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CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

DIDSOLIT-PB

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DIDSOLIT-PB: Development and implementation of decentralised solar-energy-related innovative technologies for public buildings in the Mediterranean Basin countries.

Coordinating Institution: BEG-INCERS Research Group – Universitat Autònoma de Barcelona (UAB)

Report 7

Public buildings analysed and pre-selected in each Partner's Region

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Partnership:

- UAB, BEG Research Group (Leader), Spain, (Mediterranean Region: Catalonia)
- AEIPLOUS, Greece, (MR: Ditiki-Ellada)
- Egyptian Association for Energy and Environment, EAEE, Egypt (MR: Marsa-Matrouh)
- Balqa Applied University, BAU, Jordan (MR: Al Balqa)
- Alexandria University, AU, Egypt (MR: Alexandria)
- Mediterranean Agronomic Institute of Chania, MAICh, Greece (MR: Crete)
- Eco-System Europa, SL, *EsE*, Spain (MR: Catalonia)

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CONTENT

INTRODUCTION

The aim of this document is to list and describe the public buildings that have been identified ('ib') as appropriate candidates to host some of the innovative solar-systems applications in each of the Partners' Mediterranean Regions.

For those of them that were pre-selected ('pb') from the preliminary list ('ib') a more complete description is here provided: building constructive and energetic features, available surfaces for the integration of the solar systems and a general SWOT analysis, ecompassing technical, social and economical aspects. The analysis is completed with a solar-system application proposal for each of those pre-selected buildings, according to its potential, users requirements and available economic resources.

That content comes basically from the results of activities 5.1 and 5.2. of the Project Work Plan.

Working methodology

These tasks of exploring possibilities, identifying a given number of suitable public buildings in each region, analysing them, and then making a pre-selection, have been carried out by the Project Technical Team (PTT), which is composed by a Technical Expert from each partner and the Team Leader :

Ben, UAB,	Team Leader	: Àlex Parella
P1, AEIPLOUS,	Technical Expert	: Ilias Georgakapoulos
P2, EAEE,	«	: Hisham El Agamawi
P3, BAU	«	: Ayman Maqableh
P4, AU	«	: Ashraf Abdelwahed
P5, Maich	«	: George Angelakis, Ioannis Vourdoubas & Nikos Boretos
P6, EsE	«	: Silvia Mata
Ben, UAB	«	: Joan-Carles Almécija

As a starting point, a set of selection criteria and gide lines were elaborted by the PTT (here, section 1). Previously the UAB local team, as coordinators, had established as a pre-criteria that the public buildings –buildings of a non-residential, not-industrial, but colective use- should be also of public ownership; that is, owned by a public institution. That on the grounds that –according to the project objectives- the innovative solar system to be installed in them will finally be handed over to the respective building owners.

Each Partner's Technical Expert carried out the tasks of exploring possible public buildings in their corresponding Mediterranean Region, identifying possible candidates –aftter contacting with the respective owner institution- and elaborating a proposal of some of those idenfied public buildings as pre-selected (section 2). Then those proposals were discussed within the PTT, which took a final decision (section 3).

Previously, as part of the project's committments, a minimum number of public buildings to be identified (ib) and pre-selectec (pb) by each Partner had been established. These respective minimum targets can be seen in the following table.

Summary of the results

N. of buildings Identified & analised, and Pre-selected ones [1]

Partner		N. of buildings Idenfied / analysed ('ib')		N. of buildings pre-selected ('pb')		Proposal made for 'selected' ('b')	
		Target	Actual	Target	Actual	Target	Actual
P1	AEIPLOUS	4	4	3	3	1	1
P2	EAEE	14	14	9	9	3	4
P3	BAU	14	14	9	9	3	5
P4	AU	8	8	5	5	2	5
P5	MAICH	3	3	2	3	1	3
P6	ESE (+UAB)	5	5	4	5	2	4
	Total	40-48	48	30-32	34	10-12	18

[1] Along the final selection process (May 2014) and the starting of the implementation of the solar systems, some changes in the initial set of pre-selected buildings appeared as reasonables. Therefore, PTT reviewed the initial approval. That is the reason that the present document is the 'version 2' of the Report (January 2015).

1 SELECTION CRITERIA

When selecting candidate buildings to host the solar applications several aspects were taken into considetation.

The commitment of the building owner to facilitate the installation works and ensure the operation and maintenance of the solar system in the future is essential.

The fulfilment of the technical requirements, described at the following chapter, is highly recomendended. The construction and energy profile of the building will have an strong impact on the final result, the optimization of the material and economical resources.

In addition to the energy production, the building integration of these solar applications offers the possibility to retrofit the building and improve its energy passive behaviour.

On the other hand, there are other social benefits which encompasses such as: the improvement of the energy supply quality in some areas, the visibility and pedagogical effect of the building integrated applications, environmental consciousness, etc.

The building users and visitors will be the best embassadors of this renewable and clean technologies.

In order maximize the dissemination effect, smaller applications into the maximum number of buildings have been prioritized.

1.1 Preliminary building identification ('ib')

The following desirable conditions were established:

0. Availability for hosting the type of installations planned within the Project: It is foreseen to install systems with between 10 i 14 kWp, in a self-consumption regime.
   a. Integrated photovoltaic systems (sun protections devices or similar).
   b. Solar concentration systems contributing to Solar Cooling/Heating
   c. Scaled-down solar concentration systems for electricity generation (Dish Stirling and Parabolic trough). Mostly located on the roof or building surroundings.

1. Owned and used by public institutions. Energy savings/incomes from the renewable energy generation must benefit the public institution. External energy management of the building (ESCO) it's also possible provided the last premises are fulfilled.
2. Buildings with especial visibility or public interest will be particularly valued.
3. The public beneficiary of the installation has to be able to take over some complementary costs (associated to the strictly renewable energy system: technical rooms, structural reinforcements, etc)
4. The building owner and user must get the compromise to carry out the operation and maintenance of the RE system (at least 7 years after its commissioning).
5. The system should be defined at the beginning of 2014 and executed before June 2015.
6. Buildings with good energy performance will be prioritized (coherence with nZEB initiative).
7. RE facilities could contribute to decrease the building energy demand (on the logics of the nZEB policies) by minimizing the solar gains to the building during hot seasons.
8. Buildings with significant continuous loads (during the day/night period and along the year).

9. Example: buildings with underground parking (constant lighting), hospitals (constant consumption along the year), office buildings with important permanent loads (servers, equipment). Approximate minimum gross surface: 2000 m2.

10. Building should be properly constructed, with no significant issues in their structural system and their watertight envelope. It should have enough envelope surface to integrate the RE systems (aprox. 150 m2 of roof / 150 linear meters of brise-soleil…)

11. Building energy systems (electrical, HVAC) should be in good conditions and should allow the RE interconnection.

12. The building should allow accessible data collection of:

    - ✓ *General data (year of construction, building owner and user, gross area…)*
    - ✓ *Occupation schedule*
    - ✓ *Building features (construction)*
    - ✓ *Building envelope parameters*
    - ✓ *Electric system*
    - ✓ *Heating / Cooling system*
    - ✓ *Energy consumption data: electricity and gas consumption, energy consumption profile*
    - ✓ *Monitoring system*
    - ✓ *Storage system*

Building's analysis, data collection:

In order to verify the fulfillment of some of the previous requirements a common 'building data sheet' was produced by the Technical Team.

Considering the diverse situation of the renewable energy policies in the different countries involved (self-consumption and net-metering regulations), it was decided to select buildings with significantly high continuous loads, to maximize the energy contribution as much as possible, avoiding any renewable energy production waste.

- **Brief building explanation**
- **General building data sheet**
- **Simplified annual consumption behaviour**
- **Simplified daily consumption behaviour**
- **Monitored daily consumption behaviour (desirable)**
    - Summer day (June/July/August)
    - Winter day (November/December/January)
- **Building images**

➢ ***General building data sheet***

Building data	
Building identification	
Building location	
Building use (office, health center, school…)	
Building gross surface (m2)	
Contracted power, electricity (kW)	
Contracted power, gas (kW)	
Occupation schedule	
Daily schedule (x am - x pm)	
Weekend schedule (x am - x pm)	
Weekly schedule (daily/weekend)	
Monthly schedule (vacations)	
Building annual energy consumption (kWh) (final)	
Building annual energy consumption (kWh/m2) (final)	
Heating (kWh/m2)	
Cooling (kWh/m2)	
Ventilation (kWh/m2)	
Light (kWh/m2)	
Equipment (kWh/m2)	
Pump & others (kWh/m2)	
Hot Water (kWh/m2)	
SAI (permanent loads) (kWh/m2)	
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	
Electricity consumption,daily (kWh/m2)	
Electricity consumption, weekend (kWh/m2)	

➢ ***Simplified annual consumption behaviour (minimum data)***

	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumption KWh (bill)												

➢ ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

Summer day (June/July/August)

Schedule (h)	8:00	12:00	16:00	20:00	24:00	4:00
Energy consumption KW (meter)						

Winter day (November/December/January)

Schedule (h)	8:00	12:00	16:00	20:00	24:00	4:00
Energy consumption KW (meter)						

2 BUILDINGS IDENTIFIED AND ANALISED ('*IB*')

2.1 Summary

PARTNER / Building identification (name)	Location (city)	Type of building (use)	Type of owner institution
P1 – AEIPLOUS	**Patras**		
1. University of Patras in Agrinio	Agrinio	University / Scientific	University of Patras
2. Amfilochia Town Hall	Amfilochia	Public office building	Municipality of Amfilochia
3. Dep. Chemical Engineering, UoP	Rion	University / Scientific	University of Patras
4. Scientific Park	Platani	Offices / Laboratories	Ministry of economics
P2 – EAEE	**Marsa Matrouh**		
1. Dewan El Mohafza	Matrouh	Public office building	Governorate of Matrouh
2. Egyptian Tourism Authority	Matrouh	Public office building	Ministry of Tourism
3. Matrouh Branch, AU	Matrouh	University / Scientific	Alexandria University
4. Matrouh Local assembly	Matrouh	Public office building	Governorate of Matrouh
5. Matrouh Children Hospital	Matrouh	Hospital / Health center	Ministry of Health
6. Matrouh School	Matrouh	School / Educational	Ministry of Education
7. Faculty of Education	Matrouh	University / Scientific	Ministry of High Education
8. M.E.I.L.S school	Matrouh	School / Educational	Ministry of Education
9. ElNegila International Hospital	Matrouh	Hospital / Health center	Ministry of Health
10. Muslims Youth Club	Matrouh	Social	Ministry of Youth
11. Sidi Barani Hospital	Sidi Brani	Hospital / Health center	Ministry of Health
12. El-Allamin Central Hospital	El-Allamin	Hospital / Health center	Ministry of Health
13. Matrouh General Hospital	Matrouh	Hospital / Health center	Ministry of Health
14. El Hamam Hospital	Matrouh	Hospital / Health center	Ministry of Health

PARTNER / Building identification (name)	Location (city)	Type of building (use)	Type of owner institution
P3 – BAU	**Al-Salt & Irbid**		
1. Science Building	Al-Salt	Offices, classrooms	BAU University
2. Engineering building	Al-Salt	Offices, classrooms, Labs	"
3. Business School building	Al-Salt	Offices, classrooms	"
4. Scientific research Deanship	Al-Salt	Offices	"
5. BAU main librery	Al-Salt	Offices, halls	"
6. Science & Engineering workshop	Al-Salt	workshop	"
7. Finance building	Al-Salt	Offices	"
8. Computer center	Al-Salt	Offices, computer labs	"
9. Class Rooms building	Al-Salt	Class rooms	
10. Administration building	Al-Salt	Offices	"
11. Al-Khawarizmi Building	Irbid-Huson	Computer labs	"
12. Main building	"	Offices, labs.	"
13. Workshop building	"	Workshops, offices, labs	"
14. Huson new building	"	Offices, classrooms	"
P4 – AU	**Alexandria**		
1. Faculty of Science	Alexandria	Offices, classrooms	AU university
2. Administration, Faculty of Science,	"	Offices, classrooms	"
3.Build. A, Faculty of Science	"	Teaching	"
4. SIDPEC New Adm. Building	"	Offices	Public shareholders
5. Production workshops	"	Teaching	AU
6. Library / IT building	"	Library, Offices	AU
7. Building B, Facultuy of Sciences	"	Teaching	AU
8. Electrical Engineering Dep.	"	Teaching	"
P5 – MAICh	**Kriti**		
1. MAICh campus, Conference centre,	Chania	Research and teaching	Ministry of Agriculture
2. Nea Chora Senior High School	Chania	School	Municipality of Chania
3. Kolimbari senior High School	Platania	School	Municipality of Platania

PARTNER / Building identification (name)	Location (city)	Type of building (use)	Type of owner institution
P6 – EsE, & UAB-BEG	**Catalonia**		
1. Institut de Ciències del Mar	Barcelona	Research Centre	CSIC – Ministry of Science
2. Housing Agency of Catalonia	Barcelona	Public Administration	Catalan Government
3. Municipality Offices building; afterwards replaced by: Primary School Catalunya	Sant Cugat del Vallés	Offices - School	Municipality of St. Cugat
4. Mollet Hospital	Mollet del Vallés	Hospital	Mollet Heath Foundation
5. Municipal Sports Pavilion	Granollers	Sports facilities	Municipality of Granollers
6. Area Metropolitana de Barcelona's site; afterwards replaced by: Eco Park 2	Barcelona - Parets	Offices Waste treatment	AMB AMB

2.2 M. R. Dikiti-Ellade and Patras (Greece), Partner 1: AEIPLOUS

This a summary of internal working document T *5.1.3 ib report AEIPLOUS v1*.

Identified building P1-1. UNIVERSITY OF PATRAS BUILDING IN AGRINIO

- ***General building data sheet:***

Building data	
Building ownership	**University of Patras**
Building identification	**University of Patras Building**
Building location	**Agrinio, West Greece Region**
Building use (office, health center, school…)	Teaching & administrative ofiices
Building gross surface (m2)	2.400
Contracted power, electricity (kW)	135
Contracted power, gas (kW)	0
Occupation schedule	
Daily schedule (x am - x pm)	7.00 am - 8.00 pm
Weekend schedule (x am - x pm)	
Weekly schedule (daily/weekend)	5/7
Monthly schedule (vacations)	Christmas, Easter, Summer
Building annual energy consumption (kWh) (final)	417.600
Building annual energy consumption (kWh/m2) (final)	174
Heating (kWh/m2)	
Cooling (kWh/m2)	
Ventilation (kWh/m2)	
Light (kWh/m2)	
Equipment (kWh/m2)	
Pump & others (kWh/m2)	
Hot Water (kWh/m2)	
SAI (permanent loads) (kWh/m2)	9.41
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	174
Electricity consumption,daily (kWh/m2)	0,48
Electricity consumption, weekend (kWh/m2)	
Gas consumption, annual average (kWh/m2)	0
Gas consumption,daily days (kWh/m2)	0
Gas consumption, weekend (kWh/m2)	0
SWOT analysis *	
Strengths	public visibility, educational purposes,
Weaknesses	large vacation time
Opportunities	
Threats	vandalism, maintanance not guranteed

** Important aspects, besides the technical ones, like: timing, strategic owner (RE policy maker…), public visibility, educational purposes, potential multiplier effect (at the same building or buildings owned by the same owner), etc*

- ***Simplified annual consumption behaviour (minimum data)***

	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumption KWh (bill)	39680	42960	30160	37240	27720	30040	43760	26040	47960	31480	34240	26320

Identified building P1-2. AMFILOCHIA TOWN HALL BUILDING

➢ ***General building data sheet***

Building data	
Building ownership	**Municipality of Amfilochia**
Building identification	**TOWN HALL**
Building location	**AMFILOCHIA**
Building use (office, health center, school...)	CITIZEN SERVICE
Building gross surface (m2)	1.186
Contracted power, electricity (kW)	
Contracted power, gas (kW)	No
Occupation schedule	
Daily schedule (x am - x pm)	7am-5pm
Weekend schedule (x am - x pm)	-
Weekly schedule (daily/weekend)	5/7
Monthly schedule (vacations)	-
Building annual energy consumption (kWh) (final)	130640
Building annual energy consumption (kWh/m2) (final)	110,15
Heating (kWh/m2)	
Cooling (kWh/m2)	
Ventilation (kWh/m2)	
Light (kWh/m2)	
Equipment (kWh/m2)	
Pump & others (kWh/m2)	
Hot Water (kWh/m2)	
SAI (permanent loads) (kWh/m2)	3.94
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	108,86
Electricity consumption,daily (kWh/m2)	0,298
Electricity consumption, weekend (kWh/m2)	
Gas consumption, annual average (kWh/m2)	0
Gas consumption,daily days (kWh/m2)	0
Gas consumption, weekend (kWh/m2)	0
SWOT analysis *	
Strengths	
Weaknesses	low energy demands, space ava
Opportunities	
Threats	maintanance not guaranteed

➢ ***Simplified annual consumption behaviour (minimum data)***

	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumption KWh (bill)	17760	11640	12040	7920	5440	8320	7600	23360	6640	9600	10920	9400

Identified building P1-3. DEPARTMENT OF CHEMICAL ENGINEERING, UNIVERSITY OF PATRAS, RION, PATRAS

➢ ***General building data sheet***

Building identification	**Department of Chemical Engineering**
Building location	**Rion, Patras**
Building use (office, health center, school...)	Offices& Laboratories
Building gross surface (m2)	7.800
Contracted power, electricity (kW)	
Contracted power, gas (kW)	
Occupation schedule	
Daily schedule (x am - x pm)	7.00 am - 8.00 pm
Weekend schedule (x am - x pm)	
Weekly schedule (daily/weekend)	5/7
Monthly schedule (vacations)	Christmas, Easter, Summer
Building annual energy consumption (kWh) (final)	450.840
Building annual energy consumption (kWh/m2) (final)	57,80
Heating (kWh/m2)	
Cooling (kWh/m2)	
Ventilation (kWh/m2)	
Light (kWh/m2)	
Equipment (kWh/m2)	
Pump & others (kWh/m2)	
Hot Water (kWh/m2)	
SAI (permanent loads) (kWh/m2)	8.3
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	57,80
Electricity consumption,daily (kWh/m2)	0,16
Electricity consumption, weekend (kWh/m2)	
Gas consumption, annual average (kWh/m2)	
Gas consumption,daily days (kWh/m2)	
Gas consumption, weekend (kWh/m2)	
SWOT analysis *	
Strengths	public visibility, educational pu
Weaknesses	timing, administrative procedur
Opportunities	
Threats	vandalism, maintanance not gu

** Important aspects, besides the technical ones, like: timing, strategic owner (RE policy maker…), public visibility, educational purposes, potential multiplier effect (at the same building or buildings owned by the same owner), etc*

➢ ***Simplified annual consumption behaviour (minimum data)***

	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumption KWh (bill)	46000	48000	33460	39560	31000	32040	46760	28040	41960	36480	37240	30300

Identified building P1-4. SCIENTIFIC PARK, PLATANI, PATRAS

- ***General building data sheet***

Building data	
Building ownership	**Ministry of Economics**
Building identification	**Scientific Park**
Building location	**Platani, Patras**
Building use (office, health center, school...)	Offices & Laboratries
Building gross surface (m2)	5.000
Contracted power, electricity (kW)	500
Contracted power, gas (kW)	0
Occupation schedule	
Daily schedule (x am - x pm)	7.00 am - 9.00 pm
Weekend schedule (x am - x pm)	
Weekly schedule (daily/weekend)	5/7
Monthly schedule (vacations)	no scheduled
Building annual energy consumption (kWh) (final)	457.600
Building annual energy consumption (kWh/m2) (final)	91,52
Heating (kWh/m2)	for both cooling and heating:
Cooling (kWh/m2)	21.21
Ventilation (kWh/m2)	
Light (kWh/m2)	
Equipment (kWh/m2)	
Pump & others (kWh/m2)	8,63
Hot Water (kWh/m2)	-
SAI (permanent loads) (kWh/m2)	15.33
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	91,52
Electricity consumption,daily (kWh/m2)	0,25
Electricity consumption, weekend (kWh/m2)	
Gas consumption, annual average (kWh/m2)	0
Gas consumption,daily days (kWh/m2)	0
Gas consumption, weekend (kWh/m2)	0
SWOT analysis *	
Strengths	public visibility, educational pu
Weaknesses	
Opportunities	probable plus funding
Threats	

- ***Simplified annual consumption behaviour (minimum data)***

	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumption KWh (bill)	32000	29600	37600	42400	42400	39200	34400	32000	39200	49600	40800	38400

- ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

Schedule (h)	8:00	12:00	16:00	20:00	24:00	4:00
Energy consumption KW (meter)	39	120	110	45	23	23

2.3 M. R. Marsa-Matrou (Egypt), Partner 2: EAEE

This section is a summary of internal working document T *5.1.3 ib report EAEE v2*.

