

Integrated Health, Safety and Environmental Management System

"The ESRIN Experience"

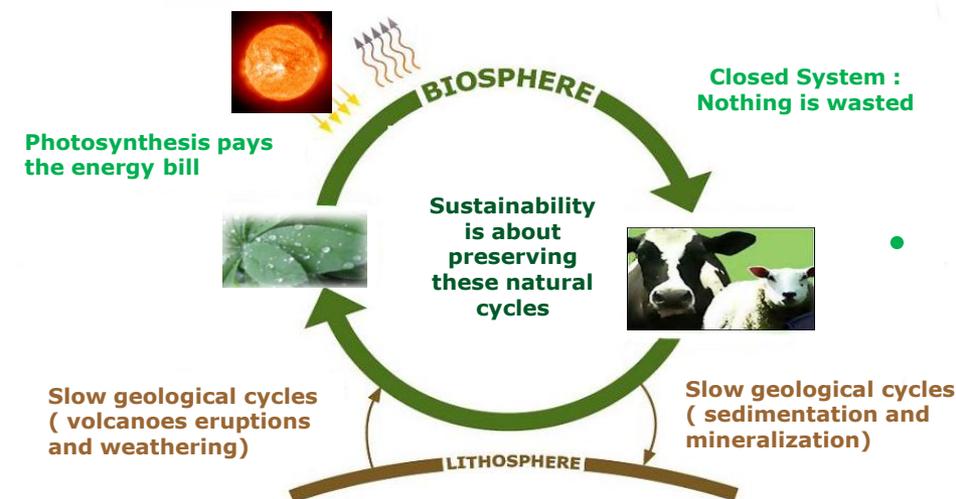


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European Space Agency

Sustainable Development



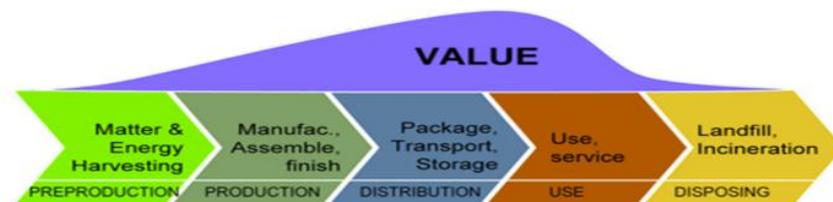
- **Sustainable Natural Life Cycle**

- **Unsustainable linear thinking of the conventional value chain.**

Is it dying or evolving into a value-loop economy?

Limits to the value chain economy:

- World population increase
- Developing countries rapid evolution effect
- Resource price increases
- Food production limitation
- Exhausting of fossil fuels, mines, soils, forests and fisheries
- Pollution affecting human health and the Ecosystem
- Climate change



The conventional value chain process

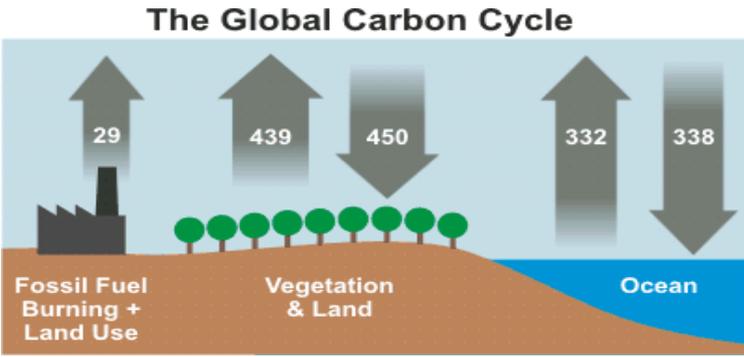
The basic process is always the same: Resources harvested from our ecosystem are partially used/ processed in order to add value, creating a product for the market that after use is simply discarded into landfills, as it is cheaper to build a new product from new raw materials than to recycle.

WS Session: "Sustainable Development and Redevelopment" (Forward)

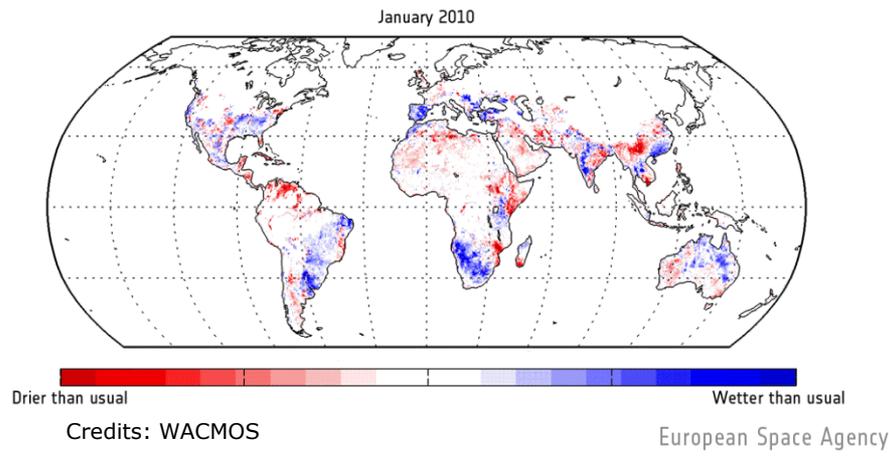
Is global warming a natural cycle or is it affected by human influence? What has science been able to say?

- *In the natural cycle, the world can warm, and cool, without any human interference. For at least the past million years this has occurred over and over again at 100,000 year intervals as described by the Milankovitch cycles.*
- *Current warming, however, is clearly not part of the natural cycle. The earth's natural cycles, if human industrial output had not been involved, would have us near or slightly below thermal equilibrium, possibly slightly cooling.*

In other words, if the natural cycle could proceed without human influence, the forcing levels would likely be around 0W/m2 to -0.1W/m2. We are currently experiencing a positive forcing of around 3.6 to 3.8W/m2 and a human induced negative forcing of around 2W/m2. The resultant forcing, depending on current levels and the Schwabe cycle is around +1.6W/m2 above natural cycle as estimated.



Source: IPCC AR4 – Flux of Carbon Dioxide in gigatonnes.



WS Session: "Sustainable Development and Redevelopment" (Forward)

Systems Theory views the world as a Complex Adaptive System (CAS) that is dynamical by definition.

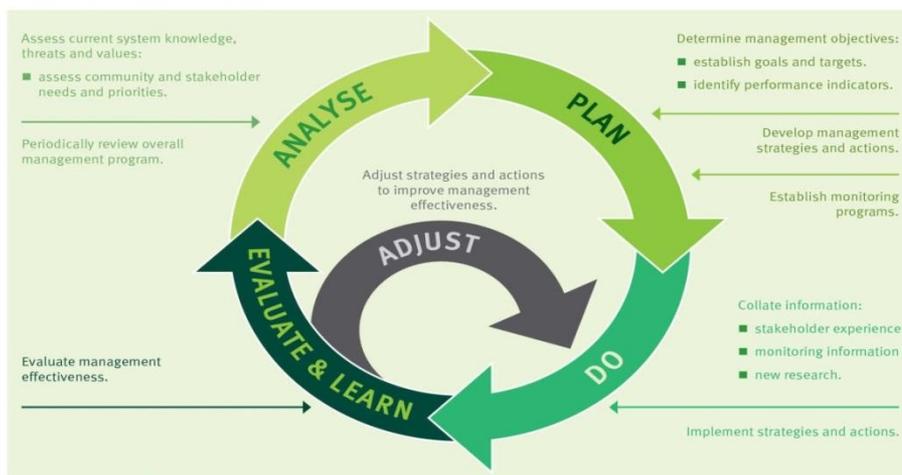
A CAS can be defined as a set of adaptive evolving subsystems (being CAS themselves) whose interactions result in complex non-linear dynamics, the results of which are emergent complex system phenomena.

The emergent patterns are more than the sum of the parts, thus the traditional reductionist methodology fails to describe how the macroscopic patterns emerge as Global Warming.

The effects of natural cycles and human activities should be considered adaptive evolving interacting agents affecting each other and creating a quickly evolving and uncertain environmental, social and economic scenario that must be dealt with in a dynamic, adaptive way.

Sustainable Redevelopment: recreating adaptive value loop systems

Adaptive management cycle



N.B. Adapted from CSIRO Marine and Atmospheric Research 2009

Adaptive Management (AM) is a systematic process for **continually improving management** models, policies and practices by **monitoring** a multitude of variables and uncertainties, deliberately **learning from the outcomes** of operational programs, and coordinating improvements **by implementing** the necessary adjustments and adaptations.

The challenge in using adaptive management approach lies in finding the correct balance between gaining knowledge to improve management in the future and achieving the best short-term outcome based on current operational knowledge (Stankey & Allan 2009).

"The ESRIN Experience"

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- **Environmental Initiatives and Best Practices**
- **Conclusion**



Background - ESA commitment for Sustainable Development

ESA aims to become an environmentally, socially and ethically responsible organization, committed both as a corporate entity and as a space agency.



The Agency Framework Policy on Sustainable Development [ESA/C(2010)29] integrates dedicated commitments and goals for the future in three major areas of action:

- **Program Activities**
- **Environment and Energy**
- **Governance and Ethics**



Priority is given to **Environment and Energy**. In particular the goal to be reached is the **20-20-20 policy of the European Union**.

Background – ESA Environmental Commitment

The 20-20-20 Targets

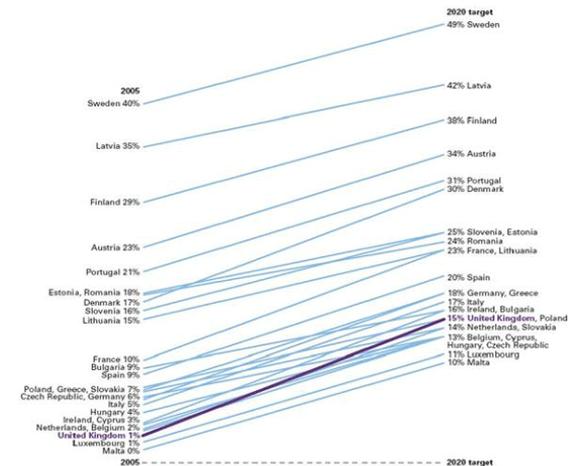
20|20|20



Agency commitment to mitigating environmental impacts, reducing CO2 emissions, promoting the use of renewable resources and improving efficiency.

The **20-20-20** targets:

-  20% reduction of CO2 emissions (T1)
-  20% improvement in energy efficiency (T2)
-  20% increase in use of renewable energy (T3)



(EU Countries performances and targets)

....by the year 2020, referring to the baseline year 2007.

Vision

"Integration of committed sustainable management in ESA is a contribution to preserving acceptable quality of life for future generations and for the Agency itself.

It is also a new corporate adaptation opportunity to enhance competitiveness, introduce new managerial analysis elements, skills and tools, optimize the management of resources, create synergies, minimize risks for business continuity, capitalize on knowledge, increase business patrimony and finally, to lead to excellence in an ethical way by playing our role of global economic and social driver responsibly."

Mission

"Supporting the achievement of the Environmental Corporate targets defined by the ESA Coordination Office for Sustainable Development (COSD) taking actions locally in accordance with HFI - FM leading indications regarding implementation of coordinated actions and plans."



Mission

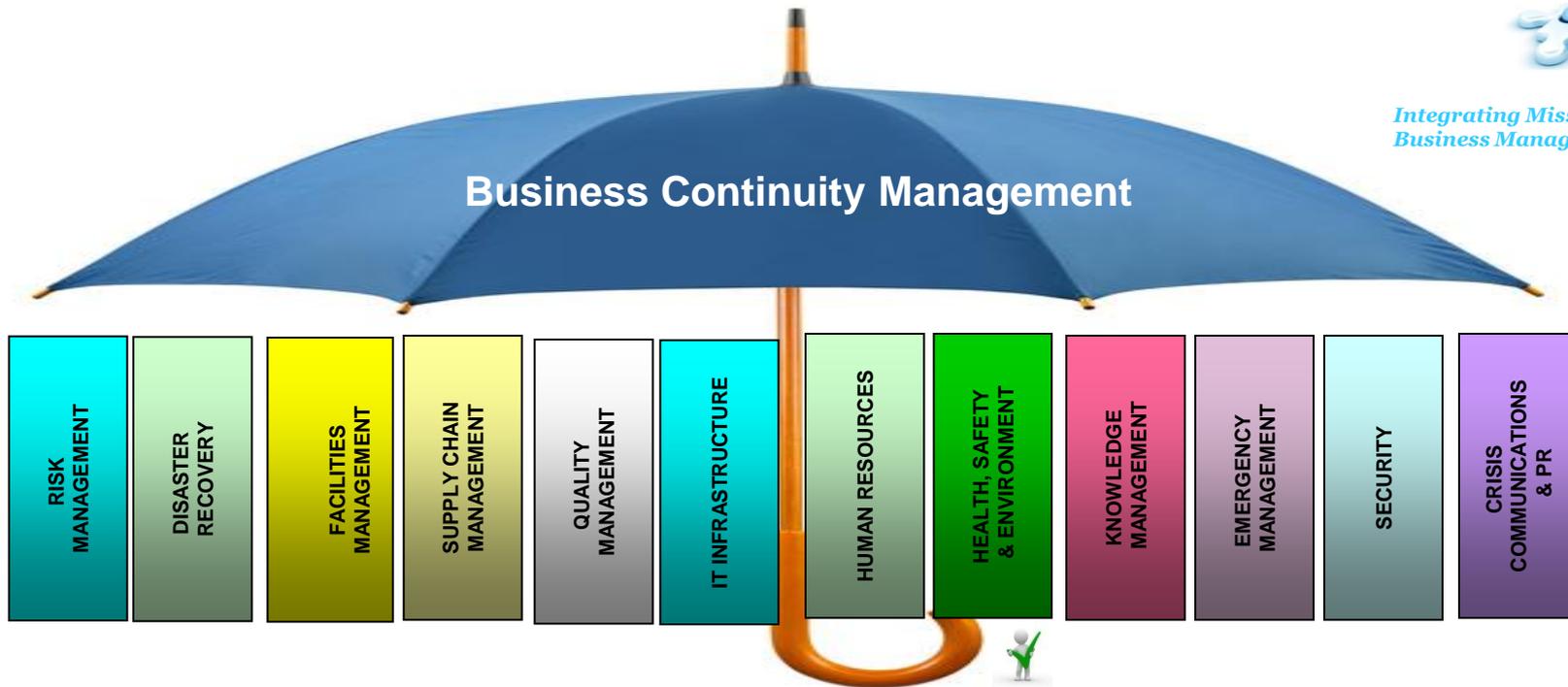
Overview -Development and integration of the Environmental Management in the Corporate Business Continuity Management

Health, Safety and Environment management as an integrated component of the Corporate Business Continuity Management

