Implementation Plan Recommendations

Recommendations

- Recommendations structured as follows:
  - Motivational Behavioural Changes
  - Electricity Efficiency measures
  - Transport measures
  - Renewable Energy
  - Water measures
  - Aircraft related measures
- National Commitments
- Funding Opportunities

Analysis of Carbon Emissions

Carbon Emissions (2016 scenario, total emissions)
in order of size

Use of:	Used by:	Used for:	kgCO2e/a	% of total
Fuel	Aviation	Ground Movement	12,908,182	*32.6%*
Fuel	Aviation	Auxiliary Power	4,249,495	*10.7%*
Electricity	MIA Tenants	HVAC	3,154,688	*8.0%*
Electricity	MIA	HVAC	2,772,270	*7.0%*
Fuel	Public Transport	Land Transport	2,770,445	*7.0%*
Electricity	MIA Tenants	Light and Operations	2,581,109	*6.5%*
Electricity	MIA	Light and Operations	2,268,221	*5.7%*
Fuel	Other employees	Land Transport	2,188,869	*5.5%*
Fuel	MIA Tenants	Heating	1,665,062	*4.2%*
Fuel	Visitors	Land Transport	1,223,597	*3.1%*
Fuel	Outbound tourists	Land Transport	1,132,312	*2.9%*
Fuel	Tourist Coaches	Land Transport	701,676	*1.8%*
Fuel	Tourist Taxis	Land Transport	522,373	*1.3%*
Fuel	Aviation	Engine Testing	414,141	*1.0%*
Electricity	Airline Catering	HVAC/Refrigeration	332,442	*0.8%*
Fuel	Airline Catering	Heating	235,954	*0.6%*
Fuel	MIA Employees	Land Transport	235,145	*0.6%*
Fuel	MIA	Passenger/Cargo	144,546	*0.4%*
Water	MIA Tenants	Potable/Grey	53,714	*0.1%*
Fuel	Airline Catering	Land Transport	49,743	*0.1%*
Water	MIA	Potable/Grey	21,557	*0.1%*
Water	Airline Catering	Potable	13,610	*0.0%*
		Total	**39,639,150**	*100.0%*