Identified building P2-1. DEWAN EL MOHAFZA, MATROUH

➢ ***General building data sheet***

Building data	
Building ownership	Governorate of Matrouh
Building identification	Dewan El Mohafza(1)
Building location	El Cornish Street, Matrouh
Building use (office, health center, school…)	Administrative Building
Building gross surface (m2)	3200
Contracted power, electricity (kW)	200
Contracted power, gas (kW)	-
Occupation schedule	
Daily schedule (x am - x pm)	9:00-22:00
Weekend schedule (x am - x pm)	9:00-22:00
Weekly schedule (daily/weekend)	7 d / 0 w
Monthly schedule (vacations)	-
Building annual energy consumption (kWh) (final)	389019
Building annual energy consumption (kWh/m2) (final)	108.1
Heating (kWh/m2)	-
Cooling (kWh/m2)	43.2
Ventilation (kWh/m2)	4.3
Light (kWh/m2)	56.2
Equipment (kWh/m2)	1.7
Pump & others (kWh/m2)	2.6
Hot Water (kWh/m2)	-
SAI (permanent loads) (kWh/m2)	3.5
Total permanent loads (kWh/m2)	3
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	108.1
Electricity consumption, daily (kWh/m2)	0.3
Electricity consumption, weekend (kWh/m2)	0.06
Gas consumption, annual average (kWh/m2)	-
Gas consumption, daily (kWh/m2)	-
Gas consumption, weekend (kWh/m2)	-
SWOT analysis *	
Strengths	High public visibility
Weaknesses	Lack of experience in maintenance
Opportunities	Exposure in the press and media
Threats	Exposed to salty air, sand and dust as nearby the sea

➢ ***Simplified annual consumption behaviour (minimum data)***

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
En. cons. kwhr	29694	20306	30474	25325	22250	45148	45748	39422	35413	32731	31854	30654

➢ ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

Schedule (h)	8	12	16	20	24	4
Energy consumption KW (meter)**on summer day (June/July/August)**	**130**	**130**	**80**	**10**	**6**	**6**
Energy consumption KW (meter) **on Winter day (Nov./Dec./Jan.)**	**95**	**95**	**48**	**6**	**6**	**6**

Identified building P2-2. EGYPTIAN TOURISM AUTHORITY, MATROUH

➢ ***General building data sheet***

Building data	
Building ownership	Ministry of Tourism
Building identification	Egyptian Tourism Authority(2)
Building location	Alexandria Street, Matrouh
Building use (office, health center, school…)	Administrative Building
Building gross surface (m2)	130
Contracted power, electricity (kW)	10
Contracted power, gas (kW)	-
Occupation schedule	
Daily schedule (x am - x pm)	8:00-15:00
Weekend schedule (x am - x pm)	8:00-13:00
Weekly schedule (daily/weekend)	5 d / 2 w
Monthly schedule (vacations)	-
Building annual energy consumption (kWh) (final)	12269
Building annual energy consumption (kWh/m2) (final)	95.2
Heating (kWh/m2)	
Cooling (kWh/m2)	28.6
Ventilation (kWh/m2)	1.4
Light (kWh/m2)	61.9
Equipment (kWh/m2)	-
Pump & others (kWh/m2)	-
Hot Water (kWh/m2)	-
SAI (permanent loads) (kWh/m2)	-
Total permanent loads (kWh/m2)	0.6
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	95.2
Electricity consumption,daily (kWh/m2)	0.26
Electricity consumption, weekend (kWh/m2)	0.052
Gas consumption, annual average (kWh/m2)	-
Gas consumption,daily (kWh/m2)	-
Gas consumption, weekend (kWh/m2)	-
SWOT analysis *	
Strengths	High public visibility
Weaknesses	Lack of experience in maintenance
Opportunities	Exposure in the press and media
Threats	Exposed to salty air, sand and dust as nearby the sea

➢ ***Simplified annual consumption behaviour (minimum data)***

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy cons.KWh	1534	347	886	566	768	1623	1874	802	1093	480	1000	1306

➢ ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

Schedule (h)	8	12	16	20	24	4
Energy consumption KW (meter) on summer day (June/July/August)	4	4	1	1	1	1
Energy consumption KW (meter) on Winter day (Nov./Dec./Jan.)	3	3	2	1	1	1

Identified building P2-3. MATROUH BRANCH, MATROUH

➢ *General building data sheet*

Building data	
Building ownership	Alexandria University
Building identification	Matrouh Branch(3)
Building location	Alexandria Street, Matrouh
Building use (office, health center, school…)	office
Building gross surface (m2)	520
Contracted power, electricity (kW)	20
Contracted power, gas (kW)	-
Occupation schedule	
Daily schedule (x am - x pm)	8:00-15:00
Weekend schedule (x am - x pm)	8:00-13:00
Weekly schedule (daily/weekend)	5 d / 2 w
Monthly schedule (vacations)	-
Building annual energy consumption (kWh) (final)	25472
Building annual energy consumption (kWh/m2) (final)	48.71
Heating (kWh/m2)	-
Cooling (kWh/m2)	4.87
Ventilation (kWh/m2)	
Light (kWh/m2)	43.84
Equipment (kWh/m2)	-
Pump & others (kWh/m2)	-
Hot Water (kWh/m2)	-
SAI (permanent loads) (kWh/m2)	-
Total permanent loads (kWh/m2)	0.9
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	48.71
Electricity consumption, daily (kWh/m2)	0.13
Electricity consumption, weekend (kWh/m2)	0.03
Gas consumption, annual average (kWh/m2)	-
Gas consumption, daily (kWh/m2)	-
Gas consumption, weekend (kWh/m2)	-
SWOT analysis *	
Strengths	Educational purposes
Weaknesses	Lack of experience in maintenance
Opportunities	Inform and familiarize students on importance and potential of solar energy
Threats	Exposed to salty air, sand and dust as nearby the sea

➢ *Simplified annual consumption behaviour (minimum data)*

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy cons.KWh	1375	2090	2379	1672	1221	3107	3073	3538	1763	1281	1959	2014

➢ *Simplified daily consumption behaviour (minimum data) (meter data collection)*

Schedule (h)	8	12	16	20	24	4
Energy consumption KW (meter)on Summer day (June/July/August)	10	10	4	1	1	1
Energy consumption KW (meter) on Winter day (Nov./Dec./Jan.)	5	5	2	1	1	1

Identified building P2-4. LOCAL ASSEMBLY, MATROUH

➢ *General building data sheet*

Building data	
Building ownership	Governorate of Matrouh
Building identification	Local assembly (4)4
Building location	Alexandria Street, Matrouh
Building use (office, health center, school…)	Office
Building gross surface (m2)	2700
Contracted power, electricity (kW)	20
Contracted power, gas (kW)	-
Occupation schedule	
Daily schedule (x am - x pm)	8:00-20:00
Weekend schedule (x am - x pm)	8:00-13:00
Weekly schedule (daily/weekend)	5 d / 2 w
Monthly schedule (vacations)	-
Building annual energy consumption (kWh) (final)	22842
Building annual energy consumption (kWh/m2) (final)	8.46
Heating (kWh/m2)	
Cooling (kWh/m2)	1.69
Ventilation (kWh/m2)	0.42
Light (kWh/m2)	6.35
Equipment (kWh/m2)	-
Pump & others (kWh/m2)	-
Hot Water (kWh/m2)	-
SAI (permanent loads) (kWh/m2)	-
Total permanent loads (kWh/m2)	-
Total (kWh/m2) (final energy) :	8.46
Electricity consumption, annual average (kWh/m2)	8.46
Electricity consumption, daily (kWh/m2)	0.02
Electricity consumption, weekend (kWh/m2)	0.04
Gas consumption, annual average (kWh/m2)	-
Gas consumption, daily (kWh/m2)	-
Gas consumption, weekend (kWh/m2)	-
SWOT analysis *	
Strengths	High public visibility
Weaknesses	Lack of experience in maintenance
Opportunities	Exposure in the press and media
Threats	Exposed to salty air, sand and dust as nearby the sea

➢ *Simplified annual consumption behaviour (minimum data)*

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy cons. KWh (bill)	1645	1542	1723	1748	1941	2184	2205	2352	1984	1841	1922	1755

➢ *Simplified daily consumption behaviour (minimum data) (meter data collection)*

Schedule (h)	8	12	16	20	24	4
Energy consumption KW (meter) on Summer day (June/July/August)	7	7	2	1	1	1
Energy consumption KW (meter) on Winter day (Nov. /Dec. /Jan.)	5	5	2	1	1	1

Identified building P2-5. CHILDREN HOSPITAL, MATROUH

- ***General building data sheet***

Building data	
Building ownership	Ministry of Health
Building identification	Children Hospital (5)
Building location	Alexandria Street, Matrouh
Building use (office, health center, school…)	Hospital
Building gross surface (m2)	2800
Contracted power, electricity (kW)	20
Contracted power, gas (kW)	-
Occupation schedule	
Daily schedule (x am - x pm)	9:00-22:00
Weekend schedule (x am - x pm)	9:00-22:00
Weekly schedule (daily/weekend)	7 d / 0 w
Monthly schedule (vacations)	-
Building annual energy consumption (kWh) (final)	22010
Building annual energy consumption (kWh/m2) (final)	3.9
Heating (kWh/m2)	-
Cooling (kWh/m2)	-
Ventilation (kWh/m2)	0.2
Light (kWh/m2)	1.8
Equipment (kWh/m2)	1.2
Pump & others (kWh/m2)	0.1
Hot Water (kWh/m2)	0.3
SAI (permanent loads) (kWh/m2)	2
Total permanent loads (kWh/m2)	1.3
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	3.9
Electricity consumption, daily (kWh/m2)	0.011
Electricity consumption, weekend (kWh/m2)	0.007
Gas consumption, annual average (kWh/m2)	-
Gas consumption , daily (kWh/m2)	-
Gas consumption, weekend (kWh/m2)	-
SWOT analysis *	
Strengths	High public visibility
Weaknesses	Lack of experience in maintenance
Opportunities	Exposure in the press and media
Threats	Exposed to salty air, sand and dust as nearby the sea

- ***Simplified annual consumption behaviour (minimum data)***

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy cons. KWh (bill)	3870	2007	1272	1646	1082	1262	1100	1200	1500	1350	1484	2737

- ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

Schedule (h)	8	12	16	20	24	4
Energy consumption KW (meter)on Summer day (June/July/August)	3	3	1	1	1	1
Energy consumption KW (meter) on Winter day (Nov./Dec./Jan.)	7	7	2.5	2	2	2

Identified building P2-6. MATROUH SCHOOL, MATROUH

➢ *General building data sheet*

Building data	
Building ownership	Ministry of Education
Building identification	Matrouh School(6)
Building location	El Galaa Street, Matrouh
Building use (office, health center, school…)	School
Building gross surface (m2)	282
Contracted power, electricity (kW)	10
Contracted power, gas (kW)	-
Occupation schedule	
Daily schedule (x am - x pm)	8:00-16:00
Weekend schedule (x am - x pm)	8:00-13:00
Weekly schedule (daily/weekend)	5 d / 2 w
Monthly schedule (vacations)	-
Building annual energy consumption (kWh) (final)	15657
Building annual energy consumption (kWh/m2) (final)	55.5
Heating (kWh/m2)	-
Cooling (kWh/m2)	-
Ventilation (kWh/m2)	-
Light (kWh/m2)	55.5
Equipment (kWh/m2)	-
Pump & others (kWh/m2)	-
Hot Water (kWh/m2)	-
SAI (permanent loads) (kWh/m2)	-
Total permanent loads (kWh/m2)	-
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	55.5
Electricity consumption, daily (kWh/m2)	0.15
Electricity consumption, weekend (kWh/m2)	0.04
Gas consumption, annual average (kWh/m2)	-
Gas consumption, daily (kWh/m2)	-
Gas consumption, weekend (kWh/m2)	-
SWOT analysis *	
Strengths	Educational purposes
Weaknesses	Lack of experience in maintenance
Opportunities	Inform and familiarize students on importance and potential of solar energy
Threats	Exposed to salty air, sand and dust as nearby the sea

➢ *Simplified annual consumption behaviour (minimum data)*

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy cons. KWh (bill)	1971	774	1323	1003	836	2060	824	1239	1530	917	1437	1743

➢ *Simplified daily consumption behaviour (minimum data) (meter data collection)*

Schedule (h)	8	12	16	20	24	4
Energy consumption KW (meter)on Summer day (June/July/August)	3.7	3.7	1	1	1	1
Energy consumption KW (meter) on Winter day (Nov./Dec./Jan.)	5	5	1	1	1	1

Identified building P2-7. FACULTY OF EDUCATION, MATROUH

➢ *General building data sheet*

Building data	
Building ownership	Ministry of High Education
Building identification	Faculty of Education(7)
Building location	El Galaa Street, Matrouh
Building use (office, health center, school…)	University
Building gross surface (m2)	458
Contracted power, electricity (kW)	15
Contracted power, gas (kW)	-
Occupation schedule	
Daily schedule (x am - x pm)	8:00-20:00
Weekend schedule (x am - x pm)	8:00-13:00
Weekly schedule (daily/weekend)	5 d / 1 w
Monthly schedule (vacations)	-
Building annual energy consumption (kWh) (final)	20753
Building annual energy consumption (kWh/m2) (final)	45.4
Heating (kWh/m2)	-
Cooling (kWh/m2)	2.3
Ventilation (kWh/m2)	-
Light (kWh/m2)	43.1
Equipment (kWh/m2)	-
Pump & others (kWh/m2)	-
Hot Water (kWh/m2)	-
SAI (permanent loads) (kWh/m2)	-
Total permanent loads (kWh/m2)	-
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	45.4
Electricity consumption, daily (kWh/m2)	0.12
Electricity consumption, weekend (kWh/m2)	0.02
Gas consumption, annual average (kWh/m2)	-
Gas consumption, daily (kWh/m2)	-
Gas consumption, weekend (kWh/m2)	-
SWOT analysis *	
Strengths	Educational purposes
Weaknesses	Lack of experience in maintenance
Opportunities	Inform and familiarize students on importance and potential of solar energy
Threats	Exposed to salty air, sand and dust as nearby the sea

➢ *Simplified annual consumption behaviour (minimum data)*

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy cons. KWh (bill)	2508	1311	1860	1540	773	2597	613	1776	2067	1454	1974	2280

➢ *Simplified daily consumption behaviour (minimum data) (meter data collection)*

Schedule (h)	8	12	16	20	24	4
Energy consumption KW (meter)on Summer day (June/July/August)	5	5	1	1	1	1
Energy consumption KW (meter) on Winter day (Nov./Dec./Jan.)	7	7	2	1	1	1

Identified building P2-8. M.E.I.L.S., MATROUH

➢ *General building data sheet*

Building data	
Building ownership	Ministry of Education
Building identification	M.E.I.L.S (8)
Building location	El Nahda Street, Matrouh
Building use (office, health center, school…)	School
Building gross surface (m2)	3784
Contracted power, electricity (kW)	15
Contracted power, gas (kW)	
Occupation schedule	
Daily schedule (x am - x pm)	8:00-16:00
Weekend schedule (x am - x pm)	8:00-13:00
Weekly schedule (daily/weekend)	5 d / 2 w
Monthly schedule (vacations)	-
Building annual energy consumption (kWh) (final)	23623
Building annual energy consumption (kWh/m2) (final)	6.24
Heating (kWh/m2)	-
Cooling (kWh/m2)	-
Ventilation (kWh/m2)	-
Light (kWh/m2)	6.24
Equipment (kWh/m2)	-
Pump & others (kWh/m2)	-
Hot Water (kWh/m2)	-
SAI (permanent loads) (kWh/m2)	-
Total permanent loads (kWh/m2)	-
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	6.24
Electricity consumption, daily (kWh/m2)	0.03
Electricity consumption, weekend (kWh/m2)	-
Gas consumption, annual average (kWh/m2)	-
Gas consumption, daily (kWh/m2)	-
Gas consumption, weekend (kWh/m2)	-
SWOT analysis *	
Strengths	Educational purposes
Weaknesses	Lack of experience in maintenance
Opportunities	Inform and familiarize students on importance and potential of solar energy
Threats	Exposed to salty air, sand and dust as nearby the sea

➢ *Simplified annual consumption behaviour (minimum data)*

	Jn	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy cons. kWh	2163	1736	1119	4455	1304	1945	1560	1295	1742	1942	1987	2375

➢ *Simplified daily consumption behaviour (minimum data) (meter data collection)*

Schedule (h)	8	12	16	20	24	4
Energy consumption KW (meter)on Summer day (June/July/August)	4	4	2	1	1	1
Energy consumption KW (meter) on Winter day (Nov./Dec./Jan.)	7	6	2	1	1	1

Identified building P2-9. ELNEGILA INT'L HOSPITAL, MATROUH

Building data	
Building ownership	Ministry of Health
Building identification	Elnegila Int'l Hospital (9)
Building location	Int'l Road, Elnegila City
Building use (office, health center, school…)	Hospital
Building gross surface (m2)	4200
Contracted power, electricity (kW)	50
Contracted power, gas (kW)	-
Occupation schedule	
Daily schedule (x am - x pm)	9:00-22:00
Weekend schedule (x am - x pm)	9:00-22:00
Weekly schedule (daily/weekend)	7 d / 0 w
Monthly schedule (vacations)	-
Building annual energy consumption (kWh) (final)	59232
Building annual energy consumption (kWh/m2) (final)	14.10
Heating (kWh/m2)	-
Cooling (kWh/m2)	-
Ventilation (kWh/m2)	0.71
Light (kWh/m2)	9.17
Equipment (kWh/m2)	1.41
Pump & others (kWh/m2)	0.71
Hot Water (kWh/m2)	1.21
SAI (permanent loads) (kWh/m2)	2.3
Total permanent loads (kWh/m2)	2.12
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	14.10
Electricity consumption, daily (kWh/m2)	0.04
Electricity consumption, weekend (kWh/m2)	0.04
Gas consumption, annual average (kWh/m2)	-
Gas consumption, daily (kWh/m2)	-
Gas consumption, weekend (kWh/m2)	-
SWOT analysis *	
Strengths	High public visibility
Weaknesses	Lack of experience in maintenance
Opportunities	Exposure in the press and media
Threats	Exposed to salty air, sand and dust as nearby the sea

- ***Simplified annual consumption behaviour (minimum data)***

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy cons. KWh	4440	5560	4786	3194	5146	5257	5297	5385	4986	5027	5265	4907

- ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

Schedule (h)	8	12	16	20	24	4
Energy consumption KW (meter) on Summer day (June/July/August)	13.5	13.5	8.5	3	3	3
Energy consumption KW (meter) on Winter day (Nov./Dec./Jan.)	12	12	8	3	3	3

Identified building P2-10. MUSLIMS YOUTH CLUB, MATROUH

General building data sheet

Building data	
Building ownership	Ministry of Youth
Building identification	Muslims Youth Club(10)
Building location	Sidi Brani Road
Building use (office, health center, school…)	Club
Building gross surface (m2)	5080[80m(office)+5000m(football court)]
Contracted power, electricity (kW)	10
Contracted power, gas (kW)	-
Occupation schedule	
Daily schedule (x am - x pm)	9:00-22:00
Weekend schedule (x am - x pm)	9:00-22:00
Weekly schedule (daily/weekend)	7 d / 0 w
Monthly schedule (vacations)	-
Building annual energy consumption (kWh) (final)	24741
Building annual energy consumption (kWh/m2) (final)	4.87
Heating (kWh/m2)	-
Cooling (kWh/m2)	-
Ventilation (kWh/m2)	-
Light (kWh/m2)	4.87
Equipment (kWh/m2)	-
Pump & others (kWh/m2)	-
Hot Water (kWh/m2)	-
SAI (permanent loads) (kWh/m2)	-
Total permanent loads (kWh/m2)	0.00
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	4.87
Electricity consumption, daily (kWh/m2)	0.01
Electricity consumption, weekend (kWh/m2)	0.01
Gas consumption, annual average (kWh/m2)	-
Gas consumption, daily (kWh/m2)	-
Gas consumption, weekend (kWh/m2)	-
SWOT analysis *	
Strengths	Educational purposes
Weaknesses	Lack of experience in maintenance
Opportunities	Inform and familiarize students on importance and potential of solar energy
Threats	Exposed to salty air, sand and dust as nearby the sea

Simplified annual consumption behaviour (minimum data)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy cons. KWh	1218	1212	1386	3622	3486	2191	2163	2063	1984	1700	1752	1964

Simplified daily consumption behavior (minimum data) (meter data collection)

Schedule (h)	8	12	16	20	24	4
Energy consumption KW (meter)on Summer day (June/July/August)	1	1	6	10	0	0
Energy consumption KW (meter) on Winter day (Nov./Dec./Jan.)	1	1	5	7	0	0

Identified building P2-11. SIDI BRANI HOSPITAL, MATROUH

➢ ***General building data sheet***

Building data	
Building ownership	Ministry of Health
Building identification	Sidi Brani Hospital (11)
Building location	Main Street, Sidi Brani
Building use (office, health center, school…)	Hospital
Building gross surface (m2)	6464
Contracted power, electricity (kW)	50
Contracted power, gas (kW)	-
Occupation schedule	
Daily schedule (x am - x pm)	9:00-22:00
Weekend schedule (x am - x pm)	9:00-22:00
Weekly schedule (daily/weekend)	7 d / 0 w
Monthly schedule (vacations)	-
Building annual energy consumption (kWh) (final)	100931
Building annual energy consumption (kWh/m2) (final)	15.61
Heating (kWh/m2)	-
Cooling (kWh/m2)	0.62
Ventilation (kWh/m2)	0.94
Light (kWh/m2)	9.37
Equipment (kWh/m2)	3.12
Pump & others (kWh/m2)	0.78
Hot Water (kWh/m2)	0.78
SAI (permanent loads) (kWh/m2)	4
Total permanent loads (kWh/m2)	4.5
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	15.61
Electricity consumption, daily (kWh/m2)	0.002
Electricity consumption, weekend (kWh/m2)	0.002
Gas consumption, annual average (kWh/m2)	-
Gas consumption, daily (kWh/m2)	-
Gas consumption, weekend (kWh/m2)	-
SWOT analysis *	
Strengths	High public visibility
Weaknesses	Lack of experience in maintenance
Opportunities	Exposure in the press and media
Threats	Exposed to salty air, sand and dust as nearby the sea

