

Industrial Research Institute

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Dr Imad HAGE CHEHADE,

مؤتمر الابداع والبتكار – القاهرة ٢٤ و ٢٥ أيار (مايو) ٢٠١٦



Table of Contents

1. National Framework
2. Industrial Research Institute (IRI).
3. Energy Activities.
4. The photovoltaic power plant.



1. National Framework

I - Introduction

II - Financing

A. Microcredit Institutions

B. Subsidized Loans

C. Kafalat Guarantee

D. BDL Incentives Loan

E. Equity Financing (Angel Investors/VC/PE)

F. Crowdfunding

III - Innovation Boost

IV - Market Access and Export

V - Business Development Services



1. National Framework

I - Introduction

In order to be successful and grow, an enabling environment should be in place for Micro, Small and Medium Enterprises.

In addition to sound macroeconomic environment, business friendly laws and regulations, a number of enablers such as financing, business development services, trade related facilities are necessary to help a firm become competitive.

This presentation includes a list of the available support institutions and services that startups and SMEs could require throughout the development life cycle, starting from the very beginning seeds to establishment, expansion, growth, to reaching maturity stages. It includes different funding options, a range of business development services, marketing opportunities etc...

The aim is to raise awareness about the existing institutions and services and to promote collaboration and synergies among them. More information about the services and products could be provided by contacting the institutions.



1. National Framework

II - Financing

Given the fast growing markets and the different challenges and whether you are planning to start a business or looking to expand and/or improve your existing services, choosing the right financial tool is substantial. This will help you explore the market's available financial tools and pick what will suit you best.

It is important to know, that most institutions require a feasibility study and/ or a business plan, administer funds upon the viability of the projects and company ideas, and that funds could be provided in small to large amounts depending on the size of the investment.

Finally, you are definitely aware that financial institutions are no longer limited to bank loans, currently many mechanisms are available including crowdfunding, angel investors, etc...



1 - National Framework

A. Microcredit Institutions

Do you need a small loan for your young new business?

Do you have an idea and you want the extra push to kick start?

micro and small loans to startup, employees and micro-entrepreneurs. Aim at improving the social, cultural, and economical and health livelihood of rural Lebanese providing in addition to the financing,

Here are some factors:

Loans amount start from \$1000US to \$15,000US and could reach a maximum of \$50,000US

Some institutions require collaterals, feasibility studies and experience in the field of work

Loan utilization could take the form of a working capital, fixed asset and/ or property investments and are restrained for commodities, securities, speculation, personal use and private cars

1 - National Framework

A. Microcredit Institutions

	Name	Al Majmou'a
	Telephone	00961 1 369269
	Website	http://www.almajmoua.org/
	Name	Vitas
	Telephone	00961 5 959859
	Website	http://vitaslebanon.com
	Name	Emkan
	Telephone	00961 1 814900
	Website	http://www.emkan.org
	Name	Investa Financial Planning Services
	Telephone	00961 1 87 87 00
	Website	http://www.investa-fps.com/
	Name	Al Tamkeen
	Telephone	00961 5 805026
	Website	http://altamkeen.com
	Name	ESFD
	Telephone	00961 1 373460/1/2
	Website	http://www.esfd.cdr.gov.lb/

	Name	Agence de Development Rural
	Telephone	00961 1 742046
	Website	http://www.adr.org.lb/
	Name	Association Entraide Professionnelle
	Telephone	00961 1 382610
	Website	http://www.aep.org.lb/
	Name	Hariri Foundation
	Telephone	00961 1 972223/4/5
	Website	http://www.hariri-foundation.org/
	Name	Makhzoumi Foundation
	Telephone	00961 1 661346
	Website	www.makhzoumi-foundation.org/
	Name	Capital Finance Company
	Telephone	00961 1 371102/6
	Website	http://www.groupcfc.com
	Name	Alpha Capital Management
	Telephone	00961 1 320 555
	Website	http://alphacap.com/aboutus

1 - National Framework

B. Subsidized Loans

Subsidized loans target start-ups and existing small and medium businesses with focus on the productive sectors such as touristic, industrial and agricultural, handicrafts as well as the sector of production of computer technology, etc... These loans benefit from a government subsidy to lending rates, provided they meet the following conditions:

- The loan must be totally invested in Lebanon in order to finance a new project or to complete an existing one, with a minimum value of LBP 50 million or its equivalent in US dollars or EUROs.
- The term of the loan must range between 5 and 7 years. And 15% of the principal may fall due during the first two years.



1 - National Framework

B. Subsidized Loans

- The total value of subsidized loans granted to one single institution or to one single economic group, must not exceed LBP 15 billion or its equivalent in US dollars or EUROS, or an amount of LBP 60 billion in case a number of debtors are not considered as a single economic group for justified economic and financial purposes.
- Interest and commissions (before computing the government subsidy which is equivalent to 4.5%, starting 1/1/2012)
 - a) For the LBP loans, they should not exceed the interest rate on two year Treasury bills plus 1.075%
 - b) For foreign currency loans, they should not exceed the three-month Libor or Euribor rate plus 7.075%



1 - National Framework

C. Kafalat Guarantee

Kafalat, is a credit guarantee institution that helps SMEs by providing loan guarantees based on business plans and feasibility studies, provided that these studies show the viability of the proposed business activity. Loans guaranteed by Kafalat benefit from interest rate subsidy.

Kafalat Basic up to LBP 300,000,000

Kafalat Plus up to LBP 600,000,000

Kafalat Innovative up to LBP 300,000,000

Kafalat Start-ups and Innovation up to LBP 650,000,000

Kafalat Trees up to LBP 480,000,000

Kafalat Small Farmers up to LBP 65,000,000

Kafalat Energy ranges from LBP 600,000,000 to LBP 1320,000,000



1 - National Framework

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Products and Services

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Kafalat Start-ups and Innovation up to LBP 650,000,000

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Kafalat Small Farmers up to LBP 65,000,000

Kafalat Energy ranges from LBP 600,000,000 to LBP 1320,000,000

1 - National Framework

C. Kafalat Guarantee

Targeted group : Entrepreneurs, Innovative startups & SME with limited liabilities

Interest rate : 0.5% special offer for a limited period

Kafalat guarantee :

Between 70% and 90% of the loan principal and interest (depending on chosen program). Against this guarantee a 2.5% commission is applied on the outstanding loan balance plus interest rate on a yearly basis.

Kafalat conditions and eligibility criteria :

Feasibility study and cash flow projection are mandatory. Individuals are not eligible for Kafalat Plus and Kafalat Innovation. The guaranteed loan is used for business development: to establish a viable new production capacity, or to sustain current production and employment. No guarantees of any form are allowed for Kafalat Plus and Kafalat Innovative.

<http://www.kafalat.com.lb/>





1 - National Framework

D. BDL (Banque Du Liban) Incentives Loans

Incentive loans with low cost encouraging investments in some productive sectors such as Tourism, agriculture, Industry, IT, Education and Environment. They include :

- Loans to entrepreneurs to finance new projects in the field of knowledge innovation. (Max 200,000 \$ for max 10 years)
- Loans to finance R & D in productive sectors. (2-4 years grace period, 10 years Max. Interest & commissions <0.75%



1 - National Framework

E. Equity Financing

(Angel Investors/Venture Capital/Private Equity)

If you are an entrepreneur with an innovative and promising idea or business; if you are unlikely to have sufficient collateral; and if you are looking for investors to share your risk and help you grow by bringing in their expertise and networks in exchange for equity ownership, then equity financing is your solution.

Seed, venture capital and private equity for startups and SMEs is available in Lebanon. The type of equity financing needed depends on a number of factors, among others: type of business and sector, company or product development phase, the value of the investment needed and other business needs.





1 - National Framework

E. Equity Financing

(Angel Investors/Venture Capital/Private Equity)

A number of funds exist and operate in a large number of sectors.

In addition the Central bank of Lebanon BDL issued a new circular in August 2013 whereby it introduced a new financing scheme that encouraged and allowed banks to invest in the capital of startups, accelerators, and incubators. Banks wishing to finance such companies will benefit from interest free loans from the Central Bank guaranteeing up to 75% of banks' investment for a maximum period of 7 years.



1 - National Framework

E. Equity Financing

(Angel Investors/Venture Capital/Private Equity)

	Name	Lebanese Business Angels
	Telephone	00 961 1 201519
	Website	www.baderlebanon.com
	Name	Faro Fund
	Telephone	00961 1 353190
	Website	http://www.ccib.org.lb
	Name	Capital Trust Group
	Telephone	00961 1 368 968
	Website	http://www.capitaltrustltd.com/
	Name	Cedrus Ventures
	Telephone	
	Website	http://www.cedrusventures.com/
	Name	The Abraaj Group
	Telephone	00971 4 506 4600
	Website	http://www.abraaj.com/

	Name	Bader
	Telephone	00961 1 201519
	Website	http://www.baderlebanon.com/
	Name	Levant Investment Bank
	Telephone	00 961 1 361523
	Website	http://www.libank.com.lb/
	Name	Lucid Investment
	Telephone	00 961 1 1 999533
	Website	http://lucid-investment.com/
	Name	Middle East Venture Partners
	Telephone	00 961 1 999605
	Website	http://www.mevp.com/



1 - National Framework

F. Crowdfunding

Crowdfunding is a new financial trend, currently booming in Lebanon. Crowdfunders play a channeling role between entrepreneurs and funders, this entails many individuals to network and pool their money, in the aim of supporting other people's or organization's initiatives.