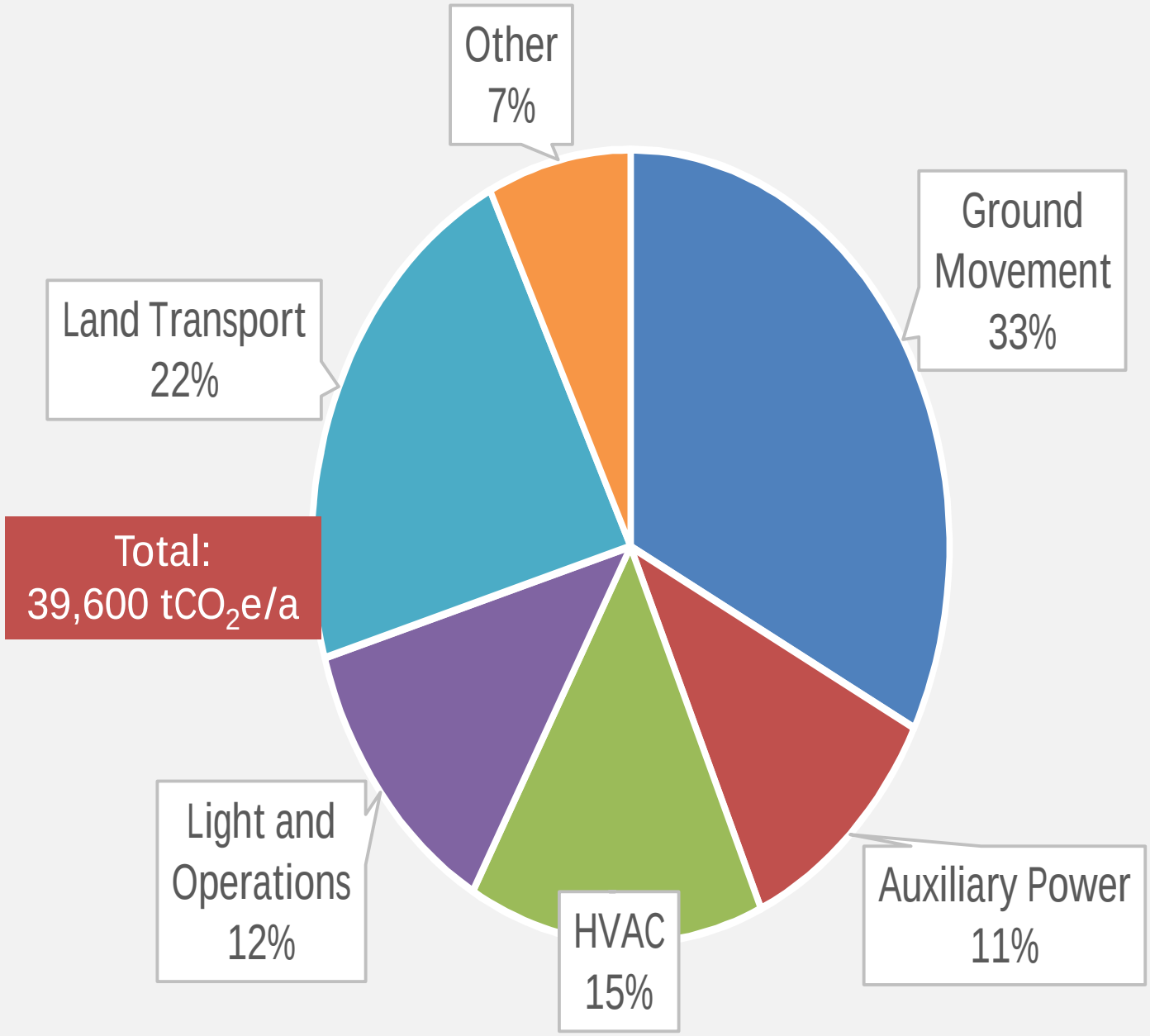
Analysis of Carbon Emissions

Analysis by Pollutant		
	kgCO2e/a	***% of total***
Fuel	28,441,540	*71.8%*
Electricity	11,108,730	*28.0%*
Water	88,881	*0.2%*
Total	**39,639,150**	*100.0%*

Analysis by Polluter			Analysis by Purpose of Use		
	kgCO2e/a	***% of total***		**kgCO2e/a**	***% of total***
Aviation	17,571,818	*44.3%*	Ground Movement	12,908,182	*32.6%*
MIA Tenants	7,454,573	*18.8%*	Auxiliary Power	4,249,495	*10.7%*
MIA	5,206,593	*13.1%*	HVAC	5,926,958	*15.0%*
Public Transport	2,770,445	*7.0%*	Light and Operations	4,849,329	*12.2%*
Other employees	2,188,869	*5.5%*	Land Transport	8,824,159	*22.3%*
Outbound tourists	1,132,312	*2.9%*	Engine Testing	414,141	*1.0%*
Visitors	1,223,597	*3.1%*	HVAC/Refrigeration	332,442	*0.8%*
Tourist Coaches	701,676	*1.8%*	Heating	1,901,016	*4.8%*
Tourist Taxis	522,373	*1.3%*	Passenger/Cargo	144,546	*0.4%*
Airline Catering	631,749	*1.6%*	Potable/Grey	75,271	*0.2%*
MIA Employees	235,145	*0.6%*	Potable	13,610	*0.0%*
Total	**39,639,150**	*100.0%*	**Total**	**39,639,150**	*100.0%*

Analysis of Carbon Emissions

Carbon Footprint by Purpose of Use



Assessment of Intervention Potential

Carbon Emissions (2016 scenario, total emissions) *in order of size*			Potential to reduce/neutralise demand	Potential to increase energy efficiency	Justification
Used by:	**Used for:**	***% of total***			
Aviation	Ground Movement	*32.6%*			**Short distances, optimised management**
Aviation	Auxiliary Power	*10.7%*			**Potential for fixed power investment (long run)**
MIA Tenants	HVAC	*8.0%*			**Potential for neutrality, behavioural change**
MIA	HVAC	*7.0%*			**Potential for neutrality, behavioural change**
Public Transport	Land Transport	*7.0%*			**Potential for improved management**
MIA Tenants	Light and Operations	*6.5%*			**Potential for neutrality, behavioural change**
MIA	Light and Operations	*5.7%*			**Potential for neutrality, behavioural change**
Other employees	Land Transport	*5.5%*			**Potential for behavioural change**
MIA Tenants	Heating	*4.2%*			**Potential for neutrality, behavioural change**
Visitors	Land Transport	*3.1%*			**Potential for behavioural change**
Outbound tourists	Land Transport	*2.9%*			**Potential for behavioural change**
Tourist Coaches	Land Transport	*1.8%*			**Potential for behavioural change**
Tourist Taxis	Land Transport	*1.3%*			**Potential for behavioural change**
Aviation	Engine Testing	*1.0%*			**Potential for neutrality**
Airline Catering	HVAC/Refrigeration	*0.8%*			**Potential for neutrality, behavioural change**
Airline Catering	Heating	*0.6%*			**Potential for neutrality, behavioural change**
MIA Employees	Land Transport	*0.6%*			**Potential for behavioural change**
MIA	Passenger/Cargo	*0.4%*			**Potential for neutrality**
MIA Tenants	Potable/Grey	*0.1%*			**Optimised management**
Airline Catering	Land Transport	*0.1%*			**Potential for equipment enhacement (long run)**
MIA	Potable/Grey	*0.1%*			**Potential for harvesting rainwater (long run)**
Airline Catering	Potable	*0.0%*			**Optimised management**