➢ ***Simplified annual consumption behaviour (minimum data)***

	Jen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy cons. KWh	9541	8504	7924	8183	7804	9352	8739	8968	8430	8895	7904	8053

➢ ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

Schedule (h)	8	12	16	20	24	4
Energy consumptionKW (meter)on Summer day (June/July/August)	21	21	15	6	6	6
Energy consumptionKW (meter) on Winter day (Nov./Dec./Jan.)	21	21	14	5	5	5

Identified building P2-12. EL - ALLAMIN CENTRAL HOSPITAL, MATROUH

General building data sheet

Building data	
Building ownership	Ministry of Health
Building identification	El - Allamin Central Hospital(12) 12
Building location	El - Allamin City 12
Building use (office, health center, school…)	Hospital
Building gross surface (m2)	8000
Contracted power, electricity (kW)	400
Contracted power, gas (kW)	-
Occupation schedule	
Daily schedule (x am - x pm)	9:00-22:00
Weekend schedule (x am - x pm)	9:00-22:00
Weekly schedule (daily/weekend)	7 d / 0 w
Monthly schedule (vacations)	-
Building annual energy consumption (kWh) (final)	1132500
Building annual energy consumption (kWh/m2) (final)	141.6
Heating (kWh/m2)	-
Cooling (kWh/m2)	14.2
Ventilation (kWh/m2)	2.8
Light (kWh/m2)	49.5
Equipment (kWh/m2)	35.4
Pump & others (kWh/m2)	11.3
Hot Water (kWh/m2)	12.7
SAI (permanent loads) (kWh/m2)	15.6
Total permanent loads (kWh/m2)	40
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	141.6
Electricity consumption, daily (kWh/m2)	0.39
Electricity consumption, weekend (kWh/m2)	0.39
Gas consumption, annual average (kWh/m2)	-
Gas consumption, daily (kWh/m2)	-
Gas consumption, weekend (kWh/m2)	-
SWOT analysis *	
Strengths	High public visibility
Weaknesses	Lack of experience in maintenance
Opportunities	Exposure in the press and media
Threats	Exposed to salty air, sand and dust as nearby the sea

Simplified annual consumption behaviour (minimum data)

	Jen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy cons.KWh (bill)	110000	105000	54000	82000	119000	109000	120000	67000	68000	138000	74000	86500

Simplified daily consumption behaviour (minimum data) (meter data collection)

Schedule (h)	8	12	16	20	24	4
Energy consumption KW (meter)on Summer day (June/July/August)	290	290	206	12	12	12
Energy consumption KW (meter) on Winter day (Nov./Dec./Jan.)	270	270	175	12	12	12

Identified building P2-13. GENERAL HOSPITAL OF MATROUH, MATROUH

➢ *General building data sheet*

Building data	
Building ownership	Ministry of Health
Building identification	General Hospital of Matrouh(13)
Building location	Alexandria Street, Matrouh
Building use (office, health center, school…)	Hospital
Building gross surface (m2)	11520
Contracted power, electricity (kW)	400
Contracted power, gas (kW)	-
Occupation schedule	
Daily schedule (x am - x pm)	9:00-22:00
Weekend schedule (x am - x pm)	9:00-22:00
Weekly schedule (daily/weekend)	7 d / 0 w
Monthly schedule (vacations)	-
Building annual energy consumption (kWh) (final)	978276
Building annual energy consumption (kWh/m2) (final)	84.92
Heating (kWh/m2)	
Cooling (kWh/m2)	4.2
Ventilation (kWh/m2)	2.5
Light (kWh/m2)	20.4
Equipment (kWh/m2)	29.1
Pump & others (kWh/m2)	6.8
Hot Water (kWh/m2)	5.1
SAI (permanent loads) (kWh/m2)	16
Total permanent loads (kWh/m2)	44
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	84.92
Electricity consumption, daily (kWh/m2)	0.2
Electricity consumption, weekend (kWh/m2)	0.2
Gas consumption, annual average (kWh/m2)	-
Gas consumption, daily (kWh/m2)	-
Gas consumption, weekend (kWh/m2)	-
SWOT analysis *	
Strengths	High public visibility
Weaknesses	Lack of experience in maintenance
Opportunities	Exposure in the press and media
Threats	Exposed to salty air, sand and dust as nearby the sea

➢ *Simplified annual consumption behaviour (minimum data)*

	Jen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy cons. KWh	82823	91105	88739	66672	72470	73949	77646	81529	85439	96428	75149	86326

➢ *Simplified daily consumption behaviour (minimum data) (meter data collection)*

Schedule (h)	8	12	16	20	24	4
Energy consumptionKW (meter)on Summer day (June/July/August)	200	200	162	10	10	10
Energy consumptionKW (meter) on Winter day (Nov./Dec./Jan.)	241	241	167	10	10	10

Identified building P2-14. EL HAMAM HOSPITAL, MATROUH

➢ ***General building data sheet***

Building data	
Building ownership	Ministry of Health
Building identification	El Hamam Hospital (14)
Building location	El Hamam Street, Matrouh
Building use (office, health center, school…)	Hospital
Building gross surface (m2)	2400
Contracted power, electricity (kW)	50
Contracted power, gas (kW)	-
Occupation schedule	
Daily schedule (x am - x pm)	9:00-22:00
Weekend schedule (x am - x pm)	9:00-22:00
Weekly schedule (daily/weekend)	7 d / 0 w
Monthly schedule (vacations)	-
Building annual energy consumption (kWh) (final)	85380
Building annual energy consumption (kWh/m2) (final)	35.6
Heating (kWh/m2)	-
Cooling (kWh/m2)	1.8
Ventilation (kWh/m2)	-
Light (kWh/m2)	12.5
Equipment (kWh/m2)	10.7
Pump & others (kWh/m2)	1.8
Hot Water (kWh/m2)	3.6
SAI (permanent loads) (kWh/m2)	5.3
Total permanent loads (kWh/m2)	4.5
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	35.6
Electricity consumption, daily (kWh/m2)	0.1
Electricity consumption, weekend (kWh/m2)	0.1
Gas consumption, annual average (kWh/m2)	-
Gas consumption, daily (kWh/m2)	-
Gas consumption, weekend (kWh/m2)	-
SWOT analysis *	
Strengths	High public visibility
Weaknesses	Lack of experience in maintenance
Opportunities	Exposure in the press and media
Threats	Exposed to salty air, sand and dust as nearby the sea

➢ ***Simplified annual consumption behaviour (minimum data)***

	Jen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy cons. KWh	6143	5892	5579	5924	6174	7084	7278	8128	7266	7725	8598	9587

➢ ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

Schedule (h)	8	12	16	20	24	4
Energy consumptionKW (meter)on Summer day (June/July/August)	11	11	6	3	3	3
Energy consumptionKW (meter) on Winter day (Nov./Dec./Jan.)	10	10	5	3	3	3

2.4 M. R. Al-Salt, Irbid (Jordan), Partner 3: BAU

This section is a summary of internal working document T *5.1.3 ib report BAU v1*.

Fourteen buildings at two pre-identified eligible regions (Salt and Irbid) were analised for equipment installation.

- **Location I:** Al-Balqa' Applied University (BAU) in Al-Salt City is located in the western central Region along the high way which connects Amman with the Jordan Valley. Since its foundation in 1997, BAU has witnessed rapid expansion. Currently BAU has 18 Campuses including the Headquarter Campus at Al-Salt city in Al-Balqa' Governorate. The entire number of students at all faculties is more than 46000 students with more than 8000 students at Al-Salt Campus. In addition, the main Campus at Al-Salt city has about 380 employees (Faculty and staff).

  BAU's everyday activities that require electricity plug load are usually equipments such as computers and copiers and lighting, which typically account for roughly 30-40% of a building's energy. In winter, central heating system is used in the entire University's utilities that require consumption of fossil fuel (mainly diesel). In summer, very few offices are equipped with cooling systems that are based on split unit air conditioning. The most energy intensive spaces on the campus are research laboratories. Fume hoods are big energy hogs and much of the equipment used in research is also energy intensive. The electricity bill for the entire campus in year 2012 shows that the total yearly electricity consumption exceeds 1.6 million Kwhr of power. However, monthly variation of electricity consumption in the same year did not exceed 10 %. The same case epeeist at Al-Huson Campus with a total electricity consumption of 0.47 million Kwhr.

  BAU Campus has 20 buildings with the total building areas of 55790 m^2 and roof top areas of about 10585 m^2. The electricity supply of the 20 buildings are all connected together, thus, it is not possible to accurately identify the consumption of a single building and thus the nergy consumption of any preselected building is averaged.

  Most of these roofs are suitable to install the different envisaged technologies of solar energy. Most of these are obstacles-free in south direction. BAU Campus map is presented in Figure 1 10 building (marked 1 to 10) in Al-Salt region were pre selected.

- **Location II:** Al-Huson University College Campus this campus is located in Irbid. It has seven main buildings and some Labs and workshops. The total area of the buildings is about 17153 m^2 with no obstacles which make it perfect to install most Solar energy applications, especially Sterling Dish

Identified building P3-1. SCIENCE BUILDING, BAU UNIVERSITY, AL-SALT

➢ ***General building data sheet***

Building data	
Building ownership	BAU University
Building identification	Science Building
Building location	Al-Salt
Building use (office, health center, school…)	Offices, Clasrooms, Labs
Building gross surface (m2)	6755
Contracted power, electricity (kW)	NA
Contracted power, gas (kW)	NA
Occupation schedule	
Daily schedule (xam -xpm)	8:00am-5:00pm
Weekend schedule (xam - xpm)	8:00am-5:00pm
Weekly schedule (daily/weekend)	Sunday-Thursday
Monthly schedule (vacations)	August
Building annual energy consumption (kWh) (final)	
Building annual energy consumption (kWh/m2) (final)	
Heating (kWh/m2)	
Cooling (kWh/m2)	NA
Ventilation (kWh/m2)	NA
Light (kWh/m2)	NA
Equipment (kWh/m2)	NA
Pump & others (kWh/m2)	NA
Hot Water (kWh/m2)	NA
SAI (permanent loads) (kWh/m2)	NA
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	78
Electricity consumption,daily (kWh/m2)	0.273
Electricity consumption, weekend (kWh/m2)	0.067
Gas consumption, annual average (kWh/m2)	NA
Gas consumption,daily days (kWh/m2)	NA
Gas consumption, weekend (kWh/m2)	NA
SWOT analysis *	
Strengths	grid connected, object frree roo
Weaknesses	need structure preperation and
Opportunities	ideal for glass substitute
Threats	limited spare parts supply in fut

➢ ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

KWh (bill)	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumptio n	4490 8	5074 9	4829 4	4842 4	4410 3	3960 7	4913 7	3293 6	3942 7	4748 8	4021 6	4576 2

Summer day (June/July/August), (NA)

Winter day (November/December/January), (NA)

Identified building P3-2. ENGINEERING BUILDING, BAU UNIVERSITY, AL-SALT

- ***General building data sheet***

Building data	
Building ownership	BAU University
Building identification	Engineering Building
Building location	Al-Salt
Building use (office, health center, school...)	Offices, Clasrooms, Labs
Building gross surface (m2)	6000
Contracted power, electricity (kW)	NA
Contracted power, gas (kW)	NA
Occupation schedule	
Daily schedule (xam -xpm)	8:00am-5:00pm
Weekend schedule (xam - xpm)	8:00am-5:00pm
Weekly schedule (daily/weekend)	Sunday-Thursday
Monthly schedule (vacations)	August
Building annual energy consumption (kWh) (final)	
Building annual energy consumption (kWh/m2) (final)	
Heating (kWh/m2)	
Cooling (kWh/m2)	NA
Ventilation (kWh/m2)	NA
Light (kWh/m2)	NA
Equipment (kWh/m2)	NA
Pump & others (kWh/m2)	NA
Hot Water (kWh/m2)	NA
SAI (permanent loads) (kWh/m2)	NA
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	94
Electricity consumption,daily (kWh/m2)	0.336230769
Electricity consumption, weekend (kWh/m2)	0.032097561
Gas consumption, annual average (kWh/m2)	NA
Gas consumption,daily days (kWh/m2)	NA
Gas consumption, weekend (kWh/m2)	NA
SWOT analysis *	
Strengths	grid connected, object frree roof
Weaknesses	not suitable for glass substitute or solar cooling
Opportunities	ideal for
Threats	many heating equipments on the roof

- ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

KWh (bill)	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumption	48071	54323	51695	51834	47210	42396	52598	35256	42204	50833	43048	48985

Summer day (June/July/August), NA

Winter day (November/December/January), NA

Identified building P3-3.

- ***General building data sheet***

NA

- ***Simplified annual consumption behaviour (minimum data)***

KWh (bill)	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumption	8949	10113	9624	9650	8789	7893	9792	6564	7857	9464	8014	9120

- ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

Summer day (June/July/August), NA
Winter day (November/December/January), NA

Identified building P3-4. SCIENTIFIC RESEARCH DEANSHIP, BAU UNIVERSITY, AL-SALT

➢ ***General building data sheet***

Building data	
Building ownership	BAU University
Building identification	Scientific Research Deanship
Building location	Al-Salt
Building use (office, health center, school...)	Offices
Building gross surface (m2)	3400
Contracted power, electricity (kW)	NA
Contracted power, gas (kW)	NA
Occupation schedule	
Daily schedule (xam -xpm)	8:00am-5:00pm
Weekend schedule (xam - xpm)	8:00am-5:00pm
Weekly schedule (daily/weekend)	Sunday-Thursday
Monthly schedule (vacations)	August
Building annual energy consumption (kWh) (final) **Building annual energy consumption** (kWh/m2) (final)	
Heating (kWh/m2)	
Cooling (kWh/m2)	NA
Ventilation (kWh/m2)	NA
Light (kWh/m2)	NA
Equipment (kWh/m2)	NA
Pump & others (kWh/m2)	NA
Hot Water (kWh/m2)	NA
SAI (permanent loads) (kWh/m2)	NA
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	53
Electricity consumption,daily (kWh/m2)	0.187538462
Electricity consumption, weekend (kWh/m2)	0.020682927
Gas consumption, annual average (kWh/m2)	NA
Gas consumption,daily days (kWh/m2)	NA
Gas consumption, weekend (kWh/m2)	NA
SWOT analysis *	
Strengths	grid connected, object frree roof
Weaknesses	not suitable for glass substitute , no central air conditioning
Opportunities	ideal for thin film
Threats	old infra structure

➢ ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

KWh (bill)	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumption	15359	17356	16517	16561	15084	13546	16805	11264	13484	16241	13754	15651

Summer day (June/July/August), NA

Winter day (November/December/January), NA

Identified building P3-5. MAIN LIBRARY, BAU UNIVERSITY, AL-SALT

➢ ***General building data sheet***

Building data	
Building ownership	BAU University
Building identification	BAU Main Library
Building location	Al-Salt
Building use (office, health center, school...)	Offices, halls
Building gross surface (m2)	8000
Contracted power, electricity (kW)	NA
Contracted power, gas (kW)	NA
Occupation schedule	
Daily schedule (xam -xpm)	8:00am-5:00pm
Weekend schedule (xam - xpm)	8:00am-5:00pm
Weekly schedule (daily/weekend)	Sunday-Thursday
Monthly schedule (vacations)	August
Building annual energy consumption **(kWh) (final)**	
Building annual energy consumption **(kWh/m2) (final)**	
Heating (kWh/m2)	
Cooling (kWh/m2)	NA
Ventilation (kWh/m2)	NA
Light (kWh/m2)	NA
Equipment (kWh/m2)	NA
Pump & others (kWh/m2)	NA
Hot Water (kWh/m2)	NA
SAI (permanent loads) (kWh/m2)	NA
Total **(kWh/m2) (final energy) :**	
Electricity consumption, annual average (kWh/m2)	103
Electricity consumption,daily (kWh/m2)	0.376
Electricity consumption, weekend (kWh/m2)	0.030439024
Gas consumption, annual average (kWh/m2)	NA
Gas consumption,daily days (kWh/m2)	NA
Gas consumption, weekend (kWh/m2)	NA
SWOT analysis *	
Strengths	grid connected, object frree roof, have central air conditioning
Weaknesses	not suitable for glass substitute ,
Opportunities	ideal for solar cooling
Threats	some heating amd cooling equipments on the roof

Simplified daily consumption, NA

Summer day (June/July/August), NA

Winter day (November/December/January), NA

Identified building P3-6. ENGINEERING WORKSHOPS, BAU UNIVERSITY, AL-SALT

➤ ***General building data***

Building data	
Building ownership	BAU University
Building identification	En gineering Workshops
Building location	Al-Salt
Building use (office, health center, school...)	workdhop
Building gross surface (m2)	2100
Contracted power, electricity (kW)	NA
Contracted power, gas (kW)	NA
Occupation schedule	
Daily schedule (xam -xpm)	8:00am-5:00pm
Weekend schedule (xam - xpm)	8:00am-5:00pm
Weekly schedule (daily/weekend)	Sunday-Thursday
Monthly schedule (vacations)	August
Building annual energy consumption (kWh) (final) **Building annual energy consumption (kWh/m2) (final)**	
Heating (kWh/m2)	
Cooling (kWh/m2)	NA
Ventilation (kWh/m2)	NA
Light (kWh/m2)	NA
Equipment (kWh/m2)	NA
Pump & others (kWh/m2)	NA
Hot Water (kWh/m2)	NA
SAI (permanent loads) (kWh/m2)	NA
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	186
Electricity consumption,daily (kWh/m2)	0.665
Electricity consumption, weekend (kWh/m2)	0.0635
Gas consumption, annual average (kWh/m2)	NA
Gas consumption,daily days (kWh/m2)	NA
Gas consumption, weekend (kWh/m2)	NA
SWOT analysis *	
Strengths	grid connected, object frree roof,
Weaknesses	low elevations
Opportunities	ideal for solar stirling engine
Threats	equipment may be not safe

➤ ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

KWh (bill)	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumptio n	3329 2	3762 2	3580 2	3589 8	3269 5	2936 2	3642 7	2441 7	2922 9	3520 4	2981 3	3392 5

Summer day (June/July/August), NA

Winter day (November/December/January), NA

Identified building P3-7. FINANCE BUILDING, BAU UNIVERSITY, AL-SALT

- ***General building data sheet***

Building data	
Building ownership	BAU University
Building identification	Finance Building
Building location	Al-Salt
Building use (office, health center, school...)	Offices
Building gross surface (m2)	870
Contracted power, electricity (kW)	NA
Contracted power, gas (kW)	NA
Occupation schedule	
Daily schedule (xam -xpm)	8:00am-5:00pm
Weekend schedule (xam - xpm)	8:00am-5:00pm
Weekly schedule (daily/weekend)	Sunday-Thursday
Monthly schedule (vacations)	August
Building annual energy consumption (kWh) (final) **Building annual energy consumption** (kWh/m2) (final)	
Heating (kWh/m2)	NA
Cooling (kWh/m2)	NA
Ventilation (kWh/m2)	NA
Light (kWh/m2)	NA
Equipment (kWh/m2)	NA
Pump & others (kWh/m2)	NA
Hot Water (kWh/m2)	NA
SAI (permanent loads) (kWh/m2)	NA
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	150
Electricity consumption,daily (kWh/m2)	0.536538462
Electricity consumption, weekend (kWh/m2)	0.051219512
Gas consumption, annual average (kWh/m2)	NA
Gas consumption,daily days (kWh/m2)	NA
Gas consumption, weekend (kWh/m2)	NA
SWOT analysis *	
Strengths	grid connected, object frree roof, has central air conditioning
Weaknesses	small roof
Opportunities	ideal for solar cooling
Threats	high wend speed

- ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

KWh (bill)	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumption	11123	12569	11961	11994	10923	9810	12170	8158	9765	11762	9961	11334