This simple form of financing could be molded in different ways, it has flexibility and creativity in itself, contributions are allowed in very small amounts and rewards based on contributions are provided.



1 - National Framework

F. Crowdfunding

Recently a decree to regulate crowdfunding activities in Lebanon has been issued by The Capital Markets Authority (CMA). This decree entails crowdfunding institutions to set up an electronic platform, as well as, to indicate the minimum amount of capital of LBP30m, or \$20,000, that SMEs and startup companies need to raise through crowdfunding. In addition, it states that crowd investors' direct and indirect investments in each company is set between LBP750,000 and LBP15m, or its equivalent in US Dollars.



1 - National Framework

F. Crowdfunding



<http://www.aflamnah.com/>

Aflamnah is a digital crowdfunding platform that lets idea owners take any money they are able to raise whether they reach their target or not. Ideas still have to set a target.

If you have an idea then crowdfunding is a new way of raising money in the Arab world to make good ideas happen.

Target : Filmmakers, Artists, Scientists, Students & Innovators

Cost of service : \$100 non-refundable fee to upload your idea 6% of the money raised



1 - National Framework

F. Crowdfunding



<https://www.zoomaal.com/>

Zoomaal is a crowdfunding platform that supports creative projects in the Arab world get funded for their work. Using crowdfunding to collect the funds, project owners no longer have to get loans or provide equity to fund their projects. In addition to the funding part, projects get a lot of exposure while crowd funding.

Target : Creative Film producers, Engineer, Freelancers & Entrepreneurs

Cost of service : 5% only from successfully funded projects

Conditions and Eligibility Criteria

Must have a project with clear starting date and end date with defined outcomes





1 - National Framework

III - Innovation Boost

Innovation and creation of new improved concepts or products that would respond to new requirements or better serve existing ones is one of the most important ingredients of success, especially in this fast paced times.

Nowadays, the majority of competitions launchers and funding organizations require innovation as an asset, therefore, it is no longer enough to have an idea if it is not as competitive as the market is.

Innovation centers mainly provide research and development as well as networking and trainings on the subject.



1 - National Framework

III - Innovation Boost



*Center for Innovation and Technology
Innovation Voucher Project*

www.cit-lb.org

The Centre for Innovation and Technology (CIT) is a dynamic division of the Industrial Research Institute (IRI), established to secure sustained support and innovation to the manufacturing industry. In February 2012 the CIT was awarded a grant from the European Union for 200,000 Euros for the implementation of the action entitled: "Innovation Vouchers", with the Presidency of the Council of Ministers as the Contracting Authority.

Target : Local Industrial SMEs and Universities.

21 innovation projects was selected and granted for 10,000 Euros each

1 - National Framework

III - Innovation Boost



Lebanese Industrial Research
Achievements Program - LIRA

www.liraprogram.com

LIRA is a program aiming at building effective cooperation between industry, academia, and research centers to address the research and development needs of the Lebanese industry, empower the industrial sector with innovations leading to the promotion of competitiveness and productivity, and achieving a transition from a welfare economy to a knowledge-based economy

Cost of service : Funding the project





1 - National Framework

IV - Market Access and Export

The institutions listed in the next slides provide assistance for SMEs through contributing to a readily exporting environment.

Some institutions provide financial incentives such as financial exemptions and cash subsidies, and others provide technical assistance services on different aspects including product development and export promotion. In addition these institutions aim to build the capacity of SMEs on access to market operations through trainings, networking and mentoring.



1 - National Framework

IV - Market Access and Export



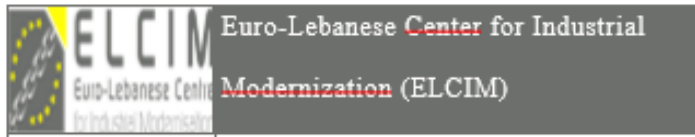
The Investment Development Authority
of Lebanon (IDAL)

<http://www.idal.com.lb/>

IDAL is the national investment agency entrusted with promoting investments to Lebanon in growth promising sectors through providing a set of incentives and services. IDAL is also entrusted with export promotion services

1 - National Framework

IV - Market Access and Export



<http://www.elcim-lb.org/>

ELCIM is an industrial center possessing a pool of local and international experts in various fields; the activities are demand driven and address industrial requirements from various sectors covering all aspects of the manufacturing and marketing activities. The methodology relies on visiting beneficiaries and preparing a full technical specs of the action agreed upon including timeframe, type and number of experts and budget.

Products & Services

Business Development Management, re-organization, Business plans, Access to Market, Production optimization, Process development, Energy management, Funding Access to loans & Training



1 - National Framework

IV - Market Access and Export



www.beirutcreativecluster.org/

BCC, the Beirut Creative Cluster, is a not-for-profit, sectorial business association. Its members are firms based in Lebanon that create and distribute digital content, media products and services, design and marketing solutions.

Products & Services :

Training Networking/Mentoring Access to Finance Access to Market

Targeted sector :

Creative Industries which include Media, Design, Architecture & ICT



1 - National Framework

IV - Market Access and Export



Soft-Shore Cluster

<http://www.lebanonsoftshore.org/>

Lebanon SoftShore is a cluster that has the objective to promote the Lebanese software industry internationally. Managed by the Industrial Research Institute (IRI) and the Euro-Lebanese Centre For Industrial Modernization (ELCIM).

Products and Services

Export promotion, Networking, Training & Seminars



1 - National Framework

IV - Market Access and Export



Trade Information center

<http://www.economy.gov.lb>

The Trade Information center provides trade statistics, import and export regulations, tariffs, company search, outsourcing opportunities. It is embedded at the Ministry of Economy and Trade.

Products and Services

Networking, Business to Business events & Match making





1 - National Framework

V - Business Development Services

The Ministry of Economy and Trade was among the first promoters of Business Development Centers, ever since, this sector has been growing tremendously.

In the next slides, 21 institutions are listed, providing a variety of business support services, ranging from incubation to simple interventions and including competitions, networking and trainings.

At a business development center, an entrepreneur is guided throughout the whole initiation phase until the graduation. Usually for a relatively low fee, an entrepreneur could be incubated and supported in every step of the way.



1 - National Framework

V - Business Development Services

Name	Product / Services	Target group	Contact
	Incubation Networking/ Mentoring	University students Young professionals Curious about media Design Technology	http://www.altcity.me/
	Incubation Networking/ Mentoring	University students Young professionals Curious about media Design Technology	http://www.amideast.org/lebanon
	Incubation Networking/Mentoring Access to markets Training VC funding	Project holders Startups and SMEs in the field of technology/ presenting innovative solutions	www.beryttech.org
	Funding Incubation Mentoring Training	Enterprises > 40 employee and/or > \$1 mil turnover Mid Level Managers/New Graduates	http://www.biatcenter.org/



1 - National Framework

V - Business Development Services

Name	Product / Services	Target group	Contact
	Incubation Access to Market Funding Networking/ Mentoring Training	Entrepreneurs Startups \ MSMEs	http://www.southbic.org/
	Funding Mentoring Access to Market Networking	Women-led start-ups	http://www.cartierwomensinitiative.com/
	Networking/ Mentoring Training Competitions Incubation	Students The community at large including: Youth Youth with Disabilities Women The Retired	www.berytech.org
	Funding Incubation Mentoring Training	Enterprises > 40 employee and/or > \$1 mil turnover Mid Level Managers/New Graduates	http://cfe.bau.edu.lb/

1 - National Framework

V - Business Development Services

Name	Product / Services	Target group	Contact
	Networking/ Mentoring Funding	Companies with revenues between US\$1million and US\$15million	http://endeavorlebanon.org/ /
	Networking	Young entrepreneurs <30 years old	http://oureclub.com/
	Networking/ Mentoring Training	MSME's Second & third generation family businesses Corporate executives/leaders	http://www.berytech.org/
	Competition Trainings Networking/ Mentoring Access to Market	All sectors	http://www.mauricefadelprize.com/
	Training Networking/Mentoring Incubation	Ideas Startups Established businesses	http://www.mitarabc.competition.com/

1 - National Framework

V - Business Development Services

Name	Product / Services	Target group	Contact
	Networking	Lebanese worldwide including entrepreneurs and businesses	http://www.lbn.com.lb/
	Incubation Networking Training	Startups and entrepreneurs /Accelerators Retail tenants related to creative and digital sectors Educational Institutions Organizations providing support for entrepreneurs	www.zre.com.lb /
	Incubation	Start-up and SMEs in the ICT Field Companies usually up to 10 people each	http://www.solidere.com/
	Training / Mentoring	Senior staff Organization leaders Family business owners Managers and directors	http://www.exceed.me/ /

1 - National Framework

V - Business Development Services

Name	Product / Services	Target group	Contact
	Vocational training Capacity building	Micro and Small enterprises (between 1 and 10 employees)	http://www.iecd.org/en/
	Training Networking	Precollege youth Young professionals Hobbyists Industry group	http://www.theagenda-beirut.com/
	Training Consulting	Individuals Companies Startups	http://www.standupcomm.me/
	Networking Mentoring Workshops Virtual Office Services	Entrepreneurs Freelancers Small Business Owners	http://www.bubleik.com/



1 - National Framework

V - Business Development Services

Name	Product / Services	Target group	Contact
	Training Networking Mentoring Working spaces	Startups SMEs Freelancers Organizations	www.neopreneur.me
	Online Platform	Entrepreneurs Startups	http://www.entrepreneurslebanon.com/
	Online platform	Entrepreneurs Startups	http://lebanon.smetoolkit.org/lebanon/en



1 - National Framework

CNRS

(Conseil National de Recherche Scientifique)



مؤسسة عامة مرتبطة مباشرة برئاسة الحكومة مع استقلالية مالية وإدارية.
يتضمن عدة مراكز وبرامج بحثية منها برنامج:

The Science, Technology and Innovation Policy (STIP)

تأسس عام ١٩٦٢

موازنة نظرية ١% من الناتج الوطني بحسب قانون إنشائه





2. Industrial Research Institute (IRI) Summary

- ✓ Introduction.
- ✓ Figure of 2015.
- ✓ The essential Resources.
- ✓ Code of Ethics.
- ✓ Laboratories.
- ✓ Conformity Assessment Subject to Technical Regulations.





