

**I  
S  
L  
E  
P  
A  
C  
T**



**SUSTAINABLE ENERGY ACTIONS FOR ISLANDS**



EUROPEAN  
COMMISSION

# Sustainable Energy Action Plans in Support of Islands Pact (ISLE-PACT)

*TREN/PREP/2009/D3/ISLANDS*



Final Conference  
Brussels, November 21, 2012

The Islands Sustainable Action Plans and  
their impact on CO<sub>2</sub> emissions by 2020

Filipe Oliveira, AREAM (Madeira)



EUROPEAN  
COMMISSION

# Island context on energy planning

- Energy systems in islands are complex structures involving energy use, energy supply and energy production, that cannot be dissociated in energy policy and energy planning.
- Main issues of energy planning in islands are guaranty of energy provision, energy dependence, overcosts, environment protection, energy efficiency, use of local resources.
- External connections (1 cable, 1 maritime infrastructure) are weaknesses and redundancy possibilities are lower.
- Electric systems need to meet seasonal and daily peaks and off-peaks with and without intermittent local energy sources.
- Sustainable energy is a major key factor for islands sustainability!

# Objectives of energy planning in Pact of Islands

- To improve knowledge about the energy supply and demand.
- To aware the regional and local authorities.
- To develop sustainable criteria and tools to simulate and build scenarios to support decision-making.
- To establish the regional and local sustainable energy policy.
- To implement regional and local sustainable energy actions.



**To reduce CO<sub>2</sub> emissions by more than 20% in 2020: improving the energy efficiency and increasing the use of local energy resources.**

# Brief overview of work developed

# Preparation work

- Constitution of Local Advisory Committees.
- Development of energy modelling tools and templates:
  - Modelling tool to make the energy balance and to develop scenarios;
  - Data collection template;
  - Plan form template;
  - Plan report template.
- Selection of baseline year.

# Energy modelling

- **Purpose:** To formulate scenarios aiming to predict energy demand and calculate impacts of actions and support decision making.
- **Software:** Specific software or built spreadsheets.
- **Requirements:** Formulate trend and alternative scenarios and provide energy balances in the island, including:
  - Final energy demand per sector and per energy carrier;
  - Secondary energy production (electricity, heat, cold);
  - Primary energy demand per energy carrier.
  - Calculation of CO<sub>2</sub> emissions.

# Energy planning process

- **First step:** Collect data and establish the energy balance (supply-demand) for the baseline.
- **Second step:** Establish the trend scenario (“business as usual”), assuming that the actual demand and supply trends, performance and behaviours are maintained.
- **Third step:** Formulate hypothesis of sustainable actions to be implemented and establish alternative scenarios testing different strategies.
- **Fourth step:** Analyse the results of the alternative scenarios and select the sustainable energy actions.



# Sustainable energy actions

- Establishment of sustainable energy actions:
  - Description of each action;
  - Responsible actors;
  - Implementation schedule;
  - Estimated costs;
  - Energy savings;
  - Renewable energy production;
  - Reduction of CO<sub>2</sub> emissions.
- Participation of stakeholders to implement the actions.
- Monitoring and evaluation.

# Results

## Key outputs

Actual number of signatories of Pact of Island: 62

- Number of ISEAPs initially foreseen in Isle-Pact: 20
- Number of ISEAPs to be completed in Isle-Pact: 57
- Number of ISEAPs completed in Isle-Pact: 52

This is an evolutionary process - today there are 3 more signatures to adhesion to Pact of Islands.