The Unifying Process

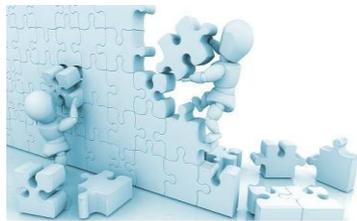
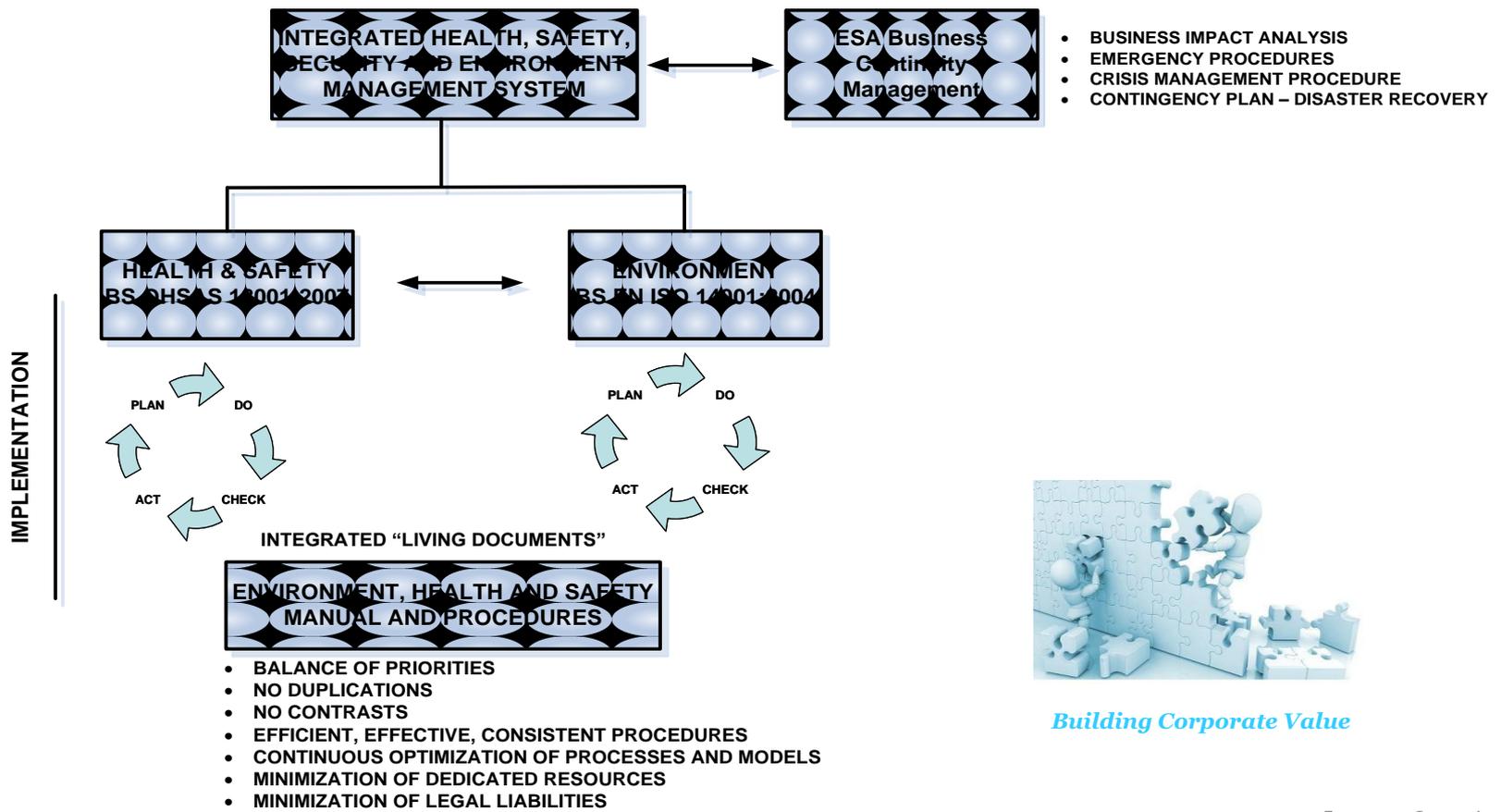


Integrating Mission in Corporate Business Management Scope



Overview - Building integrated, efficient and effective management

"The real challenge is to integrate all the different operational risk components in a consistent and efficient way"



Building Corporate Value



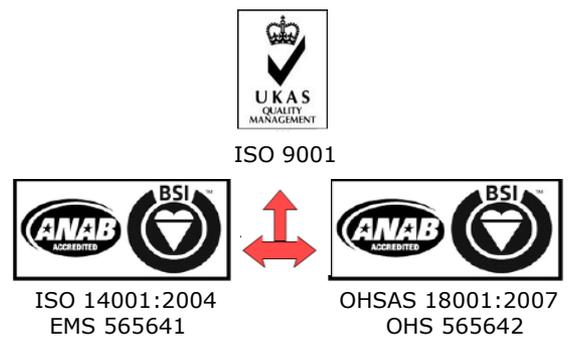
Implementation of Integrated Quality, Health & Safety and Environmental Management System (ISO 9001, ISO 14001, OHSAS 18001 Certified)

 **In December 2010 the integrated environmental management system (EMS) and the H&S one implemented at ESRIN were certified by BSI (British Standards Institution) for the ISO 14001:2004 and OHSAS 18001: 2007 international management system standards (ISO 9001:2000 was already in place).**

 ***ESRIN is now considered a "benchmark" reported internationally for the implementation of its EMS as part of an Integrated Quality, Health, Safety and Environment Management System (IHSEMS).***



ESRIN Integrated Quality Certified Environment



 ***The EMS ISO 14001: 2004 is now recommended for implementation at all ESA sites by the ESA/C(2011)13 dated 25 Feb 2011, "Sustainability at all sites" presented by ESA COSD to the Council.***

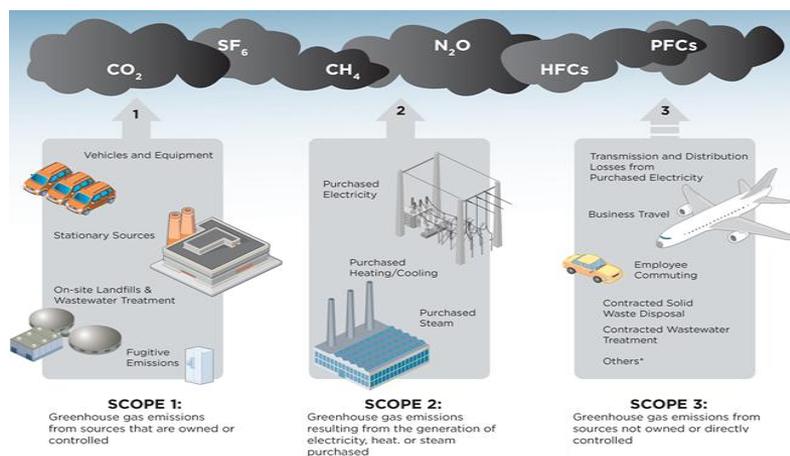
(Source: BSI Y 2010 Public International Annual Report)

Defining Operational Boundaries and Creating an Environmental Impacts Inventory



The created **Environmental Impacts Inventory** included:

- Electricity Use (from fossil fuel, as well as renewable, "green" sources)
- Other energy use (fuel oil, natural gas)
- CO₂ emissions (from energy use, as well as commuting and corporate business travel)
- Water use (potable, non-potable, bottled)
- Paper consumption
- Waste Production (including toxic and hazardous wastes)



Operational Boundaries were defined, implementing the **GHG Standard Protocol [Scope 1](#) - [Scope 2](#) - [Scope 3](#)** format, and including lagging and leading indicators:

- Absolute Factors
- Intensity Factors

(Source: EPA - Greenhouse Gas Standard Protocol)



An Environmental Management Software Tool



An **EMS IT tool** was developed to facilitate the data collection, GHG inventory and risk analysis processes, in order to support environmental performance monitoring, reporting and project plan management.



The **Y 2010 Environmental Impacts Inventory** included data from Y 2007- 2010 for the following factors, organized by scope:

Scope 1 (S1)

- Natural Gas Use
- Diesel and Fuel Oil Use

Scope 2 (S2)

- Electricity Bought from the Grid
- Heat (Steam) Bought from the Grid

Scope 3 (S3)

- Commuting and Business Travel
- Water Use (potable and bottled water)
- Paper Use
- Waste Production/ Disposal



Supporting Wise Decision Making

Conversion Factors

Data Collection Tables

Projections

Performance monitoring Graphs (Absolute Factors, Indicators, benchmarks)

Manual

Compliance

Reports

Risk Analysis

Projects Planning & Management

Best Practice/Business cases across ESA Sites

ESA Global CO2 Emissions Distribution by Site Y 2010

ESA Global CO2 Emissions by Site Y 2007-2010

ESA Global Energy Use

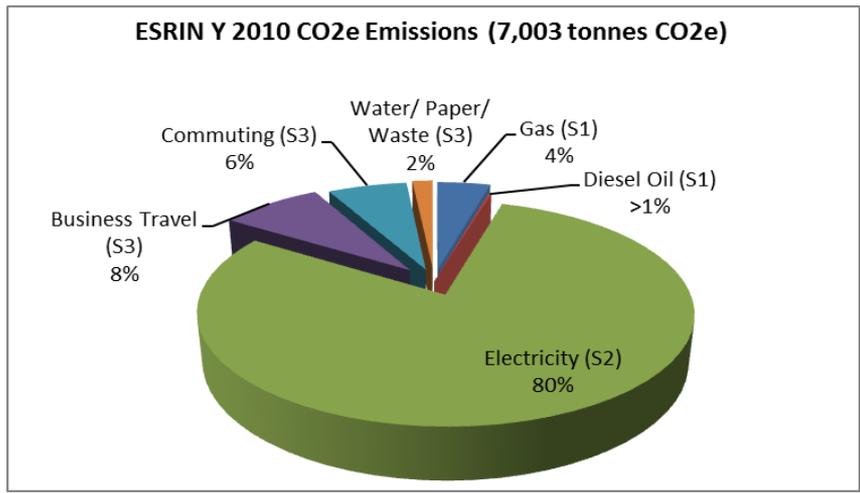
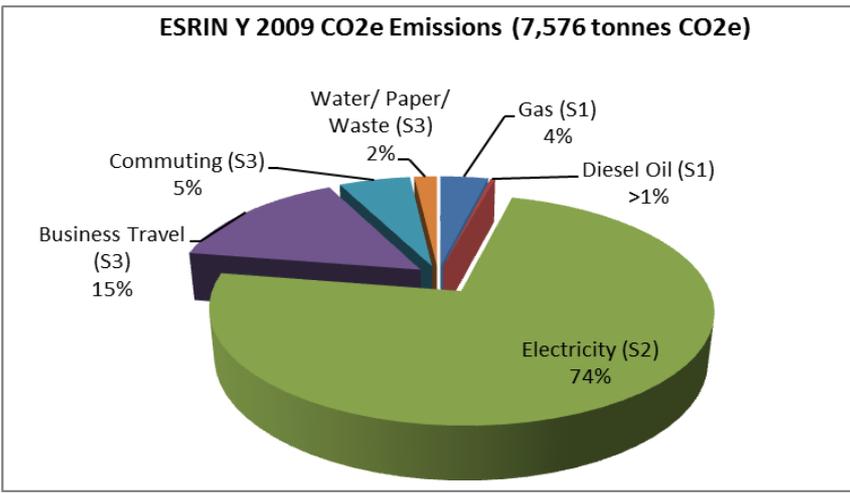
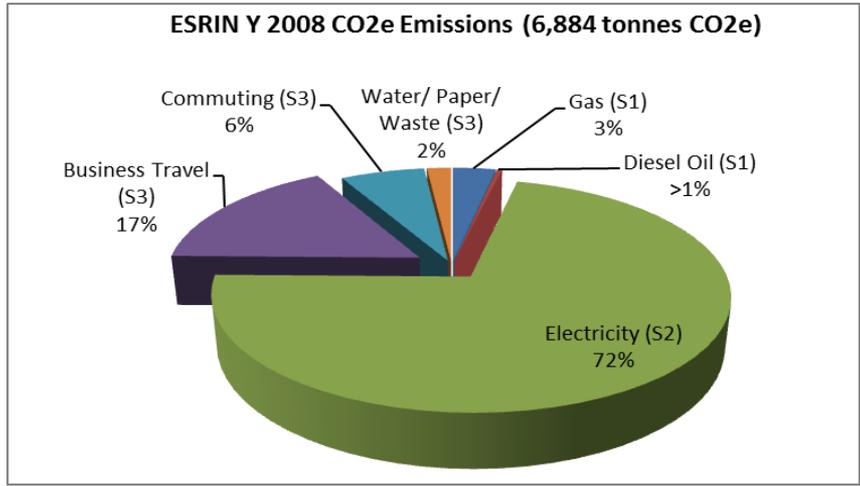
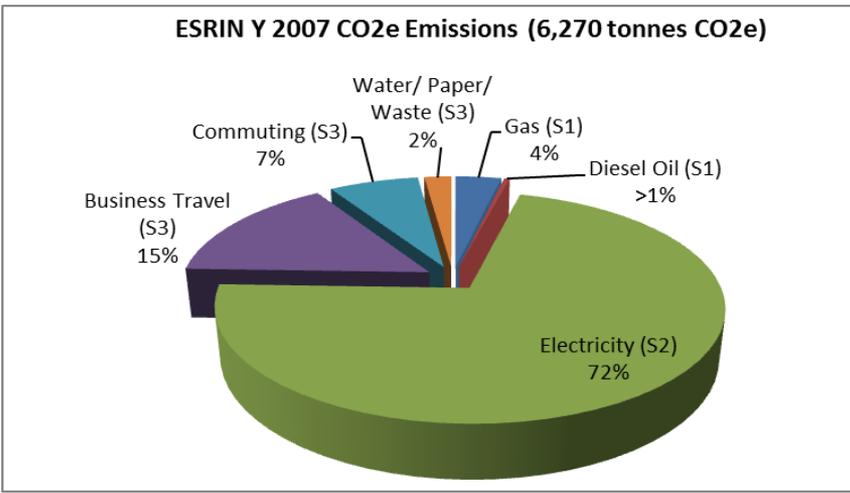
ESRIN STOXIC WASTE(m3) / TOT. WASTE(m3)

