

La Cámara de Comercio de Puerto Rico y
su Comité de Energía y Agua presentan:

CUMBRE DE INDUSTRIA ENERGÉTICA

“Conservation Engineering-Energy Efficiency”
Ahorrar sin Invertir-Negocio Redondo

Jorge Hernández PE,CEM
President & Energy Manager
Email: jorgehernandez@escopr.net
787-638-7893



#CamaraEnAccion

About Us



Founded in 2003 by Eng. Jorge Hernandez Carreras,

ESCOPR emphasizes in providing services in the optimization of energy and environmental resources for Puerto Rico and the Caribbean. Our firm is the first and only provider of quality engineering consulting on the development and implementation of energy conservation strategies, from audit to commissioning.



ENERGY ENGINEERING



PRODUCT DISTRIBUTORS



GENERAL CONTRACTORS



CAPITAL PROVIDERS

OUR MAIN SERVICES



Efficiency Engineering

- > ESCOPR with over 14 years experience implementing energy efficient projects has the best energy engineers & technologies to reduce the operational cost associated to energy and water.
- > Best LED for internal & External Lighting
- > Water Conservation
- > HVAC-Chillers, VRF & VAV Controls



Power Generation

- > ESCOPR provides Turnkey Cogeneration solutions to provide power, heating and cooling needs.
- > Cogeneration
- > OPRA Turbine
- > Flex Micro-turbines
- > GE Jenbacher Engines
- > Broad USA Absorption Chillers
- > Cain Heat Recovery Steam Generator
- > Gas fuel Infrastructure
- > Propane
- > LPG & LNG



Industrial Energy Management

- > ESCOPR is your best Energy Outsourcing to help our customers to achieve their Energy & Water Conservation Goals .
- > No Cost Energy Audits & Engineering
- > We provide the Capital Investment
- > We do the Project Management & Construction
- > Let Share the Savings!

Shared Saving Energy Performance Contract

ESCOPR finance 100% of the capital cost of the Efficiency Project, including installation and maintenance at zero cost to the customer. By retrofitting existing utility system with a new more efficient technology, we help clients lock in energy and cost savings of 50% or greater over a period up to 10 years



No Capital Costs

Absolutely no up-front capital costs for all your LED lighting



Huge Savings

Save 50% or more on your building's lighting costs



Retrofitting

Complete Retrofit of your current lighting solution included



Full Warranty

Warranty and service on all lights for the entire contract term

MEET OUR TEAM

- * We have the best team of engineers, auditors, energy consultants, technical specialists and construction personnel.



- Jorge Hernandez, PE, CEM
 - President & Energy Manager
 - Licensed professional mechanical engineer
 - Certified Energy Manager
 - OSHA Outreach Trainer
 - Over 25 years of Pharmaceutical & Manufacturing Experience



Administrative Assistance: We have one assistant in charge of the manager's agenda, client appointments, filing, typing, follow up and other clerical responsibilities.

Professionals: Architect, Draftman,, electrical engineer, Environmental Engineers and mechanical engineer

Technicians: We have near 20 electrician, HVAC technicians, certified welders for the construction, mechanical installation, preventative maintenance and repairs.



Energy Efficiency Successful Program

We Provide Engineering, Capital Investment, technologies and Project Management

Capital Investment



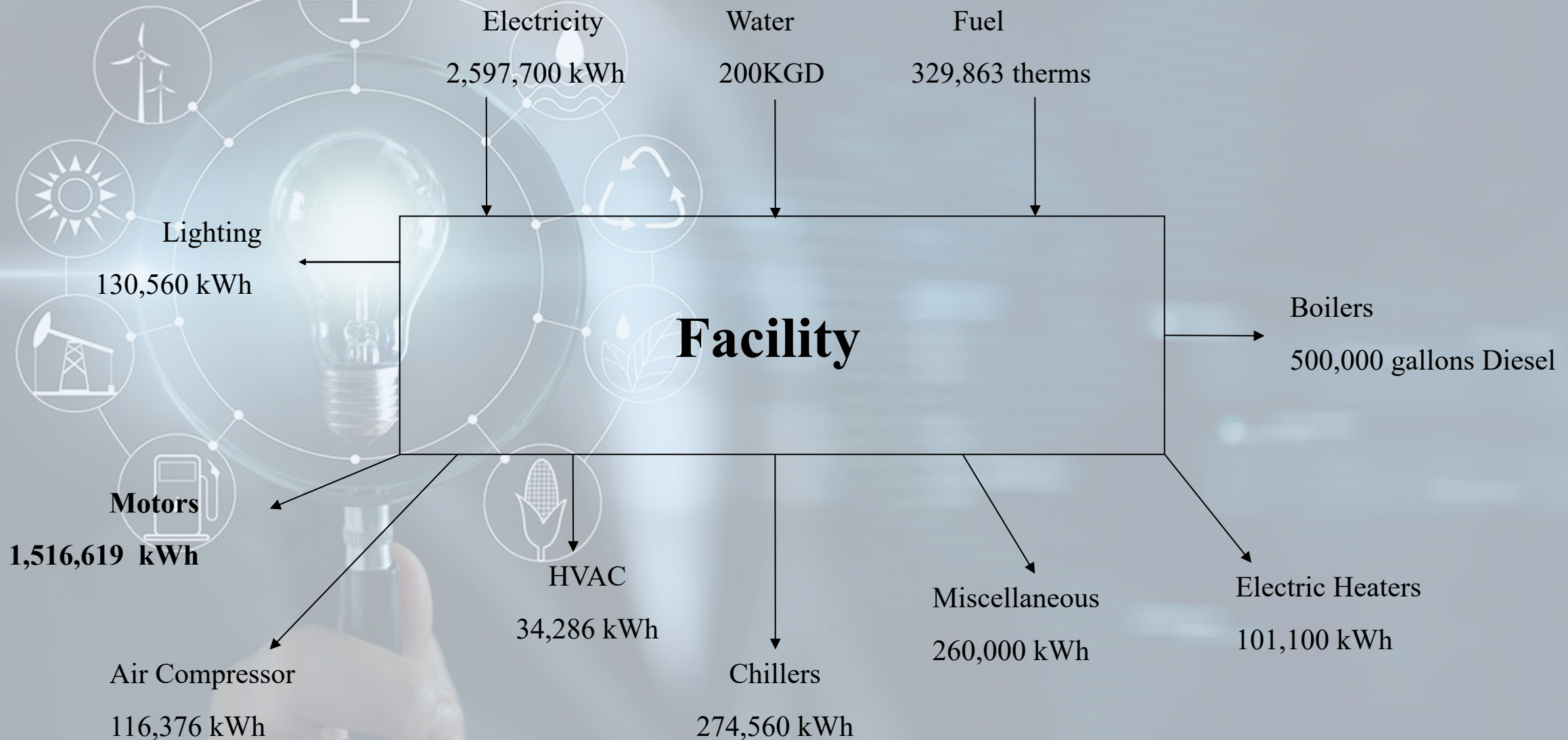
Download more graphics at www.psdgraphics.com

