PURE. Promoting the use of PV in Buildings. 1 year of the Spanish PV Demo Relay Node

PURE
Promotion of Building Integrated Photovoltaics

Intelligent Energy Europe

GOBIERNO DE ESPAÑA
MINISTERIO DE EDUCACIÓN Y CIENCIA

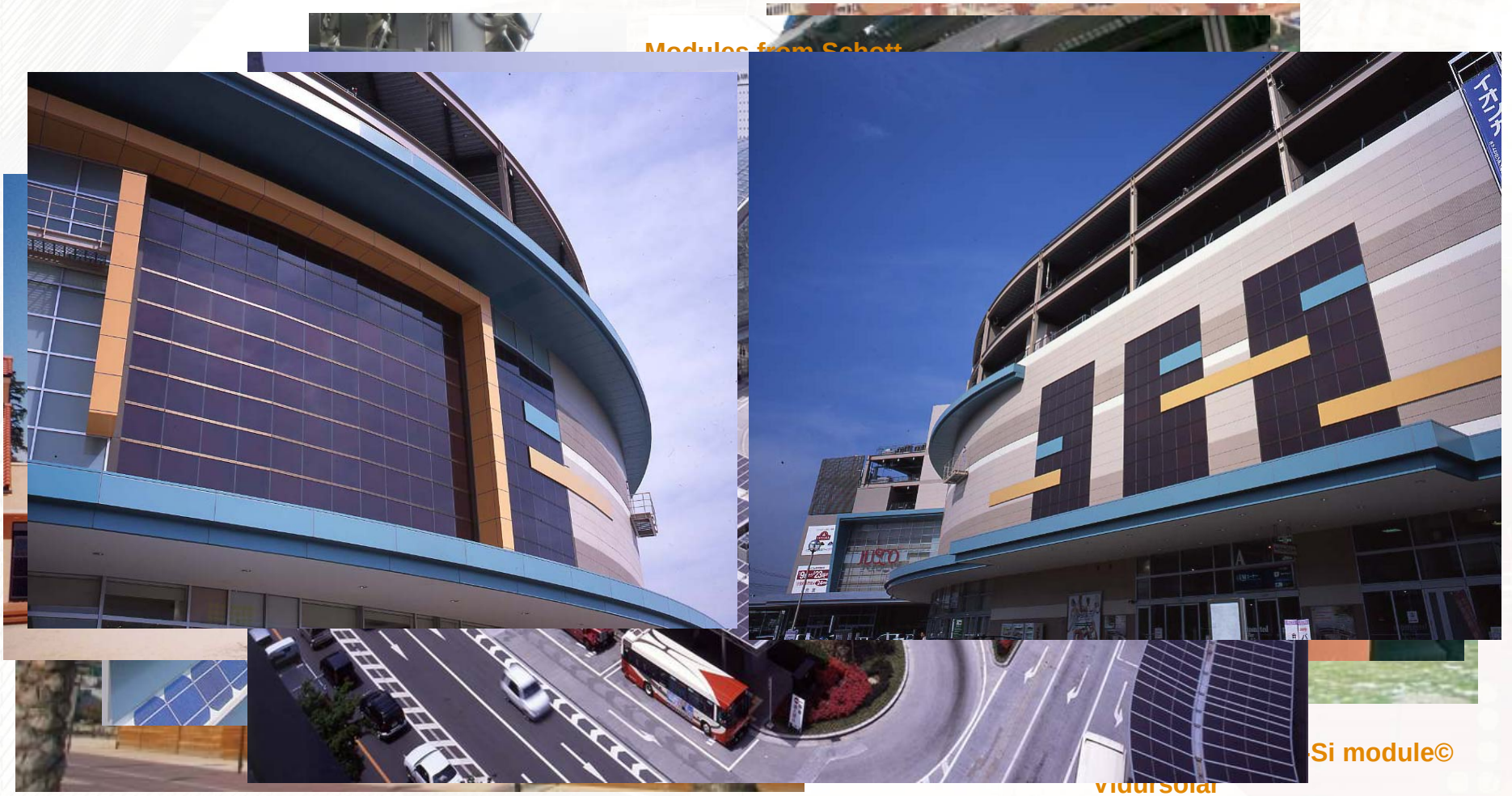
tecnalia
Corporación Tecnológica

Integration of photovoltaic systems into building structures

BANSKA BYSTRICA, 25th September 2008

Photovoltaic Boom in Europe

WHAT WE ARE TALKING ABOUT?