ESRIN POTAB WATER(m3) / RESIDENT



ESRIN Environmental Performances Y 2007 – 2010

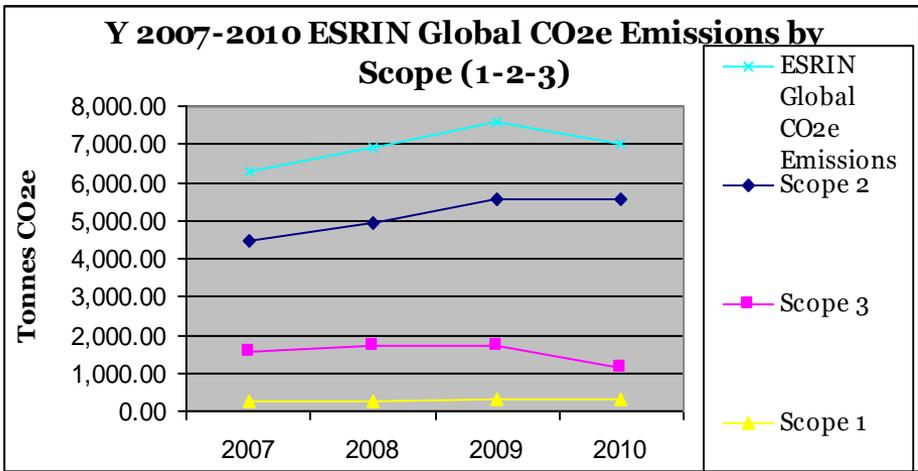
ESRIN Global CO2e Emissions Y 2007 - 2010



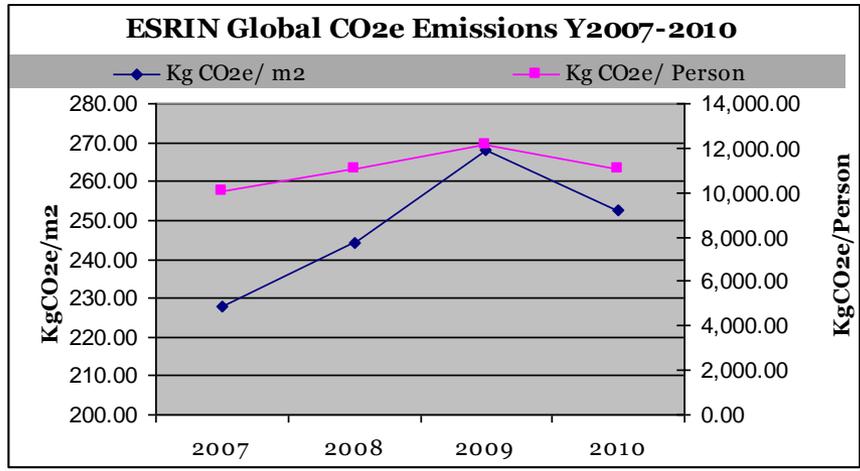
ESRIN Environmental Performances Y 2007 – 2010

Y 2007 – 2010 CO₂e Emissions Scopes 1-2-3

Absolute Factors



Intensity Factors



ESRIN Y 2010 Scope 2 CO₂e emissions rose 24% from the base line year.

Intensity Factors

For the purposes of general reporting, intensity factors were developed taking into account business evolution parameters, including total site building area (in square meters) and the total number of staff and contractors working on site.

Evolution of Buildings and Staff at ESRIN



ESRIN Environmental Performances Y 2007 – 2010

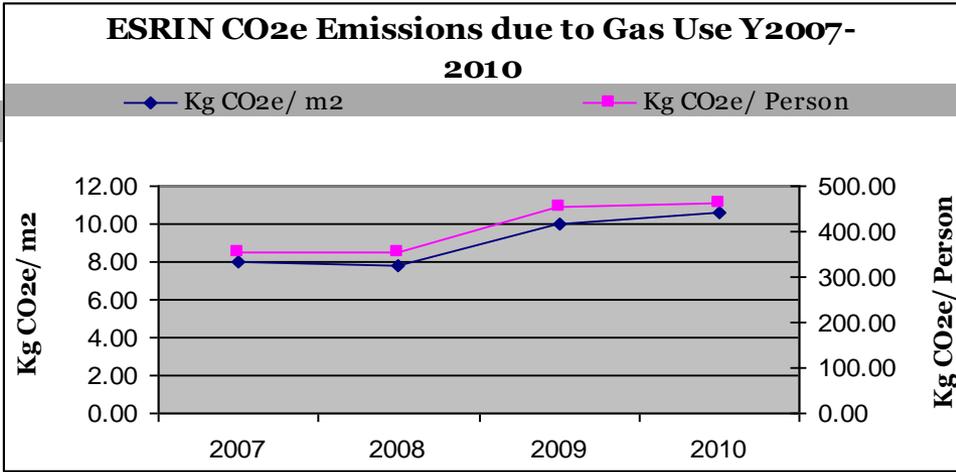
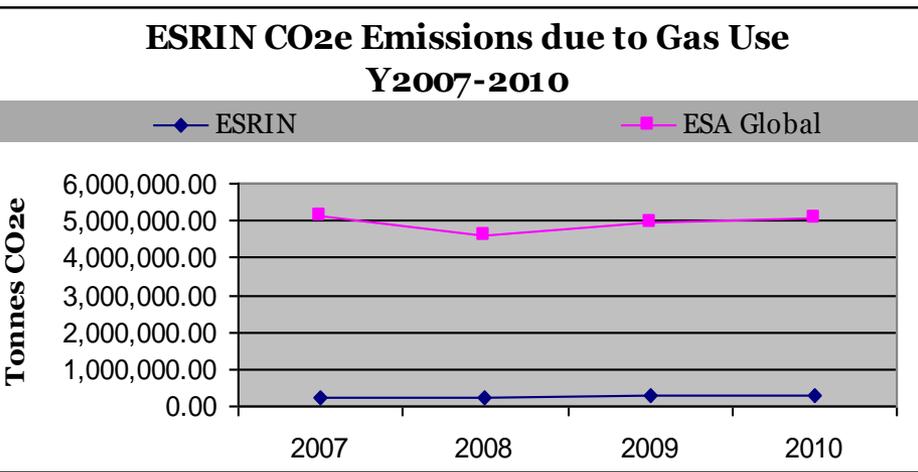
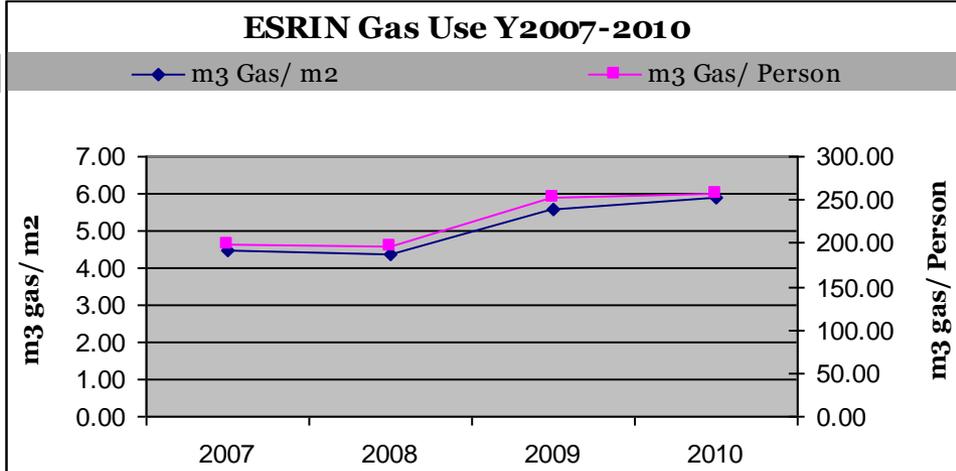
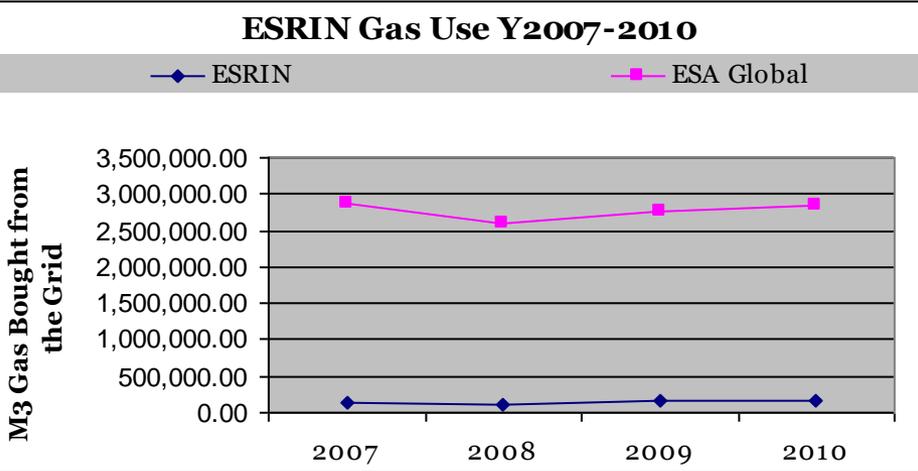


SCOPE 1

CO2e emissions from natural gas use were up 33% from the baseline year.

Absolute Factors

Intensity Factors



ESRIN Environmental Performances Y 2007 – 2010

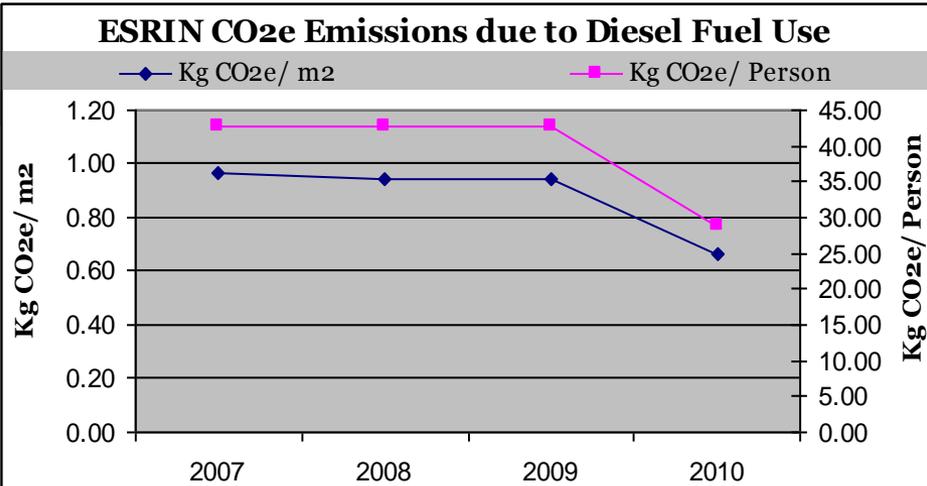
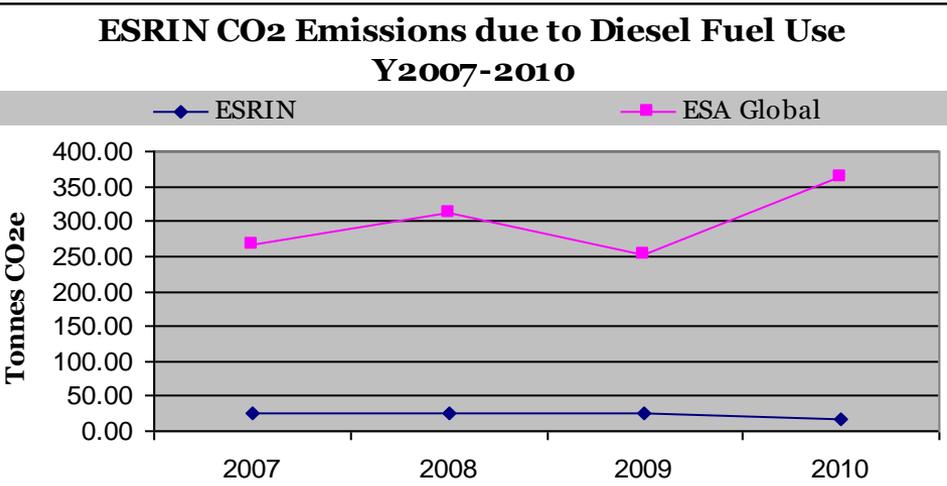
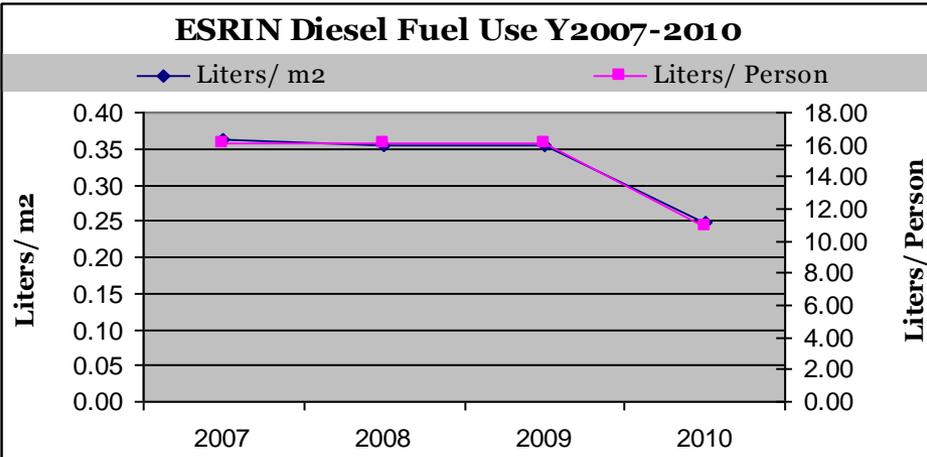
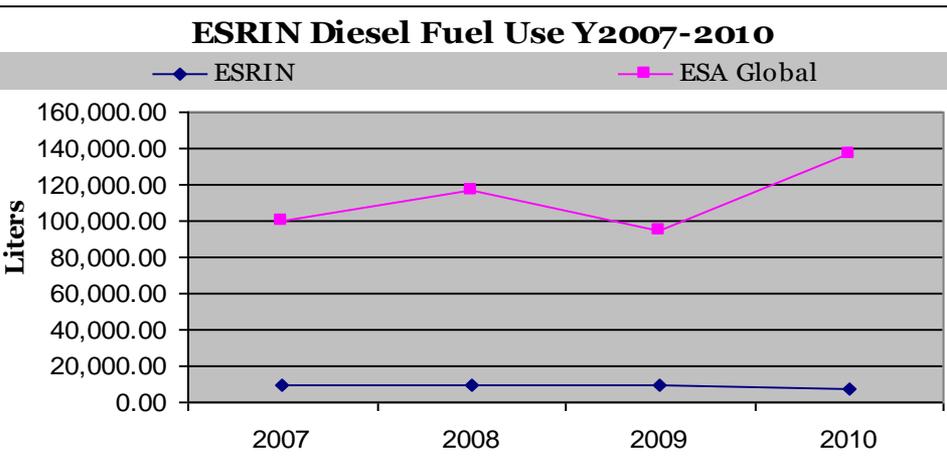
SCOPE 1



CO2e emissions from diesel fuel use were down 31% from the baseline year.