2. Industrial Research Institute (IRI) Introduction

- The Industrial Research Institute was established in 1953.
- It is a Lebanese, not-for-profit institution, for industrial studies, research and scientific material testing and analysis.
- It is deemed, under the Decree No. 10059 dated August 17th 1955, to possess public utility status.
- It is related to the Ministry of Industry and it is totally independent administratively and financially.





2. Industrial Research Institute (IRI) Figures of 2015

- More than 140 permanent employee.
- More than 300,000 tests performed.
- More than 40,000 Custom files treated.
- 14 laboratories, (7 Accredited).
- 4 international projects hosted.



2. Industrial Research Institute (IRI) The Essential Resources

- Fully Equipped Workshops.
- Pilot Plant - for applied research and initiating pilot industries.
- Lebanese Welding Centre for training and certification of welders, and inspection and control of various types of welding.
- Inspection and Control Unit.
- Certification Unit.
- Sub-Contracting and Partnership Exchange (SPX).
- European-Lebanese Center for Industrial Modernization (ELCIM).
- Center for Innovation & Technology (CIT)
- Lebanese Cleaner Production Center (LCPC)
- External resources under sub-contracting such as BIVAC, SGS, TUV etc.



2. Industrial Research Institute (IRI) Code of Ethics

In carrying out its functions, the Institute adheres to ethical and professional standards whereby it safeguards the clients best interests and regards as the client's property any information, processes, patents or techniques developed during work for him and safeguards such matters in complete secrecy.



2. Industrial Research Institute (IRI) Laboratories

1. Wet Chemistry (ANAB Accreditation)
2. Physical Chemistry (ANAB Accreditation)
3. Petroleum and Petroleum Products
4. Central Laboratory for Bread and Wheat (ANAB Accreditation)
5. Microbiology (ANAB Accreditation)
6. Paint
7. Textile, Leather and Rubber
8. Soil mechanics and Civil Engineering (ANAB Accreditation)
9. Mechanical Engineering
10. Water Lab
11. Electrical (ANAB Accreditation)
12. Metrology and Calibration (ANAB Accreditation)
13. Reclaiming Refrigerants Centre (Established in 2011)
14. Solar Water Heaters Laboratory (Established in 2011)



2. Industrial Research Institute (IRI) Conformity Assessment Subject to Technical Regulations

There are two mechanisms for the Conformity Assessment of products subject to technical regulations

A. Conformity Assessment at Destination (Lebanon)

- Horizontal standards
- Importer's warehouse
- At borders

B. Conformity Assessment in exporting country – Pre-shipment Verification





3. Energy activities Summary

- ✓ Solar Water Heater (SWH) Testing.
- ✓ CFL Testing.
- ✓ Other.

3. Energy Activities SWH Testing.

Solar Water Heaters



صفحة

٧٣٨٣

مراسيم

وزارة الصناعة

مرسوم رقم ٥٣٠٥ تاريخ ٢٨ تشرين الأول سنة ٢٠١٠ إعطاء
صفة الالتزام القانوني لمواصفات قياسية وطنية متعلقة بقطاع
تكنولوجيا العناية الصحية والكيمياء وسخان المياه الشمسي
والمصاييح الاقتصادية الموفرة للطاقة



3. Energy Activities SWH Testing.

Thermal Solar Systems and components. Solar Collectors :
NL EN 12975-1, 2006 : General Requirements;
NL EN 12975-2, 2006 : Test Methods.

Thermal Solar Systems and components. Factory Made Systems :
NL EN 12976-1, 2006 : General Requirements;
NL EN 12976-2, 2006 : Test Methods.

Thermal Solar Systems and components. Custom Build Systems:
NL EN 12977-1, 2006 : General Requirements;
NL EN 12977-2, 2006 : Test Methods.
**NL EN 12977-3, 2006 : Performance Characterization of stress
for solar heating systems.**

3. Energy Activities

SWH Testing. Marking on collector

Type plate (NL 12975-1 clause 7.2)

- Manufacturer brand name
- Serial number.
- Year of production.
- Gross area.
- Max. operating pressure.
- Stagnation temperature at $G_{glob} = 1000 \text{ W/m}^2$ and $t_{amb} = 30 \text{ }^{\circ}\text{C}$.
- Volume of the absorber.
- Empty weight.
- Country of origin.



3. Energy Activities CFL Testing.



3. Energy Activities CFL Testing Lab.



3. Energy Activities CFL Testing.

NL IEC 60968, 2007 : Safety Requirements

Main tests & inspection :

- Marking ;
- Interchangeability ;
- Protection against Electric Shock ;
- Insulation resistance ;
- Electric strength ;
- Mechanical strength ;
- Resistance to heat ;
- Cap temperature rise ;
- Resistance to flame & ignition.



3. Energy Activities CFL Testing.

NL IEC 60969, 2007: Performance Requirements

Main tests & inspection :

Starting time ;
Run up time ;
Wattage ;
Luminous flux ;
Colors temperature ;
Etc...



3. Energy Activities Other – The EcoTruck

Educational purpose, equipped with :

Photovoltaic system 100 Wp ;

Wind Turbine 1000 W ;

Thermal solar system ;

Meteo-Station ;

Clean Energy training Kit ;

Audiovisual equipment ;

Etc...

ECOTRUCK
RENEWABLE ENERGY
FOR NEW GENERATION



LSES
الجمعية اللبنانية
للمطالعة البيئية



INDUSTRIAL RESEARCH INSTITUTE
معهد البحوث الصناعية

3. Energy Activities Other – Pedagogic Platform



Objective :
A Concentrated training center on photovoltaic technologies.

In collaboration with :
UNDP, LCEC, TransEnergie & French embassy

2015-2016





4. The photovoltaic power plant Summary

- ✓ The installed PV systems.
- ✓ Energy sources of the IRI premises.
- ✓ System characteristics.
- ✓ Data of the 56 KWp system.
- ✓ Energy consumption of the IRI premises.
- ✓ Benefits of the system.
- ✓ Normal operation day curves.
- ✓ Efficiency factors.

4. The photovoltaic power generator The installed PV systems



Maximum 56 KWp

Operated on 5 July 2012



Maximum 30 KWp

Operated on 8 February 2016



4. The photovoltaic power generator Energy sources of the IRI premises



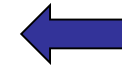
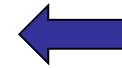
56 KWp



30 KWp



IRI premises



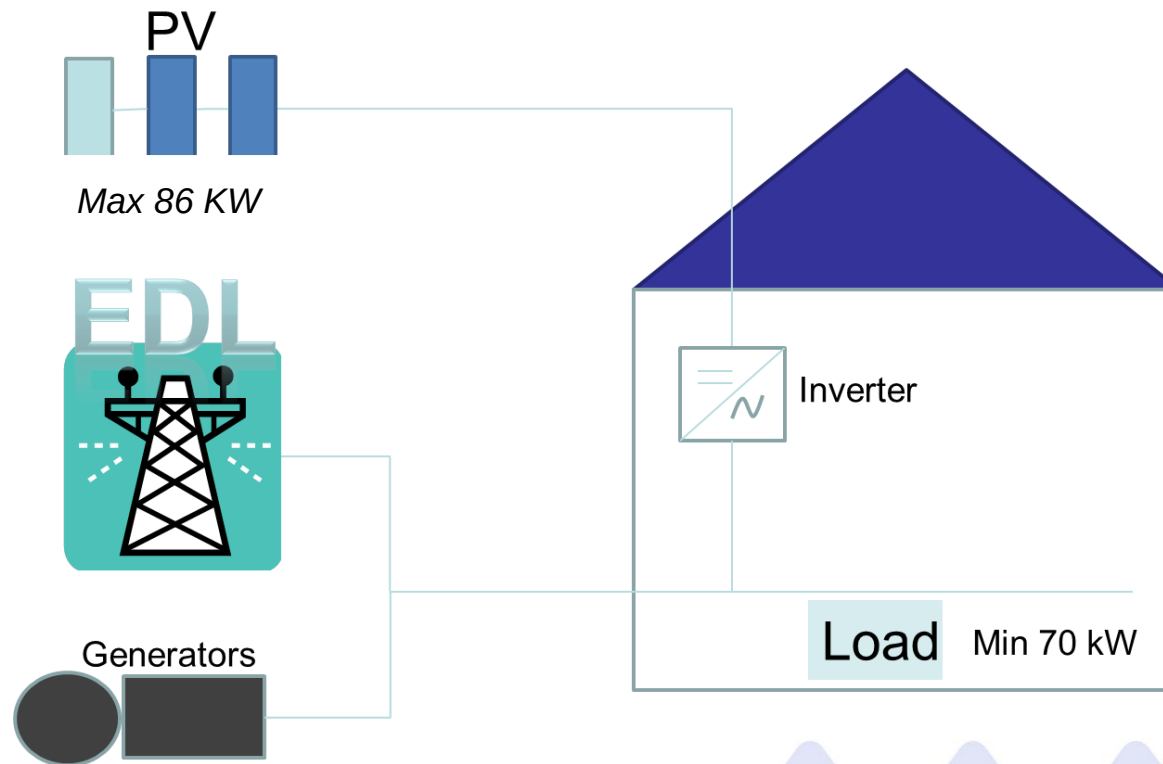
EDL



*2 x 500 KVA
200 KVA*

4. The photovoltaic power generator System characteristics

On Grid system



4. The photovoltaic power generator System characteristics

PV Specifications	System 56 Kwp	System 29.4 Kwp
Number of PV modules	204	147
Distribution of the PV modules, in series and in parallel	17 (parallel) x 12 (series)	10 (parallel) x 15(series)
Total area in m ² covered by the installed PV modules	396 m 2	193.1 m2
Maximum unit power	275 Wp	200 Wp
PV modules	Monocrystalline Silicon - Suntech	