Pre-Engineering

1. ECO
2. Right Solution
3. Savings
4. Investment

Project Management
Energy Validation
Maintenance

Energy and Water Balance for a Facility



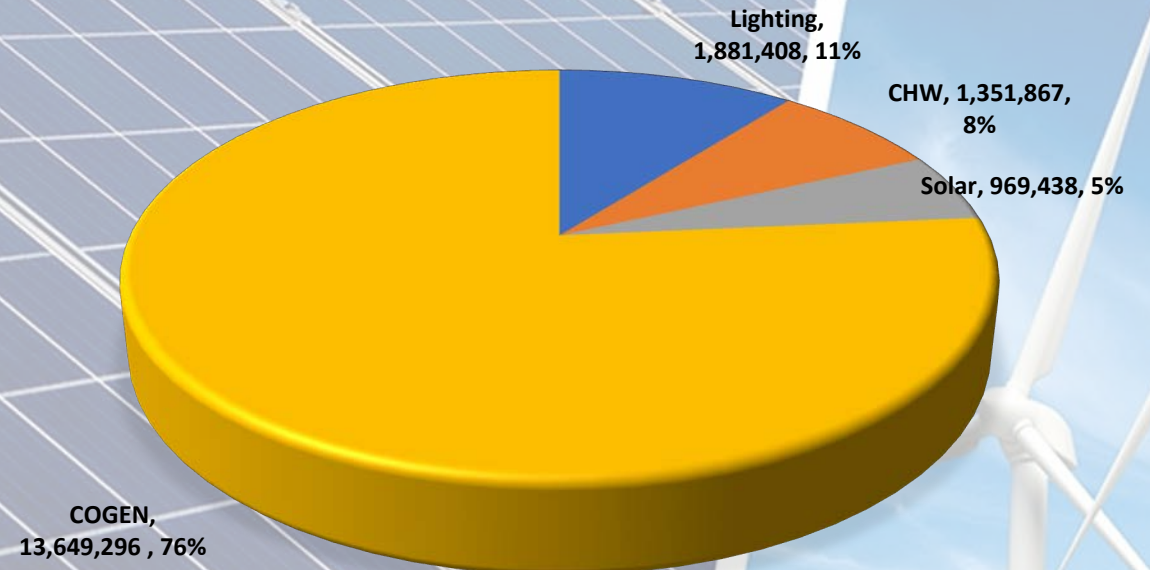
Energy Conservation CLARO Roosevelt Facility

Back



The first step in the facility analysis process was to identify all of the applicable areas that provided opportunities for energy conservation. Based on the survey, the current consumption of the existing system is **17,786,010 kWh/yr**. The chart to the right displays our results detailing the energy savings opportunities by first optimizing current systems, and secondly switching to a cleaner, less expensive energy generation method.