Absolute Factors

Intensity Factors



ESRIN Environmental Performances Y 2007 – 2010

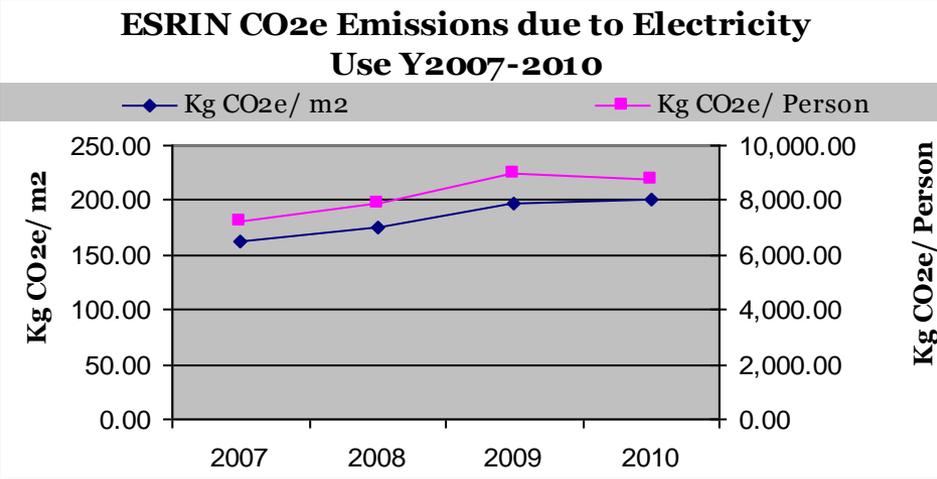
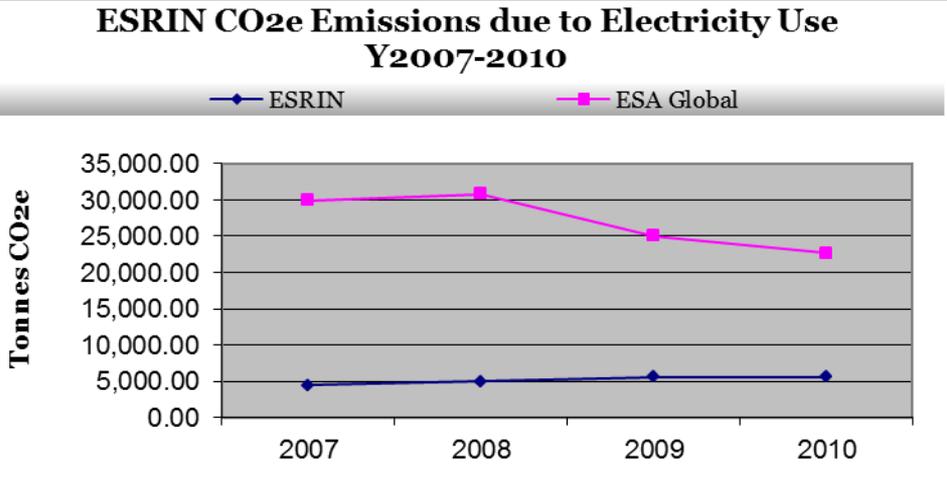
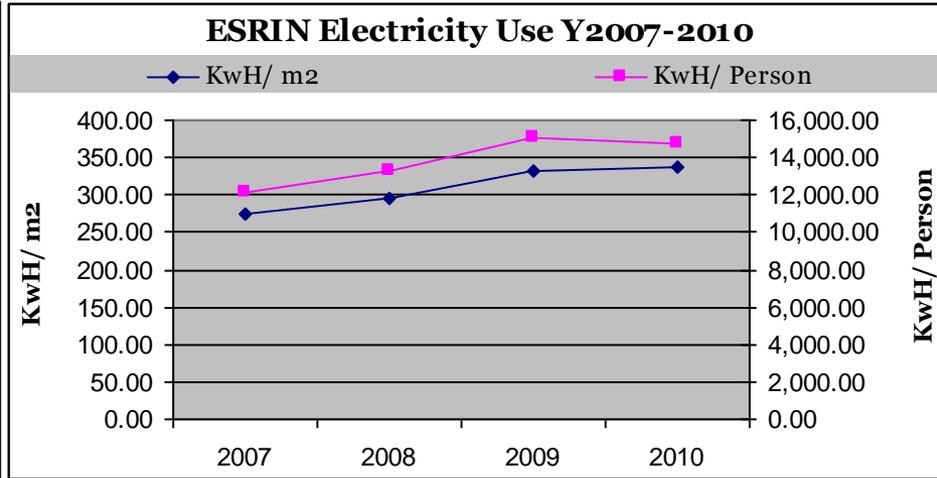
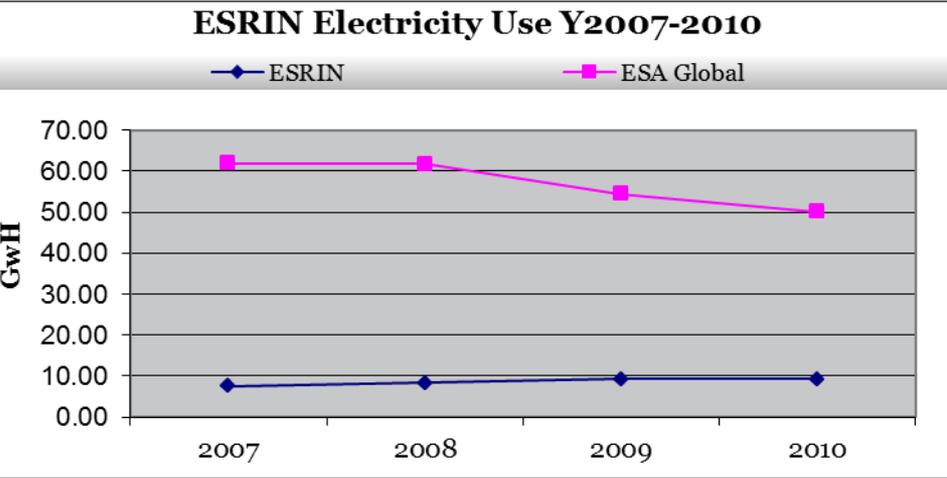
SCOPE 2



ESRIN electricity use was up 24% from the baseline year in Y 2010.

Absolute Factors

Intensity Factors

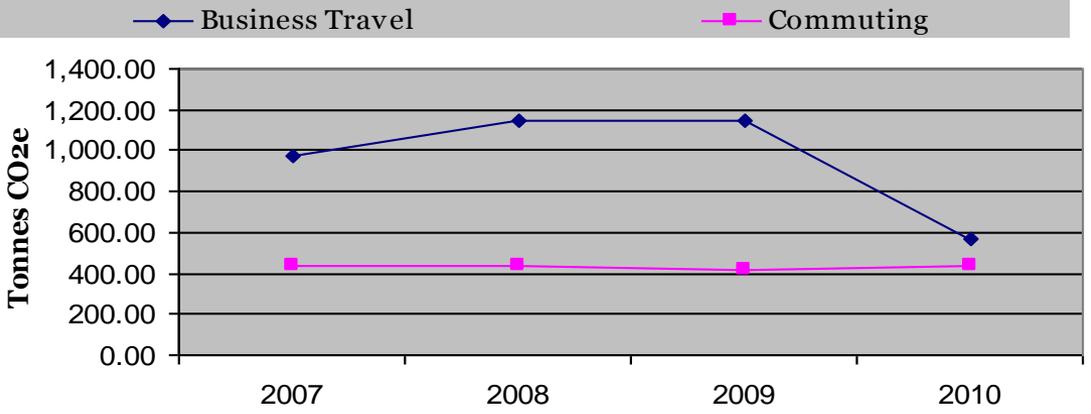


ESRIN Environmental Performances Y 2007 – 2010

SCOPE 3

Absolute Factors

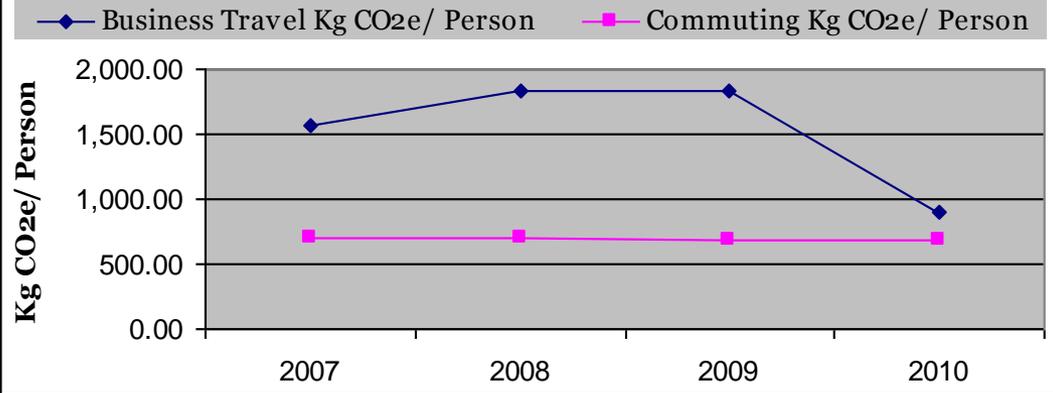
ESRIN Business Travel and Commuting CO2e Emissions Y2007-2010



Y 2010 Business Travel Emissions were down 42% from the baseline year, while Y 2010 Commuting CO2e Emissions increased 1.2% from the baseline year.

Intensity Factors

ESRIN Business Travel and Commuting CO2e Emissions Y2007-2010



Over the period Y 2007 – 2010, while the total number of people working at ESRIN increased by 2%, Commuting CO2e emissions, measured as an intensity factor in Kg CO2e/person, fell by 1% from the baseline year.

ESRIN Environmental Performances Y 2007 – 2010

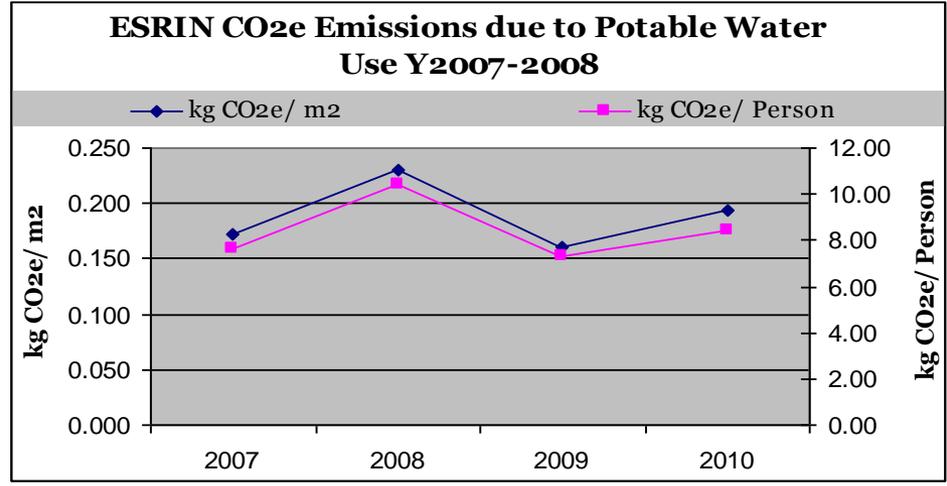
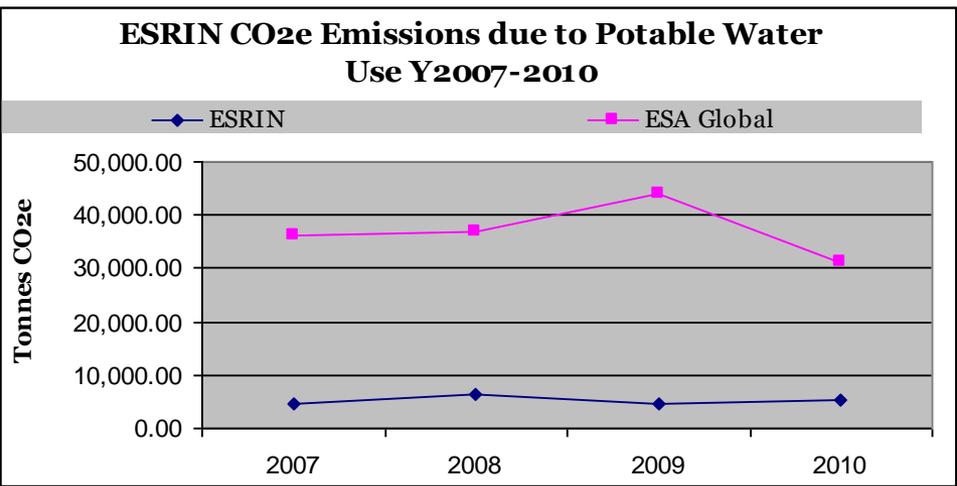
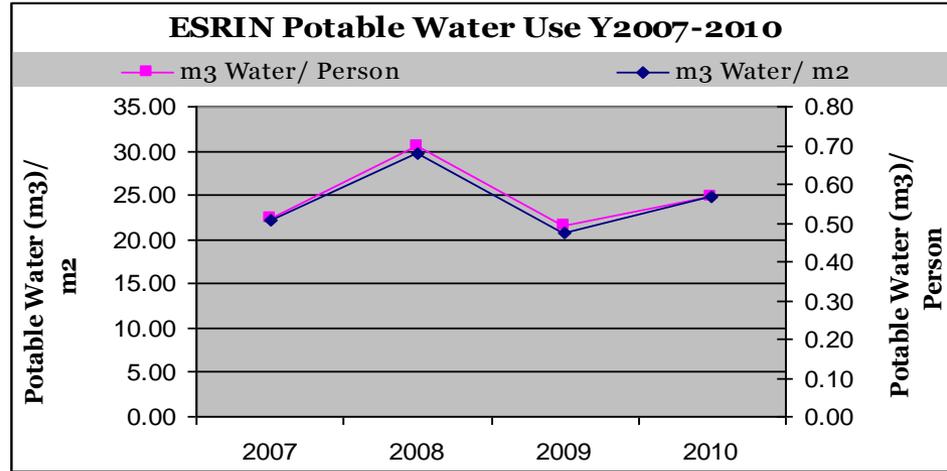
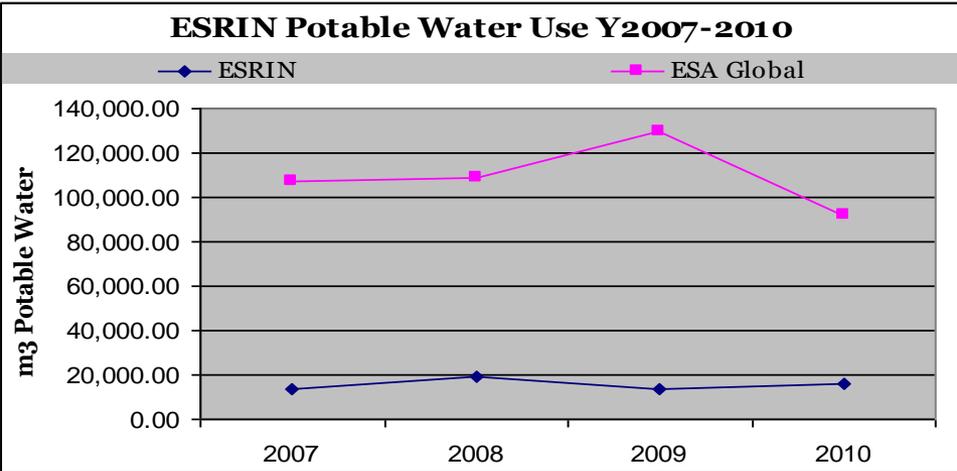
SCOPE 3



CO2e emissions from potable water use were up 13% from the baseline year.