Summer day (June/July/August), NA

Winter day (November/December/January), NA

Identified building P3-8. COMPUTER CENTER, BAU UNIVERSITY, AL-SALT

➢ ***General building data sheet***

Building data	
Building ownership	BAU University
Building identification	Computer Center
Building location	Al-Salt
Building use (office, health center, school...)	offices, Computer Labs
Building gross surface (m2)	1910
Contracted power, electricity (kW)	NA
Contracted power, gas (kW)	NA
Occupation schedule	
Daily schedule (xam -xpm)	8:00am-5:00pm
Weekend schedule (xam - xpm)	8:00am-5:00pm
Weekly schedule (daily/weekend)	Sunday-Thursday
Monthly schedule (vacations)	August
Building annual energy consumption (kWh) (final) **Building annual energy consumption (kWh/m2) (final)**	
Heating (kWh/m2)	NA
Cooling (kWh/m2)	NA
Ventilation (kWh/m2)	NA
Light (kWh/m2)	NA
Equipment (kWh/m2)	NA
Pump & others (kWh/m2)	NA
Hot Water (kWh/m2)	NA
SAI (permanent loads) (kWh/m2)	NA
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	870
Electricity consumption,daily (kWh/m2)	3.111923077
Electricity consumption, weekend (kWh/m2)	0.297073171
Gas consumption, annual average (kWh/m2)	NA
Gas consumption,daily days (kWh/m2)	NA
Gas consumption, weekend (kWh/m2)	NA
SWOT analysis *	
Strengths	grid connected, object frree roof,
Weaknesses	Not suitable for Solar cooling or CSP
Opportunities	ideal for solar stirling engine
Threats	have servers and sensitive equiments

➢ ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

KWh (bill)	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumption	141632	160051	152309	152718	139093	124911	154968	103874	124346	149768	126833	144324

Summer day (June/July/August), NA

Winter day (November/December/January), NA

Identified building P3-9. CLASS ROOMS, BAU UNIVERSITY, AL-SALT

➢ ***General building data sheet***

Building data	
Building ownership	BAU University
Building identification	Class Rooms Building
Building location	Al-Salt
Building use (office, health center, school...)	Class rooms
Building gross surface (m2)	3250
Contracted power, electricity (kW)	NA
Contracted power, gas (kW)	NA
Occupation schedule	
Daily schedule (xam -xpm)	8:00am-5:00pm
Weekend schedule (xam - xpm)	8:00am-5:00pm
Weekly schedule (daily/weekend)	Sunday-Thursday
Monthly schedule (vacations)	August
Building annual energy consumption (kWh) (final) **Building annual energy consumption (kWh/m2) (final)**	
Heating (kWh/m2)	NA
Cooling (kWh/m2)	NA
Ventilation (kWh/m2)	NA
Light (kWh/m2)	NA
Equipment (kWh/m2)	NA
Pump & others (kWh/m2)	NA
Hot Water (kWh/m2)	NA
SAI (permanent loads) (kWh/m2)	NA
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	47
Electricity consumption,daily (kWh/m2)	0.169923077
Electricity consumption, weekend (kWh/m2)	0.013756098
Gas consumption, annual average (kWh/m2)	NA
Gas consumption,daily days (kWh/m2)	NA
Gas consumption, weekend (kWh/m2)	NA
SWOT analysis *	
Strengths	grid connected, object frree roof,
Weaknesses	not suitable for CSP or glass substitute
Opportunities	large roof area
Threats	none

➢ ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

KWh (bill)	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumption	13019	14713	14001	14038	12786	11482	14245	9549	11430	13767	11659	13267

Summer day (June/July/August), NA

Winter day (November/December/January), NA

Identified building P3-10. ADMINISTRATION, BAU UNIVERSITY, AL-SALT

- ***General building data sheet***

Building data	
Building ownership	BAU University
Building identification	Adminstration Building
Building location	Al-Salt
Building use (office, health center, school…)	Offices
Building gross surface (m2)	3500
Contracted power, electricity (kW)	NA
Contracted power, gas (kW)	NA
Occupation schedule	
Daily schedule (xam -xpm)	8:00am-5:00pm
Weekend schedule (xam - xpm)	8:00am-5:00pm
Weekly schedule (daily/weekend)	Sunday-Thursday
Monthly schedule (vacations)	August
Building annual energy consumption (kWh) (final) **Building annual energy consumption (kWh/m2) (final)**	
Heating (kWh/m2)	NA
Cooling (kWh/m2)	NA
Ventilation (kWh/m2)	NA
Light (kWh/m2)	NA
Equipment (kWh/m2)	NA
Pump & others (kWh/m2)	NA
Hot Water (kWh/m2)	NA
SAI (permanent loads) (kWh/m2)	NA
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	52
Electricity consumption,daily (kWh/m2)	0.194
Electricity consumption, weekend (kWh/m2)	0.00761
Gas consumption, annual average (kWh/m2)	NA
Gas consumption,daily days (kWh/m2)	NA
Gas consumption, weekend (kWh/m2)	NA
SWOT analysis *	
Strengths	grid connected, object frree roof,
Weaknesses	No airconditioning, high wind speed
Opportunities	good for thin film or standard PV
Threats	None

- ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

KWh (bill)	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumption	17064	17530	16882	16727	15234	13681	16973	11263	13619	15918	13892	15807

Summer day (June/July/August), NA

Winter day (November/December/January, NA

Identified building P3-11. AL-KHAWARIZMI, BAU UNIVERSITY, IRBID

➢ ***General building data sheet***

Building data	
Building ownership	BAU University
Building identification	Al-Khawarizmi Building
Building location	Irbid/Al-Huson
Building use (office, health center, school…)	Computer Labs, Class rooms
Building gross surface (m2)	1800
Contracted power, electricity (kW)	NA
Contracted power, gas (kW)	NA
Occupation schedule	
Daily schedule (xam -xpm)	8:00am-5:00pm
Weekend schedule (xam - xpm)	8:00am-5:00pm
Weekly schedule (daily/weekend)	Sunday-Thursday
Monthly schedule (vacations)	August
Building annual energy consumption (kWh) (final) **Building annual energy consumption (kWh/m2) (final)**	
Heating (kWh/m2)	NA
Cooling (kWh/m2)	NA
Ventilation (kWh/m2)	NA
Light (kWh/m2)	NA
Equipment (kWh/m2)	NA
Pump & others (kWh/m2)	NA
Hot Water (kWh/m2)	NA
SAI (permanent loads) (kWh/m2)	NA
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	67
Electricity consumption,daily (kWh/m2)	0.25
Electricity consumption, weekend (kWh/m2)	0.0098
Gas consumption, annual average (kWh/m2)	NA
Gas consumption,daily days (kWh/m2)	NA
Gas consumption, weekend (kWh/m2)	NA
SWOT analysis *	
Strengths	grid connected, object frree roof, free land
Weaknesses	not suitable for glass substitute
Opportunities	ideal for solar stirling engine
Threats	None

➢ ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

KWh (bill)	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumption	10051	10325	9944	9852	8973	8058	9997	6634	8022	9376	8182	9311

Summer day (June/July/August), NA

Winter day (November/December/January), NA

Identified building P3-12. MAIN BUILDING, BAU UNIVERSITY, IRBID

➢ ***General building data sheet***

Building data	
Building ownership	BAU University
Building identification	Main building
Building location	Irbid/Al-Huson
Building use (office, health center, school…)	offices, labs, classrooms
Building gross surface (m2)	8500
Contracted power, electricity (kW)	NA
Contracted power, gas (kW)	NA
Occupation schedule	
Daily schedule (xam -xpm)	8:00am-5:00pm
Weekend schedule (xam - xpm)	8:00am-5:00pm
Weekly schedule (daily/weekend)	Sunday-Thursday
Monthly schedule (vacations)	August
Building annual energy consumption (kWh) (final)	
Building annual energy consumption (kWh/m2) (final)	
Heating (kWh/m2)	NA
Cooling (kWh/m2)	NA
Ventilation (kWh/m2)	NA
Light (kWh/m2)	NA
Equipment (kWh/m2)	NA
Pump & others (kWh/m2)	NA
Hot Water (kWh/m2)	NA
SAI (permanent loads) (kWh/m2)	NA
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	62
Electricity consumption,daily (kWh/m2)	0.229
Electricity consumption, weekend (kWh/m2)	0.0151
Gas consumption, annual average (kWh/m2)	NA
Gas consumption,daily days (kWh/m2)	NA
Gas consumption, weekend (kWh/m2)	NA
SWOT analysis *	
Strengths	grid connected, object frree roof, large nearby land
Weaknesses	not suitable for glass substitute
Opportunities	ideal for solar stirling engine
Threats	Old infrastructure

➢ ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

KWh (bill)	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumption	49410	50759	48884	48434	44113	39615	49147	32614	39436	46092	40224	45772

➢ ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

Summer day (June/July/August), NA

Winter day (November/December/January), NA

Identified building P3-13. WORKSHOPS, BAU UNIVERSITY, IRBID

- ***General building data sheet***

Building data	
Building ownership	BAU University
Building identification	Workshop building
Building location	Irbid/Al-huson
Building use (office, health center, school...)	workshop, offices, labs
Building gross surface (m2)	1300
Contracted power, electricity (kW)	NA
Contracted power, gas (kW)	NA
Occupation schedule	
Daily schedule (xam -xpm)	8:00am-5:00pm
Weekend schedule (xam - xpm)	8:00am-5:00pm
Weekly schedule (daily/weekend)	Sunday-Thursday
Monthly schedule (vacations)	August
Building annual energy consumption (kWh) (final) **Building annual energy consumption (kWh/m2) (final)**	
Heating (kWh/m2)	NA
Cooling (kWh/m2)	NA
Ventilation (kWh/m2)	NA
Light (kWh/m2)	NA
Equipment (kWh/m2)	NA
Pump & others (kWh/m2)	NA
Hot Water (kWh/m2)	NA
SAI (permanent loads) (kWh/m2)	NA
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	156
Electricity consumption,daily (kWh/m2)	0.582
Electricity consumption, weekend (kWh/m2)	0.0243
Gas consumption, annual average (kWh/m2)	NA
Gas consumption,daily days (kWh/m2)	NA
Gas consumption, weekend (kWh/m2)	NA
SWOT analysis *	
Strengths	grid connected, object frree roof, already some PVs are installed
Weaknesses	not suitable for glass substitute or CSP
Opportunities	ideal for thin film on the car park roof
Threats	none

- ***Simplified annual consumption behaviour (minimum data)***

KWh (bill)	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumptio n	1901 4	1953 3	1881 1	1863 8	1697 5	1524 5	1891 3	1255 0	1517 6	1773 7	1547 9	1761 4

- ***Simplified annual consumption behaviour (minimum data)***

Summer day (June/July/August), NA Winter day (November/December/January), NA

Identified building P3-14. HUSON NEW BUILDING, BAU UNIVERSITY, IRBID

➢ ***General building data sheet***

Building data	
Building ownership	BAU University
Building identification	Huson New Building
Building location	Irbid/al-huson
Building use (office, health center, school...)	offices, classrooms, Cafiteria
Building gross surface (m2)	3300
Contracted power, electricity (kW)	NA
Contracted power, gas (kW)	NA
Occupation schedule	
Daily schedule (xam -xpm)	8:00am-5:00pm
Weekend schedule (xam - xpm)	8:00am-5:00pm
Weekly schedule (daily/weekend)	Sunday-Thursday
Monthly schedule (vacations)	August
Building annual energy consumption (kWh) (final) **Building annual energy consumption (kWh/m2) (final)**	
Heating (kWh/m2)	NA
Cooling (kWh/m2)	NA
Ventilation (kWh/m2)	NA
Light (kWh/m2)	NA
Equipment (kWh/m2)	NA
Pump & others (kWh/m2)	NA
Hot Water (kWh/m2)	NA
SAI (permanent loads) (kWh/m2)	NA
Total (kWh/m2) (final energy) :	
Electricity consumption, annual average (kWh/m2)	NA
Electricity consumption,daily (kWh/m2)	NA
Electricity consumption, weekend (kWh/m2)	NA
Gas consumption, annual average (kWh/m2)	NA
Gas consumption,daily days (kWh/m2)	NA
Gas consumption, weekend (kWh/m2)	NA
SWOT analysis *	
Strengths	grid connected, object frree roof, Large roof, large nearby land
Weaknesses	underconstruction, no data available
Opportunities	ideal for solar stirling engine, new infrastructure
Threats	None

➢ ***Simplified annual consumption behaviour (minimum data)***

KWh (bill)	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumption	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

➢ ***Simplified daily consumption behaviour (minimum data) (meter data collection),***

Summer day (June/July/August), NA

Winter day (November/December/January), NA

2.5 M. R. Alexandria (Egypt), Partner 4: AU

This a summary of internal working document:T *5.1.3 ib report AU v2*.

Identified building P4-1. FACULTY OF SCIENCE, ALEXANDRIA UNIVERSITY

Moharam Bek campus is the main campus out of four campuses of Faculty of Science. It consists of 16 buildings on a total area of 20244 m^2, the buildings net area is 10794 m^2, the green areas are 14910 m^2 and the spaces between buildings are 20244 m^2.

- ***General building data sheet***

Building Data	
Building ownership	Alexandria University
Building identification	Faculty of Science
Building location	Faculty of Science, Moharam Bek Campus
Building use (office, health center, school…)	Offices/University teaching
Building gross surface (m2)	3×1950+2×1300+2x130+2×400+2x325+450+3×450+900+2×70+50 +2×350+440+450+150+100+75= 14965
Contracted power, electricity (kW)	1 MW
Contracted power, gas (kW)	NE
Occupation schedule	
Daily schedule (x am - x pm)	8 am - 4 pm
Weekend schedule (x am - x pm)	10 am - 1 am
Weekly schedule (daily/weekend)	Saturday-Thursday/Friday
Monthly schedule (vacations)	Official national vacations
Building annual energy consumption (kWh) (final)	569772
Building annual energy consumption (kWh/m2) (final)	38.74
Heating (kWh/m2)	NE
Cooling (kWh/m2) estimated (200(kW)*8(h/d)*6(d/w)*52(w/yr)*(DF)0.7*LF(0.5)/ area(m2)	~11.67
Ventilation (kWh/m2)	NE
Light (kWh/m2) estimated (0.6*(TC-CC))	~16.242
Equipment (kWh/m2)	NA (Not Available)
Pump & others (kWh/m2)	NA
Hot Water (kWh/m2)	NE
SAI (permanent loads) (kWh/m2)	~ 5.85
Total (kWh/m2) (final energy)	
Electricity consumption, annual average (kWh/m2)	38.74
Electricity consumption, daily (kWh/m2)	0.117
Electricity consumption, weekend (kWh/m2)	0.0438

Gas consumption, annual average (kWh/m2)	NE
Gas consumption, daily (kWh/m2)	NE
Gas consumption, weekend (kWh/m2)	NE
SWOT analysis *	
Strengths	- Renovated infrastructure - Open area around "no shades" - Large roofs areas - Renovated electrical structure - Large green areas - Large empty spaces between & around buildings
Weaknesses	- No central AC infrastructure available - No hot water infrastructure available
Opportunities	1- Installation of different system
Threats	1-

** Important aspects, besides the technical ones, like: timing, strategic owner (RE policy maker…), public visibility, educational purposes, potential multiplier effect (at the same building or buildings owned by the same owner), etc.*

➢ ***Simplified annual consumption behaviour (minimum data)***

Year 2013	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumption KWh (bill)	45373	39586	35448	46446	49622	51442	47544	39230				
Year 2012	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumption KWh (bill)	50737	39482	39222	44054	48201	58400	49272	51819	42989	53334	47829	54433
Year 2011	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumption KWh (bill)	56352	50844	36342	48488	NA	54070	64033	58481	52010	53497	54351	42402

➢ ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

Summer day (June/July/August)

Schedule (h)	8:00	12:00	16:00	20:00	24:00	4:00
Energy consumption KW (meter)	NA	NA	NA	NA	NA	NA

Winter day (November/December/January)

Schedule (h)	8:00	12:00	16:00	20:00	24:00	4:00
Energy consumption KW (meter)	NA	~2×52.00	~2×30.00	~2×12.00	~2×5.00	~2×6.00

Identified building P4-2. ADMINISTRATION, FACULTY OF SCIENCE

Administrative building is one out of 16 buildings in MoharamBek campus of Faculty of science, it consists of 3 floors. The first floor contains administrative offices, 2 lecturer classes each of capacity 250 students and 1 conference room of capacity 40 attendants. The second and the third floor are for Biochemistry department.

➢ ***General building data sheet***

Building Data	
Building ownership	Alexandria University
Building identification	Administration/Chemistry Building
Building location	Faculty of Science, Moharam Bek Campus
Building use (office, health center, school…)	Offices/University teaching
Building gross surface (m2)	3×1,950=5850
Contracted power, electricity (kW)	400 kW
Contracted power, gas (kW)	NA
Occupation schedule	
Daily schedule (x am - x pm)	8 am - 4 pm
Weekend schedule (x am - x pm)	10 am - 1 am
Weekly schedule (daily/weekend)	Saturday-Thursday/Friday
Monthly schedule (vacations)	Official national vacations
Building annual energy consumption (kWh) (final)	197137.87
Building annual energy consumption (kWh/m2) (final)	35.64
Heating (kWh/m2)	NE
Cooling (kWh/m2) estimated (107(kW)*8(h/d)*6(d/w)*52(w/yr)*(DF)0.7*LF(0.5)/ area(m2)	~16
Ventilation (kWh/m2)	NE
Light (kWh/m2) estimated (0.6*(TC-CC))	~11.78
Equipment (kWh/m2)	NA (Not Available)
Pump & others (kWh/m2)	NA
Hot Water (kWh/m2)	NE
SAI (permanent loads) (kWh/m2)	~ 9
Total (kWh/m2) (final energy)	
Electricity consumption, annual average (kWh/m2)	35.64
Electricity consumption, daily (kWh/m2)	0.11
Electricity consumption, weekend (kWh/m2)	0.04
Gas consumption, annual average (kWh/m2)	NE
Gas consumption, daily (kWh/m2)	NE
Gas consumption, weekend (kWh/m2)	NE
SWOT analysis *	
Strengths	- Renovated infrastructure - Open area around "no shades" - Large roof area - Renovated electrical structure
Weaknesses	1-
Opportunities	1- Installation of different system
Threats	1-

** Important aspects, besides the technical ones, like: timing, strategic owner (RE policy maker…), public visibility, educational purposes, potential multiplier effect (at the same building or buildings owned by the same owner), etc.*

- ***Simplified annual consumption behaviour (minimum data)*** [2]

Year 2013	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumptio n KWh (bill)	4537 3	3958 6	3544 8	4644 6	4962 2	5144 2	4754 4	3923 0				
Year 2012	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumptio n KWh (bill)	5073 7	3948 2	3922 2	4405 4	4820 1	5840 0	4927 2	5181 9	4298 9	5333 4	4782 9	5443 3
Year 2011	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumptio n KWh (bill)	5635 2	5084 4	3634 2	4848 8	NA	5407 0	6403 3	5848 1	5201 0	5349 7	5435 1	4240 2

- ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

Summer day (June/July/August)

Schedule (h)	8:00	12:00	16:00	20:00	24:00	4:00
Energy consumption KW (meter)	NA	NA	NA	NA	NA	NA

Winter day (November/December/January)

Schedule (h)	8:00	12:00	16:00	20:00	24:00	4:00
Energy consumption KW (meter)	NA	52.00	30.00	12.00	5.00	6.00

[2] Data presented in Simplified annual consumption have been recorded by Only One Energy Meter, combining all building consumptions of the FOS, MOHARAM BEK CAMPUS.

Identified building P4-3. BUILDING A, FACULTY OF SCIENCE

Building "A" is one out of 5 buildings in El-Shatby campus of faculty of science in middle of Alexandria, it consists of 5 floors.

- ***General building data sheet***

Building data	
Building ownership	Alexandria University
Building Identification	Building A
Building location	Faculty of Science, Elshatby Campus
Building use (office, health center, school,…)	University teaching
Building gross surface (m2)	5×1,250+2×700+2×270 = 8190
Contracted power, electricity (kW)	150 kW
Contracted power, gas (kW)	NE
Occupation schedule	
Daily schedule (x am - x pm)	8 am - 4 pm
Weekend schedule (x am - x pm)	10 am - 1 am
Weekly schedule (daily/weekend)	Saturday-Thursday/Friday
Monthly schedule (vacations)	Official national vacations
Building annual energy consumption (kWh) (final)	342885.0917
Building annual energy consumption (kWh/m2) (final)	41.86
Heating (kWh/m2)	NE
Cooling (kWh/m2) estimated (78(kW)*8(h/d)*6(d/w)*52(w/yr)*(DF)0.7*LF(0.5)/ area(m2)	~8.9
Ventilation (kWh/m2)	NE
Light (kWh/m2) estimated (0.6*(TC-CC))	~19.776
Equipment (kWh/m2)	NA
Pump & others (kWh/m2)	NA
Hot Water (kWh/m2)	NE
SAI (permanent loads) (kWh/m2)	~25
Total (kWh/m2) (final energy)	
Electricity consumption, annual average (kWh/m2)	41.86
Electricity consumption, daily (kWh/m2)	0.122
Electricity consumption, weekend (kWh/m2)	0.075
Gas consumption, annual average (kWh/m2)	NE
Gas consumption, daily (kWh/m2)	NE
Gas consumption, weekend (kWh/m2)	NE
SWOT analysis *	
Strengths	1- Higher power demand at morning and night than 14 kW 2- Three separate roofs
Weaknesses	1- The electrical infrastructure is old
Opportunities	1- Installation of different systems
Threats	1-

- ***Simplified annual consumption behaviour (minimum data)*** [3]

2011	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumption KWh (bill)	46800	46920	31020	33360	47220	42180	51240	50280	42840	47760	59460	53520
2012	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumption KWh (bill)	65280	55020	44040	59040	52380	58680	47220	38940	37560	43860	53100	67080
2013	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumption KWh (bill)	55440	41580	46680	55980	55260	52260	48240	38400				

- ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

Summer day (June/July/August), NA

Winter day (November/December/January), NA

[3] Data presented in Simplified annual consumption have been recorded by Only One Energy Meter, combining all building consumptions of the FOS SHATBY CAMPUS.