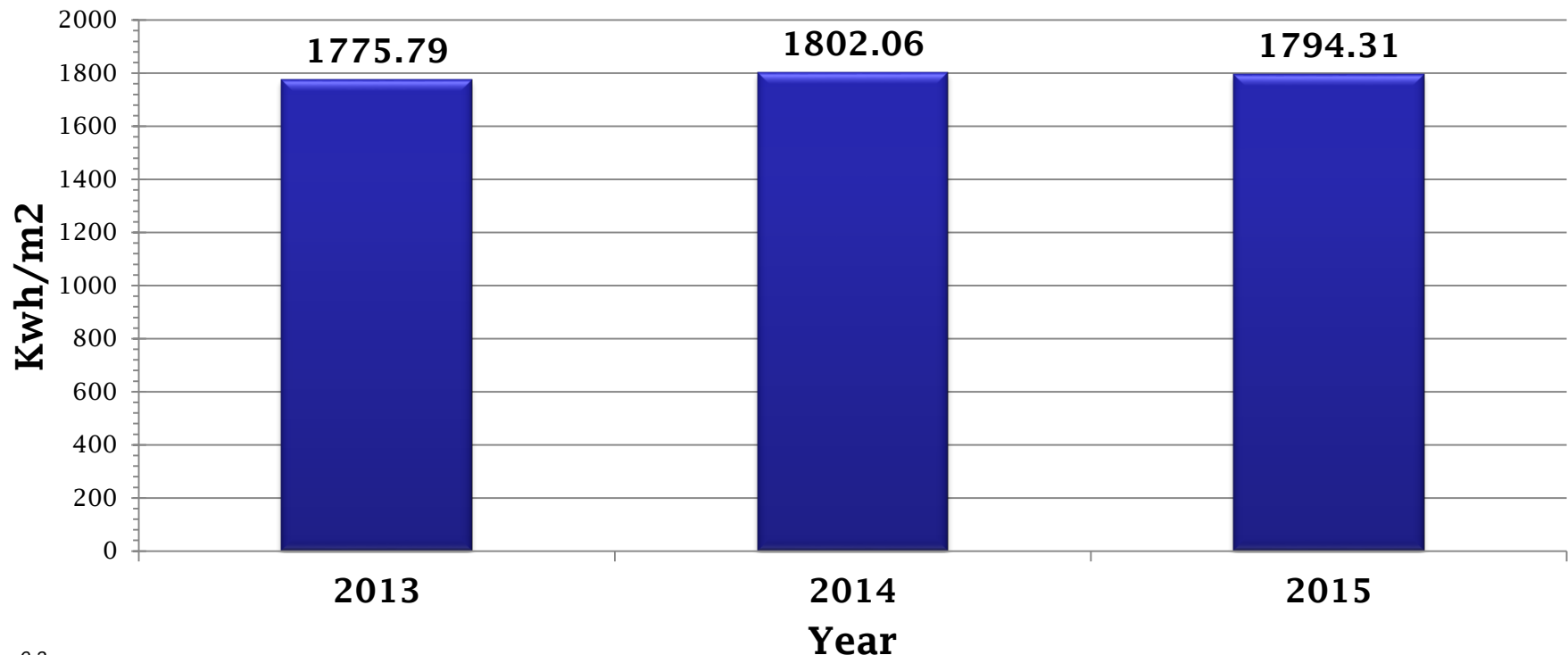


4. The photovoltaic power generator System characteristics

Inverters Specifications	System 56 Kwp	System 29.4 Kwp
Manufacturer	Fornius	
Model	CL 48.0	Symo 5.0-3-M
Number of inverter	1	5
Maximum output power	48 KVA	5 KVA
Operating voltage	230 - 500 V	163-800 V
Output frequency	50 Hz / 60 Hz	
Degree of protection	IP20	IP65
Environmental conditions	-20 °C to 50 °C , 0% to 95 %	-20 °C to 60 °C , 0% to 100 %
Maximum efficiency	95.9 %	98/0 %