Absolute Factors

Intensity Factors



ESRIN Environmental Performances Y 2007 – 2010

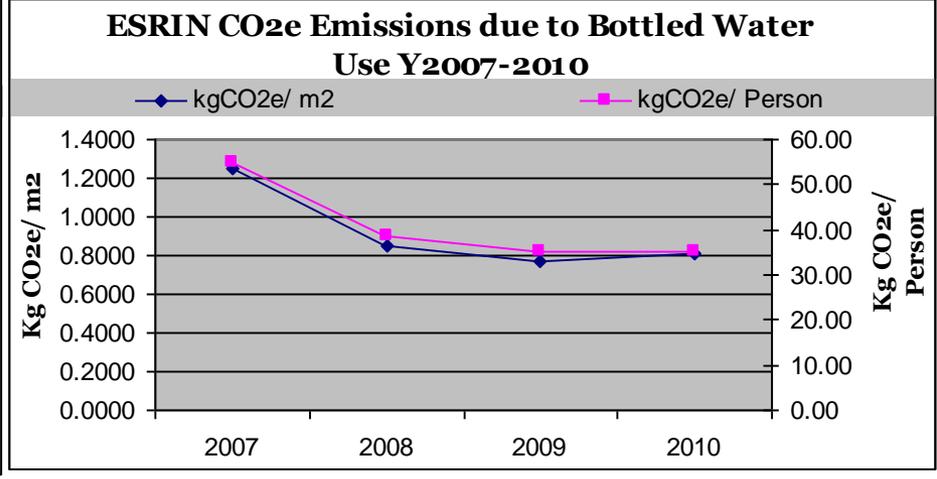
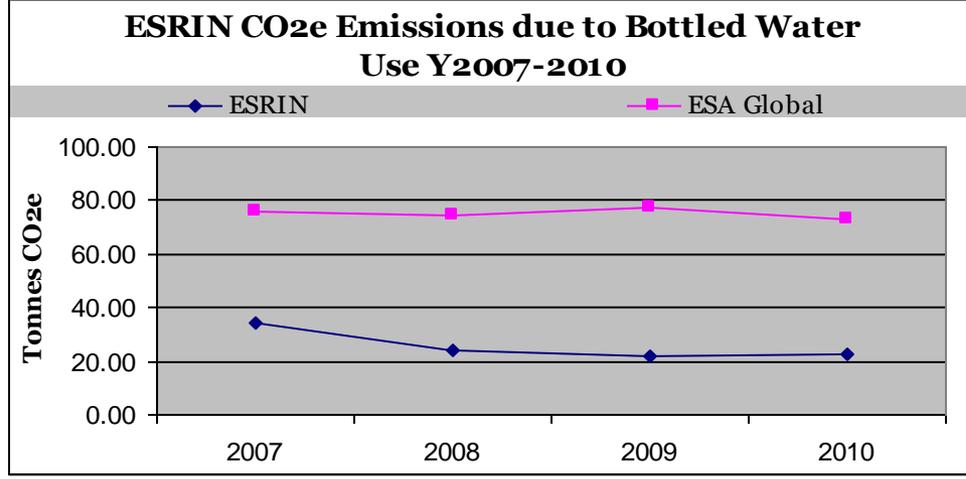
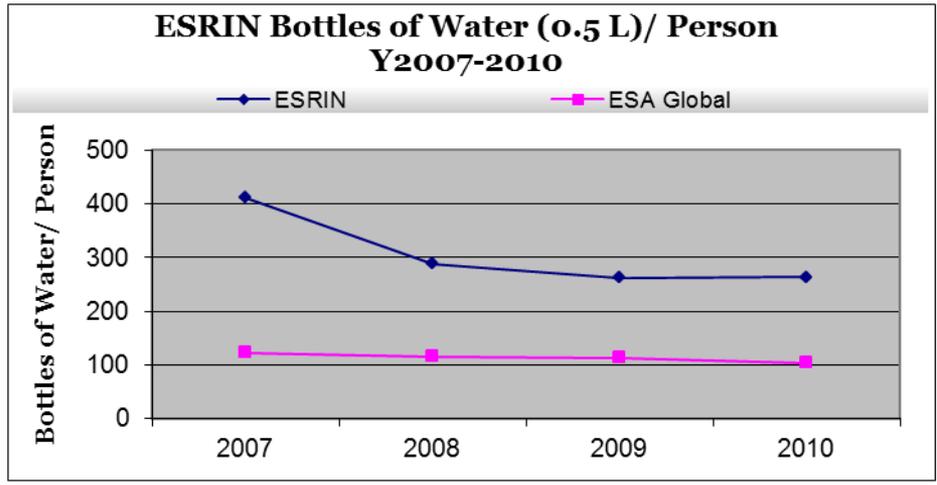
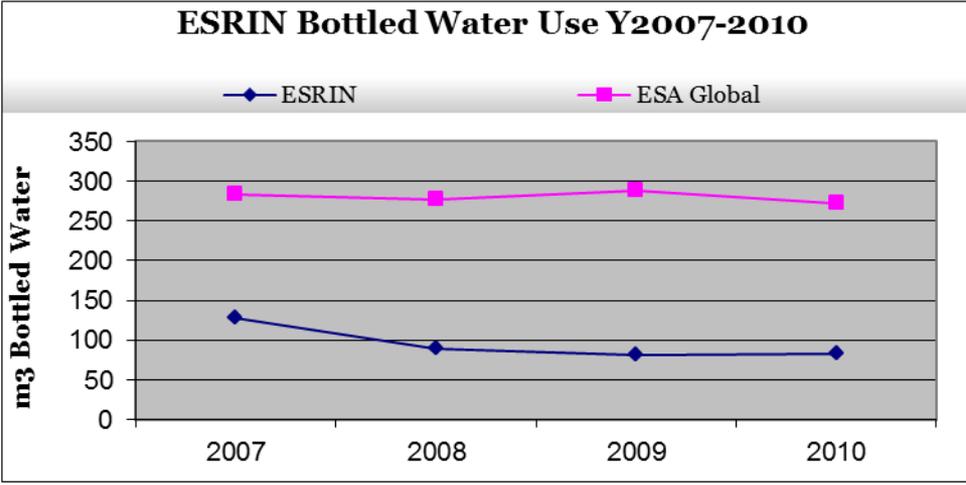
SCOPE 3



CO₂e emissions from bottled water use were down 35% from the baseline year.

Absolute Factors

Intensity Factors



ESRIN Environmental Performances Y 2007 – 2010

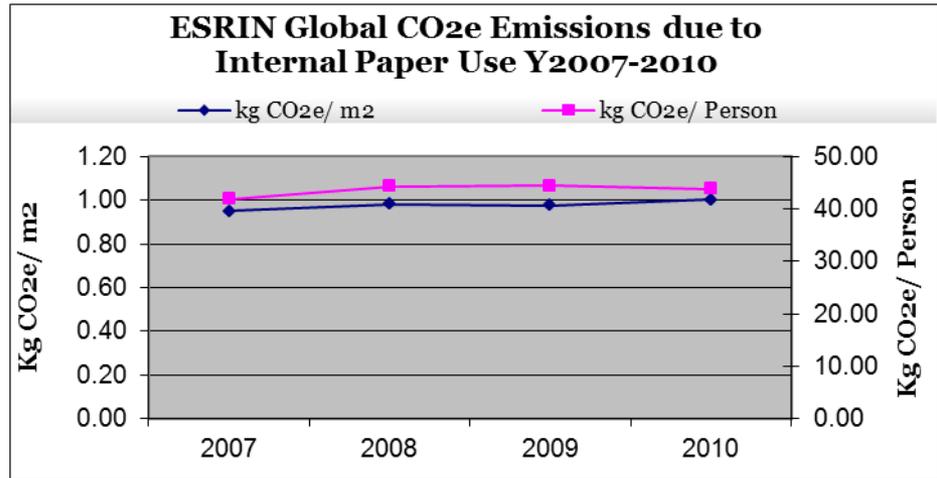
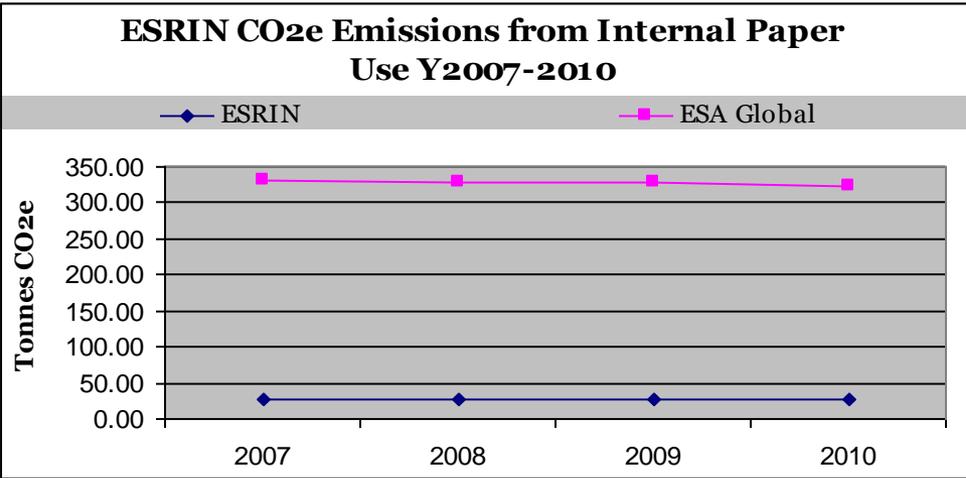
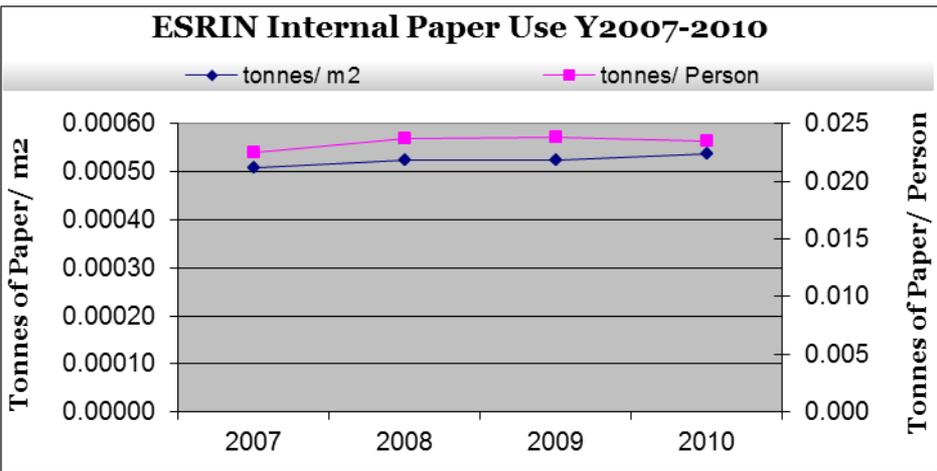
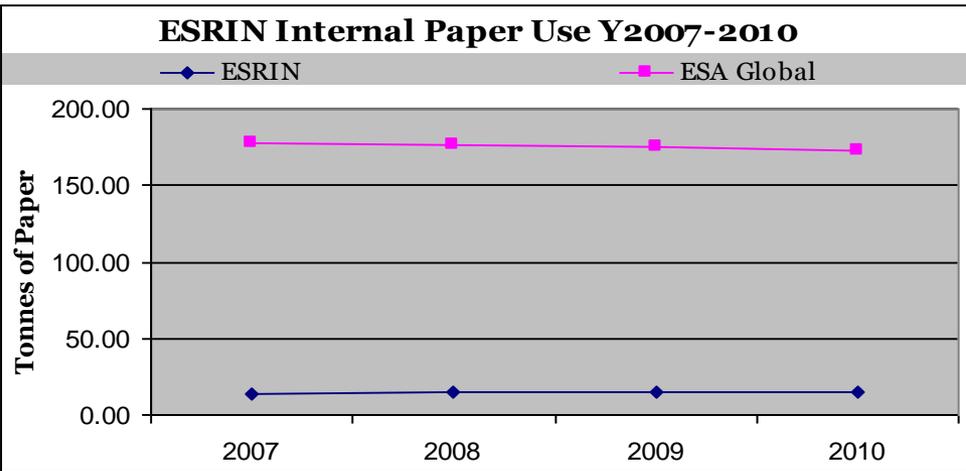
SCOPE 3



CO₂e emissions from paper use were up 6% from the baseline year.