# Results in 2020 for each ISEAP (1/5)

ISEAP	EXPECTED ENERGY SAVINGS [MWh/year]	EXPECTED RENEWABLE ENERGY INCREASE [MWh/year]	EXPECTED CO2 REDUCTION [ton/year]	CO2 Emission in baseline year [ton/year]	CO2 Emission in 2020 [ton/year]	Reduction of CO2 Emission [%]
Aegina	4 898	2 204	4 727	85 536	84 412	<b>1%</b>
Aglantzia	101 538	5 751	43 475	178 357	143 513	<b>20%</b>
Agios Athanasios	41 822	4 809	18 649	104 155	83 744	<b>20%</b>
Andros	4 511	2 026	4 553	68 041	54 742	<b>20%</b>
Aradippou	451 782	4 264	35 068	146 093	116 676	<b>20%</b>
Corvo	252	751	520	2 125	1 289	<b>39%</b>
Crete	3 872 840	604 359	1 184 894	3 992 198	2 994 744	<b>25%</b>
Dali	32 694	1 109	14 492	67 945	53 169	<b>22%</b>
Donousa	96	57	74	666	400	<b>40%</b>
El Hierro	26 004	42 498	37 681	48 897	24 056	<b>51%</b>
Ergates	11 445	296	5 202	21 077	16 862	<b>20%</b>
Faial	11 623	13 796	8 898	70 154	56 244	<b>20%</b>
Flores	2 018	5 103	1 774	13 634	7 851	<b>42%</b>

# Results in 2020 for each ISEAP (2/5)

ISEAP	EXPECTED ENERGY SAVINGS [MWh/year]	EXPECTED RENEWABLE ENERGY INCREASE [MWh/year]	EXPECTED CO2 REDUCTION [ton/year]	CO2 Emission in baseline year [ton/year]	CO2 Emission in 2020 [ton/year]	Reduction of CO2 Emission [%]
Fuerteventura	299 397	252 606	368 241	789 560	552 380	<b>30%</b>
Geri	38 459	30	14 070	60 871	47 939	<b>21%</b>
Gotland	29 222	1 653 528	19 340	660 554	300 900	<b>54%</b>
Graciosa	2 136	13 930	11 520	17 384	13 020	<b>25%</b>
Gran Canaria	1 632 901	1 294 249	1 808 553	4 169 030	3 041 140	<b>27%</b>
Hiiumaa	6 980	93 725	40 545	34 375	-511	<b>101%</b>
Ios	1 183	1 098	1 249	10 034	3 973	<b>60%</b>
Irakleia	135	102	126	825	216	<b>74%</b>
Kea	2 170	372	2 006	12 367	10 519	<b>15%</b>
Koufosini	313	180	238	2 043	1 183	<b>42%</b>
Kythnos	1 204	554	802	8 622	6 713	<b>22%</b>
La Gomera	36 610	20 399	29 291	85 036	65 715	<b>23%</b>
La Palma	164 175	93 161	128 823	323 395	253 228	<b>22%</b>

# Results in 2020 for each ISEAP (3/5)

ISEAP	EXPECTED ENERGY SAVINGS [MWh/year]	EXPECTED RENEWABLE ENERGY INCREASE [MWh/year]	EXPECTED CO2 REDUCTION [ton/year]	CO2 Emission in baseline year [ton/year]	CO2 Emission in 2020 [ton/year]	Reduction of CO2 Emission [%]
Lakatamia	161 549	6 639	57 381	215 611	168 210	<b>22%</b>
Lanzarote	356 943	22 070	490 919	934 473	750 943	<b>20%</b>
Larnaca	284 337	19 540	105 475	421 489	337 378	<b>20%</b>
Latsia	75 027	4 586	29 445	155 822	122 092	<b>22%</b>
Lefkara	3 446	109	1 503	6 339	4 412	<b>30%</b>
Leipsoi	445	150	257	3 187	2 903	<b>9%</b>
Lemnos	10 325	3 621	5 744	89 377	81 626	<b>9%</b>
Lesvos	47 232	21 198	29 548	519 082	445 917	<b>14%</b>
Madeira	358 953	497 188	449 266	1 020 796	762 482	<b>25%</b>
Milos	4 493	827	1 872	26 746	27 426	<b>-3%</b>
Mykonos	16 347	2 580	6 597	100 392	103 297	<b>-3%</b>
Naxos	13 892	6 068	8 831	101 319	80 023	<b>21%</b>
Oland	4 523	9 932	11 928	335 639	220 986	<b>34%</b>