Identified building P4-4. ADMINISTRATION BUILDING, NEW SIDI KERIR PETROCHEMICALS

New Sidi Kerir Petrochemicals Co. (SIDPEC) administration building is one of the two administration buildings in SIDPEC industrial compound at El-Amryia, west of Alexandria.

➢ ***General building data sheet***

Building data		
Building ownership	Egyptian Petrochemicals Holding Company (Echem)	20%
	Egyptian Petrochemicals Company	7%
	Capital Holding Company (NCB)	7%
	National Bank For Investment	7%
	Social Insurance Fund Of Governmental Sector Workers	19%
	Social Insurance Fund For Public & Private Sector Workers	12%
	Misr Insurance Company	3%
	Nasser Scoial Bank (NSB)	2%
	Other Shareholders (Public Offering)	23%
Building Identification	SIDPEC New Adminstiration Building	
Building location	KM 36 Alexandria/Cairo Desert Road El-Amerya - El-Nahda Territory - Alexandria.	
Building use (office, health center, school,…)	Offices	
Building gross surface (m2)	4×1900=7600 m2	
Contracted power, electricity (kW)	30 MW (Min. payment of 23 MW) for the whole company.	
	This building shares about 7% only of the gross (~1600 KW)	
Contracted power, gas (kW)	NA	
Occupation schedule		
Daily schedule (x am - x pm)	8 am - 4 pm	
Weekend schedule (x am - x pm)	NA	
Weekly schedule (daily/weekend)	Sunday-Thursday/Friday-Saturday	
Monthly schedule (vacations)	Official national vacations	
Building annual energy consumption (kWh) (final)	12,953,000	
Building annual energy consumption (kWh/m2) (final)	1700	
Heating (kWh/m2)	NE	
Cooling (kWh/m2)	~1200	
Ventilation (kWh/m2)	NE	
Light (kWh/m2)	NA	
Equipment (kWh/m2)	NA	
Pump & others (kWh/m2)	NA	
Hot Water (kWh/m2)	NE	
SAI (permanent loads) (kWh/m2)	NE	

Total (kWh/m2) (final energy)	
Electricity consumption, annual average (kWh/m2)	1700
Electricity consumption, daily (kWh/m2)	6.53
Electricity consumption, weekend (kWh/m2)	NA
Gas consumption, annual average (kWh/m2)	NE
Gas consumption, daily (kWh/m2)	NE
Gas consumption, weekend (kWh/m2)	NE
SWOT analysis *	
Strengths	1- New building 2- High power demand
Weaknesses	
Opportunities	1- Installation of different systems
Threats	

- ***Simplified annual consumption behaviour (minimum data)***

2012	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Gross Energy consumption KWh (bill)	16412.07 x 10^3	15521.16 x 10^3	12969.16 x 10^3	9229.09 x 10^3	17100 x 10^3	16373 x 10^3	15311 X 10^3	17054 x 10^3	16016 x 10^3	16065 x 10^3	16443 x 10^3	16563 x 10^3
Sedpec Consumption (7% of Gross) kWh	1148840	1086470	907830	646030	1197000	1146110	1071770	1193780	1121120	1124550	1151010	1159410
2013	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Gross Energy consumption KWh (bill)	17715 x 10^3	15246 x 10^3	15527 x 10^3	16041 x 10^3	15219 x 10^3	15495 x 10^3	16645 x 10^3	17115 x 10^3	16587 x 10^3	17007 x 10^3	Not Yet	Not Yet
Sedpec Consumption (7% of Gross) kWh	1240050	1067220	1086890	1122870	1065330	1084650	1165150	1198050	1161090	1190490	Not Yet	Not Yet

- ***Simplified daily consumption behavior (minimum data) (meter data collection)***

Summer day (June/July/August), NA

Winter day (November/December/January), 12-11-2013

Schedule (h)	8:00	12:00	16:00	20:00	24:00	4:00
Energy consumption KW (meter)	154.26	NA	154.26	0.0	0.0	0.0

Identified building P4-5. PRODUCTION WORKSHOPS, ALEXANDRIA UNIVERSITY

Production workshop building inn Faculty of Engineering campus in El-Shatby, middle of Alexandria.

- ***General building data sheet***

Building data	
Building ownership	Alexandria University
Building Identification	Production workshops
Building location	Faculty of Engineering, Elshatby Campus
Building use (office, health center, school,…)	University teaching
Building gross surface (m2)	5,420
Contracted power, electricity (kW)	150 kW
Contracted power, gas (kW)	NE
Occupation schedule	
Daily schedule (x am - x pm)	8 am - 4 pm
Weekend schedule (x am - x pm)	10 am - 1 am
Weekly schedule (daily/weekend)	Saturday-Thursday/Friday
Monthly schedule (vacations)	Official national vacations
Building annual energy consumption (kWh) (final)	100597.511
Building annual energy consumption (kWh/m2) (final)	18.56
Heating (kWh/m2)	NE
Cooling (kWh/m2) estimated (25(kW)*8(h/d)*6(d/w)*52(w/yr)*(DF)0.7*LF(0.5)/ area(m2)	4.03
Ventilation (kWh/m2)	NE
Light (kWh/m2)	NA
Equipment (kWh/m2)	NA
Pump & others (kWh/m2)	NA
Hot Water (kWh/m2)	NE
SAI (permanent loads) (kWh/m2)	~12.92
Total (kWh/m2) (final energy)	
Electricity consumption, annual average (kWh/m2)	18.56
Electricity consumption, daily (kWh/m2)	0.056
Electricity consumption, weekend (kWh/m2)	0.021
Gas consumption, annual average (kWh/m2)	NE
Gas consumption, daily (kWh/m2)	NE
Gas consumption, weekend (kWh/m2)	NE
SWOT analysis *	
Strengths	1- Roof facing south
Weaknesses	1- Old building
Opportunities	1- PVs installation
Threats	1-

- ***Simplified annual consumption behaviour (minimum data)***

2013	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy KWh (bill)	NA	NA	NA	NA	7004	7622	NA	5974	NA	NA	NA	NA

- ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

Summer day (June/July/August), NA

Winter day (November/December/January)

Schedule (h)	8:00	12:00	16:00	20:00	24:00	4:00
Energy KW (meter)	NA	100	25	8	8	8

Identified building P4-6. LIBRARY & IT BUILDING, ALEXANDRIA UNIVERSITY

Library & IT building is one out of 16 buildings in Moharam Bek campus of Faculty of science in west of Alexandria, it consists of 2 floors.

- ***General building data sheet***

Building data	
Building ownership	Alexandria University
Building Identification	Library/IT building
Building location	Faculty of Science, Moharam Bek Campus
Building use (office, health center, school,…)	Offices/Labs/Library
Building gross surface (m2)	3×450 = 1350
Contracted power, electricity (kW)	50 kW
Contracted power, gas (kW)	NE
Occupation schedule	
Daily schedule (x am - x pm)	8 am - 4 pm
Weekend schedule (x am - x pm)	10 am - 1 am
Weekly schedule (daily/weekend)	Saturday-Thursday/Friday
Monthly schedule (vacations)	Official national vacations
Building annual energy consumption (kWh) (final)	88964
Building annual energy consumption (kWh/m2) (final)	65.9
Heating (kWh/m2)	NE
Cooling (kWh/m2) estimated (34.5(kW)*8(h/d)*6(d/w)*52(w/yr)*(DF)0.7*LF(0.5)/ area(m2)	22.32
Ventilation (kWh/m2)	NE
Light (kWh/m2) estimated (0.6*(TC-CC))	26.148
Equipment (kWh/m2)	NA
Pump & others (kWh/m2)	NA
Hot Water (kWh/m2)	NE
SAI (permanent loads) (kWh/m2)	~0
Total (kWh/m2) (final energy)	
Electricity consumption, annual average (kWh/m2)	65.9
Electricity consumption, daily (kWh/m2)	0.199
Electricity consumption, weekend (kWh/m2)	0.074
Gas consumption, annual average (kWh/m2)	NE
Gas consumption, daily (kWh/m2)	NE
Gas consumption, weekend (kWh/m2)	NE
SWOT analysis *	
Strengths	1- Renovated infrastructure 2- Open area around "no shades" 3- Renovated electrical structure
Weaknesses	1- No loads from 4 pm – 7:30 am
Opportunities	1-
Threats	1-

➢ ***Simplified annual consumption behaviour (minimum data)*** [4]

2013	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumption KWh (bill)	45373	39586	35448	46446	49622	51442	47544	39230				
2012	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumption KWh (bill)	50737	39482	39222	44054	48201	58400	49272	51819	42989	53334	47829	54433
2011	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumption KWh (bill)	56352	50844	36342	48488	NA	54070	64033	58481	52010	53497	54351	42402

➢ ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

Summer day (June/July/August), NA

Winter day (November/December/January)

Schedule (h)	8:00	12:00	16:00	20:00	24:00	4:00
Energy consumption KW (meter)	5	20	0	0	0	0

[4]Data presented in Simplified annual consumption have been recorded by Only One Energy Meter, combining all building consumptions of the FOS, MOHARAN BEK CAMPUS.

Identified building P4-7. BUILDING B, ALEXANDRIA UNIVERSITY

"B" Building is one out of 5 buildings in El-Shatby campus of Faculty of science in middle of Alexandria, it consists of 7 floors.

- ***General building data sheet***

Building data	
Building ownership	Alexandria University
Building Identification	Building B
Building location	Faculty of Science, Elshatby Campus
Building use (office, health center, school,…)	University teaching
Building gross surface (m2)	7×900+2×900 = 8100
Contracted power, electricity (kW)	200 kW
Contracted power, gas (kW)	NE
Occupation schedule	
Daily schedule (x am - x pm)	8 am - 4 pm
Weekend schedule (x am - x pm)	10 am - 1 am
Weekly schedule (daily/weekend)	Saturday-Thursday/Friday
Monthly schedule (vacations)	Official national vacations
Building annual energy consumption (kWh) (final)	216388.2944
Building annual energy consumption (kWh/m2) (final)	26.71
Heating (kWh/m2)	To be estimated
Cooling (kWh/m2) estimated (89(kW)*8(h/d)*6(d/w)*52(w/yr)*(DF)0.7*LF(0.5)/ area(m2)	~ 9.6
Ventilation (kWh/m2)	NE
Light (kWh/m2) estimated (0.6*(TC-CC))	10.226
Equipment (kWh/m2)	NA
Pump & others (kWh/m2)	NA
Hot Water (kWh/m2)	NE
SAI (permanent loads) (kWh/m2)	~12.98
Total (kWh/m2) (final energy)	
Electricity consumption, annual average (kWh/m2)	26.71
Electricity consumption, daily (kWh/m2)	0.081
Electricity consumption, weekend (kWh/m2)	0.03
Gas consumption, annual average (kWh/m2)	NE
Gas consumption, daily (kWh/m2)	NE
Gas consumption, weekend (kWh/m2)	NE
SWOT analysis *	
Strengths	3- High power demand at morning
Weaknesses	2- Large areas of the roof is un-flat 3- The electrical infrastructure is old
Opportunities	1-
Threats	1-

➢ ***Simplified annual consumption behaviour (minimum data)5***

2011	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumptio n KWh (bill)	4680 0	4692 0	3102 0	3336 0	4722 0	4218 0	5124 0	5028 0	4284 0	4776 0	5946 0	5352 0
2012	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumptio n KWh (bill)	6528 0	5502 0	4404 0	5904 0	5238 0	5868 0	4722 0	3894 0	3756 0	4386 0	5310 0	6708 0
2013	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumptio n KWh (bill)	5544 0	4158 0	4668 0	5598 0	5526 0	5226 0	4824 0	3840 0				

➢ ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

Summer day (June/July/August), NA

Winter day (November/December/January)

Schedule (h)	8:00	12:00	16:00	20:00	24:00	4:00
Energy consumption KW (meter)	~2×20	~2×30	~2×6	~2×6	~2×6	~2×6

[5]Data presented in Simplified annual consumption have been recorded by Only One Energy Meter, combining all building consumptions of the FOS SHATBY CAMPUS.

Identified building P4-8. ELECTRICAL ENGINEERING, ALEXANDRIA UNIVERSITY

Electrical Engineering department building in Faculty of Engineering campus in El-Shatby, middle of Alexandria.

- ***General building data sheet***

Building data	
Building ownership	Alexandria University
Building Identification	Electrical Engineering (EE) Department
Building location	Faculty of Engineering, Elshatby Campus
Building use (office, health center, school,…)	University teaching
Building gross surface (m2)	20,627
Contracted power, electricity (kW)	200 kW
Contracted power, gas (kW)	NA
Occupation schedule	
Daily schedule (x am - x pm)	8 am - 4 pm
Weekend schedule (x am - x pm)	10 am - 1 am
Weekly schedule (daily/weekend)	Saturday-Thursday/Friday
Monthly schedule (vacations)	Official national vacations
Building annual energy consumption (kWh) (final)	648701.525
Building annual energy consumption (kWh/m2) (final)	31.44
Heating (kWh/m2)	NE
Cooling (kWh/m2) estimated (80(kW)*8(h/d)*6(d/w)*52(w/yr)*(DF)0.7*LF(0.5)/ area(m2)	~3.39
Ventilation (kWh/m2)	NA
Light (kWh/m2)	NA
Equipment (kWh/m2)	NA
Pump & others (kWh/m2)	NA
Hot Water (kWh/m2)	NE
SAI (permanent loads) (kWh/m2)	~8.5
Total (kWh/m2) (final energy)	
Electricity consumption, annual average (kWh/m2)	29.73
Electricity consumption, daily (kWh/m2)	0.095
Electricity consumption, weekend (kWh/m2)	0.0357
Gas consumption, annual average (kWh/m2)	NA
Gas consumption, daily (kWh/m2)	NA
Gas consumption, weekend (kWh/m2)	NA
SWOT analysis *	
Strengths	1- High power demand at morning
Weaknesses	1- Building under renovation
Opportunities	1-
Threats	1- Roof may not support heavy systems

- ***Simplified annual consumption behaviour (minimum data)***

2013	Gen	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Des
Energy consumption KWh (bill)	120990	86085	80415	108720	96345	88350	NA	73551				

- ***Simplified daily consumption behaviour (minimum data) (meter data collection)***

Summer day (June/July/August), NA

Winter day (November/December/January), NA

2.6 M. R. Creete (Greece), Partner 5: MAICH

This section is a summary of internal working document: T *5.1.3 ib report MAICh v1*.

Identified building P5-1. Academic research institute-Municipality of Chania , Prefecture of Chania

Evaluation of the energy consumption of the building

The structures in the campus of the Mediterranean Agronomic Institute of Chania are located at 35o29'39''N 24o2'57''E on a surface with 6-10 degrees slope and a South-Southwest aspect. The rooftops receive direct sunlight for the entire day without obstruction from the present trees and there are no other tall structures in the immediate area.

The pilot building in the campus of the Mediterranean Agronomic Institute of Chania is an old construction (1982) which has undergone some restoration. It operates during all the months of the year, for five days per week (closed in weekends).

The energy consumption includes:

- Use of electricity mainly for lighting, but also for the operation of some electrical appliances.
- Use of oil and gas for space heating and hot water. During the summer there are as cooling systems small air conditioners.

Building gross surface (m2) is 11.200 m2.

The energy consumption is:

- 440.160kwh / year of oil and gas
- 965.440kwh / year of electricity.

Therefore, the energy consumption in this building is:

- Electricity: 86,2 kwh/m2 per year
- Oil and Gas: 39,3 kwh/m2 per year
- Total: 125,5 kwh/m2 per year

Suggestions and Measures for Energy Upgrade for the pilot building in the campus of the Mediterranean Agronomic Institute of Chania. The following measures are proposed to upgrade the building:

- Replacement of single glazing with double
- Thermal insulation of the roof of the building
- Replacement of old inefficient light bulbs with energy saving bulbs
- Changing the existing burner - boiler with two smaller ones that will consume biomass fuel (wood or wood products)
- Installing various renewable energy technologies such as solar panels and photovoltaic system and a Stirling dish on the roof of the building to inform and familiarize students with the applications of solar energy.

➢ ***General building data sheet***

Building data	**University / School**
Building ownership	Ministry of Agriculture
Building identification	Academic Research
Building location	Municipality of Chania, Crete, Greece
Building use (office, health center, school…)	Institute
Building gross surface (m2)	11,200
Contracted power, electricity (kW)	-
Contracted power, gas (kW)	0
Occupation schedule	
Daily schedule (x am - x pm)	9:00-17:00
Weekend schedule (x am - x pm)	closed
Weekly schedule (daily/weekend)	Daily
Monthly schedule (vacations)	12 months
Building annual energy consumption (kWh) (final)	1,405,600
Building annual energy consumption (kWh/m2) (final)	125.5
Heating (kWh/m2) + HOT WATER	39.3
Cooling (kWh/m2) +VENTILATION	15.5
Ventilation (kWh/m2)	-
Light (kWh/m2)	31.7
Equipment (kWh/m2)	39
Pump & others (kWh/m2)	0
Hot Water (kWh/m2)	-
SAI (permanent loads) (kWh/m2)	0
Total (kWh/m2) (final energy) :	125.5
Electricity consumption, annual average (kWh/m2)	86.2
Electricity consumption,daily (kWh/m2)/day	0.33
Electricity consumption, weekend (kWh/m2)	0
Oil&Gas consumption, annual average (kWh/m2)	39.3
Oil&Gas consumption,daily days (kWh/m2)/day	0.15
Oil&Gas consumption, weekend (kWh/m2)	0
SWOT analysis*	
Strengths	Public visibility-Educational purpose
Weaknesses	Lack of experience in maintenance
Opportunities	Dissemination in the local society
Threats	Complicated legal framework due to the fact that Crete is an island

➢ ***Simplified annual electrical consumption behaviour***

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Electrical consumption KWh (bill)	86000	78800	79600	66000	75600	81200	107440	105200	76000	72000	68000	69600

➢ ***Simplified daily power consumption behaviour (meter data collection)***

*With reference to one out of the block of buildings in MAICh

Summer day (June/July/August)

Schedule (h)	8:00	12:00	16:00	20:00	24:00	4:00
Power consumption KW (meter)	11	21	22	10	4	3

Identified building P5-2. NEA CHORA SENIOR HIGH SCHOOL, MUNICIPALITY O CHANIA, PREFECTURE OF CHANIA

Evaluation of the energy consumption of the building

The building that housed the senior high school was built in 2005 and is therefore quite modern. It operates seasonally from 1/9 to 30/6 during the school year and remains closed during the summer months.

The energy consumption includes:

- Use of electricity mainly for lighting, but also for the operation of some electrical appliances
- Use of oil for space heating
- Since the summer school was closed, and there are no cooling systems apart from a few small air conditioners in teachers' offices.
- During the operation of the school, hot water is not used, and there are therefore no production systems for hot water.

The total building area is 2.190 m2.

The electricity consumption is 23.652kwh / year and the oil consumption is 4.600lt / year.

Therefore, the energy consumption in this building is:

- Electricity: 10,8 kwh/m2 per year
- Thermal energy: 24,4 kwh/m2 per year
- Total: 35,2 kwh/m2 per year

Comparing the energy indicators of this school with appropriate indicators for schools in Northern Greece (but not Crete) in climatic zones C and D (not A), they are as follows:

Electricity consumption in schools in Evros in 2001-2005

- Electricity: 7,89-14,78 kwh/m2 per year
- Average value : 10,14 kwh/m2 per year
- Thermal energy: 54,11-125,19 kwh/m2 per year
- Average value : 72 kwh/m2 per year

The difference in the consumption of thermal energy between the Nea Chora senior high school in Chania and schools of Evros is mainly due to different climatic conditions between the two. As for the consumed electricity, we observed substantial differences.

Suggestions and Measures for Energy Upgrade of the Nea Chora senior high school in Chania

The following measures are proposed to upgrade the building:

- Replacement of old inefficient light bulbs with energy saving bulbs
- Changing the existing burner - boiler with another which will consume biomass fuel (wood or wood products)
- Installing the roof of the building with a small solar panel and a small photovoltaic system to inform and familiarize students with the applications of solar energy.