Absolute Factors

Intensity Factors



ESRIN Environmental Performances Y 2007 – 2010

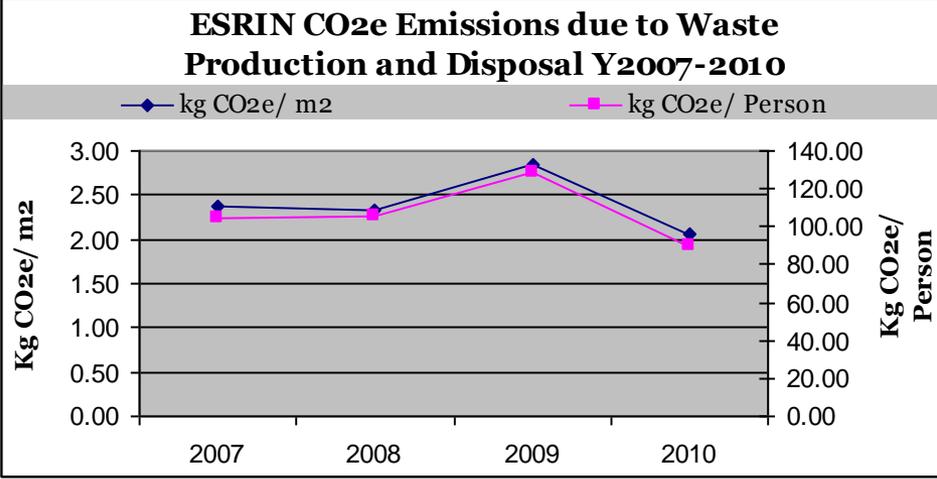
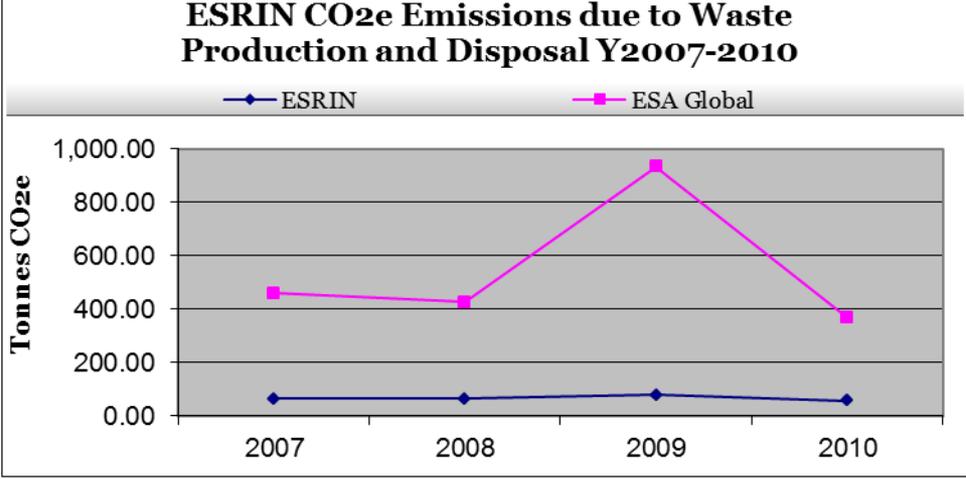
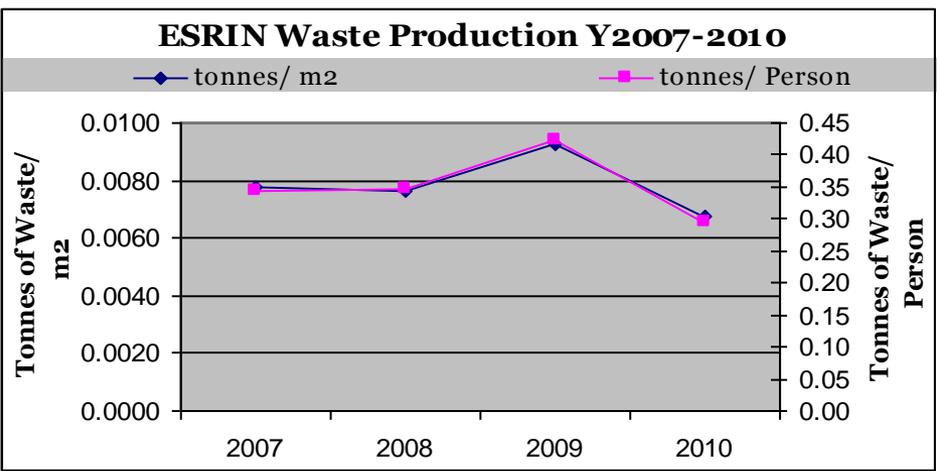
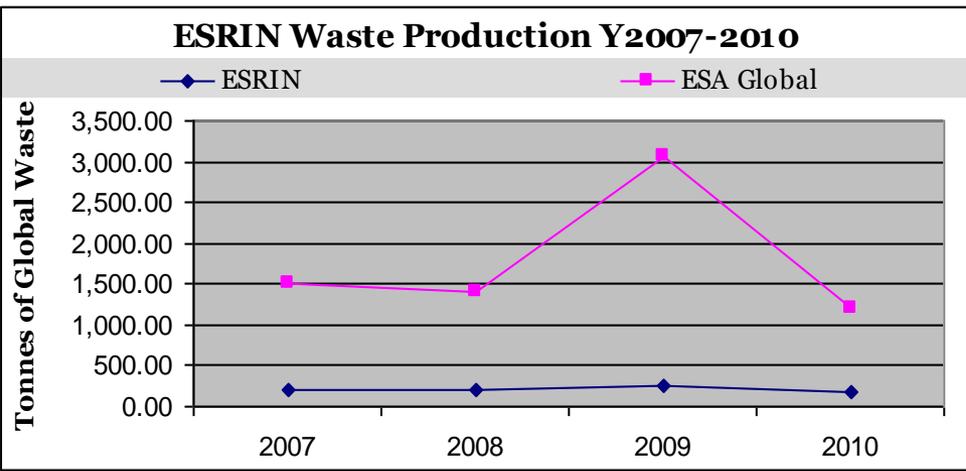
SCOPE 3



CO₂e emissions from waste production and disposal were down 13% from the baseline year.

Absolute Factors

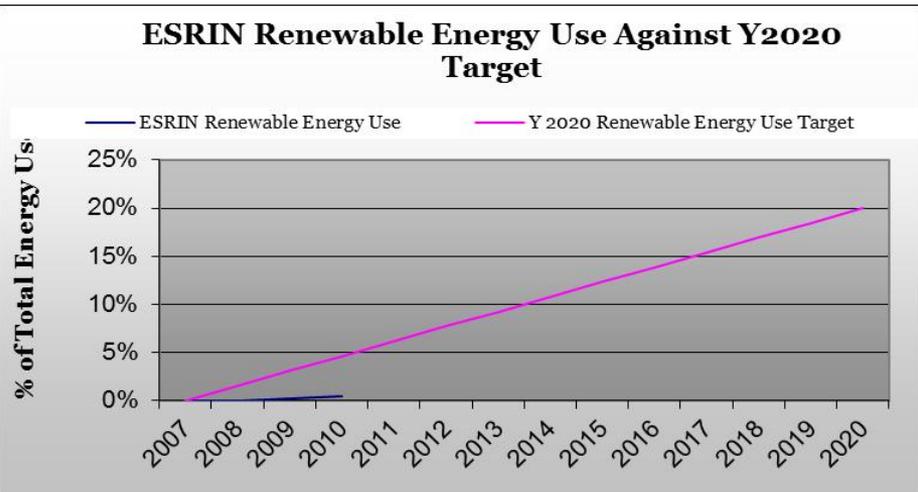
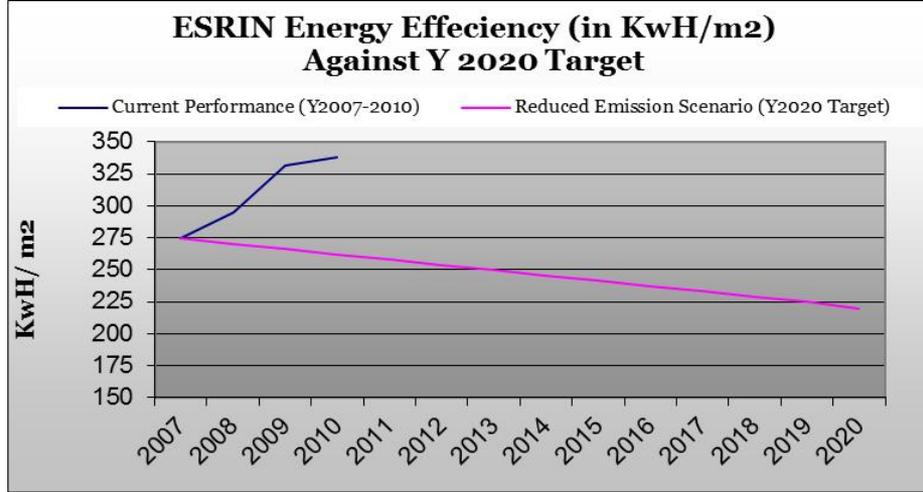
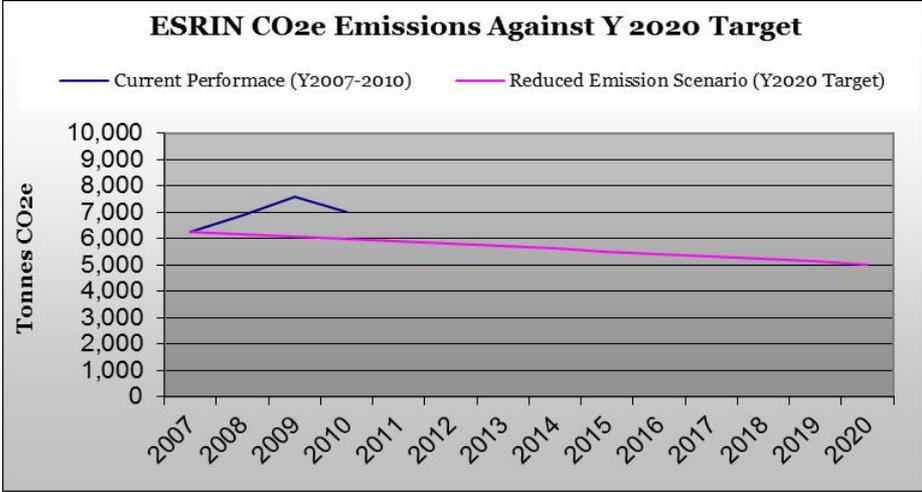
Intensity Factors





ESRIN Y 2007 - 2010 Environmental Performance

ESRIN Y 2007 – 2010 Environmental Performance Against Y 2020 Objectives



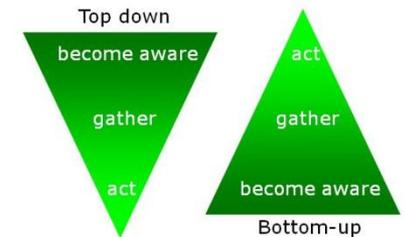
ESRIN Y 2011 Environmental Project Plan- Carbon Management Strategies and Impact Mitigating Measures



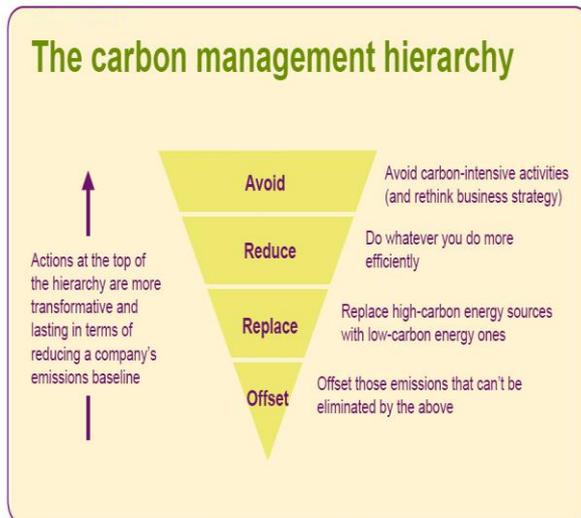
Strategies and Impact Mitigating Measures

In 2011, input was gathered from across all ESA sites for the implementation of impact mitigating measures to be put in place this year, following a **carbon management hierarchy**.

SMART Goals and Projects were considered, according to the following criteria, and taking into account 20-20-20 targets :



Decision Making adopted approach



- a. **Costs** (Capital- installation, start-up/ Annual-operational) and financial savings
- b. **Annual savings** (financial and CO2 emissions)
- c. **% Reduction of CO2 emissions** (local and global)
- d. **% Reduction in energy use** (local and global- expressed as intensity factor- Kwh/ m2)
- e. **Project Risk** (low, medium, high)
- f. **Return of Investment (R.O.I.)**

ESRIN Y 2011 Environmental Project Plan- Four project evaluations

ESRIN Y 2011 – Environmental Impact Mitigation Project evaluations

(From the document "Y 2011 Environmental Impact Mitigating Measures Plan")

CMP	Project	COSTS (Euro)		ANNUAL SAVINGS		PROJECT RELEVANCE					Project Risk	Return of Investment (R.O.I.)
		Capital (installation, start-up, etc.)	Annual (operational, maintenance, etc.)	Financial	CO ₂ (tonnes)	Total Cost per Ton of Reduced CO ₂ Emissions	% Reduction of Site CO ₂ Emissions	% Reduction of ESA Global CO ₂ Emissions	% Site Energy Reduction (Kwh/m ²)	% ESA Global Energy Reduction (Kwh/m ²)		
1/13	Solar PV Panel Plant + New contract for power supply using renewable, green-certified energy	€1,000,000	€20,000.00	€79,000	5,117 tonnes	€4/ton	69%	11.38%	N/A	N/A	L	13 years
2/13	Installation of dimmable, energy efficient lights in Building 5	€10,000.00	€500.00	€1,500	5.4 tonnes	N/A ¹	N/A ¹	N/A ¹	0.1%	0.018%	L	8 years
3/13	Use of low energy consumption light bulbs	€15,000.00	€500.00	€1,500	N/A	N/A ¹	N/A ¹	N/A ¹	0.1%	0.018%	L	10 years
4/13	Automatic, motion-detector light switches in restrooms	€30,000.00	€1,000.00	€7,500	N/A	N/A ¹	N/A ¹	N/A ¹	0.5%	0.09%	L	5 years

1: No CO₂e emissions due to CP #01/13



Projects were implemented in Y 2011 using funding already available.

ESRIN Y 2011 Environmental Project Plan- Examples



Each Project also included a reference table providing an informational resource for the:

- Project Owner- responsible for project implementation
- Project Controller- in charge of overseeing monitoring and assessment of the project and including details regarding funding, budget, allocated resources, monitoring parameters, potential obstacles to timely completion of the project, measuring the projects effectiveness and success, and timing/ schedule of the projects course and completion.

SITE	ESRIN			
Project	New contract for power supply using renewable, green-certified energy			
Reference	CMPo1			
Owner	R. Franciosi			
Department	HFI			
Descri	SITE	ESRIN		
Benefit	Project	Installation of dimmable, energy efficient lights in Building 5		
	Reference	CMPo2		
	Owner	R. Franciosi		
	Department	HFI		
Fundin	Descri	SITE	ESRIN	
	Benefits	Project	Automatic motion detector light switches in restrooms	
Resour	Reference	CMPo4		
	Owner	R. Franciosi		
Ensurit	Funding	Department	SITE	ESRIN
	Resource	Description	Project	Use of low energy consumption light bulbs
Measur	Ensurin	Benefits	Reference	CMPo3
		Owner	R. Franciosi	
Timing	Measuri	Funding	Department	OPS-FM
		Resources	Description	Use of low energy consumption light bulbs
Notes	Timing	Ensuring Succ	Benefits	<ul style="list-style-type: none"> Financial savings: € 1,500.00 Payback period: 10 years 0.3% Reduction site energy use (kwh/m2)(ESRIN) .018% Reduction site energy use (kwh/m2)(GLOBAL)
		Measuring Su	Funding	<ul style="list-style-type: none"> Project cost: € 15,000.00 Operational cost: € 500.00 Source of funding: Available budget Y 2011 - Investments
Notes	Timing	Resources	<ul style="list-style-type: none"> Implementation: ESRIN FM. Carbon emission monitoring: HSSE Existing Budget: Investments- Y 2011 	
		Ensuring Success	<ul style="list-style-type: none"> Key success factors, or things that will need to happen for this project to succeed: The monitoring of procurement, timing and delivery Principal risk: Light MTBF and disposal costs/CO2 impact evaluation Mitigating risk action: Choice of high MTBF and minimal CO2 impact disposal products 	
Notes	Measuring Success	Measuring Success	<ul style="list-style-type: none"> Metrics for displaying performance or achievement: Measuring kwh energy use before and after implementation. When success will be measured/evaluated: before and after implementation. 	
		Timing	<ul style="list-style-type: none"> Milestones/ key dates - start date: 01.09.2011 - completion date: 30.09.2011 	
Notes	No specific remarks.			