4. The photovoltaic power generator Data of the 56 KWp system

Solar radiation

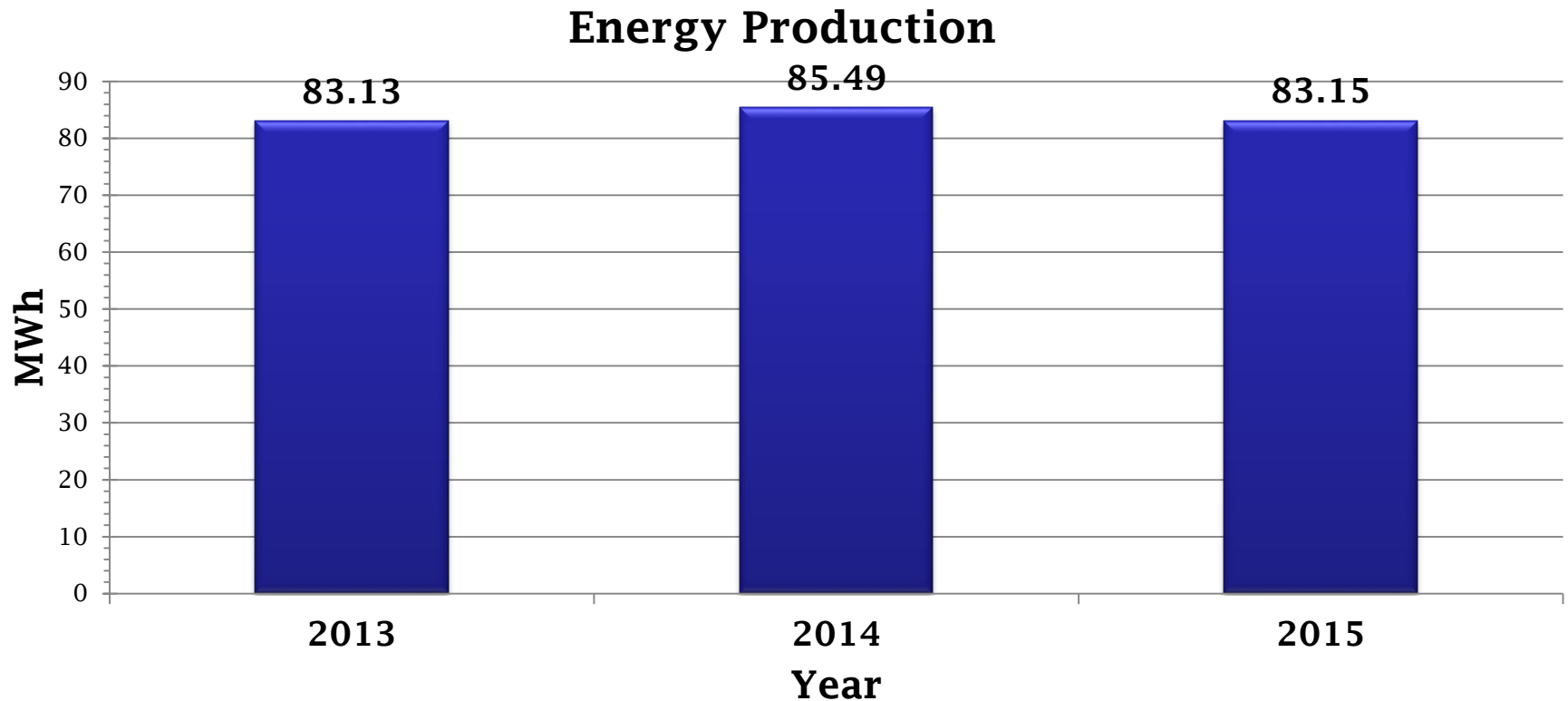


0.2

Total : 5732.16 KWh/m2

Average : 1790.72 KWh/m2

4. The photovoltaic power generator Data of the 56 KWp system

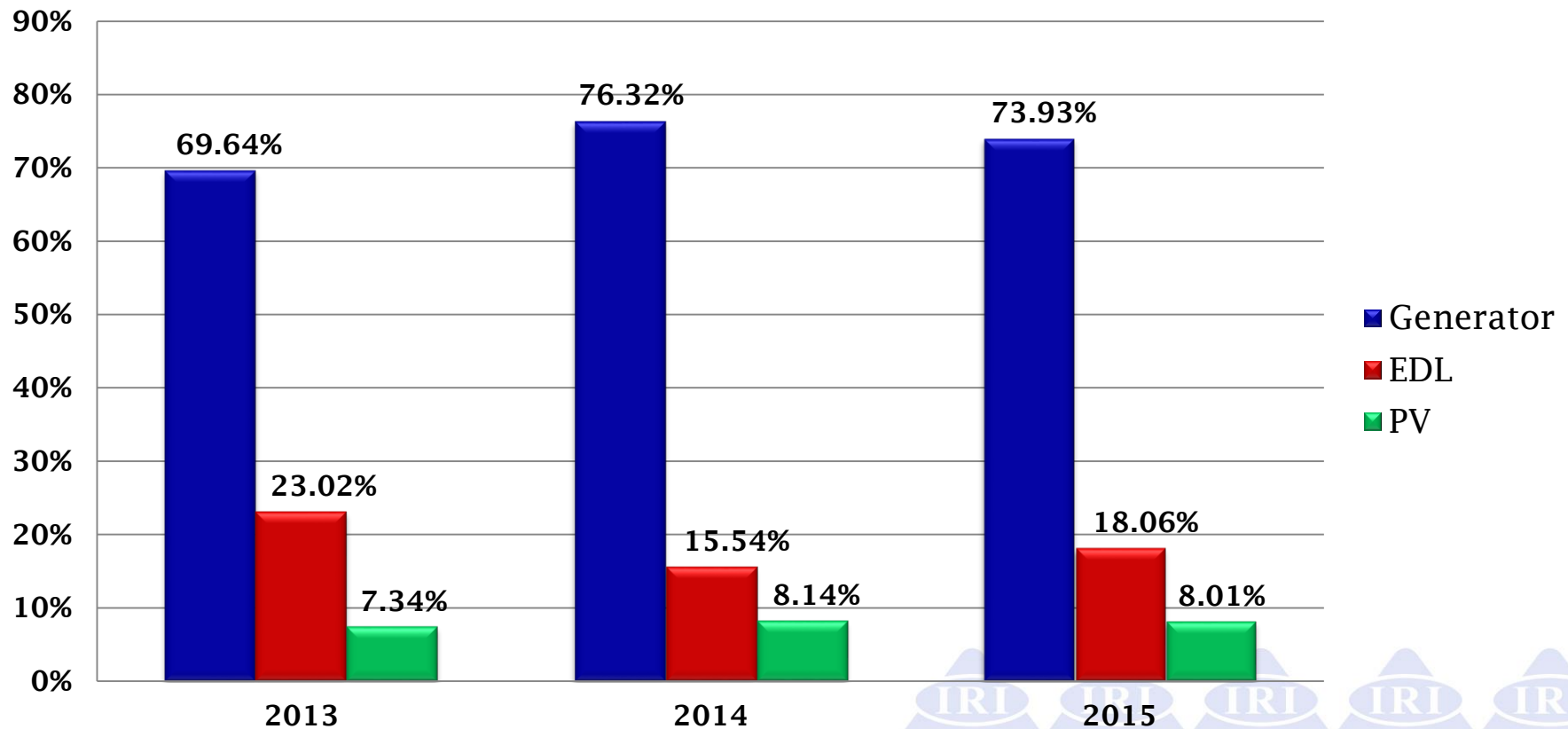


Total : 251.77 MWh

Average : 83.92 MWh

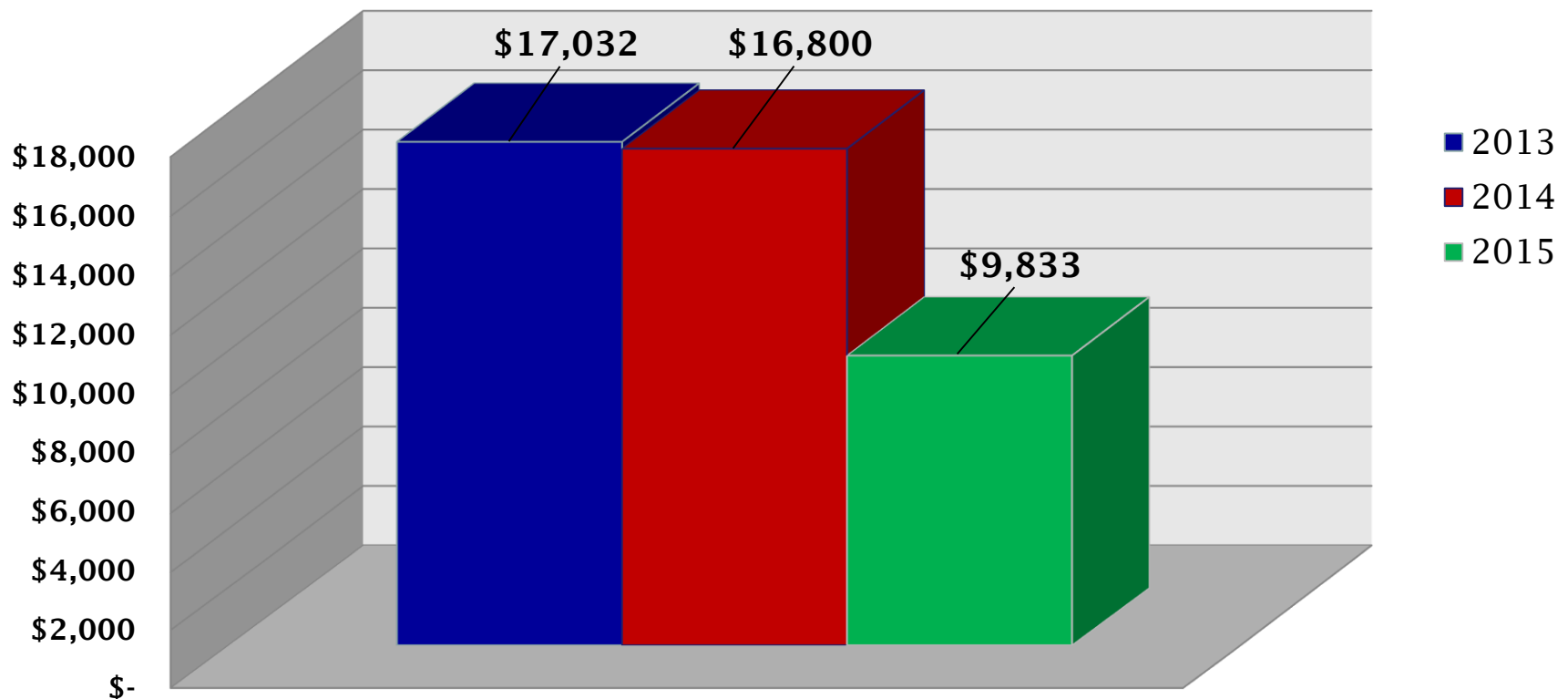
4. The photovoltaic power generator Energy consumption of the IRI premises

IRI annual energy production from different energy sources



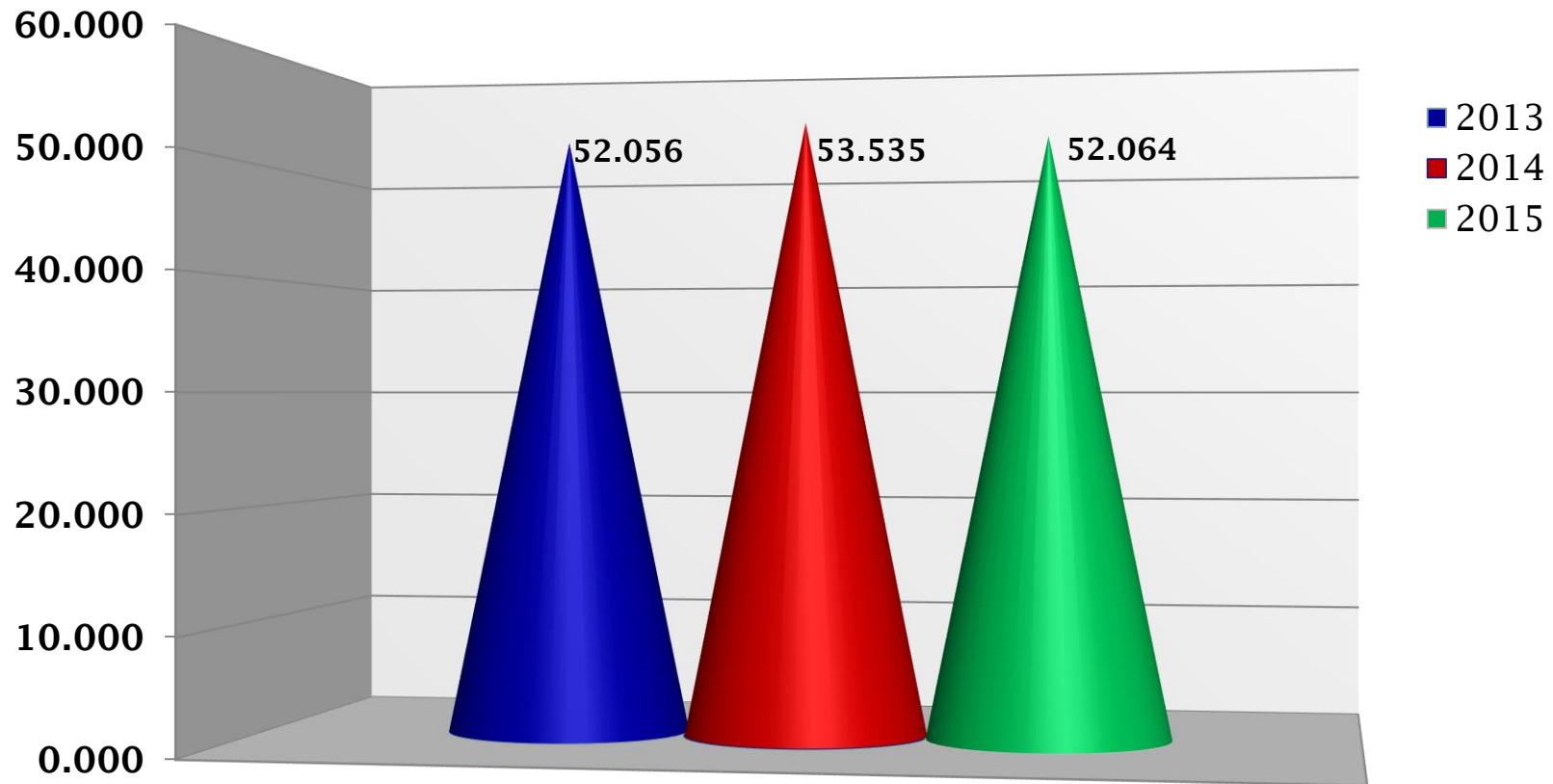
4. The photovoltaic power generator Benefits of the system