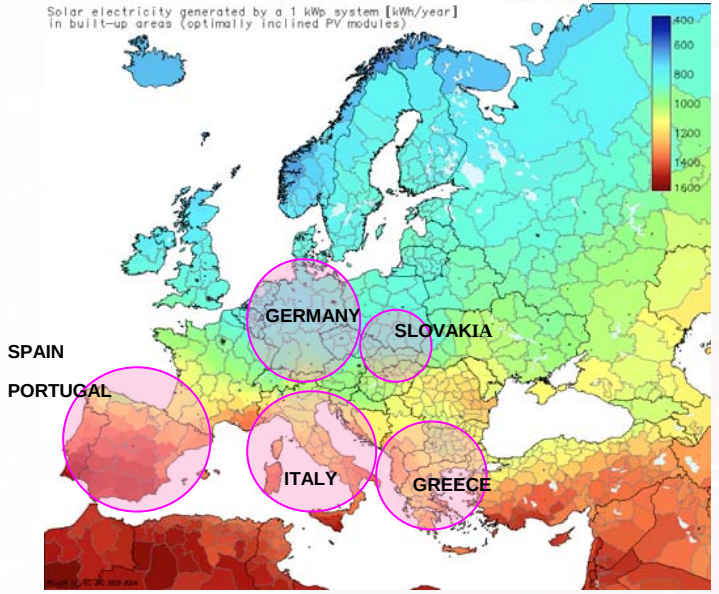
Modules from Schott

Si module© Vidursolar

Social centre “El Barranquet”, El Campello. Alicante.
© Pablo Alonso, 2007 (Pv-upscale)

PROMOTING THE USE OF PHOTOVOLTAIC SYSTEMS IN THE URBAN ENVIRONMENT THROUGH DEMO RELAY NODES

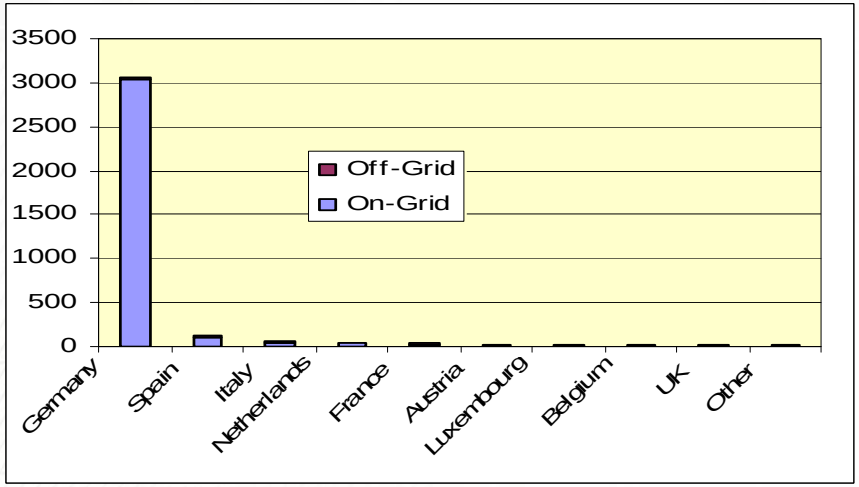
- European Experience ALTENER EIE - Intelligent Energy – Europe Programme
- PURE: *Promoting the Use of PV Systems in the Urban Environment through Demo Relay Nodes*
  - ✓ Partners from Spain, Italy, Portugal, Germany, Slovakia (Slovak Innovation and Energy Agency) and Greece.
- Starting date: 01st January 2006



Supported by

Motivation of PURE

Cumulative installed PV power in Europe by 2006 (MWp)