SMART Tasks – Teamwork
 Distributing coordinated Tasks
 across ESA sites

ESRIN Y 2011 Environmental Project Plan- Four project evaluation summary

ESRIN Y 2011 – Environmental Impact Mitigation Project Summary

(From the document "Y 2011 Environmental Impact Mitigating Measures Plan")

	Total number of Projects for evaluation	Total Capital Costs (€)	Total Annual Financial Savings (€)	Total Annual CO _{2e} Savings (Tonnes)	Average Overall Payback Period (years)	20-20-20 Targets		
						(T1) ESRIN Global CO _{2e} reduction (%)	(T2) ESRIN % Global Energy use Reduction (kwh/m ²)	(T3) ESRIN Increase in Renewable Energy Use (%)
Funded Projects	CMP 1,2,3,4/ 13	€1.055.000,00	€89.500,00	5.117,39	12	+69%	0,70%	+78,88%

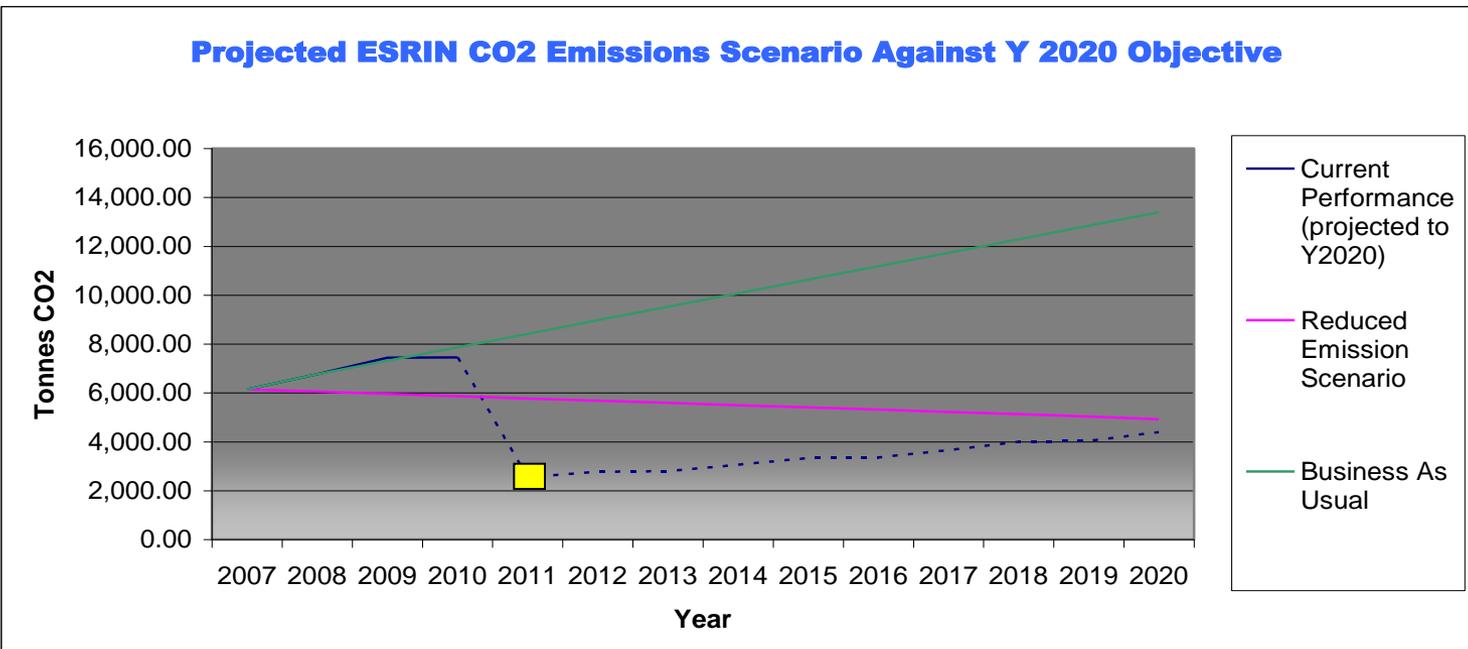


The total annual CO_{2e} emissions savings in Y 2011, following the implementation of these 4 projects, was estimated to be 5.117,39 tonnes CO_{2e}, a reduction of 69%.

Estimated Y 2011 Total CO_{2e} emission will be approximately 2250 Tonnes.

Y 2011 Environmental Project Plan- Performance monitoring and projections

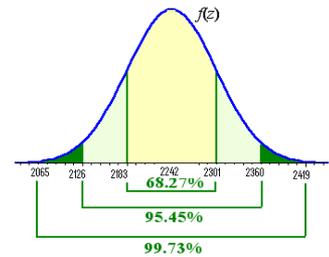
ESRIN Y 2011 – Environmental Impact Mitigation - Monitoring and Projections
 (From the document "Y 2011 Environmental Impact Mitigating Measures Plan")



Y 2011- Estimating Total CO_{2e} Emission and Project plan Risk Analysis

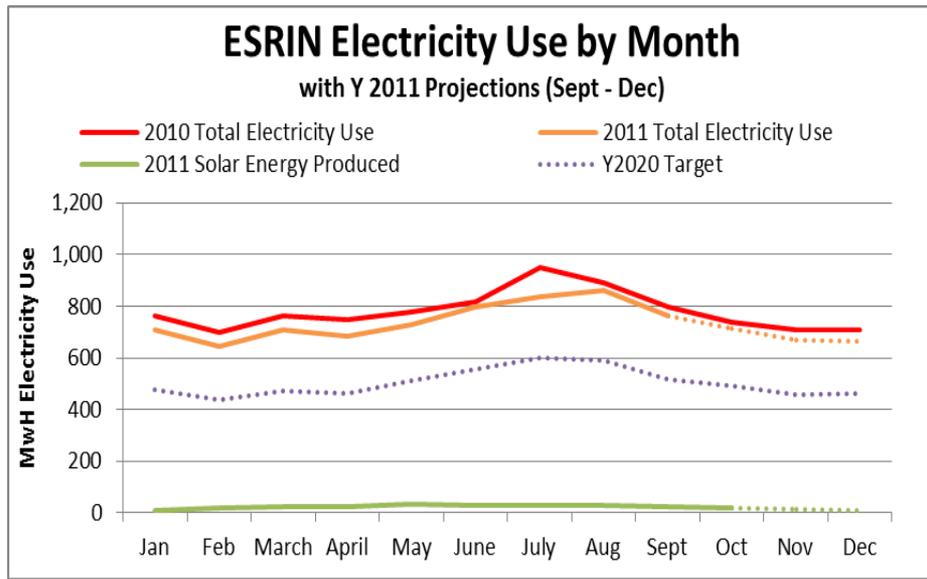
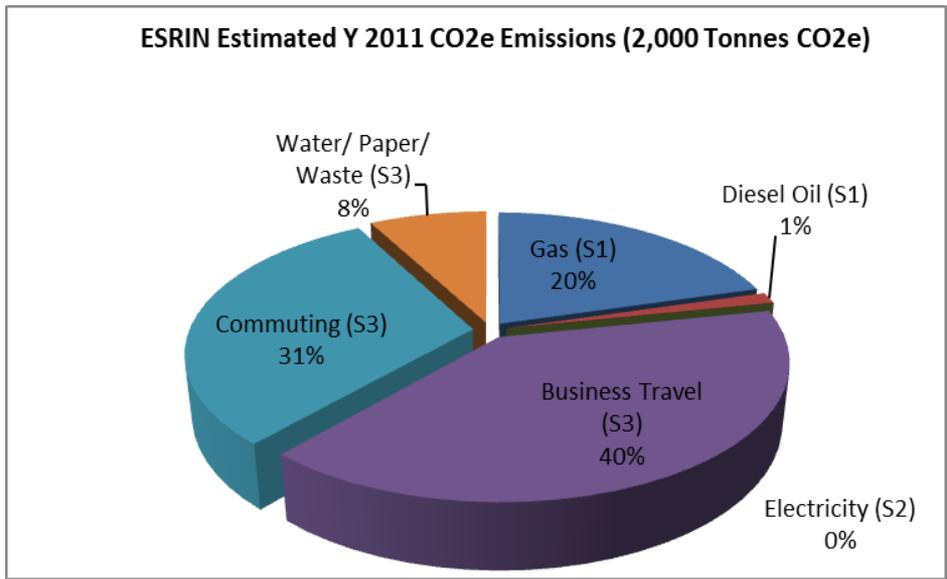
- Estimated Annual Total CO_{2e} emission
- Standard Deviation
- 2183 Tonnes < Y2011 ESRIN Total CO_{2e} < 2301 Tonnes
- 2126 Tonnes < Y2011 ESRIN Total CO_{2e} < 2360 Tonnes

E=2242 CO_{2e} tonnes
 SD=59 CO_{2e} tonnes
 Probability: 70% of success
 Probability: 95% of success



ESRIN Y 2011 Environmental Performance Monitoring & Projections

Y 2011 Projected CO2e Emissions and Electricity Use



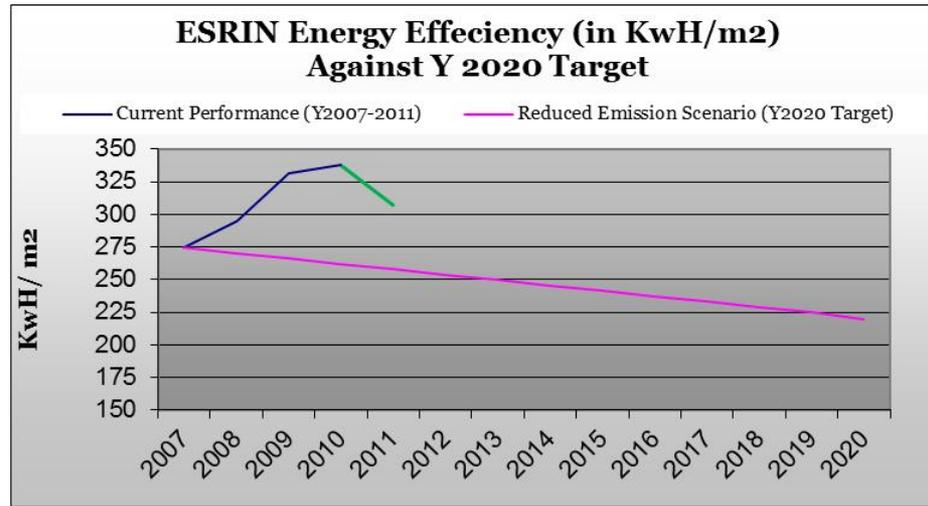
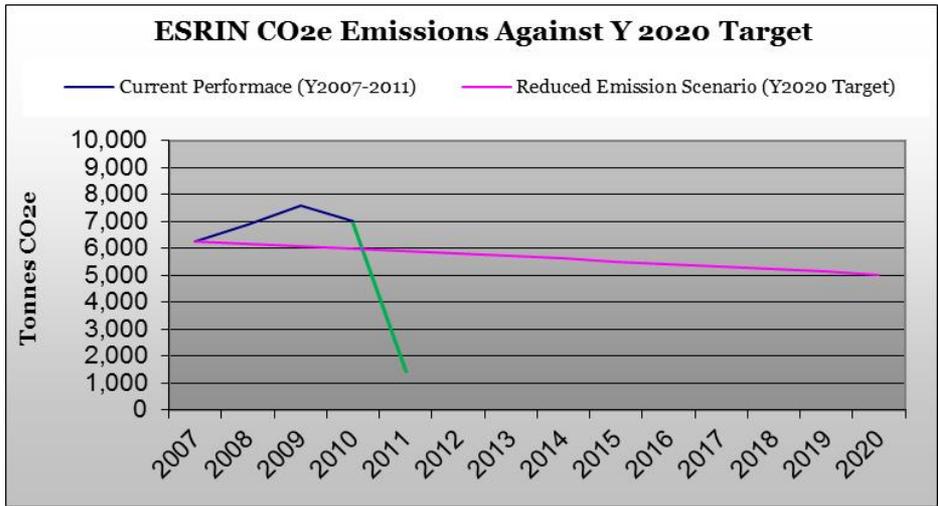
***The purchase of electricity provided by renewable resources eliminates CO2e Emissions due to electricity use**

*Total ESRIN electricity use in Y 2011 is expected to be 6% lower than in Y 2010, yet still 13% above the baseline year.



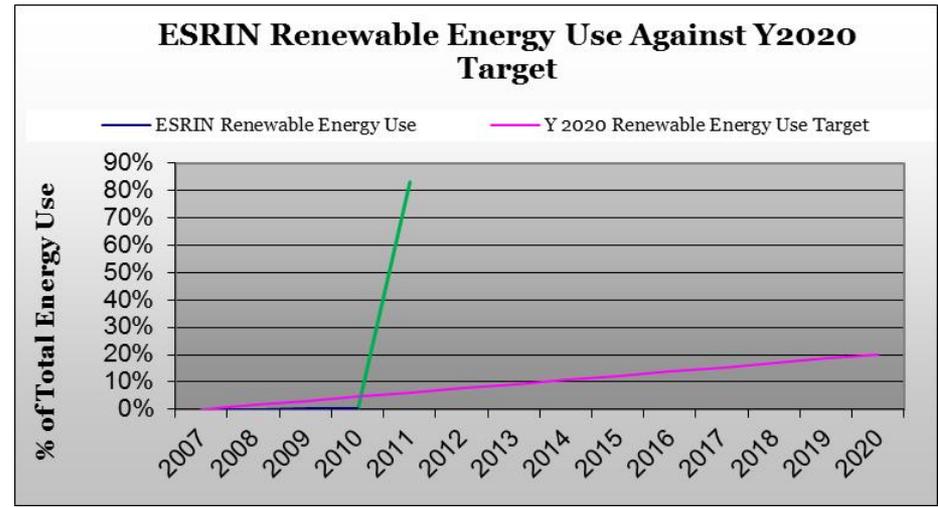
ESRIN Y 2011 Environmental Performance Monitoring

Y 2011 Environmental Performance Against Y 2020 Objectives



*ESRIN CO₂e emissions are projected to drop by 80% from the baseline year in Y 2011.