# Results in 2020 for each ISEAP (4/5)

ISEAP	EXPECTED ENERGY SAVINGS [MWh/year]	EXPECTED RENEWABLE ENERGY INCREASE [MWh/year]	EXPECTED CO2 REDUCTION [ton/year]	CO2 Emission in baseline year [ton/year]	CO2 Emission in 2020 [ton/year]	Reduction of CO2 Emission [%]
Outer Hebrides	53 917	1 004 225	563 216	191 743	-336 799	<b>276%</b>
Paralimni	90 741	4 664	34 916	199 001	158 277	<b>20%</b>
Pico	9 010	16 774	11 374	61 284	50 177	<b>18%</b>
Polis Chrysochou	5 989	836	6 762	27 658	21 753	<b>21%</b>
Porto Santo	8 195	13 818	14 174	37 646	21 236	<b>44%</b>
Psimolofou	7 061	272	2 735	11 664	9 167	<b>21%</b>
Saaremaa	93 420	93 062	75 840	158 692	123 492	<b>22%</b>
Samothrace	1 440	435	1 041	19 033	17 660	<b>7%</b>
Samso	2 350	127 950	34 800	22 633	-17 435	<b>177%</b>
Santa Maria	4 344	6 072	4 683	24 123	18 355	<b>24%</b>
São Jorge	6 297	19 289	14 700	38 814	26 417	<b>32%</b>
São Miguel	100 617	217 840	147 964	481 976	393 596	<b>18%</b>
Sardinia	20 797 000	8 315 000	10 590 000	25 572 000	19 866 000	<b>22%</b>

# Results in 2020 for each ISEAP (5/5)

ISEAP	EXPECTED ENERGY SAVINGS [MWh/year]	EXPECTED RENEWABLE ENERGY INCREASE [MWh/year]	EXPECTED CO2 REDUCTION [ton/year]	CO2 Emission in baseline year [ton/year]	CO2 Emission in 2020 [ton/year]	Reduction of CO2 Emission [%]
Schoinoussa	186	29	74	1 136	1 174	-3%
Sifnos	2 512	988	1 520	16 830	13 115	22%
Skyros	2 241	761	1 242	17 116	15 713	8%
Strovolos	261 868	9 407	105 950	493 083	394 952	20%
Syros	13 998	5 208	8 128	108 437	97 673	10%
Tenerife	1 998 496	1 268 312	1 769 659	4 660 631	3 234 976	31%
Terceira	34 917	101 942	64 419	271 251	204 669	25%
Thira	15 329	1 669	5 444	100 828	113 395	-12%
<b>TOTAL</b>	<b>31 623 848</b>	<b>15 914 019</b>	<b>18 442 218</b>	<b>47 418 823</b>	<b>35 469 380</b>	<b>25%</b>



# Comparing results of ISEAPs with EU 27 and some Member States

	CO2 emissions in 2010 [ton/year] (source EEA)	Reduction of CO2 of ISEAPs in 2020 compared with EU 27 and some Member States in 2010
EU 27	4 720 878 000	0,4%
Germany	936 544 000	2%
Belgium	132 459 000	14%
Portugal	70 599 000	26%
Denmark	61 065 000	30%

# Critical factors for the implementation of ISEAPs



- **Regulatory** – EU, national and local regulations.
- **Political** – national and local changes of government and energy policies.
- **Financial** – EU, national and local programmes and incentives, for public and private investors, mainly for infrastructures and energy efficiency actions.
- **Organisational** – Follow-up of Pact of Islands to evaluate monitoring process and to promote new adhesions.

**I  
S  
L  
E  
P  
A  
C  
T**



**SUSTAINABLE ENERGY ACTIONS FOR ISLANDS**



EUROPEAN  
COMMISSION