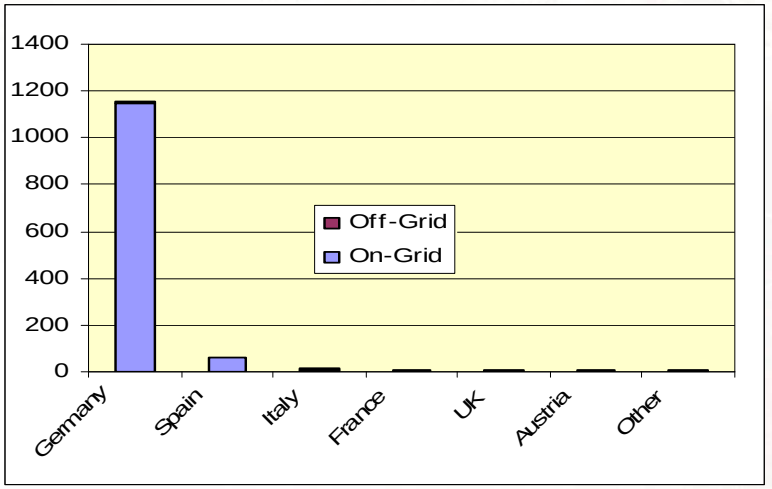
TOTAL Installed: 3.419MW

Germany: 89,6%

Spain: 3,4%

Rest of Europe: 7%

PV power installed in Europe in 2006 (MWp)



TOTAL Installed: 1.243MW

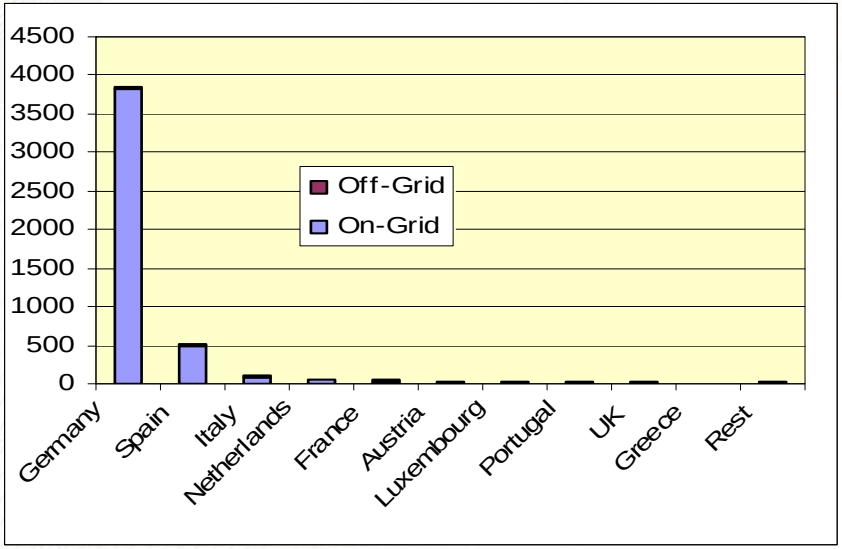
Germany: 92,5%

Spain: 4,8%

Rest of Europe: 2,7%

Motivation of PURE

Cumulated installed PV power in Europe by 2007 (MWp)



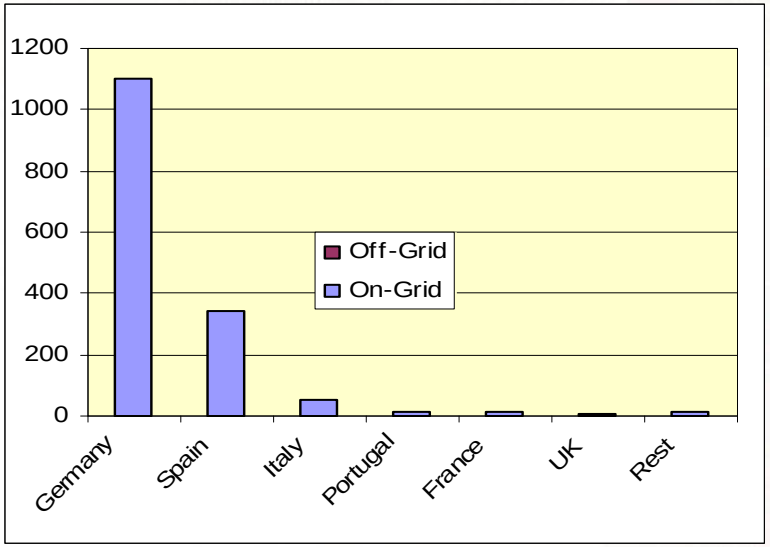
TOTAL Installed: 4.689 MW

Germany: 82,0% (89%)