Assessment of Intervention Potential

Carbon Emissions (2016 scenario, total emissions) *in order of size*			Potential to reduce/neutralise demand	Potential to increase energy efficiency	Justification
Used by:	**Used for:**	***% of total***			
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Other e					
MIA Te					hange
Visitors					
Outbou					
Tourist					
Tourist Taxis	Land Transport	*1.3%*			**Potential for behavioural change**
Aviation	Engine Testing	*1.0%*			**Potential for neutrality**
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MIA	Passenger/Cargo	*0.4%*			**Potential for neutrality**
MIA Tenants	Potable/Grey	*0.1%*			**Optimised management**
Airline Catering	Land Transport	*0.1%*			**Potential for equipment enhacement (long run)**
MIA	Potable/Grey	*0.1%*			**Potential for harvesting rainwater (long run)**
Airline Catering	Potable	*0.0%*			**Optimised management**

mainly Electricity use and Employee Transport

mainly Passenger transport and Aviation auxiliary power

	Measure	Potential Implementation Period	Potential Carbon Savings		Pre-Requisites and Conditionalities
			tCO_2e 2013 Scenario	**tCO2e 2016 total Scenario**	
Motivational behavioural changes	Employee Incentive Schemes/Empower-ment/Motivation to reduce electricity consumption	Short-term			Willingness of employees/potentially spurred through fiscal incentives or establishiment of environmental champions
	Develop corporate cultures toward energy efficency	Short Term			Willingness of employees/potentially spurred through fiscal incentives or establishiment of environmental

The Energy Efficiency Directive provides measures to accelerate energy efficiency improvements, and makes clear that an integrated approach is called for to address all aspects of energy supply and demand.

	Measure	Studies Required	Stakeholders involved	Preliminary Cost-Benefit considerations where possible
Motivational behavioural changes	Employee Incentive Schemes/Empower-ment/Motivation to reduce electricity consumption	N/A	Airport Stakeholders	No significant cost
	Develop corporate cultures toward energy efficency	N/A	Airport Stakeholders	No significant costs

	Measure	Potential Implementation Period	Potential Carbon Savings		Pre-Requisites and Conditionalities
			tCO_2e 2013 Scenario	**tCO2e 2016 total Scenario**	
Motivational behavioural changes	Employee Incentive Schemes/Empower-ment/Motivat… consumption				Willingness of employees/potentially spurred through fiscal incentives or …nmental
	Develop corp… energy efficer…				…s/potentially …centives or …nmental

Potential energy savings due to measures targeting behaviour

Intervention	Range of energy savings
Feedback	5-15%
Direct feedback including smartmeters	2-15%
Indirect Feedback (eg enhanced billing)	2-10%
Feedback and target setting	5-15%
Energy audits	5-20%
Community based initiatives	5-20%

The Energ… energy efficiency … s called for to addr…

	Measure	Studies Required	Stakeholders involved	Preliminary Cost-Benefit considerations where possible
Motivational behavioural changes	Employee Incentive Schemes/Empower-ment/Motivation to reduce electricity consumption	N/A	Airport Stakeholders	No significant cost
	Develop corporate cultures toward energy efficency	N/A	Airport Stakeholders	No significant costs

	Measure	Potential Implementation Period	Potential Carbon Savings		Pre-Requisites and Conditionalities
			tCO_2e 2013 Scenario	**tCO2e 2016 total Scenario**	
Efficiency in the use of electricity	Install electricity saving devices in lighting/operations (motions sensors, LEDs, water heating, etc)	Short-term/Medium Term	2032	897	
	Enhance consumption-sensitivity of electricity pricing	Medium Term			Depends on the expiry of current leasing agreements and warrants further technical studies on any changes to the implementatino of this measures
	Introduce and maintain electricity use monitoring systems	Short Term			
	Replace old airconditioning equipment	Medium to Long Term	149	65	Ensuring the set up of energy efficient parameters in tendering processes
	Prioritise energy efficiency in acquisition of new equipment	Medium to Long Term			Ensuring the set up of energy efficient parameters in tendering processes
	Prioritise on energy efficiency of new buildings and insulation of MIA building	Medium Term			Ensuring the set up of energy efficient parameters in tendering processes