- ***General building data sheet***

Building data	**University / School**
Building ownership	Ministry of education
Building identification	Secondary-high School
Building location	Municipality of Chania, Crete, Greece
Building use (office, health center, school,...)	School
Building gross surface (m2)	2.190
Contracted power, electricity (kW)	-
Contracted power, gas (kW)	0
Occupation schedule	
Daily schedule (x am - x pm)	9:00-16:00
Weekend schedule (x am - x pm)	closed
Weekly schedule (daily/weekend)	Daily
Monthly schedule (vacations)	Closed in July, August, Chrismas and Easter holidays
Building annual energy consumption **(kWh) (final)**	77.088
Building annual energy consumption **(kWh/m2) (final)**	35,2
Heating (kWh/m2) + HOT WATER	24,4
Cooling (kWh/m2)	0
Ventilation (kWh/m2)	0
Light (kWh/m2)	10,8
Equipment (kWh/m2)	0
Pump & others (kWh/m2)	0
Hot Water (kWh/m2)	-
SAI (permanent loads) (kWh/m2)	0
Total **(kWh/m2) (final energy) :**	35,2
Electricity consumption, annual average (kWh/m2)	10,8
Electricity consumption,daily (kWh/m2)/day	0,056
Electricity consumption, weekend (kWh/m2)	0
Oil&Gas consumption, annual average (kWh/m2)	24,4
Oil&Gas consumption,daily days (kWh/m2)/day	0,126
SWOT analysis*	
Strengths	Public visibility-Educational purpose
Weaknesses	Lack of experience in maintenance
Opportunities	Dissemination in the local society
Threats	Complicated legal framework concerning installation and operation of such systems due to the fact that Crete is an island

- ***Simplified annual consumption behaviour (minimum data)***

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy consumption KWh (bill)	8565	8565	8565	4284	8565	8565	0	0	8565	8565	8565	4284

Identified building P4-3. KOLIMBARI SENIOR HIGH SCHOOL; MUNICIPALITY PLATANIA, CHANIA

Evaluation of the energy consumption of the building

The building is an old high school construction (1980) which has undergone some restoration. It operates seasonally from 1/9 to 30/6 during the school year and remains closed during the summer months.

The energy consumption includes:

a) Use of electricity mainly for lighting, but also for the operation of some electrical appliances

b) Use of oil for space heating (according to the Director, the heating of the school in winter is incomplete due to a low budget available for the purchase of fuel).

Since summer the school was closed and there are no cooling systems apart from a few small air conditioners in the teachers' offices.

During operation of the school hot water is not used and there are therefore no production systems for hot water.

The roof of the building is not insulated and neither is the shell wall of the building.

During the initial construction of the building plain glass windows were placed, but during the renovation of the windows, repositioned to the north, double glazing was installed in aluminum frames.

The building has a common burner - boiler, a common pipe transport system for hot water to both the Junior and Senior high school, resulting in wasted energy as many times it is required to heat a portion of one building and not the other.

The total building area is 4.500 m2.

The electricity consumption is 23.400 kwh / year and the oil consumption is 4.500 lt / year.

Therefore, the energy consumption in this building is:

a) Electricity: 5,2 kwh/m2 per year

b) Thermal energy: 11,6 kwh/m2 per year

Total: 16,8 kwh/m2 per year.

Comparing the energy indicators of this school with appropriate indicators for schools in Northern Greece (but not Crete in climatic zones C and D (not A), the results are as follows:

Electricity consumption in schools in Evros in 2001-2005

Electricity: 7,89-14,78 kwh/m2 per year

Average value : 10,14 kwh/m2 per year

Thermal energy: 54,11-125,19 kwh/m2 per year

Average value : 72 kwh/m2 per year

The large difference in thermal energy consumption among Kolymbari senior high school and schools of Evros is due to:

a) different climatic conditions

b) incomplete building heating for the school in Kolymbari

Suggestions and Measures for Energy Upgrade for the Kolymbari senior high school

The following measures are proposed to upgrade the building:

a) Replacement of single glazing with double

b) Thermal insulation of the roof of the building

c) Replacement of old inefficient light bulbs with energy saving bulbs

d) Changing the existing burner - boiler with two smaller ones (one for the junior school and one for the senior) that will consume biomass fuel (wood or wood products)

e) Installing a small solar panel and a small photovoltaic system on the roof of the building to inform and familiarize students with the applications of solar energy.

➢ ***General building data sheet***

Building data	**University / School**
Building ownership	Ministry of education
Building identification	Secondary, High School
Building location	Municipality of Platanias, Crete, Greece
Building use (office, health center, school…)	School
Building gross surface (m2)	4.500
Contracted power, electricity (kW)	-
Contracted power, gas (kW)	0
Occupation schedule	
Daily schedule (x am - x pm)	9:00-16:00
Weekend schedule (x am - x pm)	closed
Weekly schedule (daily/weekend)	Daily
Monthly schedule (vacations)	closed in July,August, Chrismas and Easter holidays
Building annual energy consumption (kWh) (final)	75.600
Building annual energy consumption (kWh/m2) (final)	16,8
Heating (kWh/m2) + HOT WATER	11,6
Cooling (kWh/m2)	0
Ventilation (kWh/m2)	0
Light (kWh/m2)	5,2
Equipment (kWh/m2)	0
Pump & others (kWh/m2)	0
Hot Water (kWh/m2)	-
SAI (permanent loads) (kWh/m2)	0
Total (kWh/m2) (final energy) :	16,8
Electricity consumption, annual average (kWh/m2	5,2
Electricity consumption,daily (kWh/m2)/day	0,027
Electricity consumption, weekend (kWh/m2)	0
Oil&Gas consumption, annual average (kWh/m2)	11,6
Oil&Gas consumption,daily days (kWh/m2)/day	0,06
SWOT analysis*	
Strengths	Public visibility-Educational purpose
Weaknesses	Lack of experience in maintenance
Opportunities	Dissemination in the local society
Threats	Complicated legal framework concerning installation and operation of such systems due to the fact that Crete is an island

➢ ***Simplified annual consumption behaviour (minimum data)***

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Energy consumption KWh (bill)	8400	8400	8400	4200	8400	8400	0	0	8400	8400	8400	4200

2.7 M. R. Catalonia (Spain), Partners 6 & Ben: EsE & UAB

This section is as a summary from Project Technical Team's working document "T 5.1.3. 'ib' report_EsE_v2".

Identified building P6-1. INSTITUT DE CIÈNCIES DEL MAR - CSIC, BARCELONA

➢ ***General building data sheet***

Building data		
Ownership	CSIC, Spanish Government	
Identification	Institut de Ciències del Mar- CSIC	
Location	Barcelona	
Use	Research and office Centre	
Total Built Surface	13.741 m^2	
Air-conditioner Surface	7.724 m^2	
Illumined Surface	12.630 m^2	
Contracted power:		
Electricity (kW)	Tariff: 6.1 Power: 651 kW	
Gas (kW)	Tariff: 3.4P Consumption > 100.000 kWh/year	
Occupation schedule		
Daily schedule (x am - x pm)	08:00-20:00	
Weekend schedule (x am - x pm)	09:00-15:00	
Weekly schedule (daily/weekend)	Monday-Friday	
Monthly schedule (vacations)	Don't closed	
Annual Hours Working	3.744	
Annual Energy Consumption	**kWh/year**	**kWh/m^2 /year**
Heating		
Cooling		
Ventilation		
Light		
Equipment		
Pump & others		
Hot Water		
SAI (permanent loads)		
Final Average Energy	**kWh**	**kWh/m^2**
Electricity consumption, annual average	3.125.861,00	247,49
Electricity consumption, daily average	8.564,00	0,68
Electricity consumption, weekend average		
SWOT Analysis		
Strengths	Great visibility because is located at harbour and into of the one of most famous neighbourhoods of Barcelona	
Weaknesses	Not exist monitoring system	
Opportunities	Big dissemination in the local and foreign society	
Threats	Possible problems due to the proximity to the sea, air salinity	

➢ ***Simplified annual consumption behaviour***

Electric Energy Consumption (MWh) in 2012											
Gen	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Des**
238,38	228,31	238,98	224,11	254,53	290,34	320,37	315,79	268,27	258,56	248,17	240,06

Identified building P6-2. AGÈNCIA DE L'HABITATGE DE CATALUNYA, BARCELONA

- ***General building data sheet***

Building data		
Ownership	Catalan Government	
Identification	Agència de l'Habitatge de Catalunya / Housing Agency of Catalonia	
Location	Barcelona	
Use	Office	
Total Built Surface	5.328	m^2
Contracted power:		
Electricity (kW)	Tariff: 3.0A	Power: 315 kW
Gas (kW)	Tariff: 3.3P	Consumption ≤ 87.500 kWh/year

Occupation schedule	
Daily schedule (x am - x pm)	08:00-15:00
Weekend schedule (x am - x pm)	Closed
Weekly schedule (daily/weekend)	Monday-Friday
Monthly schedule (vacations)	Don't closed

Annual Energy Consumption	**kWh/year**	**kWh/m² /year**
Heating		
Cooling		
Ventilation		
Light		
Equipment		
Pump & others		
Hot Water		
SAI (permanent loads)		

Final Average Energy	**kWh**	**kWh/m²**
Electricity consumption, annual average	680.549,00	127,73
Electricity consumption,daily average	2.031,49	0,38
Electricity consumption, weekend average		

SWOT Analysis	
Strengths	Building in process of adaptation and reduction of energy consumptions
Weaknesses	Few consumption in weekend
Opportunities	Generate synergies with European Project MARIE
Threats	Little visibility from the street

- ***Simplified annual consumption behaviour***

Electric Energy Consumption (MWh) in 2012											
Gen	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Des**
50,90	53,11	53,91	50,16	59,13	63,62	69,29	63,51	54,24	60,56	53,66	48,48

Identified building P6-3. OFFICES PUBLIC BUILDING, AT SANT CUGAT

- ***General building data sheet***

Building data		
Ownership	Sant Cugat Council	
Identification	OFFICE	
Location	Sant Cugat	
Use	Office and Residential	
Illumined Surface	8.000	m^2
Contracted power:		
Electricity (kW)	Tariff: 6.1	Power: 500 kW
Gas (kW)		

Occupation schedule	
Daily schedule (x am - x pm)	08:00-20:00
Weekend schedule (x am - x pm)	09:00-13:00
Weekly schedule (daily/weekend)	Monday-Saturday
Monthly schedule (vacations)	2 weeks/year
Annual Hours Working	

Annual Energy Consumption	**kWh/year**	**kWh/m^2 /year**
Heating	284.800,00	35,6
Cooling	316.800,00	39,6
Ventilation		**
Light	284.240,00	35,53
Equipment	37.600,00	4,7
Pump & others		included cooling
Hot Water		NO HWP
SAI (permanent loads)	443.200,00	55,4

Final Average Energy	**kWh**	**kWh/m^2**
Electricity consumption, annual average	1.205.659,75	150,71
Electricity consumption, daily average	3.598,98	0,45
Electricity consumption, weekend average		

SWOT Analysis	
Strengths	Easy adaptation of technologies on the roof/facade
Weaknesses	Location in small town
Opportunities	Dissemination in local society
Threats	Lack of experience in maintenance

Identified building P6-4. HOSPITAL DE MOLLET, MOLLET DEL VALLÉS, BARCELONA AREA

➢ ***General building data sheet***

Building data		
Ownership	Fundació Sanitaria Mollet / Health public Foundation	
Identification	Hospital de Mollet	
Location	Mollet del Valles	
Use	Sanitary	
Total Built Surface	22.182,00	m^2
Contracted power:		
Electricity (kW)	Tariff: 6.1	Power: 1,600 kW
Gas (kW)	Tariff: Supra Gas	Consumption >1,000,000 kWh/year
Occupation schedule		
Daily schedule (x am - x pm)	All day	
Weekend schedule (x am - x pm)	All day	
Weekly schedule (daily/weekend)	Monday-Friday	
Monthly schedule (vacations)	Don't closed	
Annual Hours Working	8.760,00	
Annual Energy Consumption	**kWh/year**	**kWh/m^2 /year**
Heating	1.643.000,00	74,07
Cooling	2.171.764,00	97,91
Ventilation	2.477.000,00	111,67
Light	472.000,00	21,28
Equipment	778.000,00	35,07
Pump & others	916.000,00	41,29
Hot Water	1.134.000,00	51,12
SAI (permanent loads)	250.000,00	11,27
Final Average Energy	**kWh**	**kWh/m^2**
Electricity consumption, annual average	7.604.161,00	342,81
Electricity consumption,daily average	20.833,32	0,94
Electricity consumption, weekend average		
Gas consumption, annual average		
Gas consumption,daily average		
Gas consumption, weekend average		
SWOT Analysis		
Strengths	Great Visibility and Dissemination	
Weaknesses	Location in small town	
Opportunities	Generate synergies with European Project GREEN HOSPITAL	
Threats	Lack of experience in maintenance	

➢ ***Simplified annual consumption behaviour***

Electric Energy Consumption (MWh) in 2012											
Gen	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Des**
650,18	584,72	614,03	572,92	595,10	674,82	703,92	779,13	618,79	651,38	581,26	577,92

Identified building P6-5. MUNICIPAL PAVILION, GRANOLLERS, BARCELONA AREA

- ***General building data sheet***

Building data		
Ownership	Granollers City Council	
Identification	PAVILION	
Location	Granollers	
Use	Sport Centre	
Total Built Surface	7.112	m^2
Contracted power:		
Electricity (kW)	Tariff: 3.0A	Power: 55.426 kW / 55.426kW / 87kW
Gas (kW)	Tariff: 3.4P	Consumption > 100.000 kWh/year
Occupation schedule		
Daily schedule (x am - x pm)	08:00-23:30	
Weekend schedule (x am - x pm)	09:00-19:00	
Weekly schedule (daily/weekend)	Monday-Sunday	
Monthly schedule (vacations)	Don't closed, in summer is reduced its activity	
Annual Hours Working		

Annual Energy Consumption	**kWh/year**	**kWh/m² /year**
Heating		
Cooling		
Ventilation		
Light		
Equipment		
Pump & others		
Hot Water		
SAI (permanent loads)		

Final Average Energy	**kWh**	**kWh/m²**
Electricity consumption, annual average	96.652,00	13,59
Electricity consumption,daily average	288,51	0,04
Electricity consumption, weekend average		

SWOT Analysis	
Strengths	Great Visibility
Weaknesses	Location in small town
Opportunities	Dissemination in local society
Threats	Lack of experience in maintenance

- ***Simplified annual consumption behaviour***

Electric Energy Consumption (MWh) in 2012											
Gen	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Des**
9,10	8,80	8,36	7,48	7,87	8,39	6,58	5,45	7,89	9,00	9,28	8,45

3 BUILDINGS PRE-SELECTED ('PB')

3.1 Summary and references

The following pages build mainly in the working document *"T 5.2-3 Pre-selected buildings report-evaluation"* (30/05/2014 version). A more complete information regarding each pre-selected building –specially regarding the respective building's would-be hosting-surface (images) and solar system specificities (sketches) may be found in that working document.

Having been reviewed by the Project Technical Team (PTT) the data regarding the 48 initially identified & analysed buildings, 14 of them were pre-selected for more in-deep study regarding which could be the better ones as for hosting project's solar systems.

These pre-selection also included to make precise a first approach to the respective type of solar technology/system proposed by each Partner as more appropriate for each pre-selected building.

In the following points –one for each Partner/MR- it is presented a summary-description for each of those 33 pre-selected buildings, and for each of them it is stated, as a first approach, the conceptual proposal regarding the type of project's solar system/technology the PTT approved as more convenient. This first approach to the type of installation to carry out in each pre-selected building also include the respective power of the system that could be installed, as well as its cost-forecast, so to have at the time a basis for then matching each partner's budget availability and project's commitments regarding total power to be installed. That information is summarised, at the beginning of each partner's point, in a table, in which it is also stated at the bottom the at the time proposal by the PTT regarding which of the listed pre-selected buildings ('pb') to finally select for carrying out the proejct's applciations ('b').

3.1.1 Summary of the pre-selected buildings ('pb')

'id' code	PARTNER / ('pb' code) .Building identification (name)	Location (city)	Type of building (use)	Type of owner institution
	P1 – AEIPLOUS (3 buildings)	**Patras**		
1	1. University of Patras in Agrinio	Agrinio	University / Scientific	University of Patras
2	2. Amfilochia Town Hall	Amfilochia	Public office building	Municipality of Amfilochia
4	3. Scientific Park	Platani	Offices / Laboratories	Ministry of economics

'id' code	PARTNER / ('pb' code) .Building identification (name)	Location (city)	Type of building (use)	Type of owner institution
	P2 – EAEE (9 buildings)	**Marsa Matrouh**		
1	1. Dewan El Mohafza	Matrouh	Public office building	Governorate of Matrouh
4	2. Matrouh Local assembly	Matrouh	Public office building	Governorate of Matrouh
5	3. Matrouh Children Hospital	Matrouh	Hospital / Health center	Ministry of Health
7	4. Faculty of Education	Matrouh	University / Scientific	Ministry of High Education
8	5. M.E.I.L.S school	Matrouh	School / Educational	Ministry of Education
9	6. ElNegila International Hospital	ElNegila	Hospital / Health center	Ministry of Health
11	7. Sidi Barani Hospital	Sidi Brani	Hospital / Health center	Ministry of Health
13	8. Matrouh General Hospital	Matrouh	Hospital / Health center	Ministry of Health
14	9. (El Hamam Hospital) replaced by: Matrou public Library.	Matrouh	Library	
	P3 – BAU (9 buildings)	**Al-Salt & Irbid**		
1	1. Science Building	Al-Salt	Offices, classrooms	BAU University
2	2. Engineering building	Al-Salt	Offices, classrooms, Labs	"
4	3. Scientific research Deanship	Al-Salt	Offices	"
5	4. BAU main librery	Al-Salt	Offices, halls	"
6	5. Science & Engineering workshop	Al-Salt	workshop	"
7	6. Finance building	Al-Salt	Offices	"
11	7. Al-Khawarizmi Building	Irbid-Huson	Computer labs	"
12	8. Main building	"	Offices, labs.	"
13	9. Workshop building	"	Workshops, offices, labs	"

'id' code	PARTNER / ('pb' code) . Building identification (name)	Location (city)	Type of building (use)	Type of owner institution
	P4 – AU (5 buildings)	**Alexandria**		
1	1. Faculty of Science	Alexandria	Offices, classrooms	AU university
2	2. Administration, Faculty of Science,	"	Offices, classrooms	"
3	3. Build. A, Faculty of Science	"	Teaching	"
7	4. Building B, Facultuy of Sciences	"	Teaching	AU
8	5. Electrical Engineering Dep.	"	Teaching	"
	P5 – MAICh (3 buiildings)	**Kriti**		
1	1. MAICh campus, Conference centre,	Chania	Research and teaching	Ministry of Agriculture
2	2. Nea Chora Senior High School	Chania	School	Municipality of Chania
3	3. Kolimbari snior High School	Platania	School	Municipality of Platania
	P6 – EsE, & UAB-BEG (5 buildings)	**Catalonia**		
1	1. Institut de Ciències del Mar	Barcelona	Research Centre	CSIC – Ministry of Science
2	2. Housing Agency of Catalonia	Barcelona	Public Administration	Catalan Government
3	3. Municipality Offices building; afterwards replaced by: Primary School Catalunya	Sant Cugat del Vallés	Offices - School	Municipality of St. Cugat
4	4. Mollet Hospital	Mollet del Vallés	Hospital	Mollet Heath Foundation
6	5. Area Metropolitana de Barcelona's site; afterwards replaced by: Eco Park 2	Barcelona - Parets	Offices Waste treatment	AMB AMB

3.1.2 Summary of the tye of solar systems that were proposed for the pre-selected buildings

-22 different systems have been proposed: **17 BIPV** systems (86% of the kWp; 76% of the budget), **4 DS** (8% kW - 14% €) and only **1 PT-SCH** (6% kW - 10% €).

- **BIPV** is going to be the main application. It provides a wide range of technological and cost options, from 3,5 - 4,75 €/Wp. We need to focus our efforts in the "Executive project" and "Tender" stages in order to fit all the technical requirements in the assigned budget.

Primary structures design and execution, like canopies, pergolas or brise-soleils, will be specifically challenging.

- Dish Stirling has been selected by 4 partners due to its technological dissemination effect and the modularity of the system costs, although its expensive cost ratio. The "Pilot" stage, to be implemented in Barcelona till the end of Summer, will be extremely important to learn from the mounting and operation process. Technical experts and SMEs local technicians involved in the installation can attend the programmed training session.

- Parabolic Trough - Solar Cooling and Heating is the most challenging technology in terms of energy performance and technical and economical viability.

Regarding PT-SCH suitability, we knew from the very beginning that it wouldn't be competitive at this small scale. There are a lot of factors that increase the cost ratio (monitoring and project costs, small scale absorption machine, etc).

However, it's very important to be able to quantify how all these issues affect to the viability of the system.

Even though the solution is not the most cost efficient, considering the innovative approach, the Project could make the decision to boost one or two installations, in order to have demonstrative units that might encourage other projects in a more suitable system scale.

However, in order to minimize the risks, and avoid failed experiences, we only should select locations and users totally committed with the O&M of these demonstrative units.

Only Alexandria University has been included at the final selection list. They offer a representative building and a strong commitment from the university to boost and maintain the system.

Matrouh governorate building, was considered too risky, in terms of building loads and future O&M.

BAU has an interesting candidate building, with big cooling demand. However, the partner and the institution doesn't seem to feel comfortable with the decision.

- PV "cooling" might be an interesting alternative for Matrouh Governorate building, in other to offer an alternative to the proposed SCH.

By retrofitting the existing cooling system (highly efficient Heat Pump) and integrating a PV pergola at the roof top, visible and useful to the visitors and building users.

Even though is available in the market, this technological option has to be further detailed in terms of equipment selection and costs.

-Parabolic Trough for electricity generation (dish stirling or turbine) was finally discarded due to the lack of cost efficient solutions in the market at this small scale.