Spain: 11% (3,4%)

Rest of Europe: 7% (7%)

PV power installed in Europe in 2007 (MWp)



TOTAL Installed: 1.541 MW (+57%)

Germany: 71,58% (92,5%)

Spain: 22,13% (4,8%)

Rest of Europe: 6,3%(2,7%)

Motivation of PURE

T2 PUISSANCE PHOTOVOLTAÏQUE CUMULÉE DANS LES PAYS DE L'UNION EUROPÉENNE EN 2006 ET EN 2007* (EN MWC)
CUMULATED PHOTOVOLTAIC CAPACITY IN THE EUROPEAN UNION COUNTRIES AT THE END OF 2006 AND 2007* (IN MWP)

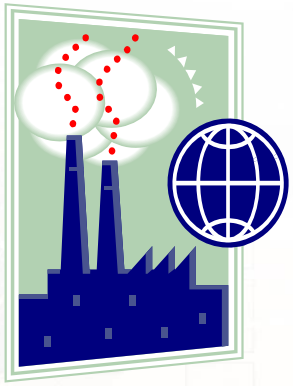
Pays/*Countries*	2006			2007*		
	Réseau/ *on-grid*	Hors réseau/ *off-grid*	Total	Réseau/ *on-grid*	Hors réseau/ *off-grid*	Total
Allemagne/*Germany*	2 711,000	32,000	2 743,000	3 811,000	35,000	3846,000
Espagne/*Spain*	149,629	25,366	174,995	489,449	26,366	515,815
Italie/*Italy*	37,100	12,900	50,000	86,900	13,300	100,200
Pays-Bas/*Netherlands*	46,992	5,713	52,705	48,992	6,013	55,005
France/*France*	12,311	21,554	33,865	24,481	22,178	46,659
Autriche/*Austria*	22,416	3,169	25,585	25,300	3,300	28,600
Luxembourg/*Luxembourg*	23,696	0,000	23,696	23,793	0,000	23,793
Portugal/*Portugal*	0,775	2,641	3,416	15,029	2,841	17,870
Royaume-Uni/*United Kingdom*	12,960	1,300	14,260	15,960	1,700	17,660
Grèce/*Greece*	1,621	5,074	6,695	3,310	5,860	9,170
Belgique/*Belgium*	4,108	0,053	4,161	6,108	0,053	6,161
Suède/*Sweden*	0,555	4,295	4,850	1,555	4,595	6,150
Finlande/*Finland*	0,165	4,356	4,521	0,200	4,800	5,000
Rép. tchèque/*Czech Rep.*	0,647	0,196	0,843	3,754	0,207	3,961
Danemark/*Denmark*	2,565	0,335	2,900	2,740	0,380	3,120
Chypre/*Cyprus*	0,526	0,450	0,976	0,836	0,864	1,700
Pologne/*Poland*	0,101	0,337	0,438	0,155	0,483	0,638
Slovénie/*Slovenia*	0,265	0,098	0,363	0,537	0,098	0,635
Irlande/*Ireland*	0,100	0,300	0,400	0,100	0,300	0,400
Hongrie/*Hungary*	0,150	0,100	0,250	0,150	0,150	0,300
Roumanie/*Romania*	0,095	0,095	0,190	0,125	0,175	0,300
Bulgarie/*Bulgaria*	0,053	0,013	0,066	0,108	0,033	0,141
Malte/*Malta*	0,058	0,000	0,058	0,100	0,000	0,100
Slovaquie/*Slovakia*	0,000	0,020	0,020	0,000	0,060	0,060
Lituanie/*Lithuania*	0,000	0,025	0,025	0,000	0,040	0,040
Estonie/*Estonia*	0,000	0,008	0,008	0,000	0,013	0,013
Lettonie/*Latvia*	0,000	0,006	0,006	0,000	0,006	0,006
Total UE/EU	3 027,888	120,404	3 148,292	4 560,682	128,815	4 689,496