*Current monitored trends indicate that ESRIN total energy use will drop by 6% in Y 2011.



ESRIN Y 2011 Green Trends

*Due to the purchase of electricity provided from renewable sources in Y 2011, ESRIN has increased renewable energy use by 83% from the baseline year, Y 2007.

ESRIN Environmental Initiatives and Best Practices



Environmental Initiatives in place at ESRIN

The ESRIN Solar Energy Initiative



Solar energy, taken from nearly 1500 m² (16,1045 ft²) of solar panels installed on the roofs of ESRIN buildings, will account for at least 3% of all ESRIN energy use in 2011.

The project was developed using technologies from ESA Business Incubation Technology Transfer Program (BIC).



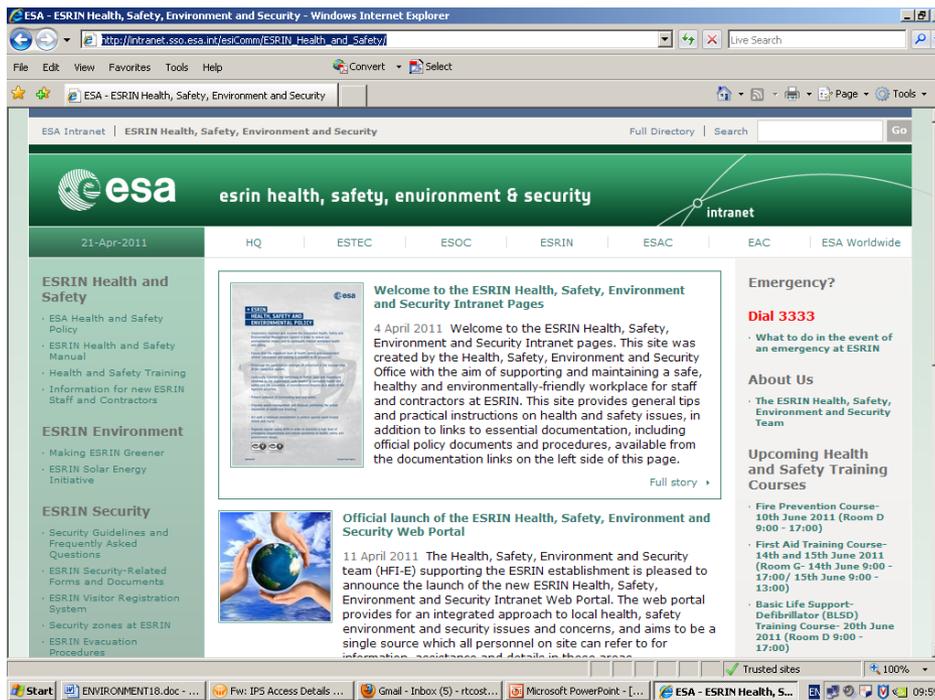
The remainder of energy used by ESRIN will be provided for only by renewable sources of energy.

(To view ESRIN photovoltaic energy production and CO_{2e} savings in real time, click on the photo above).

ESRIN Environmental Initiatives and Best Practices



Communication



The screenshot shows a web browser window displaying the ESRIN Intranet. The page features a green header with the ESA logo and the text "esrin health, safety, environment & security intranet". Below the header, there is a navigation menu with links for HQ, ESTEC, ESOC, ESRIN, ESAC, EAC, and ESA Worldwide. The main content area is divided into several sections: "ESRIN Health and Safety" (with links to policy, manual, and training), "ESRIN Environment" (with links to greener initiatives), "ESRIN Security" (with links to guidelines and evacuation procedures), "Welcome to the ESRIN Health, Safety, Environment and Security Intranet Pages" (a central announcement dated 4 April 2011), "Emergency?" (with a "Dial 3333" instruction), "About Us" (introducing the team), and "Upcoming Health and Safety Training Courses" (listing dates and times for various courses). The browser's taskbar at the bottom shows several open applications, including "ENVIRONMENT18.doc", "Fw: IPS Access Details...", "Gmail - Inbox (5) - rfcost...", "Microsoft PowerPoint - [...]", and "ESA - ESRIN Health, S...".

With the launch of ESRIN's Health, Safety, Environment and Security Web Portal, ESRIN staff and contractors have access to a communication tool which serves as a single source for information, assistance, documents and details regarding health, safety, environment and security issues.

<http://intranet.sso.esa.int/esiComm/ESRIN Health and Safety/>



ESRIN Environmental Initiatives and Best Practices



Reporting

Findings regarding environmental performance, achievements and initiatives are published both locally and ESA-wide.



Reporting allows for the opportunity to synthesize environmental findings and communicate them clearly and concisely for management from different directorates, stakeholders and the general public.

ESRIN's "GREEN PERFORMANCE" Local Indicators in Support of ESA-wide Environmental Sustainability Efforts

Introduction

Environmental sustainability is rapidly becoming one of the most important political, social and ethical issues of our time. It has become abundantly clear in recent years that our current rate of pollution, resource consumption and unconstrained development will not be sustainable in the long term...

The European Space Agency, given its professional area of expertise and competence, its activities and its political influence, has a major responsibility with regard to sustainability efforts. Accordingly, during the March Council meeting 2010, ESA committed to adopting a Sustainable Development Policy...



- 20% total reduction in EU greenhouse gas emissions from 1990
20% of EU energy consumption to be provided by renewable resources
20% total reduction in energy use to be achieved with respect to levels, with an emphasis on improving energy efficiency

Perhaps at no ESA establishment is the importance of environmental matters more apparent than here at ESRIN, the Centre for Earth Observation, where climate change, resource consumption, and pollution can be well controlled...

building 9 panels will have a new Forest She acquired or Environment. But any effort be complete efforts, in efforts into employees. Sustainability benchmark different or business travel and energy use), electricity use, water consumption (including bottled water), gas consumption, paper consumption, waste, etc. Each of these benchmarks calculated for ESRIN was then matched against the average calculated for all ESA sites.

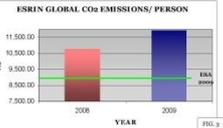
Benchmarks

Global CO2 Emissions

Global CO2 emissions consider CO2 emissions from all sources, including commuting travel, business travel (ESA missions), and energy use. ESRIN global CO2 emissions in 2009 amounted to 7,416 tons, roughly 17% of ESA global CO2 emissions, 43,528 tons.

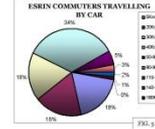
Furthermore, at ESRIN, energy use accounted for 70% of global CO2 emissions, while business travel accounted for 15% and commuting for 6%, much lower with respect to the percentages for ESA global CO2 emissions (see figures 1 and 2).

However, ESRIN CO2 emissions calculated per person increased over the years 2008 to 2009, from 10,799 CO2 kg/person in 2008 to 11,262 CO2 kg/person in 2009 and we remained consistently above the 2009 ESA average (8,780 CO2 kg/person) in both years, as well (see fig. 3, 2009 ESA average represented by the green line). Therefore, while our

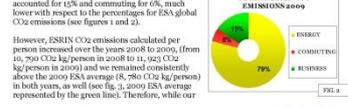
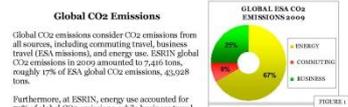


Commuting CO2 Emissions

In order to compile an assessment of the impact that commuting to ESRIN has on global CO2 emissions and the overall environment, the total entries into the ESRIN site over the years 2008 and 2009 were considered. In large part, the entries to the site were by car, though the number of pedestrian entries to the site (i.e. those having travelled to the site by bus, train or bike) did go up slightly, +1% (see fig. 4). A recent survey of those travelling to ESRIN by some means other than a car revealed that 60% take a bus, while nearly 40% travel by train, and about 1% travel by bike or other means.



Of those commuting by car, an ESRIN commuting model compiled in 2010 revealed that nearly 90% of ESRIN employees travel from within a distance of 5 km or less to get to work. That number nearly doubles, to 57%, from distances of 20 km or less. And 55% of ESRIN commuters travel from within distances of 20 km or less (see fig. 5).



Y2010 Report on ESRIN Environmental Performances published on the ESRIN Health, Safety, Environment and Security Intranet web portal (Link: http://intranet.sso.esa.int/esiComm/ESRIN_Health_and_Safety/).

ESRIN Environmental Initiatives and Best Practices

Training

In March 2011 BSI Internal Auditor Training for 10 participants from ESRIN and other ESA sites held at ESRIN for ISO 14001: 2004 Environmental Management System.

(The training course was integrated with internal auditor training for the ISO 9001 Quality Management System and OHSAS 18001 Health and Safety Management System training)



ESRIN Environmental Initiatives and Best Practices

ESRIN has also put in place a comprehensive recycling program, with recycling bins on every floor of every building, complete with recycling for glass and plastic in the canteen and bar.



In addition, all waste produced by ESRIN is carefully monitored and tracked using an electronic system, ensuring that all waste is disposed of in the proper way.

ESRIN Environmental Initiatives and Best Practices

"Greening" Buildings and Increasing Efficiencies



We have also taken steps to improve efficiencies and make buildings at ESRIN "greener".



These steps include the use of high efficiency, motion-activated lights, energy saving, thermal-insulated windows, and electricity saving programs for our computer systems.



ESRIN Environmental Initiatives and Best Practices

"Green Contractors" and Service Providers

To further help in our environmental and sustainable development activities, we have chosen green contractors and service providers to help our business function on a daily basis.

These include a:

- Zero emissions canteen
- Green certified site service companies
- Paper provided only from responsibly managed forests and use of EU Ecolabel products.



Canteen service



NATURA, 100% Italian company, is currently one of the leading brand for environmental, facilities management and energy efficiency services.
We help our customers to manage their energy use and spending and to reduce their energy facilities' environmental impact.
We see WorkSpaces as opportunities to make big contributions to a company's bottom line. We approach things from a different viewpoint: the Shareholder Value perspective.



Natuna is certified
EN ISO 9001:2000
EN ISO 14001:2004
OHSAS 18001:2007



Facility Maintenance



Printing service

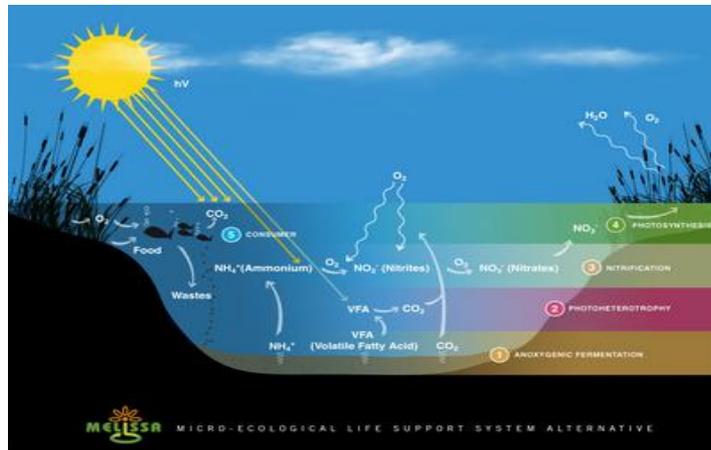


The mark of responsible forestry



Sustainability in a Space Agency way

Transferring available space technology to support environment and sustainable development initiatives



The MELiSSA project (Micro-Ecological Life Support System Alternative)



A multi-disciplinary project that aims at developing technologies for a regenerative life support system for use in long-term space missions, such as those to the ISS and possible future Mars missions.



This pilot project to be initiated at ESRIN- utilizes available space technology to supplement the water purification process and reduce local environmental impacts.

ESRIN Environmental Initiatives and Best Practices

ESA – NASA: sharing solutions and metrics between Space partners

Previous activities

- ESA - NASA High-Performance Sustainable Design/Green Building Workshop, 22.09.2010
- NASA representatives visit to ESRIN, 04.5.2011 .

Present activities



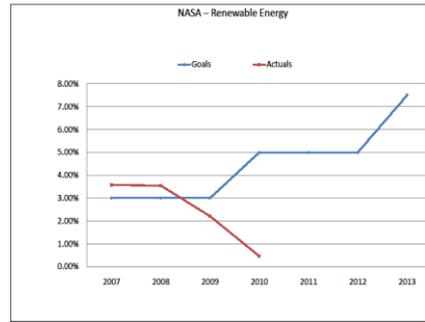
2011 International Workshop on Environment and Alternative Energy – "Global Collaboration in Sustainable Environmental and Alternative Energy Strategies"

promoted and organized by **NASA** at Noordwijk, The Netherlands – November 15 – 18, 2011.

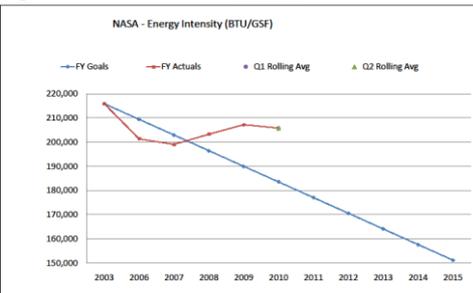
Future planned activities

- NASA proposed organizing the Year 2013 International Workshop at ESRIN.

NASA Strategic Sustainable Performance Metrics

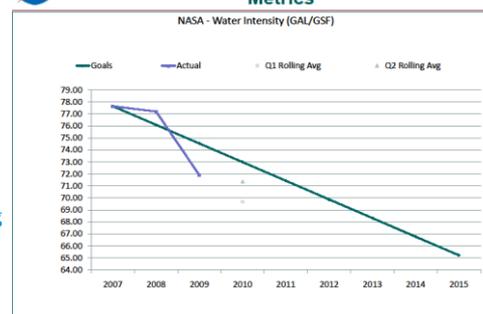


NASA Strategic Sustainable Performance Metrics



Leading to Innovation
 Sharing experiences and building new corporate solutions for a sustainable future

NASA Strategic Sustainable Performance Metrics



(Source: Panel session- Measuring Sustainability by J. Leatherwood, NASA HQ Environmental Management Division, 3 Nov 2010)

"As NASA faces similar environmental management challenges, particularly as regards energy efficiency, working together we can share ideas and best practices, leading to our mutual success in environmental management adaptation initiatives and activities".

Conclusion

Climate change poses both challenges and opportunities.

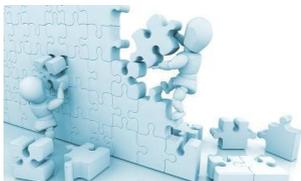
It could be considered an economic threat to the core business as it may harm business operations and success.

The best way to meet the challenge of dealing with Climate Change is to treat the process as a potential driver for corporate opportunities.

As an organization like the Agency needs time to adapt its operations and services, effective action is required now to ensure it is prepared for predictable future challenges.



Thanks for your time and attention.



"We care for the Agency, we care for its people."
ESRIN Health, Safety, Environment & Security Team