ENERGY SAVINGS OPORTUNITIES



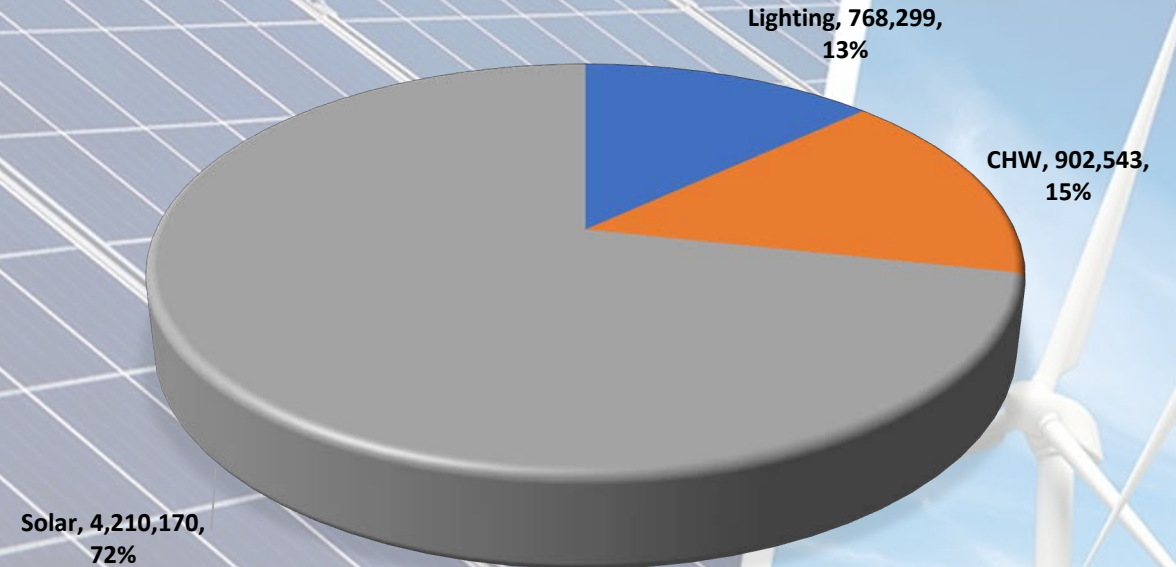
Energy Conservation Bo. Palmas Facility

Back



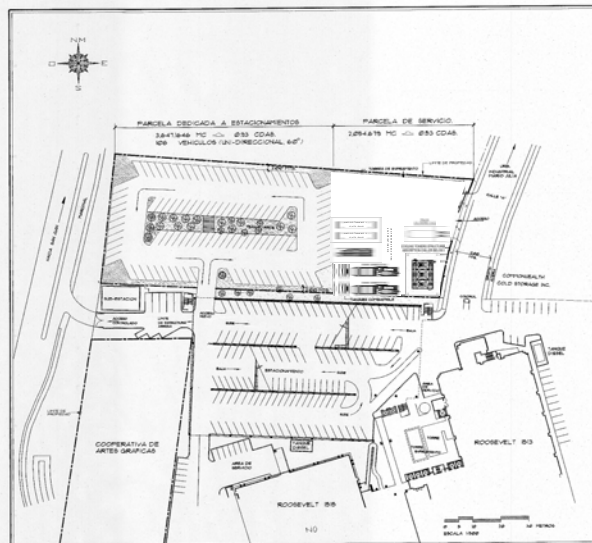
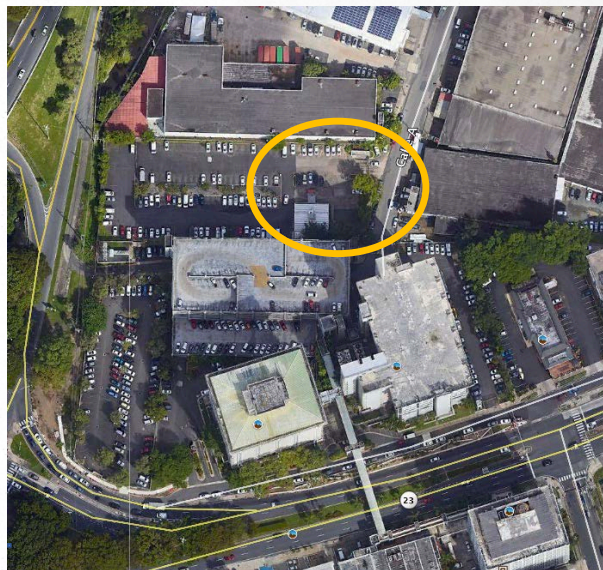
The first step in the facility analysis process was to identify all of the applicable areas that provided opportunities for energy conservation. Based on the survey, the current consumption of the existing system is 5,385,600 kWh/yr. The chart to the right displays our results detailing the energy savings opportunities by first optimizing current systems, and secondly switching to a cleaner, less expensive energy generation method.

ENERGY SAVINGS OPORTUNITIES



COGEN Roosevelt Facility

PROPOSED CHP LOCATION



B. ESQUEMA DE ESTACIONAMIENTO SOBRE TERRENO Y PARCELA DE SERVICIO

Project Facts

Roosevelt CHP Cogen Plant (Natural Gas)

Energy Generation

Total Projected Cost	\$6,029,441
Energy Cost Savings	\$1,045,341
Simple Payback	5.77 years
CO ₂ Reduction	5,686.41 Tons
System Capacity	2,600 kW
AC Energy Generation	13,921,704 kWh

Applied Technologies:

(2) Jenbacher Engines, Absorption Chiller

Numbers reflect annual project savings based on prior energy consumption, local electric rates (\$0.197/kWh) and specific usage hours. Savings for individual locations may vary.



PROYECTO:	COMPLEJO TELEFONICO DE CAPARRA / AVENIDA FRANKLIN DELANO ROOSEVELT NUM. 1500, 1513, 1515
ALTERNATIVAS DE DESARROLLO DEL SOLAR PAPIRO, INC. CALLE A URBANIZACION INDUSTRIAL MARIO JULIA, GUAYNABO, PUERTO RICO.	

ESCALA:	1:500
FECHA:	SENO 2008
PROYECTADO POR:	ING. JOSE E. RIVERA
REVISADO POR:	ING. GREGORIO
NO. DE PLAN:	A-3
NO. DE HOJA:	3/4

Bo. Palmas Solar Energy System



Project Facts

Bo. Palmas Rooftop Solar System

Energy Generation

Total Projected Cost	\$6,250,089
Energy Cost Savings	\$829,403
Simple Payback	7.54 years
CO ₂ Reduction	4,348.54 Tons
DC System Size	2,538 kW
AC Energy Generation	4,210,170 kWh

Applied Technologies:

Rooftop Solar System (2,538 kW), Net Metering

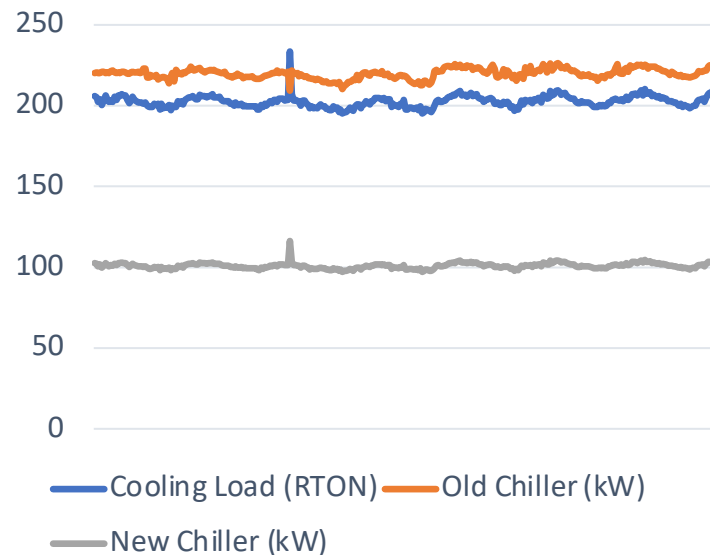
Numbers reflect annual project savings based on prior energy consumption, local electric rates (\$0.197/kWh) and specific usage hours. Savings for individual locations may vary.