Amount of annual financial savings due to the installed PV system



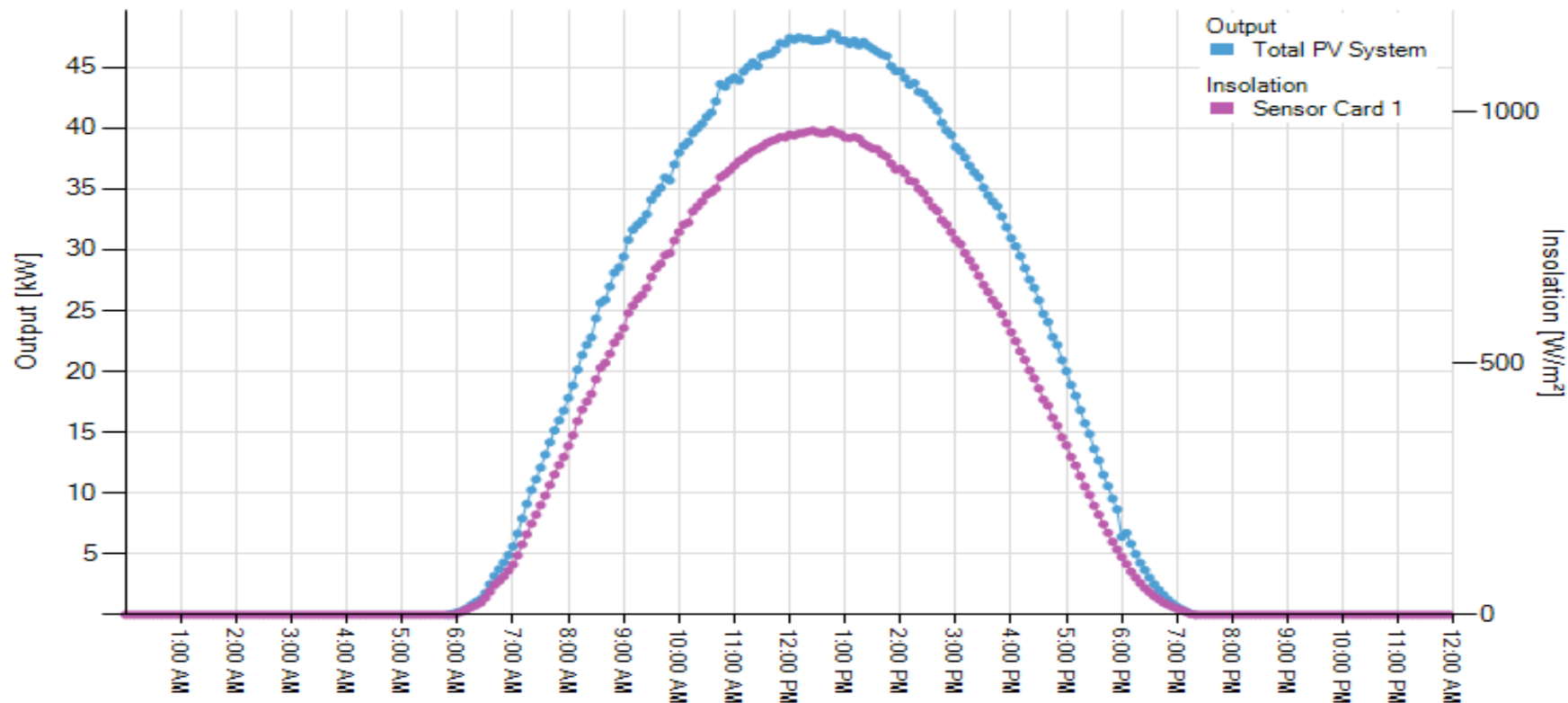
4. The photovoltaic power generator Benefits of the system