3.1.3 Building pre-selection 'pb' and selection 'b' proposal

1. Building selection criteria:

-Most of the 'pb' and 'b' fulfil the initial requested conditions.

-The most challenging points are:

(1;2) Public access, educational purposes and maintenance commitment have been prioritized at the building selection.

(4) It is required a pre-agreement with the building owner and user. It should be signed before the official acceptance of the 'b' candidates lists.

(7;10) Some of the proposed 'b' still require some more research in terms of energy loads (electricity, heating and cooling). This data should be collected before the beginning of the "Executive Projects".

(8;9) Some 'b' buildings (mainly located in Egypt) would require construction and energy systems partial retrofitting.

1. *Owned and used by public institutions. Energy savings/incomes from the renewable energy generation must benefit the public institution. External energy management of the building (ESCO) it's also possible provided the last premises are fulfilled.*
2. *Buildings with especial visibility or public interest will be particularly valued.*
3. *The public beneficiary of the installation has to be able to take over some complementary costs (associated to the strictly renewable energy system: technical rooms, structural reinforcements, etc)*
4. *The building owner and user must get the compromise to carry out the operation and maintenance of the RE system (at least 7 years after its commissioning).*
5. *The system should be defined at the beginning of 2014 and executed before June 2015.*
6. *Buildings with good energy performance will be prioritized (coherence with nZEB initiative).*

   RE facilities could contribute to decrease the building energy demand (on the logics of the nZEB policies) by minimizing the solar gains to the building during hot seasons.
7. *Buildings with significant continuous loads (during the day/night period and along the year)*
8. *Building should be properly constructed, with no significant issues in their structural system and their watertight envelope. It should have enough envelope surface to integrate the RE systems*
9. *Building energy systems (electrical, HVAC) should be in good conditions and should allow the RE interconnection.*
10. *The building should allow accessible data collection of:*

    - General data (year of construction, building owner and user, gross area…)
    - Occupation schedule
    - Building features (construction)
    - Building envelope parameters
    - Electric system
    - Heating / Cooling system
    - Energy consumption data: electricity and gas consumption, energy consumption profile
    - Monitoring system
    - Storage system

3.2 M. R. Dikiti-Ellade and Patras (Greece) , Partner 1: Aeiplous.

Three out of the four identified & analysied public buildings by AEIPLOUS were pre-selected by the Project Technical Team (PTT):

P1. PATRAS (AEIPLOUS) Summary			
'pb' pre-selected buildings	**Solar energy system that would be installed**	**power (kW)**	**Estimated cost (€)**
1. University of Patras building in Agrino	A) BIPV: glass laminated crystalline. Roof pergola	6	104.580 €
	B) BIPV: glass laminated crystalline. Car shelter	15	
2. Town hall building in Amfilochia	A) BIPV: glass laminated crystalline. SW façade	11,30	99.600 €
	B) BIPV: glass laminated crystalline. Roof	8,70	
3. Patras science park	A) BIPV: glass laminated crystalline. Roof pergola	7,80	91.830 €
	B+C) BIPV: EFTE Car shelter	7,20	
	D) BIPV: glass laminated crystalline Skylight	6,00	
P1's proposal for: 'b', selected buildings : pb 1			

1.University of Patras building in Agrino	**BIPV: A) Car shelter (15kWp) + B) Roof pergola (6 kWp) = 21 kWp** **SWOT:** **Strengths:** public visibility; educational purposes **Weaknesses:** large vacation time **Opportunities: --** **Threats:** vandalism; maintenance issues **Comments:** **A) Roof pergola:** Building users should be able to use the pergola shadowed area. Accessibility to the roof **B) Car shelter:** Existing structure typology? Should the PV glass substitute an existing material? ✓ Do the Permanent Loads include Sundays and holyday periods? The global figures of Permanent Loads (22.500 kWh/y) and Production (24.000 kWh/y) are similar. However, we should find out the daily production peak in order to estimate the overall production loses.
2. Town hall building in Amfilochia	**BIPV: WF (0,8 kWp) + SWF (12,1 kWp) + SEF (4 kWp) + Roof (4 kWp) = 21 kWp** **SWOT:** **Strengths:** --- **Weaknesses:** low energy demands; space availability; roof insulation problems **Opportunities: --** **Threats:** maintenance not guaranteed ✓ We should be able to find some Strengths / Opportunities in our pre-selected buildings **Comments:** ☝ SE façade is opaque, so it looks more suitable for conventional opaque PV modules. ✓ Try to avoid solar fields smaller than 5 kWp, in order to optimize the inverter output range (5 kWp...). If we want to optimize the energy production, each different solar field orientation implies one inverter. ✓ We should control the Permanent Loads in order to minimize production loses.
3. Patras science park	**BIPV) glass laminated semitransparent crystalline and flexible thin film** **A) Canopies + B+C) Car Park + Skylight D = 21 kWp** **SWOT:** **Strengths:** Public visibility, educational purposes, maintenance guarantee, administrative flexibility, -maintenance guarantee, as in the Science Park building there is expertised technical staff - there is more administrative flexibility relative to the other buildings **Weaknesses:** --- **Opportunities:** Probable plus funding **Threats:** ---

Comments:

A) Car shelter: Existing structure? Could the primary structure be fitted in the budget?

- ☝ We should find semitransparent thin film modules with a cost range that fits into the global budget. Another option would be, to consider the semitransparent PV modules for both, Car Shelter and Pergola.

B) Roof pergola:

- ☝ Existing structure? Could the primary structure be fitted in the budget?
- ☝ We should control the Permanent Loads in order to minimize production loses.
- ✓ Good options in terms of PV integration and energy savings and user comfort.
- ✓ The building appears to be in good conditions and perfectly suitable.

3.3 M. R. Marsa-Matrouh (Egypt), Partner 2: EAEE

Nine out of the forteen identrified & analysed buildins were finally pre-selected for more indeep analysis regarding the possibilities for hosting projects' solar systems

P2. (EAEE), summary

'pb' pre-selected buildings	Solar Renewable Energy system (RE)	Installed power (kW)	Estimated cost (€)
1.Governorate building	BIPV-glass laminated semitransparent crystalline	24.2	163,600
2.Local assembly	BIPV-glass laminated semitransparent a-Si thin film	10	42,500
3.Children hospital	BIPV-glass laminated semitransparent a-Si thin film	10	42,500
4.Education faculty	BIPV-glass laminated semitransparent crystalline	5	23,750
5.MIELS school	BIPV-glass laminated semitransparent crystalline	5	23,750
6.Negila hospital	BIPV-glass laminated semitransparent a-Si thin film	10	42,500
7.Sidi Barani hospital	BIPV-glass laminated semitransparent a-Si thin film	10	42,500
8.Matrouh general hospital	BIPV-glass laminated semitransparent a-Si thin film	30	127,500
9.Matrouh public library	BIPV- flexible thin film	20	99,000
'b' selected buildings proposal		**Total ++installed power 'b'**	**Total cost estimation (€)**
1; 5; 8; 9		**79.2 kWp**	**413,600€**

1. Governorate of Matrouh	**BIPV: glass laminated semitransparent crystalline modules, pergola = 24,8 kWp** (+ 20 KW cooling power (high efficient heat pump)) **SWOT:** **Strengths:** -high public visibility -PV cooling will be the first Solar application in the region **Weaknesses:** -lack of experience in maintenance -During the winter season the building has no cooling demand and a negligible heating load, minimizing its performance. **Opportunities:** -Exposure in the press and media -Innovative technical solution. Local SMEs active in the field of RES will get experience form the O&M. **Threats:** exposed to salty air, sand and dust as nearby the sea **Comments:** ✓ The roof surface and orientation are suitable. ☝ There's a lack of information regarding cooling and heating loads in order to be able to undertake a proper system dimensioning, ☝ Concerns on possible additional costs to retrofit the existing interior fancoils units. ✓ BIPV for cooling purposes appears to be a good solution. Semitransparent pergola installed on the roof (north area), that can be used by the building users and visitors for certain social events or activities. a) The electricity production can be used to feed the existing cooling system (retrofiting some components when required) + high efficient Heat Pumps. Taking into consideration the announced permanent loads (6 kW), a system of around 15-30 kWp might be feasible in order to minimize energy production loses during inactivity periods. 20 kWp would produce around 10% of the total annual building energy consumption (389.000 kWh/y, in the report) ☝ The Matrouh governorate appears to be a very good opportunity for BIPV, since the roof might be used as meeting area, with nice views over the sea. It is suggested to install a pergola (shading device) and not simple standard modules.
2. Local assembly. Governorate of Matrouh.	**BIPV) glass laminated semitransparent a-Si thinfilm, pergola = 10 kWp** **SWOT:** **Strengths:**high public visibility; **Weaknesses:** -lack of experience in maintenance -low electricity consumption as only one floor is occupied **Opportunities:** exposure in the press and media **Threats:** exposed to salty air, sand and dust as nearby the sea

Comments:

- ✓ The roof surface and orientation look suitable.
- ✓ The proposed combination of building loads and system integration doesn't look suitable.
- ☝ The building loads are extraordinarily low for the building typology and its operation schedule.

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3. Children Hospital. Ministry of Heath. Matrouh	**BIPV: a-Si glass laminated semitransparent = 9,82 Wp** **SWOT:** **Strengths:** high public visibility **Weaknesses:** lack of experience in maintenance **Opportunities:** Exposure in the press and media **Threats:** exposed to salty air, sand and dust as nearby the sea **Comments:** ☝ The proposed combination of building loads and system integration doesn't look suitable. ☝ The building loads are extraordinarily low for the building typology and its operation schedule. ☝ The building loads are almost the same as the RE production (around 16.000 kWh/y.With no net metering option and some difficulties for grid connection, the storage system appears to be the only way to minimize energy production loses. The vacation period might increase this issue. ☝ The building permanent loads are very low (1-2 kW) ✓ The proposed roof top location would require a primary substructure (like a pergola) in order to integrate the propose semitransparent a-Si technology.
4. Faculty of education, AU branch	**BIPV) glass laminated semitransparent crystalline modules = 5 kWp** **SWOT:** **Strengths:** - public visibility purposes **Weaknesses:** - The building location doesn't look suitable due to nearby shadows. - Lack of experience in maintenance. **Opportunities:** -The installation and operation of the systems will give the opportunity to post-graduate students to do research. -Local SMEs and stakeholders will be informed and involved. **Threats:** - exposed to salty air, sand and dust as nearby the sea **Comments:** ✓ Appropriate metal roof surface for flexible thin film ☝ Building total and permanent loads should be defined in order to verify the suitability of the proposed PV installed power. ☝ Building should be totally operative once the BIPV be installed.

5. MEILS school. Ministry of Education. Matrouh	**BIPV) glass laminated semitransparent crystalline modules. Ground mounted pergola = 5,06 kWp** **SWOT:** **Strengths:** - educational and visibility purposes **Weaknesses:** **-**lack of experience in maintenance -The access to the roof i too difficult for students. **Opportunities:** **- I**nform and familiarize students on importance and potential of solar energy. - Local SMEs and stakeholders will be informed and involved. - Exposure in the press and media. **Threats:** **-**exposed to salty air, sand and dust as nearby the sea **Comments:** ✓ The pedagogic side and the building users commitment are clear strengths. ☝ The location of the pergola has to be analyzed according user needs and electrical board proximity. ☝ Since young students will be playing around and might use the installation as a learning workshop, security issues will be extremely important .
6. EL-Negila Int'l Hospital	**BIPV) glass laminated semitransparent thin film modules = 10 kWp** **SWOT:** **Strengths:** public visibility purposes **Weaknesses:** The building location doesn't look suitable due to nearby shadows. Lack of experience in maintenance. **Opportunities:** **-**Dissemination in the local society -Exposure in the press and media. **Threats:** exposed to salty air, sand and dust as nearby the sea **Comments:**
7. Sidi Barani Hospital	**BIPV) glass laminated semitransparent a-Si film = 10 kWp** **SWOT:** **Strengths:** **-** public visibility purposes **Weaknesses:** -Remote area (200km from Matrouh) which makes the maintenance process too costly. -Lack of experience in maintenance. **Opportunities:** **-**Dissemination in the local society -Exposure in the press and media. **Threats:** exposed to salty air, sand and dust as nearby the sea **Comments:**

8. General Hospital of Matrouh. Ministry of Health	**BIPV) glass laminated semitransparent a-Si thinfilm modules, pergola = 30 kWp** **(+ 20 KW cooling power (high efficient heat pump))** **SWOT:** **Strengths:** public visibility purposes **Weaknesses:**-Remote area (200km from Matrouh) which makes the maintenance process too costly. -Lack of experience in maintenance. **Opportunities: -**Dissemination in the local society -Exposure in the press and media. **Threats:** **Comments:** ✓ The roof surface and orientation are suitable. ✓ The building loads (100.000 kWh from 9:00 – 22:00h) are suitable for the proposed PV system. ✓ The permanent building load appear to be 10 kW (approx. the maximum produced by a 20 kWp FV system). ☝ The permanent building loads should be properly verified before deciding the system dimension. ☝ Construction details (interaction with the roof and existing skylights) might be challenging. ☝ The thin film roof top could be substitute by semitransparent pergola (like the one proposed at version 2). ✓ **BIPV for cooling purposes appears to be a good solution.** **Semitransparent pergola installed on the roof (north area), that can be used by the building users and visitors for certain social events or activities.** **a) The electricity production can be used to feed the existing cooling system (retrofiting some components when required) + high efficient Heat Pumps.**
9. Matrouh public library	**BIPV) flexible thin film metal roof-top integrated = 20 kWp** **SWOT:** **Strengths: -**public visibility purposes -The library will e officially inaugurated on Sept 2014 **Weaknesses:** -The building permanent loads still not identified -Lack of experience in maintenance **Opportunities:** **-**The metal roof provides a great opportunity to integrate this technology. -Local SMEs and stakeholders will be informed and involved. -Exposure in the press and media. **Threats:** exposed to salty air, sand and dust as nearby the sea **Comments:** ✓ Appropriate metal roof surface for flexible thin film ☝ Building total and permanent loads should be defined in order to verify the suitability of the proposed PV installed power. ☝ Building should be totally operative once the BIPV be installed.

3.4 M. R. Al-Salt and Irbid (Jordan), Parrner 3: BAU

Nine out of the fourteen idenfied & analysed public buildings have been finally pre-selected for a more in-deep study regarding their potential for hosting project's solar systems:

P3. (BAU), summary

'pb' pre-selected buildings	Solar energy system that would be installed	power (kW)	Estimated cost (€)
1.Science Building (BAU)	BIPV-glass laminated semi-transparent crystalline- curvilinear Canopy	24	114,000€ (122.500 €)
2. Engineering Building (BAU)	BIPV-glass laminated semi-transparent crystalline	4	19.000 €
3.Scientific Research Deanship (BAU)	BIPV-glass laminated semi-transparent crystalline- Façade	3	14,000€
4. Main Library	PT-SCH	17	140,000 €
5. (5-6) Engineering Workshop (BAU)	Stirling Dish	4	44,000 € (44.550 €)
6. (5-6) Finance building (BAU)	BIPV- glass laminated semi-transparent crystalline- Façade brise-Soleil	15	71,000€ (75.000 €)
7.(7-8) Engineering Workshop (HUC)	A) BIPV-flexi Thin film (3,5 €/Wp?) B) Stirling Dish	3.5 (-3,5?) 4	16,150€ (12.250 €) 45,000 € (44.550 €)
8. (7-8) Bairooni Building (HUC)	a) BIPV-glass laminated semi-transparent crystalline- Canopy	20 (+4,2 kWp)	95,000€ (121.000 €)
9.Main building(HUC)	BIPV- glass laminated semi-transparent crystalline- Façade brise-Soleil	8	39,000€ (40.000 €)
'b' Selected buildings proposal **1+5; 6; 7; 8; 9**		**Total installed power 'b'** **78.5kWp** **(+0,7kWp)**	**Total cost estimation (€)** **425,000 €** **(447.600 €)** **(418.420 €)**

*** Buildings 1 and 5 can be considered as parts of a building-compound**

** In red, some suggested adjustments of the budget*

1.Science Building (BAU)	**BIPV: glass laminated semi-transparent crystalline- curvilinear skylight** **24 kWp** **SWOT:** **Strengths:** **-**Excellent visibility and object free roof -Grid connected (no waste at weekend and holidays) -The owner has expertise in PV installation and maintenance **Weaknesses:** - the existing roof structure needs to be redesigned and fabricated -need a customised made modules - Some painted steel beams in the existing structure are rusty due to rainfall water leak **Opportunities:** - ideal for glass substitute - will be good example for roof type BIPV model and it could be the first in Jordan **Threats:** - Existing steel structure might not be strong enough to withstand PV modules weight - Rusty beams in the existing steel structure might affect negatively PV modules if the rust problem is not treated. **Comments:** ☝ Is it curvilinear or polyhedral? In case of curvilinear (polycarbonate?), the secondary substructure should be adapted to the glassed modules (challenging). The current substructure dimensions and constructive properties (static, maintenance, etc) should be detailed as soon as possible. ✓ High visibility and passive effect (sun protection)
2. Engineering building (BAU)	**BIPV: glass laminated semi-transparent crystalline canopy = 4 kWp** **SWOT:** **Strengths:** - Facing south - Excellent Visibility and object free - Grid connected and thus there will be no waste at weekend and holidays - the owner has local expertise in PV installation and maintenance **Weaknesses:** - Many heating equipment's on the roof **Opportunities:** - tight space **Threats:** - Shade from the main building is a constrain **Comments:** ☝ The proposal is not detailed enough and the shadow of the building, apparently, makes it unfeasible.
3. Scientific Research Deanship (BAU)	**BIPV-glass laminated semi-transparent crystalline- Façade = 3 kWp** **SWOT:** **Strengths:** - Facing south - Grid connected and thus there will be no waste at weekend and holidays - the owner has local expertise in PV installation and maintenance

Weaknesses: - 90 degree tilt angle

Opportunities: - high visibility

Threats: -low elevation

Comments:

- The proposed façade could be suitable for conventional opaque PV modules. For semitransparent applications, we should find surfaces with shading properties
- The proposed production ratio of 1560 kWh/kWp looks quite overestimated for a façade in Jordan.

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4. Main Library (BAU)

PT-SCH = 17,1 kWc **Alternative: BIPV + Heat Pump ("PV cooling")**

SWOT:

Strengths: - Facing south

- existing cooling facilities

Weaknesses:

- BAU university has another ENPI project which goucous on solar cooling (Duplication)

- A similar module is installed in Jordan (Dead sea) and it shows that if it is not well maintained it stop working.

Opportunities: - can be used ro replace the some of the existing cooling load

Threats:

1) BAU has another ENPI project for the PT-SCH and if we consider this option it will be duplication
2) lack of experience in such a system especially it need a lot of maintenance compared to other options.
3) There is a similar project in Jordan in the Dead Sea which proves a frailer of such a technology in Jordan as it needs a lot of maintenance.
4) the proposed system capacity is very small compared to the cooling load which will not make a significant input.
5) there exist chillers in the building and if we want to replace them with a new syste it will be big waste.

Comments:

- ✓ The building looks suitable in terms of cooling loads, roof availability and general construction.
- ✓ It might be a good opportunity for ENPI Project, in terms of diversification .
- Partner and user are not convinced about the suitability of the application.
- Operation and Maintenance should be guaranteed.

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5. Engineering Workshop (BAU)

Dish Stirling = 4 kW (1 kWe + 3 kWt

SWOT:

Strengths:

- Large roof open area and ideal for Stirling Dish

- Excellent Visibility and object free

- Grid connected and thus there will be no waste at weekend and holidays

- the owner has local expertise in PV installation and maintenance

Weaknesses:

- the base need to be integrated to the building structure

Opportunities: - ideal for Stirling dish

- First examples in Jordan

Threats: - Approval for net-metering by the utility operator

Comments:

- It is important to check the roof static resistance.
- DS: Thermal loads (heat water) should be clearly defined, as well as existing hot water piping and storage system. Distance between them and DS?
- The roof looks suitable. However, an easy access for visitors should be guaranteed .

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6. Finance building (BAU)

BIPV-glass laminated semi-transparent crystalline- Façade brise-soleil = 15 kWp

SWOT:

Strengths:

- Facing south

- Excellent Visibility and object free

- Grid connected and thus there will be no waste at weekend and holidays

- the owner has local expertise in PV installation and maintenance

Weaknesses: - Upper PV rows might cast shades on the lower PV rows especially in summer season.

Opportunities: - No similar examples in Jordan, will be the fisrt example in Jordan

Threats: - Installation works might be dangerous due to the height of the building.

Comments:

- Ideally, sun protection should be linked to glassed surface (the right side doesn't seem appropriate). Is the façade able to fit 15 kWp (approx. 180 lm)?
- Installation works might be challenging and more expensive due to the building height.
- Façade interventions tend to be very sensitive. Building owner should be totally convinced about the architectural solution.