Roosevelt 1513 Chiller Replacement



Current Efficiency: 1.09kW/Ton
 New Efficiency 0.49 KW/Ton

CHW Analysis (ROOS 1513)



Project Facts

Roosevelt 1513 Chiller Replacement

Efficiency Upgrade

Total Projected Cost	\$577,949
Energy Cost Savings	\$221,037
Simple Payback	2.61 years
CO ₂ Reduction	1,087.34 Tons
Demand Reduction	120 kW
Energy Conservation	1,052,741 kWh
New Chiller Efficiency	0.498 kW/Ton

Applied Technologies:

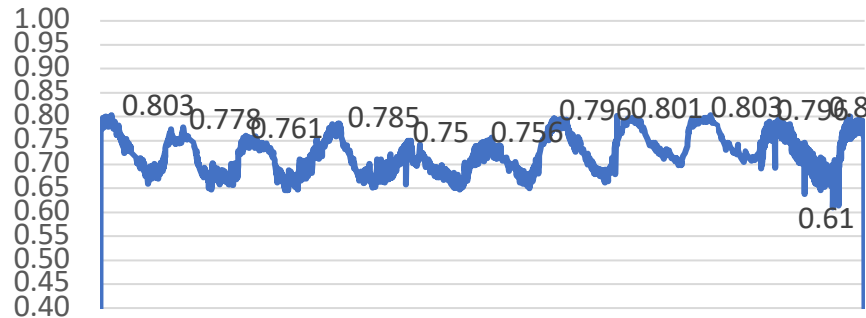
Water Cooled Magnetic Bearing Chiller (250 Ton)

Numbers reflect annual project savings based on prior energy consumption, local electric rates (\$0.197/kWh) and specific usage hours. Savings for individual locations may vary.

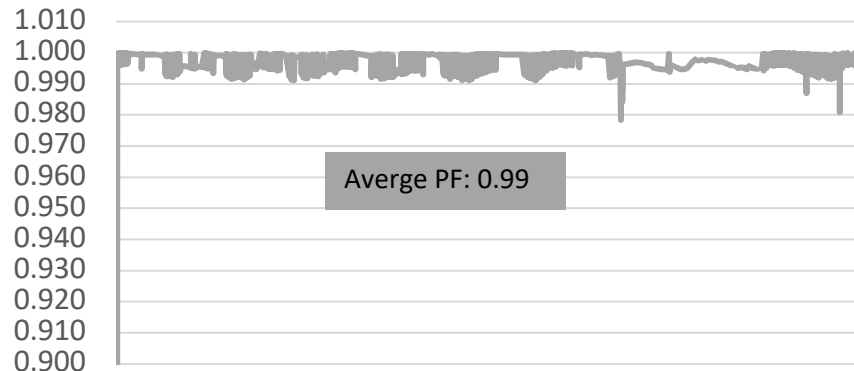
Bo. Palmas Power Factor Correction



CURRENT POWER FACTOR GRAPHIC



CORRECTED POWER FACTOR



Project Facts

Barrío Palmas Power Factor Correction

Capital Projects

Total Projected Cost	\$78,769
----------------------	----------

Energy Cost Savings	\$31,693
---------------------	----------

Simple Payback	2.48 years
----------------	------------

KVA Savings (Monthly)	343 kVA
-----------------------	---------

Bank Capacity	600 kVAR
---------------	----------

Corrected Power Factor	98%
------------------------	-----

Applied Technologies:

600 kVAR Automatic Capacitor Bank

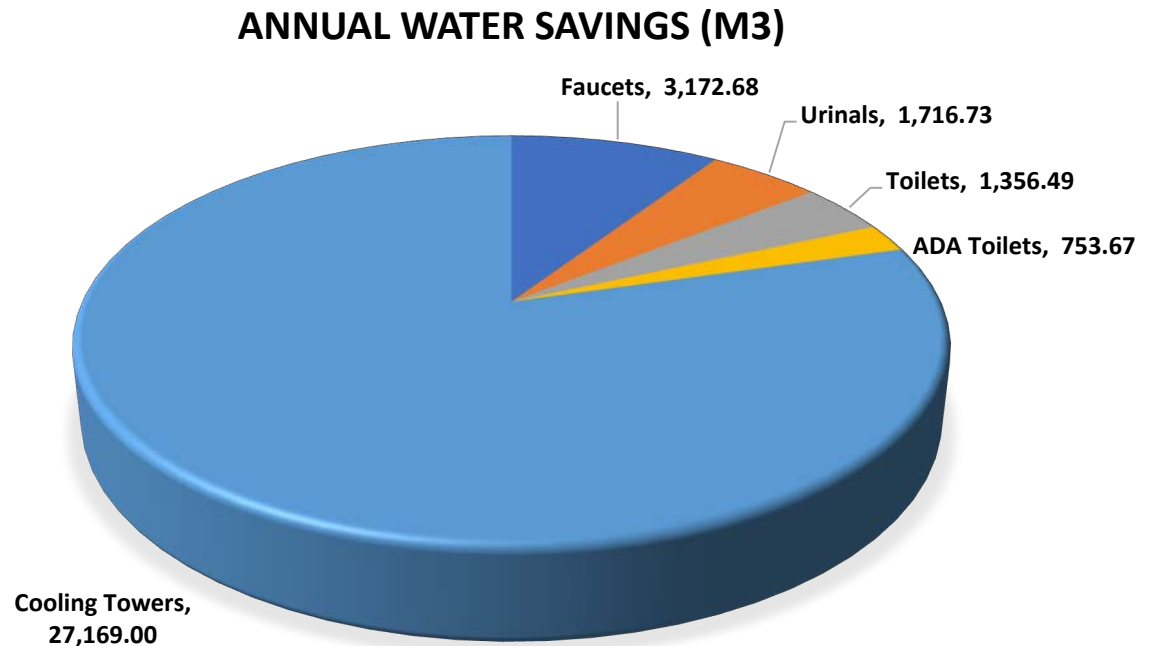
Numbers reflect annual project savings based on prior energy consumption, local electric rates (\$7.70/kVA) and specific usage hours. Savings for individual locations may vary.