Yearly tCO₂ reduction



4. The photovoltaic power generator Normal operation day curves

Sunday, April 27, 2014

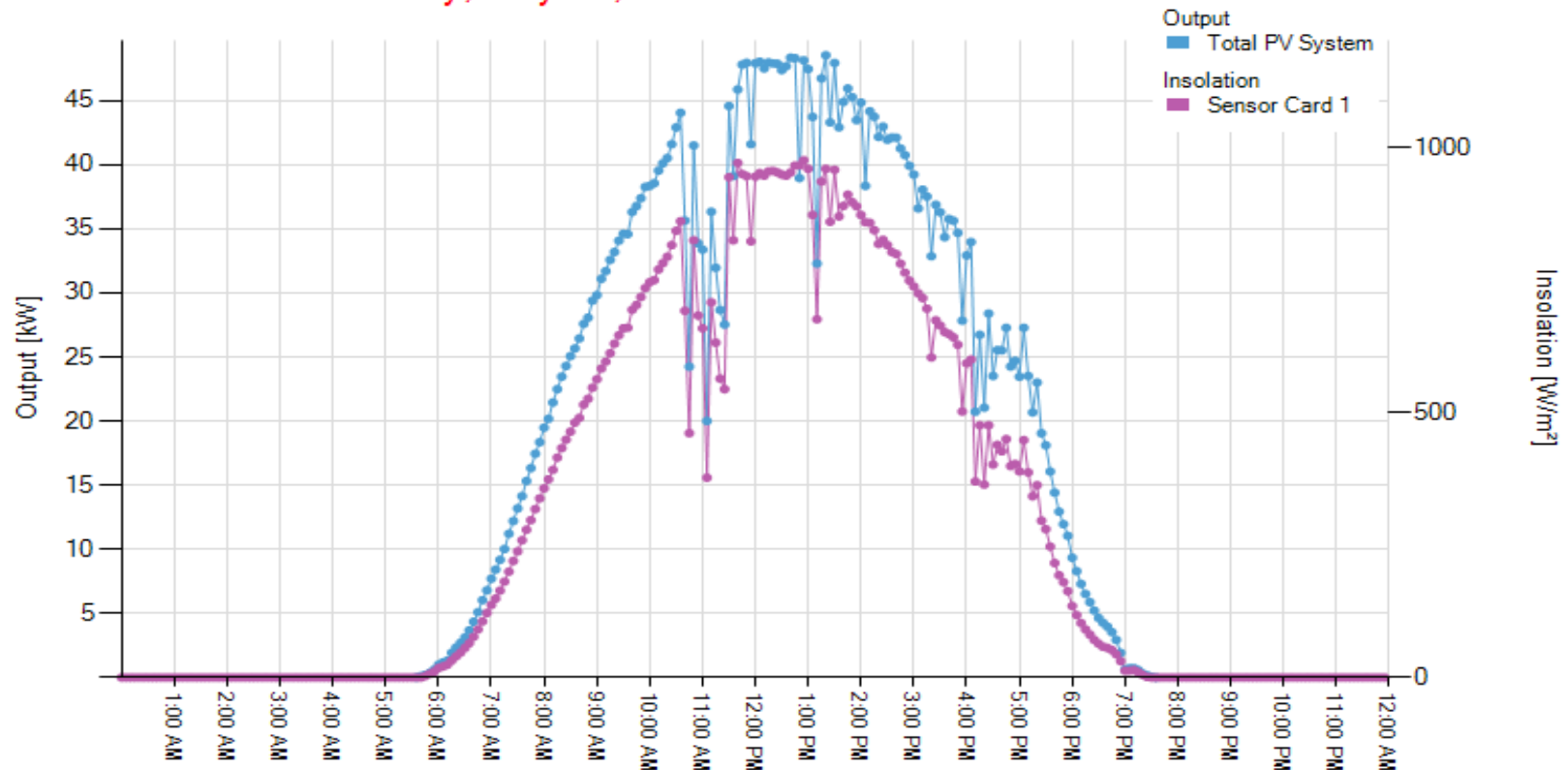


Total 370.84 KWh

Total 7.24 KWh/m2

4. The photovoltaic power generator Normal operation day curves

Wednesday, May 14, 2014



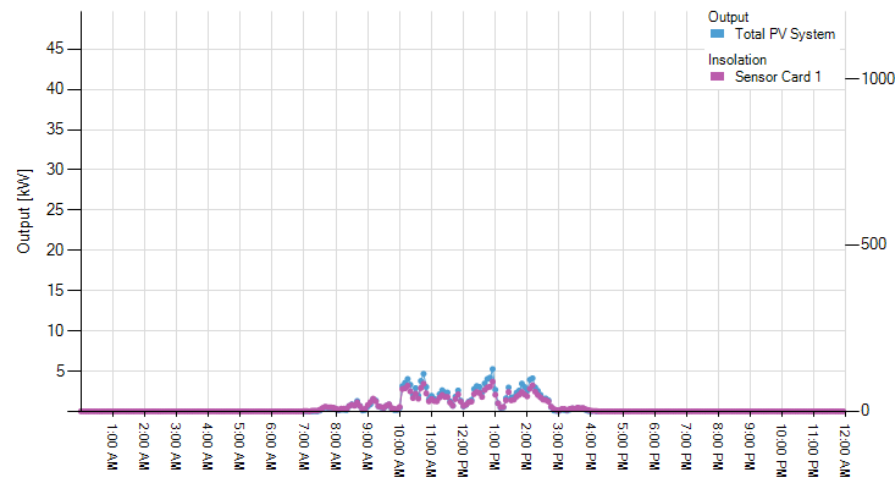
Total 367.83 KWh

Total 7.03 KWh/m2

4. The photovoltaic power generator

Normal operation day curves

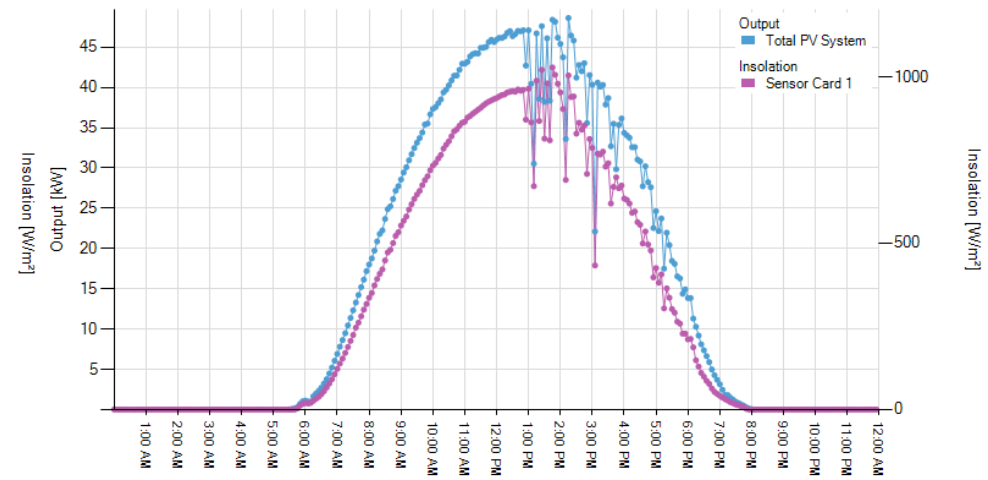
Wednesday, January 07, 2015



Total 12.77 KWh

Total 0.26 KWh/m²

Wednesday, June 24, 2015



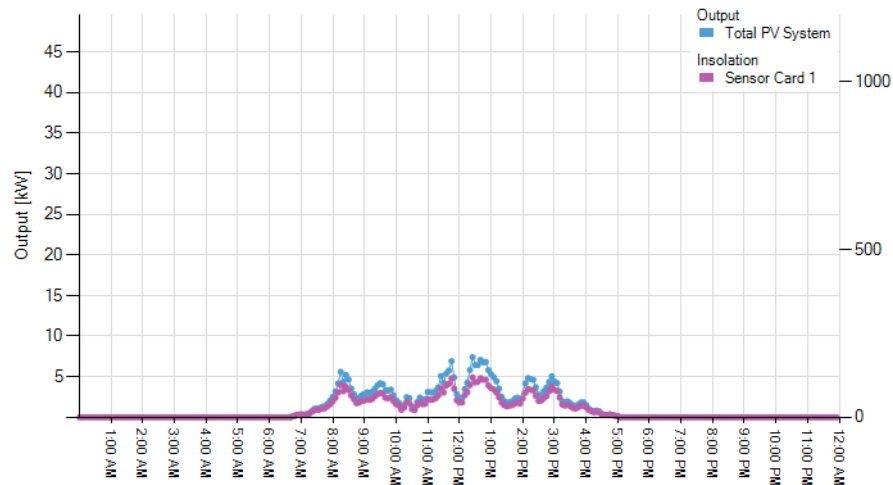
Total 380.04 KWh

Total 7.46 KWh/m²

4. The photovoltaic power generator

Normal operation day curves

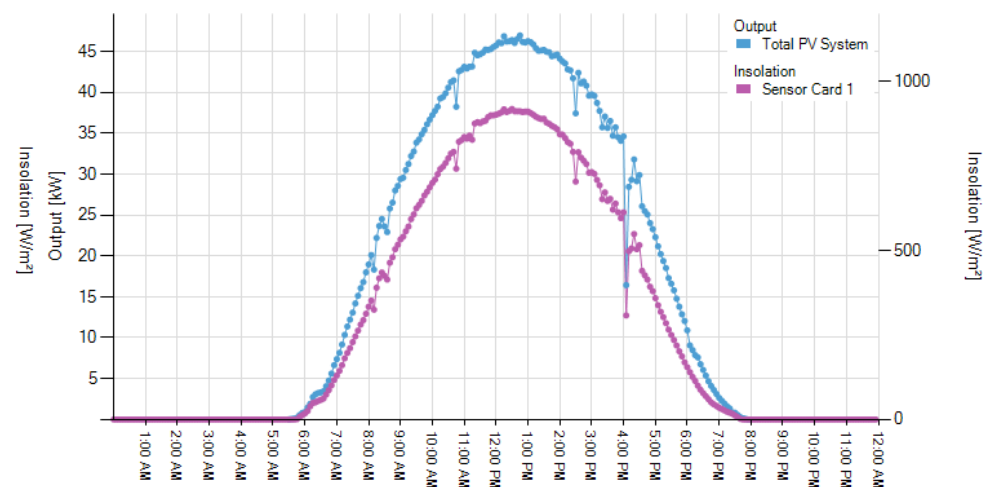
Monday, February 03, 2014



Total 29.02 KWh

Total 0.52 KWh/m²

Tuesday, July 01, 2014

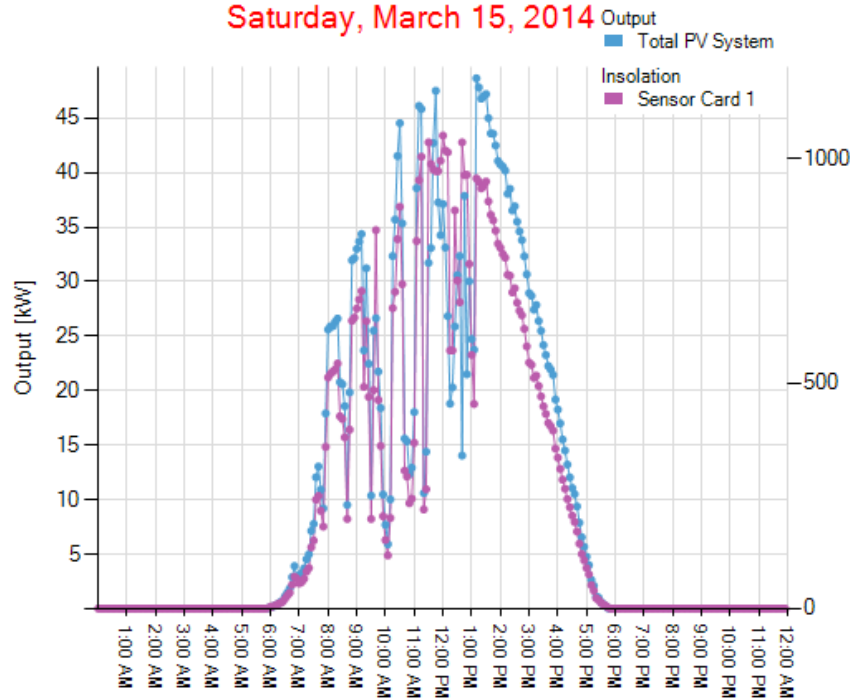


Total 376.93 KWh

Total 7.02 KWh/m²

