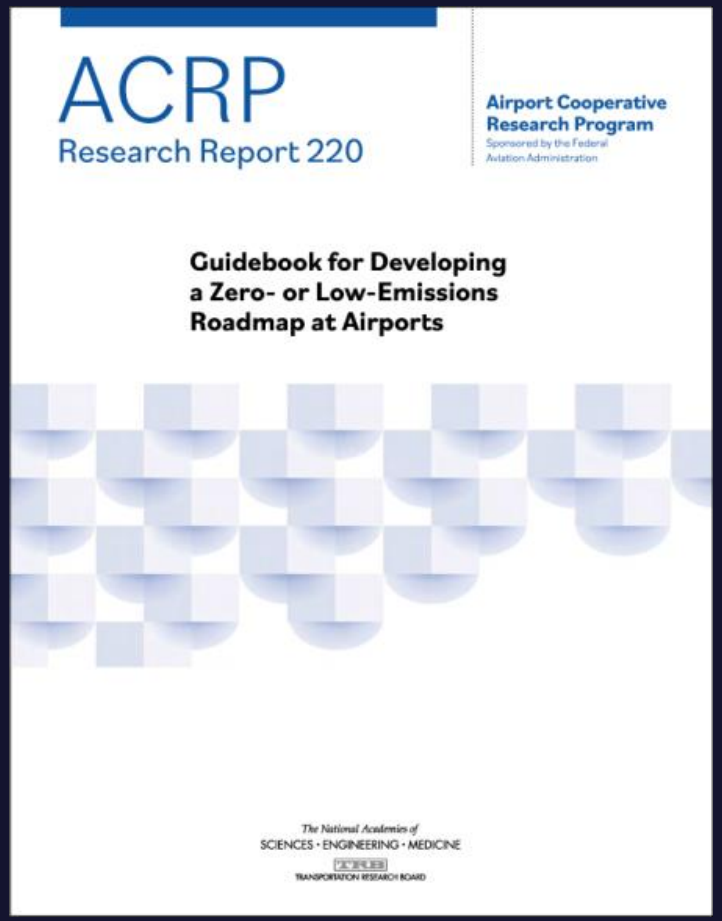
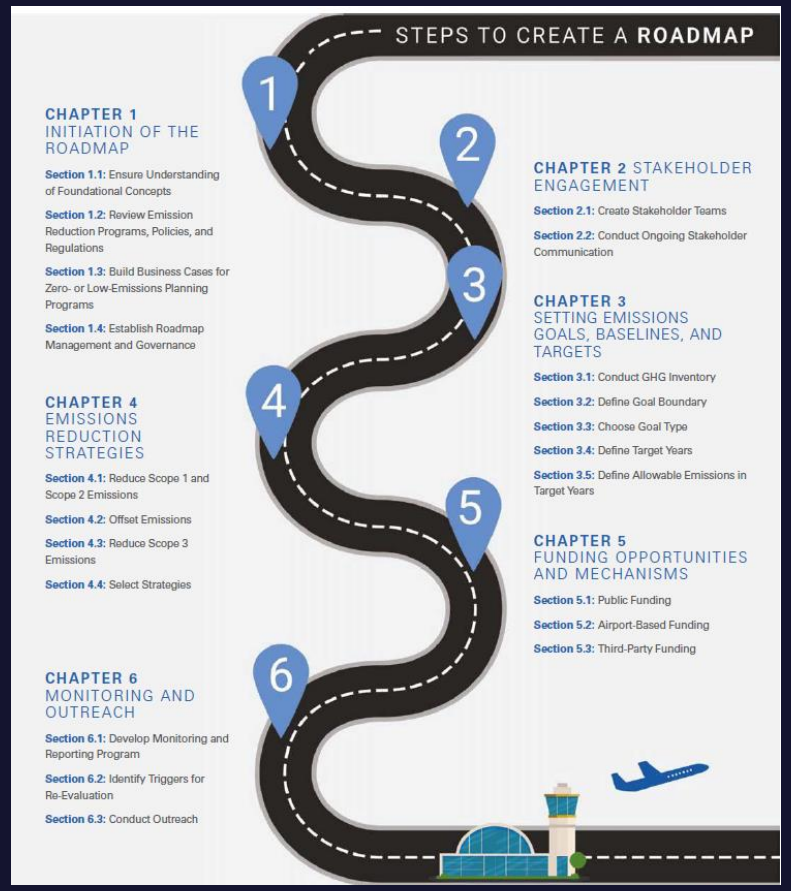
Challenge #3: Planning in an Uncertain Environment

- Net Zero plans typically require unproven technology
- Shifting scientific consensus around carbon offsets/removal could impact “last 20% of emissions”
- Revenue diversion legal challenges are usually not well understood at the time of Net Zero plans
- Exceptionally long timescales mean future costs and technologies are uncertain

ACRP Report 220: Low & Zero Emission Roadmaps at Airports



Provides guidance to airports on key steps to developing emissions roadmap



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