Movement detectors: 441,410 kwh
Replacement of luminaires: 958,000 kwh
Use of waste heat for water heating at MIA: 373,750 kwh
Employee and company culture: 2% of demand: 564,858 kwh

897 Tonnes of CO_2e

Replacement of old airconditioning equipment

65 Tonnes of CO_2e

	Measure	Studies Required	Stakeholders involved	Preliminary Cost-Benefit considerations where possible
Efficiency in the use of electricity	Install electricity saving devices in lighting/operations (motions sensors, LEDs, water heating, etc)	N/A	Airport Stakeholders	Cots associated with water heating are to be studied in greater detail to asses the feasbility of the measure. This is in part due to the infrastructural changes which may be required to install such equipment
	Enhance consumption-sensitivity of electricity pricing		Airport Stakeholders within the Terminal and Airfield	
	Introduce and maintain electricity use monitoring systems	N/A	Airport Stakeholders	
	Replace old airconditioning equipment	Subject to financial constraints	Airport Stakeholders	This is already in the set up of a number of airport stakeholders. Infact airconditioning equipment which has been recently replaced is consdidered to be energy efficient
	Prioritise energy efficiency in acquisition of new equipment	Subject to financial constraints	Airport Stakeholders	To be studied before new equipment is purchased
	Prioritise on energy efficiency of new buildings and insulation of MIA building	Subject to financial constraints	Airport Stakeholders	This is already within the set up of the airport operator as Skyparks has been specifically built in a manner to consider energy efficiency

- Can be implemented in the short to medium term.
- A number of stakeholders have already adopted some of these measures including:
  - replacement of incandescent lamps by PL (energy saving) lamps
  - the replacement of fluorescent lighting control chokes by HF electronic chokes
  - the introduction of inverters in high load motor control centres, replacement of terminal building air-conditioning chillers by more efficient chillers
  - improving coefficient of performance by some 25% and introduction of highly efficient VRV units
  - Replacement of lights with LED lamps

	Measure	Potential Implementation Period	Potential Carbon Savings		Pre-Requisites and Conditionalities
			tCO_2e 2013 Scenario	**tCO2e 2016 total Scenario**	
Ground Transport	More use of e- and tele-working	Short-term	73		Depending on the nature of work
	Employee incentive schemes for car-pooling and green modes of transport	Short Term	242		Willingness of employees/potentially spurred through fiscal incentives or establishiment of environmental champions
	Rationalise frequency/extent of public transport service in redundant routes/times	Medium Term			Depends on the national public transport system and the Transport strategy which is currently being drafted
	Provide electricity charging points for vehicles	Medium Term	Not Relevant	134	Establishment of convenient areas for charging points
	Use green vehicles to replace existing ones including the possibility of using vehices used to transport passengers on apron to electrric vehicles or H2O buses	Medium to Long Term			Procurement procedures to favour green vehicles.
	Incentivise use of green vehicles through priority access, pricing incl. car park charges	Medium Term			Technical system to allow for the identfication of green vehicles
	Car park facilities for long stays (e.g. while abroad) with Park and Ride	Medium Term			Set up of established areas within the boundary. Must also tie in with the National Transport Strategy
	Promote use of biofuels	Medium Term			Conversion of equipment

Measure	Studies Required	Stakeholders involved	Preliminary Cost-Benefit considerations where possible
More use of e- and tele-working	N/A	Airport Stakeholders	
Employee incentive schemes for car-pooling and green modes of transport	N/A	Airport Stakeholders	
Rationalise frequency/extent of public transport service in redundant routes/times	Studies on the efficiency and effectiveness of the national public transport	Transport Malta	
Provide electricity charging points for vehicles	EU fuded project currently analysing in detail a pilot project on the use of electric vehicles (national project not specific to airport)	Airport operator and Transport Malta	The value of the carbon emissions saved over a 12 year period based on a shadow price of €25/tonne amounts to €30,000 in net present value terms based on a discount rate of 5.5%. To determine the financial feasibility, cost savings have also to be taken into consideration.
Use green vehicles to replace existing ones		Airport Stakeholders	
Incentivise use of green vehicles through priority access, pricing incl. car park charges		Carpark operator and Transport Malta	
Car park facilities for long stays (e.g. while abroad) with Park and Ride	N/A	Carpark operator and Transport Malta	
Promote use of biofuels		Airport Stakeholders /Malta Resources Authorty	Given the current debate on the overall reduction of emissions, this measure has to be studied in greater detail