Water Conservation Roosevelt Facility

[Back](#)

We began our water conservation analysis by first understanding the current consumption and consumers. Presently, the facility has an annual water consumption of **64,942 m³**. By applying water conservation technologies, a total of **34,168.57 m³** can be saved.

- ▶ Cooling Towers (27,169 m³)
- ▶ Faucets (3,172.68 m³)
- ▶ Toilets (2,110.16 m³)
- ▶ Urinals (1,716.73 m³)

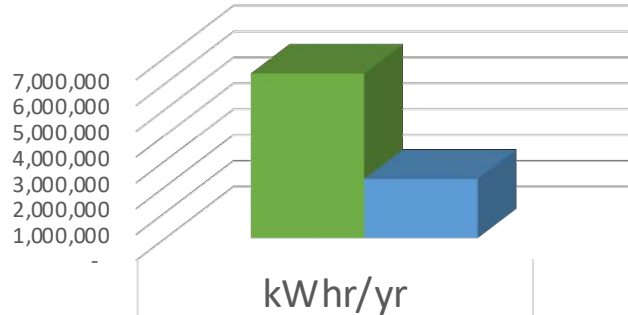


Case Studies LED Upgrades

UNIVERSIDAD
ANA G. MÉNDEZ

UAGM

UAGM Lighting Upgrades



64%

Energy Consumption Reduction
(Lighting System)

Project Facts

Lighting Retrofit

Efficiency Upgrade

Energy Cost Savings \$937,634

Power Savings 1,385 kW

Energy Savings 5,198,233 kWh

Num. of Locations 4 Campuses

Num. of Fixtures 23,677

Applied Technologies:

LED Tubes, LED Retrofit Kits, LED Lamps, Sensors

Numbers reflect annual project savings based on prior energy consumption, local electric rates and specific usage hours. Savings for individual locations may vary.