4. The photovoltaic power generator Normal operation day curves

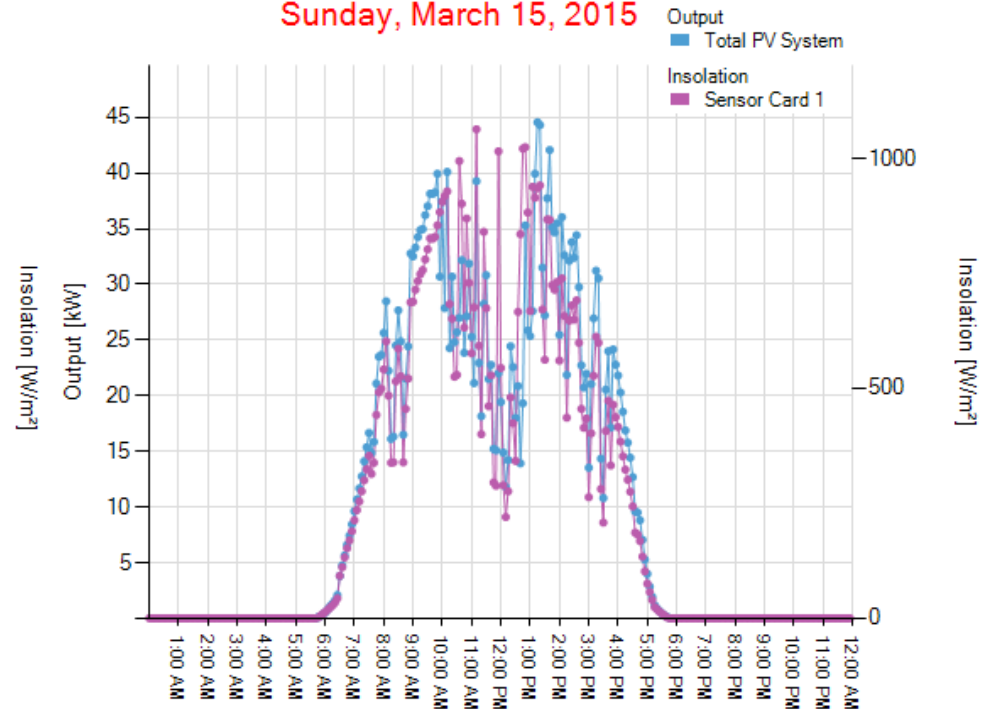
Saturday, March 15, 2014



Total 255.64 KWh

Total 5.52 KWh/m2

Sunday, March 15, 2015



Total 250.33 KWh

Total 5.74 KWh/m2

4. The photovoltaic power generator Efficiency Factors

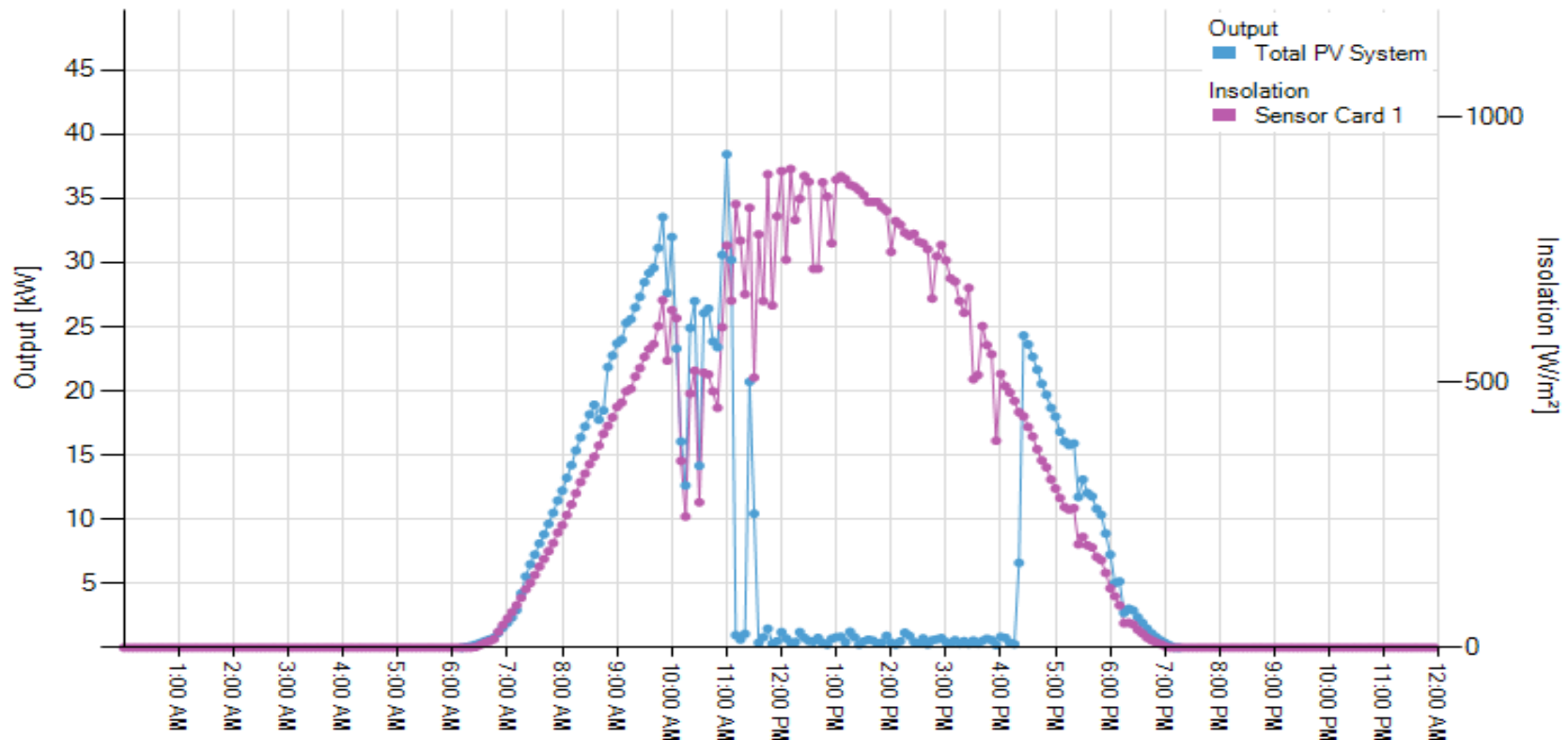
Damages of the PV

*6 Panels have been damaged
since 5 July 2012*



4. The photovoltaic power generator Efficiency Factors

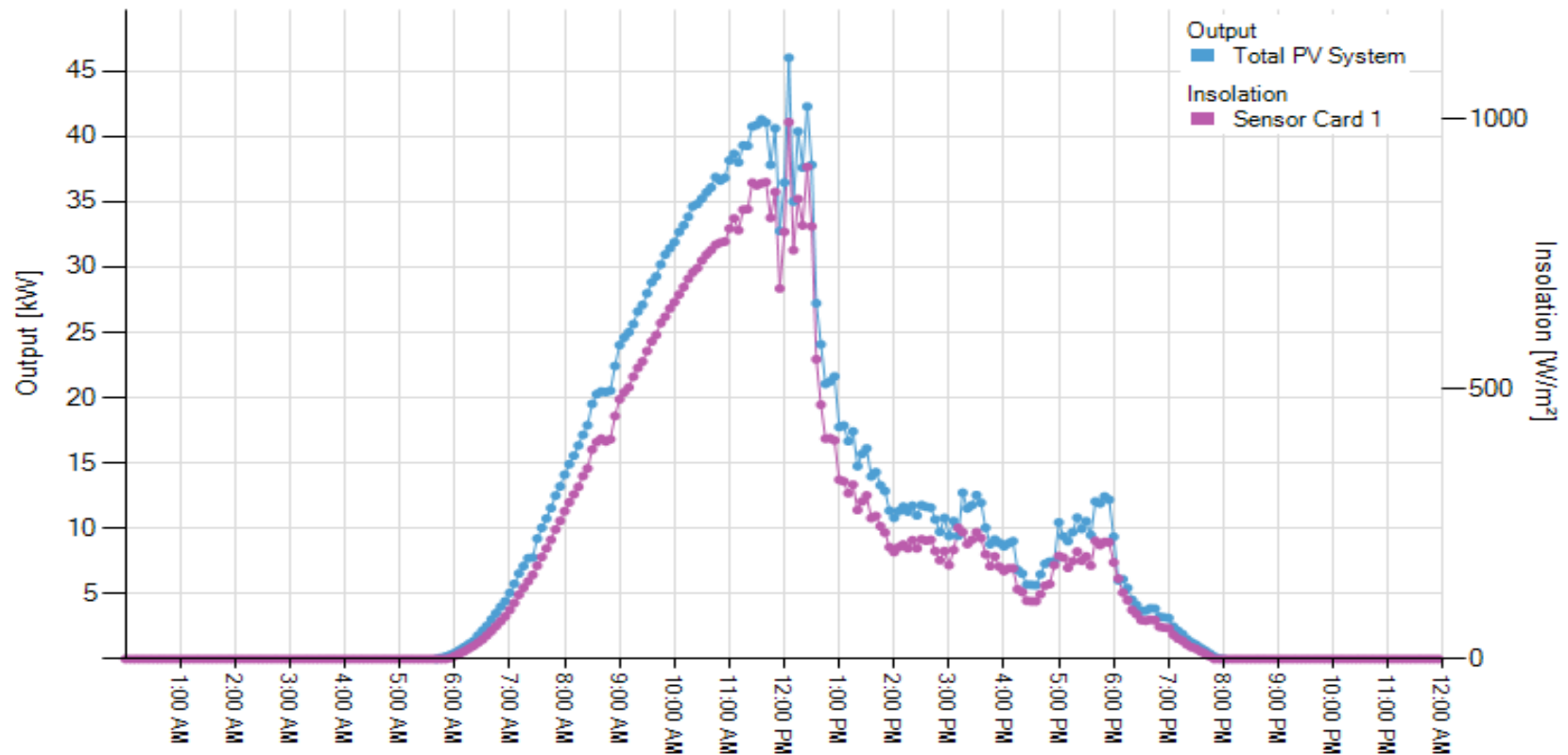
Sunday, August 30, 2015



Limits settings to protect the inverter

4. The photovoltaic power generator Efficiency Factors

Monday, July 13, 2015



Clouds in the sky

For additional Information:
www.IRI.org.lb

← → ↻ www.iri.org.lb/index.html


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Questions

Thank You

شكراً



Dr Imad HAGE CHEHADE,

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