E and tele-working
Employee incentive schemes for car-pooling and green modes of transport

315 Tonnes of CO_2e

Promotion of Green Vehicles

134 Tonnes of CO_2e

	Measure	Potential Implementation Period	Potential Carbon Savings		Pre-Requisites and Conditionalities
			tCO_2e 2013 Scenario	**tCO2e 2016 total Scenario**	
Renwable Energy	Installation of PV Units	Short -term	23,616	10,430	Establishing boundaries of critical and non-critical areas
Water related measures	Improve rainwater harvesting infrastructure	Medium Term	10		Availability of land space
	Treatment of Sewage Water	Medium to Long term			

Renewable Energy: PV Panels

There are significant tracts of land within the airport boundary which could be developed into solar farms. The development of this area depends on the parameters to establish what is critical and non-critical within an airport boundary given safety considerations related to flight operations, such as glare from the panels during the critical periods of take-offs and landings.

Within the airport boundary there are already 0.096MWp of PVs installed. The potential supply of PV panels could be installed within the boundary, outside the boundary if sufficient tracts of land can be found within Malta as well as outside Malta

	Measure	Studies Required	Stakeholders involved	Preliminary Cost-Benefit considerations where possible
Renwable Energy	Installation of PV Units	Operational Security studies	Airport Stakeholders /Malta Resources Authorty/Civil Aviation Authority	Translating the carbon emissions into monetary terms based on the shadow price of carbon at a discount rate of 5.5% over a twenty year period generates €3.1 milllio in NPV terms.
Water related measures	Improve rainwater harvesting infrastructure	Determine the financial feasibility	Airport Stakeholders	The value of the carbon emissions saved over a 20 year period based on a shadow price of €25/tonne of CO2 amounts to €3000 in net present value terms based on a 5.5% discount rate
	Treatment of Sewage Water			

Improve rainwater harvesting infrastructure/Treatment of sewage effluent

10 Tonnes of CO_2e

Renewable Energy: PV Panels

10,430 Tonnes of CO_2e

	Measure	Potential Implementation Period	Potential Carbon Savings		Pre-Requisites and Conditionalities
			tCO_2e 2013 Scenario	**tCO2e 2016 total Scenario**	
Aircraft Measures	Fixed Power Ground Units to replace APU	Long Term	559		Depends on technical parameters and on willingness of airliners to use the system
	Parallel Taxi Way	Long-Term			Aviaibility of land space, technical cosiderations etc

Fixed Power Ground Units to replace the use of APUs.

559 Tonnes of CO_2e

	Measure	Studies Required	Stakeholders involved	Preliminary Cost-Benefit considerations where possible
Aircraft Measures	Fixed Power Ground Units to replace APU	Requires in depth study on the financial and economic viability of the investment	Airport operator and Airlines	The value of the carbon emissions saved over a 15 year period based on a shadow price of €25/tonne of CO2 amounts to €370,000 in net present value terms based on a 5.5% discount rate
	Parallel Taxi Way	Requires in depth study on the financial and economic viability of the investment	Airport operator, traffic control and Airlines	

National Commitments (EU 2020)

Target	EU	Malta
CO2 emission reduction targets	-20% over 1990	5% over 2005
Renewable energy A commitment to achieve by 2020 a target of 10% of energy consumed in all forms of transport from renewable sources	20%	10%
Energy efficiency – reduction of energy consumption in Mtoe	20% increase in energy efficiency equalling 368 Mtoe	0.24Mtoe

Funding Opportunities (2014-2020)

Partnership Agreement

Malta's Priorities	Mapping to the CSF Thematic Objectives			
Fostering competitiveness through innovation and the creation of a business-friendly environment	(1) Research, Technological Development and Innovation	(2) Information Communication Technologies	(3) Competitiveness of SMEs	(4) Low Carbon (RE use and EE in SMEs)
Sustaining an environmentally-friendly and resource-efficient economy	**(4) Low Carbon**	**(5) Climate Change, Risk Prevention and Management**	**(6) Environment and Resource Efficiency**	**(7) Sustainable Transport**
Creating opportunities through investment in human capital and improving health and well-being	**(8) Employment and labour mobility**	**(9) Social Inclusion and Combating Poverty**	**(10) Education and Training**	**(11) Institutional Capacity and Public Administration**

Source: http://www.ppcd.gov.mt/eufunds20142020; Extracted: February 2014