Case Studies LED Upgrades

UNIVERSIDAD
ANA G. MÉNDEZ

UAGM





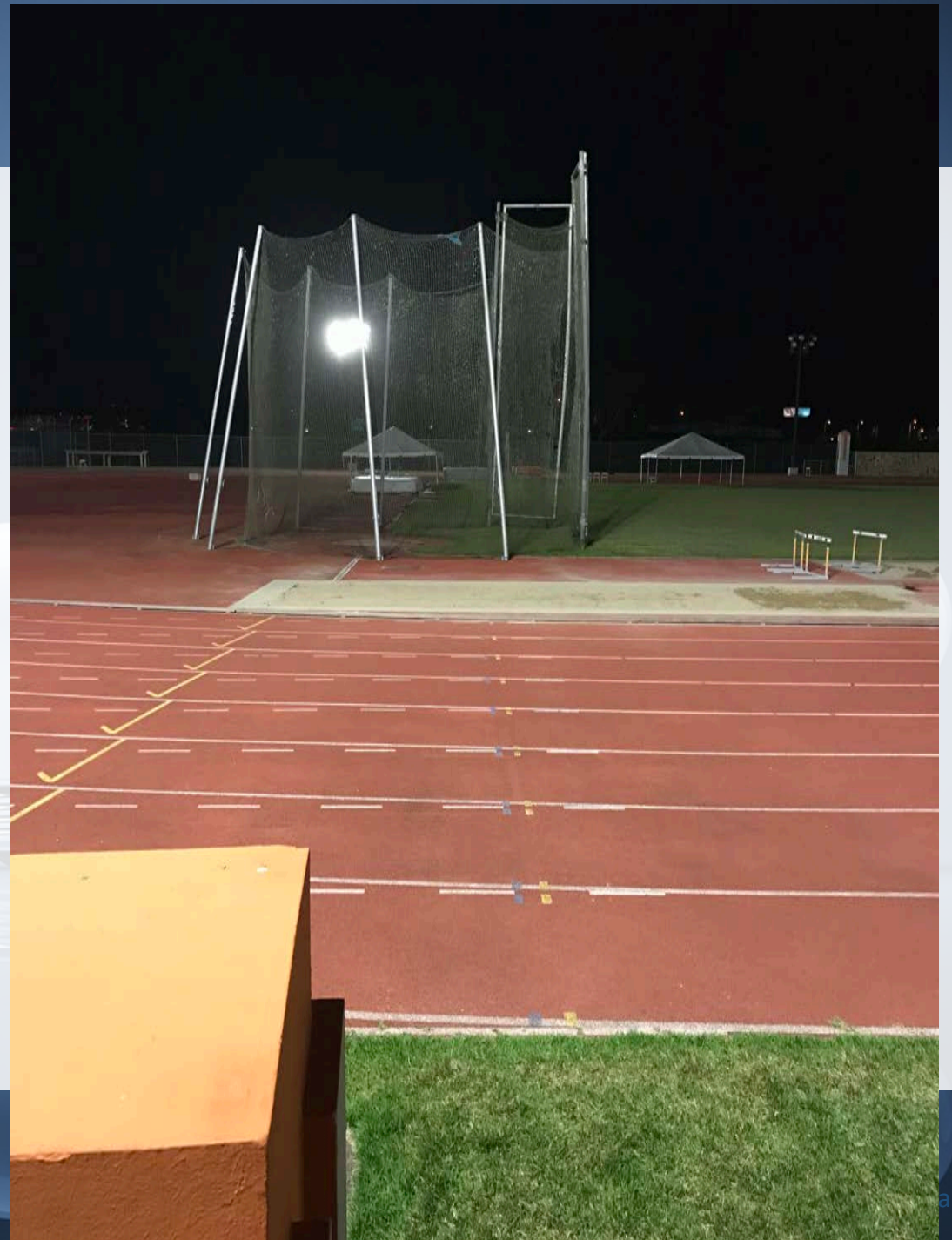
BEFORE



AFTER



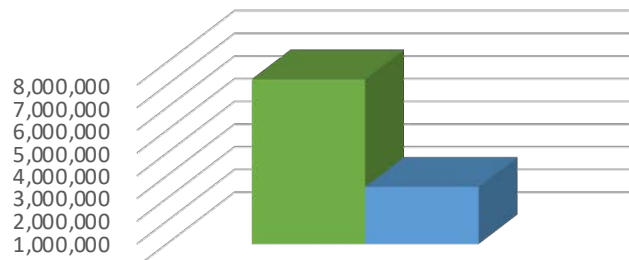
Cu



Case Studies LED Upgrades



HIMA San Pablo Lighting Upgrades



	kWhr/yr
■ Before Retrofit	7,270,024
■ After Retrofit	2,532,762



65%

Energy Consumption Reduction
(Lighting System)

Project Facts

Lighting Retrofit

Efficiency Upgrade

Energy Cost Savings \$1,045,363

Power Savings 894kW

Energy Savings 4,737,261kWh

Num. of Locations 6 Hospitals

Num. of Fixtures 16,470

Applied Technologies:

LED Tubes, LED Retrofit Kits, LED Lamps

Numbers reflect annual project savings based on prior energy consumption, local electric rates and specific usage hours. Savings for individual locations may vary.

Cumbre de Industria Energética

Before

After

Hospitales
HIMA•San Pablo

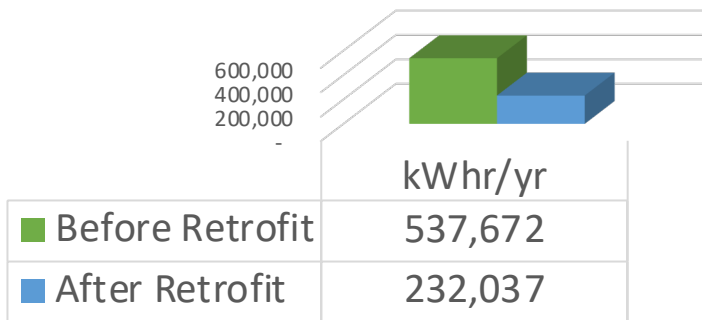


Case Studies LED Upgrades

DEPARTAMENTO DE DESARROLLO
ECONÓMICO Y COMERCIO
DDEC



Departamento de Desarrollo
Economico y Comercio Lighting
Upgrades



57%

Energy Consumption Reduction
(Lighting System)

Project Facts

Lighting Retrofit

Efficiency Upgrade

Energy Cost Savings	\$86,307
Power Savings	86.3kW
Energy Savings	305365kWh
Num. of Locations	1 Office Building
Num. of Fixtures	2,736

Applied Technologies:

LED Tubes, LED Retrofit Kits, LED Lamps, Sensors

Numbers reflect annual project savings based on prior energy consumption, local electric rates and specific usage hours. Savings for individual locations may vary.