* *Provisoire/Preliminary*

Source : EurObserv'ER 2008

Motivation of PURE

- Main reasons for the high development in Germany.
  - ~~Energy resource (solar radiation)~~
  - Legislation: feed-in-tariffs
  - Technological development
  - Social awareness



Motivation of PURE

BIPV area potential (in km²)		Residential buildings	Agriculture buildings	Industrial buildings	Commercial buildings	Other buildings	All buildings	tio "solar electri oduction potenti electricity consumption"
Australia	Roof	373.50	22.50	6.00	16.5	3.75	422.25	46.1%
	Façade	140.06	2.81	2.25	8.25	1.41	158.34	
Austria	Roof	85.65	17.13	15.19	17.45	4.20	139.62	34.7%
	Façade	32.12	2.14	5.70	8.73	1.58	52.36	
Canada	Roof	727.20	36.36	60.60	133.32	6.06	963.54	30.6%
	Façade	272.70	4.55	22.73	66.66	2.72	361.33	
Denmark	Roof	50.88	14.84	10.60	10.60	1.06	87.98	31.6%
	Façade	19.08	1.86	3.98	5.30	0.40	32.99	
Finland	Roof	78.28	21.01	19.16	8.45	0.41	127.31	19.4%
	Façade	19.08	1.86	3.98	5.30	0.40	32.99	
Germany	Roof	721.78	164.04	229.66	164.04	16.40	1 295.92	30.1%
	Façade	270.67	20.51	86.12	82.02	6.15	485.97	
Italy	Roof	410.26	113.96	136.75	91.17	11.40	763.53	45.0%
	Façade	153.85	14.25	51.28	45.58	4.27	286.32	
Japan	Roof	753.88	40.48	75.89	91.07	5.06	966.38	14.5%
	Façade	282.71	5.06	28.46	45.54	1.90	362.39	
Netherlands	Roof	127.48	42.70	52.75	35.80	0.63	259.36	32.2%
	Facade	47.81	5.34	19.78	17.90	0.24	97.26	
Spain	Roof	251.97	78.74	55.12	55.12	7.87	448.82	48.0%
	Façade	94.49	9.84	10.67	27.56	2.95	168.31	
Sweden	Roof	134.52	36.11	32.92	14.51	0.71	218.77	19.5%
	Façade	50.45	4.51	12.35	7.26	0.27	82.04	
Switzerland	Roof	67.12	21.90	21.05	12.80	15.36	138.22	34.6%
	Façade	25.17	2.74	7.89	6.40	5.76	51.83	
United Kingdom	Roof	601.88	71.09	61.61	168.24	11.85	914.67	30.7%
	Façade	225.70	8.89	23.10	84.12	4.44	343.00	
United States	Roof	6 791.83	322.91	602.76	2 260.36	118.40	10 096.26	57.8%
	Façade	2 546.94	40.36	226.04	1 130.18	44.40	3 786.10	

PILOT EXPERIENCES – PURE Project

- **Objectives:**
  - Develop 2002/91/EC Directive on Energy performance on Buildings.
  - Overcome the following challenges:
    - ✓ Lack of basic information concerning technical and economic aspects of solutions.
    - ✓ Lack of awareness about the importance on integrating RES into the buildings.
    - ✓ Delay of implementation in EU countries.

- **Beneficiaries:** Agents responsible for managing the change concerning the introduction of PV in the urban area.
  - Local authorities & Public bodies.
  - Architects' associations.
  - Building industry professionals.
  - End-users: resident associations, building owners, students, etc.