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7. Engineering Workshop (HUC)

A) BIPV-flexible thin film = 3,5 kWp

B) Dish Stirling = 4 kW (1 kWe + 3 kWt)

SWOT:

Strengths:

- Large open area and ideal for Stirling Dish-

- Existing Facing south car park canopy

- Excellent Visibility and object free

- Grid connected and thus there will be no waste at weekend and holidays
- the owner has local expertise in PV installation and maintenance

Weaknesses: - Easy access to people

Opportunities:

- ideal for Stirling dish and Flexible Thin Film
- First examples in Jordan

Threats: - Approval for net-metering by the utility operator

Comments:

- Considering there's plenty of PV existing systems, the PV power could be reallocated at building 9 (for example).
- Nearby trees shadows might affect DS performance. The shadow study included in the report doesn't seem to be negative. However, the shadow of the trees might be significantly more dense in Summer.
- DS: Thermal loads (heat water) should be clearly defined, as well as existing hot water piping and storage system. Distance between them and DS?
- Taking into account that net metering can't be taken for granted, it's extremely important to know the global building energy consumption and total permanent loads.
- ✓ Appropriate metal roof surface for flexible thin film

8. Bairooni Building (HUC)

BIPV-1 glass laminated semi-transparent crystalline canopy = 20 kWp.

SWOT:

Strengths: - Facing south

- Excellent Visibility and object free
- Grid connected and thus there will be no waste at weekend and holidays
- the owner has local expertise in PV installation and maintenance

Weaknesses: - Consumption figures for last year are not available

Opportunities: - The building is energy efficient

Threats: - Approval for net-metering by the utility operator

Comments:

- ✓ The proposed PV integration looks suitable, providing shading devices and comfort to the building and campus users.
- ✓ If grid connection and net metering is available, this location could host more installed power in case of any problem with some of the other buildings.
- Taking into account that net metering can't be taken for granted, it's extremely important to know the global building energy consumption and total permanent loads. (3300 m2)

9. Main building (BAU)

BIPV-glass laminated semi-transparent crystalline- Façade brise-soleil = 8 kWp (+3,5 kWp)

SWOT:

Strengths: - Facing south

- Excellent Visibility and object free
- Grid connected and thus there will be no waste at weekend and holidays
- the owner has local expertise in PV installation and maintenance

Weaknesses: - Architectural view acceptance after PV installation.

- Maintenance and cleaning of PV modules

Opportunities:

- The building has already surfaces on the façade that will ease PV installations

Threats: - Net metering acceptance by the utility operator.

Comments:

- In other to unify and simplify solutions, another row of brise-soleil could be installed (+3,5 kWp), by integrating the PV proposed at building 7.
- Façade interventions tend to be very sensitive. Building owner should be totally convinced about the architectural solution.
- Taking into account that net metering can't be taken for granted, it's extremely important to know the global building energy consumption and total permanent loads.

3.5 M. R. Alexandria (Egypt), Partner 4: AU

In that case, five out of the eight initially idenfied & analysed public buildings were pre-selected within the PTT for a more in-deep study regarding which would be the most appropriate ones for hosting the foreseen project's solar systems in the MR of Alexandria.

P4. (AU), summary

'pb' pre-selected buildings		Solar energy system that would be installed	power (kW)	Estimated cost (€)
1. **Faculty of Science "FoS", AU.** MoharamBek "MB" campus	A)	BIPV-glass laminated semi-transparent thin film	5	21250€ (4.25€/W)
2. **Administration building, FoS, AU, MB campus**	A)	PTSC(6000 € discount for one PT row)	17 .1	137,313€ (8.03€/W) 131,313 € (7.68 €/W)
	B)	BIPV-flexible thin film	2.5	8,750 € (3.5€/W)
3. **Faculty of Science "FoS", AU.** El-Shatby "ES" campus	A)	BIPV-glass laminated semi-transparent thin film	15	63,750 € (4.25€/W)
4. **Faculty of Engineering "FoE", AU.**	A)	BIPV-flexible thin film	10	35,000 (3.5 €/W)
5. **SIDPEC administration building**	A)	BIPV-glass laminated semi-transparent thin film	10	42,500 (4.25€/W)
'b' selected buildings proposal 1, 2 & 3			Total installed power 'b' 39.6 kWp	Total cost estimation (€) 231,063 € (225,063 €)

1. Faculty of Science "FoS", AU. **MoharamBek "MB" campus**	**(V1; V2) BIPV: glass laminated semi-transparent Thin film (5kWp)** **(V3) BIPV: flexible thin film (8,5 kWp) + Dish Stirling 4 kW (1kWe + 3 kWt)** **(original): BIPV flexible thin film (6 kWp) + Dish Stirling 4 kW (1kWe + 3 kWt)** **SWOT:** **Strengths:** - Renovated infrastructure - Open area around "no shades" - Large roofs areas - Renovated electrical structure - Large green areas Large empty spaces between & around buildings **Weaknesses:** - No central AC infrastructure available No hot water infrastructure available **Opportunities:** **Threats:** **Comments:** ☝ DS: Thermal loads (heat water) should be clearly defined, as well as existing hot water piping and storage system. Distance between them and DS? ☝ In case of DS ground mounted solution, campus users security issues will be very important. ☝ Final locations still pending to be defined. ✓ High visibility and very positive dissemination effect among university and scientific communities.
2.Administration building, FoS, AU, MB campus	**PT-SCH (1 7,1 kWc) + BIPV: flexible thin film (2,5 kWp)** **SWOT:** **Strengths:** - Renovated infrastructure - Open area around "no shades" - Large roof area Renovated electrical structure **Weaknesses:** **Opportunities:** Installation of innovative system able to be monitored and visited by the students and scientific community. **Threats:** **Comments:** ☝ Cooling and heating loads should be clearly defined. Summer cooling loads won't be sufficient to get a proper system performance. ☝ Building owners and users will need specialized technicians for the O&M. ✓ Building user and owner are committed to Operate and Maintain the building. The use of the application for pedagogical purposes might strength this commitment.

3. Faculty of Science "FoS", AU. **El-Shatby "ES" campus**	**BIPV-glass laminated semi-transparent crystalline- Façade** **(V1; V2) 15 kWp; (V3) 7,5 kWp; (Original) 10 kWp** **SWOT:** **Strengths:** - Higher power demand at morning and night than 14 kW **Weaknesses:** -The electrical infrastructure is old **Opportunities:** Installation of innovative system able to be monitored and visited by the students and scientific community. **Threats:** **Comments:** ☝ Mounting and Maintenance might be challenging, since the system is allocated at the upper part of the facade. Budget and human resources should be compromised. ✓ The visibility and functionality (sun protection) of the system will be very significant.
4. Faculty of Engineering "FoE", AU.	**BIPV-flexilbe thin film = 10 kWp** **SWOT:** **Strengths:** - Facing south **Weaknesses:** - Old building **Opportunities:** **Threats:** **Comments:** ✓ The building looks suitable to for roof integration (thin film) ☝ Building electrical installation might need to be retrofitted
5. SIDPEC administration building	**BIPV-glass laminated semi-transparent crystalline- Pergola = 10 kWp** **SWOT:** **Strengths:** New building High power demand **Weaknesses:** **Opportunities:** **Threats:** **Comments:** ☝ It might be an interesting opportunity to engage a big company from the oil industry into the Renewable Energy field. ☝ The company has skilled O&M workers. ☝ The facility has no public access, since is inside the company's restricted area.

3.6 M. R. Creete (Greece), Partner 5: Maich

In the case of Creete, the three initially identified and analysed public buildings were pre-selected for the corresponding more in-deep analyses for deciding the best options as for hosting the project's solar systems:

P5. (MAICh), summary

'pb' pre-selected buildings	Solar energy system that would be installed	power (kW)	Estimated cost (€)
1. M.A.I.Ch.	A) BIPV: (skylight semitransp. crystalline)	5	25.000 €
	B) BIPV (skykight semiptransp. thin film)	8.2	34.030 €
2.Kolymbari	BIPV	13.2	26,000 €
3. NeaChora	BIPV	13.2	26,400 €
'b' Selected buildings proposal Pb 1		Total installed power 'b' 13.2 kWp	Total cost estimation (€) 56.000 € * 59.030 €

1. MAICh academic research institute-Municipality of Chania	**BIPV: Thin film roof top (9,2 kWp) + Dish Stirling (4 kWp) = 13,2 Wp** **SWOT:** **Strengths:** public visibility; educational purpose **Weaknesses:** lack of experience in maintenance **Opportunities:** Local SMEs will get experience from the operation -The operation of the systems will give the opportunity to post graduate students to do research. -Dissemination in the local society **Threats:** Complicated legal framework concerning installation and operation of such systems due to the fact that Crete is an island **Comments:** ✓ The building permanent loads are properly identified (night consumption of 7 kW) And match with the approximate maximum energy production of the RE systems. This will minimize de energy loses during vacation periodes, in case the RE installation can't be connected to the grid. ☝ For BIPV only 2 €/Wp have been considered. This budget might cover only the cost of the PV modules. Some extra budget will be required for the rest of the system components and installation. ✓ A skylight is proposed for semitransparent crystalline modules integration.

	It will give visibility and provide shadow to the conference room transients. ✓ BIPV semitransparent glass (9,2 kWp) + Dish Stirling (4 kW) = 13,2 kWp
2. Kolympari senior High School Municipality Platania - Chania	**BIPV: Thin film roof top = 13,2 Wp** **SWOT:** **Strengths:** public visibility; educational purpose **Weaknesses:** lack of experience in maintenance **Opportunities:** Local SMEs will get experience from the operation Dissemination in the local society **Threats:** Complicated legal framework concerning installation and operation of such systems due to the fact that Crete is an island **Comments:** ☝ Electrical building loads and PV annual generation might be similar if the "Net metering law 4203/2013" is fully operational (expected to be in Summer 2014). ☝ The proposed location "roof top" doesn't look suitable for the kind of PV integration the project is working with. A primary substructure like a pergola, should be required.
3. Nea Chora senior high school. Municipality of Chania	**BIPV) Thin film roof top = 13,2 kWp** **SWOT:** **Strengths:** public visibility; educational purpose **Weaknesses:** lack of experience in maintenance **Opportunities:** Local SMEs will get experience from the operation Dissemination in the local society **Threats:** Complicated legal framework concerning installation and operation of such systems due to the fact that Crete is an island **Comments:** ☝ Electrical building loads and PV annual generation might be similar if the "Net metering law 4203/2013" is fully operational (expected to be in Summer 2014). ☝ The proposed location "roof top" doesn't look suitable for the kind of PV integration the project is working with. A primary substructure like a pergola, should be required.

3.7 M. R. Catalonia (Spain), Partners 6 & Ben: EsE & UAB

In that case, four of the five initially identified and analysed public buildings (number 1, 2, 3 and 4) were pre-selected for more in-deep analysis on the best options regarding they to host the planned project's solar systems. However, the public institutions owners of two of them (number 1 and 3) finally declined to participate. Then two new ones (number 5 and 6 below) were analysed and entered as pre-seleted

P6. (EsE)			
'pb', pre-selected buildings	**Solar energy system that would be installed**	**power (kW)**	**Estimated cost (€)**
1. ICM	**A) BIPV - Pergola** Glass laminated semitransparent - Crystalline	9.540 kWp	46.078,20 €
2. HOUSING AGENCY	**A) BIPV - Skylight** Glass laminated semitransparent - Crystalline **B) BIPV - Roof** ETFE laminated flexible - Thin Film	2,160 kWp 7,437 kWp	10.432,80 € 26.624,46 €
3. a) Municipality Offices building; replaced by:			
b) Primary School Catalunya (St. Cugat)			
4. MOLLET HOSPITAL	**A) BIPV - Canopy** Glass laminated semitransparent - Crystalline	9,817 kWp	47.416,11 €
5. OFFICE AMB, afterwards replaced by:	**A) BIPV - Facade** Glass laminated semitransparent – Crystalline	9,873 kWp	47.686,59 €
ECO PARC (ECO2)	**A) Dish Stirling** Cogeneration system: 1 kWe+3 kWt	4,000 kWp	37.920,00 €
'b' **selected buildings proposal**		**Total installed power 'b'**	**Total cost estimation (€)**
2, 3, 4, 5		**33,287 kWp**	**170.079,96 €**

* first year of maintenance included (0,08 €/Wp)

1. ICM	**BIPV: glass laminated semi-transparent crystalline module = 9,54 kWp** **SWOT:** **Strengths:** Great visibility because is located at harbour and into of the one of most famous neighbourhoods of Barcelona **Weaknesses:** The building doesn't have any monitoring system **Opportunities:** Big dissemination opportunities in the local and foreign society **Threats:** -Possible problems due to the proximity to the sea, air salinity. -Lack of maintenance experience in small scale building integrated PV systems -There is a complicated legal framework concerning renewable energy installations **Comments:** ☝ Interesting building due to its high visibility and scientific use. ☝ The building is relatively new, thus any intervention in the façade or building appearance might be challenging.
2. HOUSING AGENCY OF CATALUNYA	**A) BIPV: glass laminated semitransparent crystalline. Skylight = 2,16 kWp** **B) BIPV: flexible thin film (metal roof). = 7,43 kWp** **Strengths:** -Building in process of adaptation and reduction of energy consumptions -Experience in O&M **Weaknesses:** -Low consumption on weekends and holidays **Opportunities:** -To generate synergies with European Project MARIE **Threats:** -Little visibility from the street -There is a complicated legal framework concerning renewable energy installations **Comments:** ☝ Mounting and construction details might be challenging, since the skylight is going to be part of the waterproofing of the building. ☝ The skylight has low visibility from the inside. ✓ MARIE project (energy efficiency in the Mediterranean countries) is using the building block as pilot experience. Thus is going to give a lot of synergies and additional projection.
3. SCHOOL Sant Cugat	**Strengths:** **Weaknesses:** **Opportunities:** **Threats:**

Comments:

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4. Mollet Hospital (Mollet Heath Foundation)

BIPV) glass laminated semi-transparent crystalline - canopy = 9,8 kWp

SWOT:

Strengths:

- Great Visibility and Dissemination expectations, because of building managers strong commitment
- One of the most modern Hospitals built within the last years with good levels of energy efficiency
- O&M company already contracted and taking care of building's energy systems.
- Possibility to improve the passive behaviour (cooling energy demand and users comfort) by using PV as a shading device

Weaknesses:

- Mollet is a relatively small town, with less media impact than Barcelona

Opportunities: - "Hospital de Mollet" is part of an international network "GREEN HOSPITAL". There's a great opportunity to generate positive synergies with this initiative.

Threats:

- Lack of maintenance experience in small scale building integrated PV systems that might be easily overcame with the expertise in other energy O&M activities.

- There is a complicated legal framework concerning renewable energy installations

Comments:

☝ The building is very new, thus any intervention in the façade or building appearance might be challenging.

✓ The visibility and functionality (sun protection) of the system will be very significant.

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5. ECO2

Treatment plant of urban waste

Dish Stirling) 4 kW (1kWe + 3 kWt)

SWOT:

Strengths:

- Great Visibility and Dissemination expectations, building placed around a lot of industries
- Building has other renewable facilities, such as biogas, photovoltaic
- Maintenance experience in other renewable systems

Weaknesses:

- The building doesn't have any energy monitoring system

Opportunities:

- The Unit will be part of environmental education visit, which organizes public entity
- Great dissemination of such technology by the public entity

Threats:

- There is a complicated legal framework concerning renewable energy installations

Comments:

☝ DS: Thermal loads (heat water) should be clearly defined, as well as the existing hot water piping and storage system. Distance between them and DS? Do some additional civil works might be required?

General statement on the European Union

Project funded by the EUROPEAN UNION

The European Union is made up of 27 Member States who have decided to gradually link together their know-how, resources and destinies. Together, during a period of enlargement of 50 years, they have built a zone of stability, democracy and sustainable development whilst maintaining cultural diversity, tolerance and individual freedoms. The European Union is committed to sharing its achievements and its values with countries and peoples beyond its borders.

بيان عام عن الاتحاد الأوروبي

يتكوّن الإتحاد الاوروبي من ال 27 الدول الأعضاء الذين قرروا معاً ربط خبراتهم والموارد ومصائرها. معاً، وخلال فترة 50 عاماً من التوسع، تم بناء منطقة من الإستقرار، الديمقراطية والتنمية المستدامة مع الحفاظ على التنوع الثقافي، التسامح والحريات الفردية. يلتزم الإتحاد الأوروبي في تقاسم إنجازاته وقيمه مع الدول والشعوب خارج حدوده.

General statement on the European Union (Greek)

Η Ευρωπαϊκή Ένωση αποτελείται από 27 Κράτη Μέλη που έχουν αποφασίσει να συνδέσουν σταδιακά την τεχνογνωσία, τους πόρους και το μέλλον τους. Κατά τη διάρκεια μιας περιόδου διεύρυνσης 50 ετών, έχουν δημιουργήσει μαζί μια ζώνη σταθερότητας, δημοκρατίας και αειφόρου ανάπτυξης διατηρώντας παράλληλα την πολιτιστική πολυμορφία, τη διαφορετικότητα και τις ατομικές τους ελευθερίες. Η Ευρωπαϊκή Ένωση έχει δεσμευθεί να μοιράζεται τα επιτεύγματα και τις αξίες της με χώρες και λαούς που βρίσκονται εκτός των συνόρων της.

Statement about the Programme

ENPI CBCMED
CROSS-BORDER COOPERATION IN THE MEDITERRANEAN

The 2007-2013 ENPI CBC Mediterranean Sea Basin Programme is a multilateral Cross-Border Cooperation initiative funded by the European Neighbourhood and Partnership Instrument (ENPI). The Programme objective is to promote the sustainable and harmonious cooperation process at the Mediterranean Basin level by dealing with the common challenges and enhancing its endogenous potential. It finances cooperation projects as a contribution to the economic, social, environmental and cultural development of the Mediterranean region. The following 14 countries participate in the Programme: Cyprus, Egypt, France, Greece, Israel, Italy, Jordan, Lebanon, Malta, Palestinian Authority, Portugal, Spain, Syria, Tunisia. The Joint Managing Authority (JMA) is the Autonomous Region of Sardinia (Italy). Official Programme languages are Arabic, English and French.

بيان حول البرنامج

هو برنامج للتعاون المشترك عبر الحدود لحوض البحر الأبيض المتوسط، هو جزء من سياسة الجوار والشراكة الأوروبية 2013 – 2007 NPI CBC MedEإن برنامج ومن آلياتها التمويلية. يهدف هذا البرنامج إلى تعزيز ودعم عملية التعاون المستدام والمنسجم على مستوى حوض البحر الأبيض المتوسط وذلك من خلال معالجة التحديات المشتركة وتعزيز الإمكانات الذاتية. يموّل البرنامج مشاريع التعاون كمساهمة في التنمية الإقتصادية، الإجتماعية، البيئية والثقافية لمنطقة البحر الأبيض المتوسط. إن الدول قبرص، مصر، فرنسا، اليونان، إسرائيل، إيطاليا، الأردن، لبنان، مالطا، السلطة الفلسطينية، البرتغال، إسبانيا، سوريّا، ال 14 التالية هي الدول المشاركة في البرنامج: هي منطقة الحكم الذاتي لمقاطعة سردينيا (إيطاليا). إن اللغات الرسمية للبرنامج هي : العربية ، الإنجليزية والفرنسية. JMAتونس. إن سلطة الإدارة المشتركة

Statement about the Programme

Το Πρόγραμμα Διασυνοριακής Συνεργασίας Μεσογειακής Λεκάνης (ENPI CBC Mediterranean Sea Basin) 2007-2013 είναι μια πολυμερής πρωτοβουλία Διασυνοριακής Συνεργασίας η οποία χρηματοδοτείται από το Ευρωπαϊκό Μέσο Γειτονίας και Εταιρικής Σχέσης (ENPI). Το Πρόγραμμα έχει σαν στόχο να συμβάλει στην προώθηση της βιώσιμης και αρμονικής συνεργασίας στην περιοχή της Μεσογειακής Λεκάνης αξιοποιώντας πλήρως τις ενδογενείς δυνατότητες της περιοχής και αντιμετωπίζοντας τις κοινές προκλήσεις. Χρηματοδοτεί έργα συνεργασίας τα οποία συμβάλλουν στην οικονομική, κοινωνική, περιβαλλοντική και πολιτιστική ανάπτυξης της Μεσογείου. Στο Πρόγραμμα συμμετέχουν οι ακόλουθες 14 χώρες: Κύπρος, Αίγυπτος, Γαλλία, Ελλάδα, Ισραήλ, Ιταλία, Ιορδανία, Λίβανος, Μάλτα, Παλαιστινιακή Αρχή, Πορτογαλία, Ισπανία, Συρία, Τυνησία. Η Κοινή Διαχειριστική Αρχή (ΚΔΑ) του Προγράμματος, είναι η Αυτόνομη Περιφέρεια της Σαρδηνίας (Ιταλία). Επίσημες γλώσσες του Προγράμματος είναι τα Αραβικά, Αγγλικά και Γαλλικά.

European Union web links
http://ec.europa.eu/world/.
Europe Aid Development and Cooperation Office http://ec.europa.eu/europeaid/index_en.htm
ENPI CBC Med Programme http://www.enpicbcmed.eu

The project DIDSOLIT-PB is implemented under the ENPI CBC Mediterranean Sea Basin Programme (www.enpicbcmed.eu). Its total budget is 4,3 million Euro, and it is financed, for an amount of 4,1 million Euro, by the European Union through the European Neighbourhood and Partnership Instrument. The ENPI CBC Med Programme aims at reinforcing cooperation between the European Union and partner countries regions placed along the shores of the Mediterranean Sea."

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