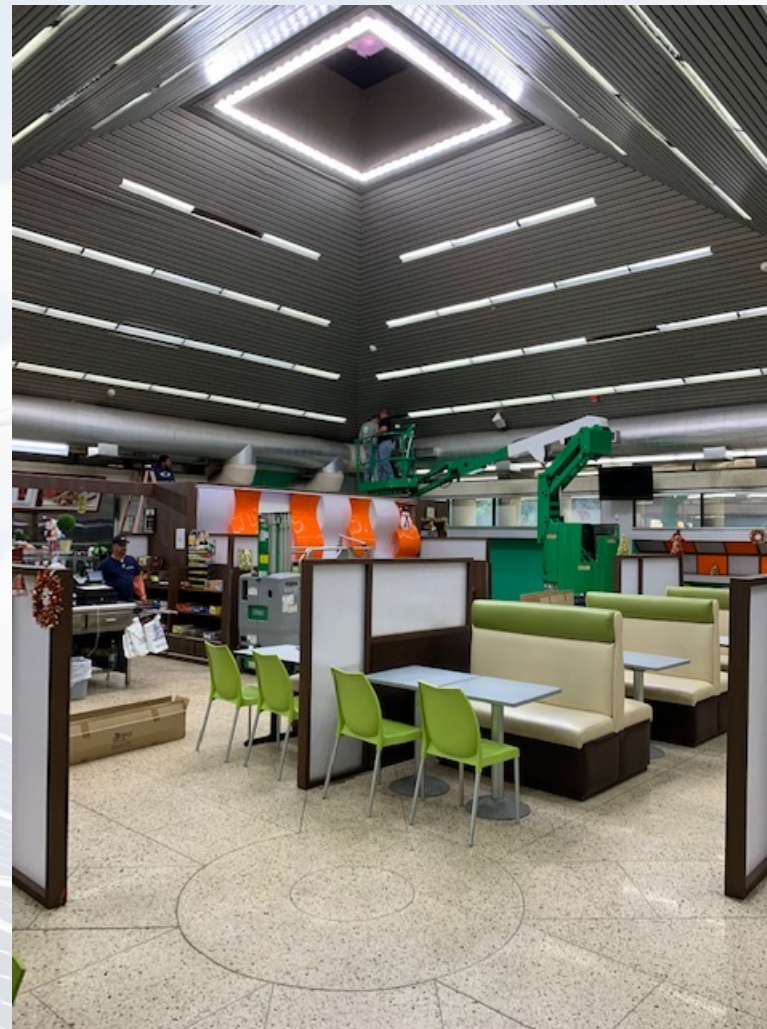
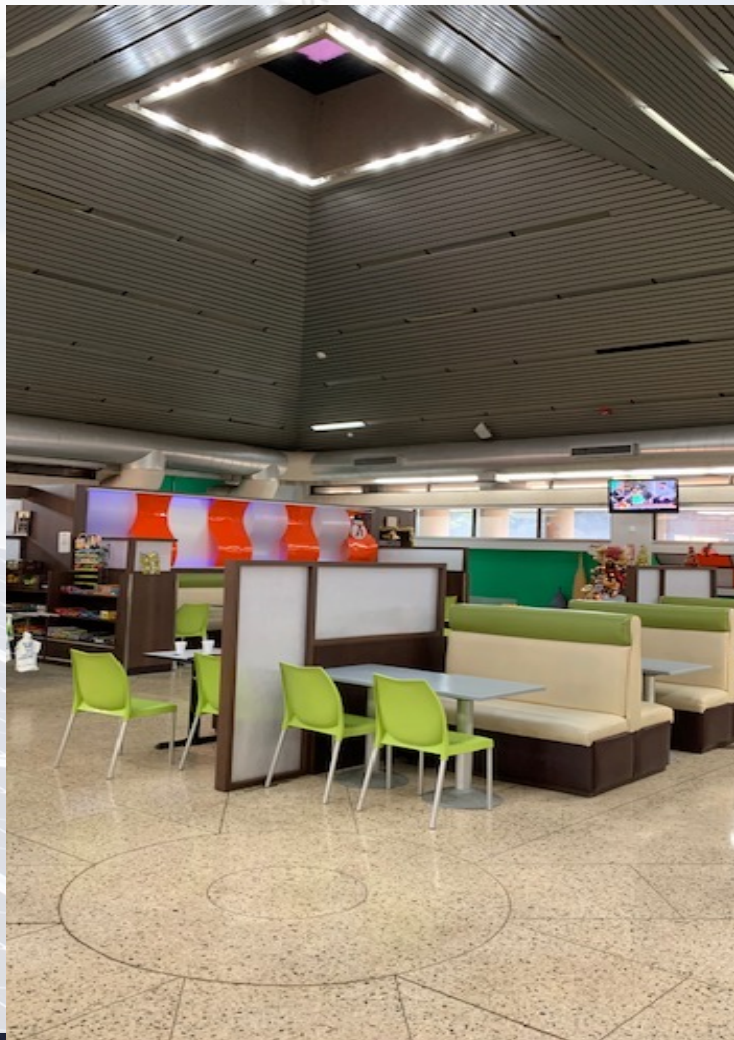
Cumbre de Industria Energética

Edificio Fomento Económico



Cumbre de Industria Energética

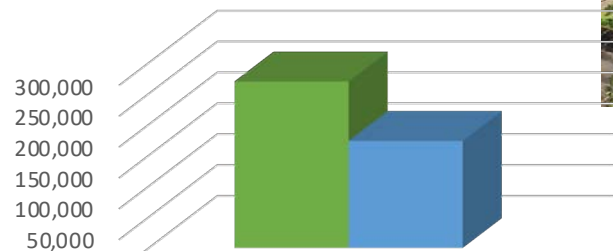
Fomento Económico



Case Studies LED Upgrades



UPR Utuado Lighting Upgrades



36%

Energy Consumption Reduction
(Lighting System)

■ Before Retrofit	270,038
■ After Retrofit	173,891

Project Facts

Lighting Retrofit

Efficiency Upgrade

Energy Cost Savings	\$29,448
Power Savings	26.193 kW
Energy Savings	96,147 kWh
Num. of Locations	1 Campus
Num. of Fixtures	1,480

Applied Technologies:

LED Tubes, LED Retrofit Kits, LED Lamps, Sensors

Numbers reflect annual project savings based on prior energy consumption, local electric rates and specific usage hours. Savings for individual locations may vary.

Cumbre de Industria Energética



BEFORE



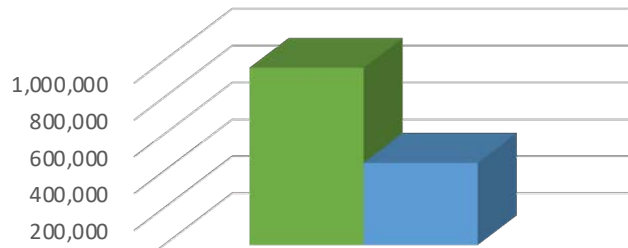
AFTER



Case Studies LED Upgrades



Zimmer Ponce Lighting Upgrades



53%

Energy Consumption Reduction
(Lighting System)

	kWhr/yr
■ Before Retrofit	961,633
■ After Retrofit	448,252

Project Facts

Lighting Retrofit

Efficiency Upgrade

Energy Cost Savings	\$117,135
Power Savings	66.015 kW
Energy Savings	96,147 kWh
Num. of Locations	1 Factory
Num. of Fixtures	1,254

Applied Technologies:

LED Tubes, LED Retrofit Kits, LED Lamps, Sensors

Numbers reflect annual project savings based on prior energy consumption, local electric rates and specific usage hours. Savings for individual locations may vary.