Supported by

PILOT EXPERIENCES – PURE project

- Means: Photovoltaic – Demo Relay Node
  - Facility of about 50-100 m^2 housing several promotional actions.
  - Activities:
    - ✓ Permanent Exhibition, Contact Point, Experimental / Interactive area
    - ✓ Periodic events: conferences for professionals and decision-makers, seminars on demand.
    - ✓ Satellite actions

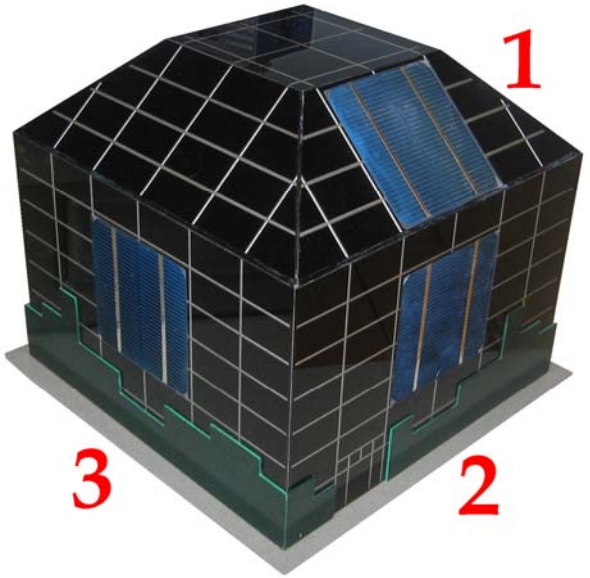
PURE. One year experience in SPAIN

Permanent Exhibition

Meeting point

PURE. One year experience in SPAIN

Experimental Area



Conference room

PURE. One year experience in SPAIN

- **CONFERENCES**
  - 5th June 2007. *"Integration of Photovoltaics in Buildings: Legislation and business opportunities*". Place: Zamudio. 41 persons
  - 27-28th June 2007: "*Innovative technologies and possibilities for the integration of PV systems into the buildings*". Place: Zamudio. 65 persons
  - 12th December 2007: "*The role of Photovoltaic Solar Energy in our cities*". Place: ROBOTIKER premises, Zamudio. 40 persons
  - 2nd April 2008: "*Integration of Photovoltaics into the buildings*". Place: Bilbao Exhibition Centre. 250 persons. CONSTRULAN Exhibition. EVE + ROBOTIKER

PURE. One year experience in SPAIN

SEMINARS

- Seminar on Building Integration of Photovoltaic systems" have been organised at ROBOTIKER premises for teachers of Technical schools of the Basque Country specialised in energy technologies.
  - ✓ 25th October 2007. 17 teachers attended the seminar, from several technical schools of Vizcaya
  - ✓ 22nd November 2007: 16 teachers attended the seminar, from several technical schools of Vizcaya.
  - ✓ 17th April 2008. 26 teachers attended the seminar, from 13 technical schools of province of Vizcaya.
- The content of the seminar can be summarized in:
  - ✓ Presentation of PURE Project
  - ✓ Barriers and opportunities for BIPV systems
  - ✓ Application of the Spanish Technical Building Code
  - ✓ Analysis of problems attached to heterogeneous PV systems: new architectures
  - ✓ Guided-visit to the exhibition of PURE PV-DRN, including visit to the experimental area.
  - ✓ Audiovisual presentation with a compilation of best practices on BIPV.

PURE. One year experience in SPAIN

- **GUIDED-VISITS**
  - More than 400 persons have visited Spanish PV-DRN
- **PARTICIPATION IN EVENTS**
  - "Renewable energy sources in the building sector", that was h
    18th October 2007
  - Workshop of PURE project
    Building Integration of PV sy
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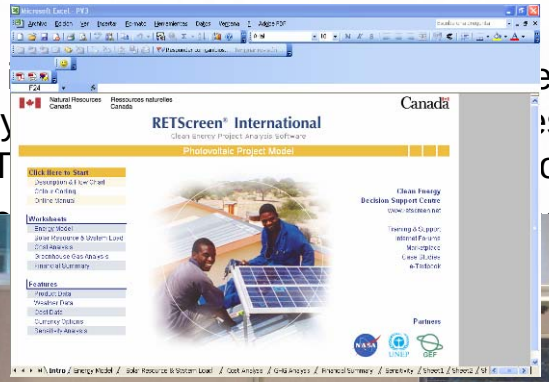
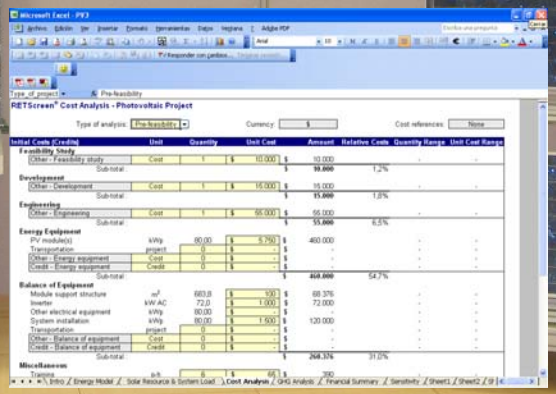
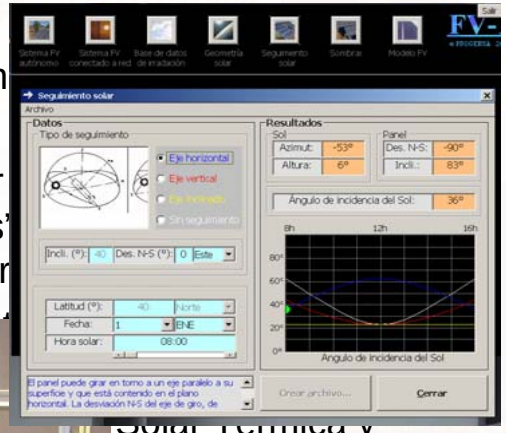
  - 
  - 
  - 
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PURE. One year experience in SPAIN

ACHIEVEMENTS

- Set-up of the 5 PV-DRN in Europe.
- Participation of PURE partners in more than 30 events talking about BIPV since January 2006. Scope: regional, national and international.
- Information about national legislation concerning the implementation of 2002/91/EC Directive.
- Analysis of Technical and Economic Solutions for Integration of PV into Buildings. Need to be emphasized.

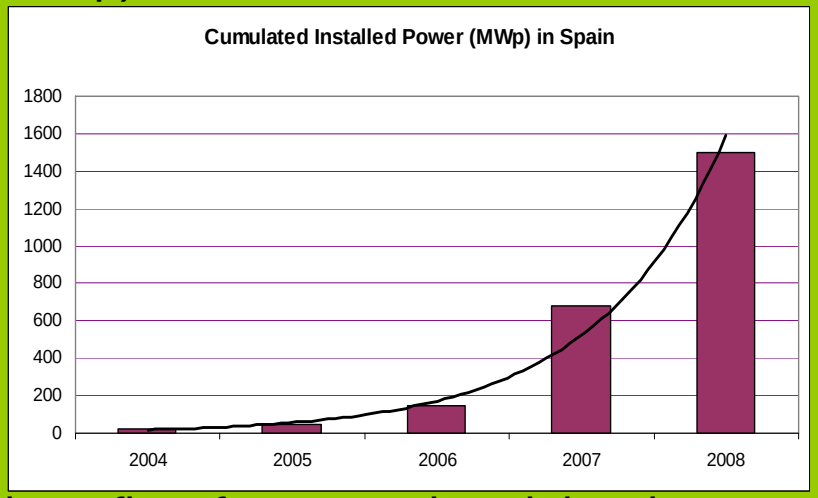
LESSONS LEARNT

- First, to know the PHOTOVOLTAIC technology, and then, to try to aware target groups of BIPV.
- Conferences and speakers have to be selected according to the target audience, as well as the topic.
- Need to involve manufacturers of PV solutions in the project, even in conferences as speakers.
- Compilation of materials should be simple.

PURE. One year experience in SPAIN

MOST IMPORTANT LESSON LEARNT

- SPAIN, despite the huge installation capacity in the last 2-3 years, is lack of BIPV installations (less than 1% of total capacity < 10 MWp).



- Reasons:
  - Technical barriers: losses in BIPV.
  - Economical barriers: cost of materials.
  - Aesthetical barriers: best practices.
  - Ideological barriers: myths of BIPV.

- Need to encourage stakeholders, to promote benefits of BIPV, to break barriers through Demo projects.

- Very important: suitable regulation. Feed-in-tariffs, simple installation procedures.

This is even more evident in countries with less installation capacity such as Slovakia.

Passion or the future

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