Case Studies LED Upgrades www.escopr.net



Case Studies LED Upgrades

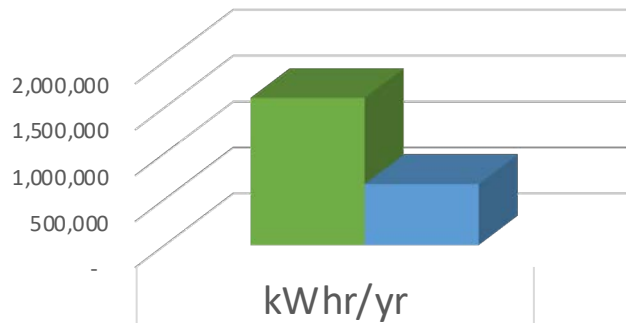


Plaza Loiza Lighting Upgrades



58%

Energy Consumption Reduction
(Lighting System)



■ Before Retrofit	1,603,437
■ After Retrofit	669,454

Project Facts

Lighting Retrofit

Efficiency Upgrade

Energy Cost Savings	\$191,117
Power Savings	179.933kW
Energy Savings	933982kWh
Num. of Locations	8 Stores
Num. of Fixtures	3,966

Applied Technologies:

LED Tubes, LED Retrofit Kits, LED Lamps, Sensors

Numbers reflect annual project savings based on prior energy consumption, local electric rates and specific usage hours. Savings for individual locations may vary.

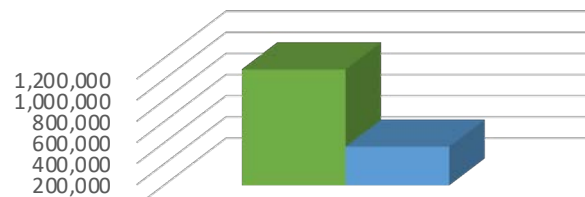
Case Studies LED Upgrades



Case Studies LED Upgrades



Caribbean University Lighting Upgrades



	kWhr/yr
■ Before Retrofit	1,097,737
■ After Retrofit	368,396

66%

Energy Consumption Reduction
(Lighting System)

Project Facts

Lighting Retrofit

Efficiency Upgrade

Energy Cost Savings	\$203,907
Power Savings	181.571kW
Energy Savings	729341kWh
Num. of Locations	4 Campuses
Num. of Fixtures	3,011

Applied Technologies:

LED Tubes, LED Retrofit Kits, LED Lamps, Sensors

Numbers reflect annual project savings based on prior energy consumption, local electric rates and specific usage hours. Savings for individual locations may vary.

Case Studies LED Upgrades

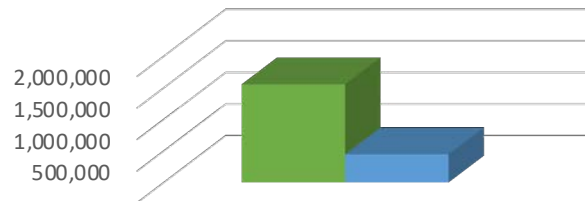


Centros Comerciales de Puerto Rico Lighting Upgrades



71%

Energy Consumption Reduction (Lighting System)



■ Before Retrofit	1,554,213
■ After Retrofit	453,682

Project Facts

Lighting Retrofit

Efficiency Upgrade

Energy Cost Savings	\$280,421
Power Savings	248.711kW
Energy Savings	1100082kWh
Num. of Locations	7 Shopping Centers
Num. of Fixtures	2,813

Applied Technologies:

LED Tubes, LED Retrofit Kits, LED Lamps, Sensors

Numbers reflect annual project savings based on prior energy consumption, local electric rates and specific usage hours. Savings for individual locations may vary.

Case Studies LED Upgrades



Traditional T12 Fluorescent Tubes

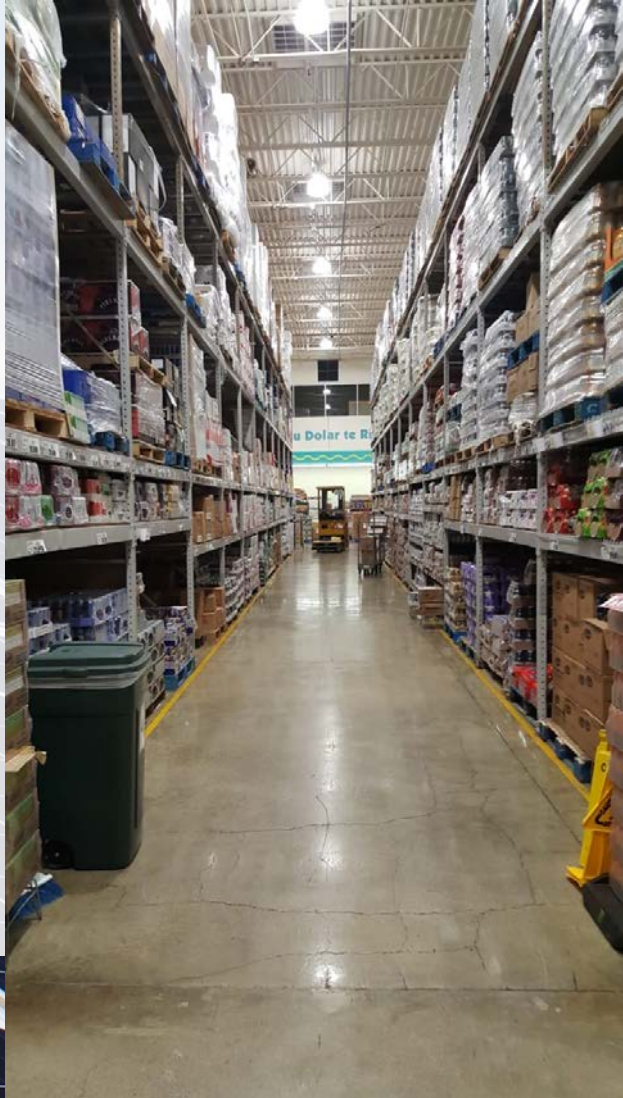
VS

Energy Focus Serie 200D LED Tubes



Cumbre de Industria Energética

Perez Hermanos Interior



Cumbre de Industria Energética

Perez Hermanos Exterior

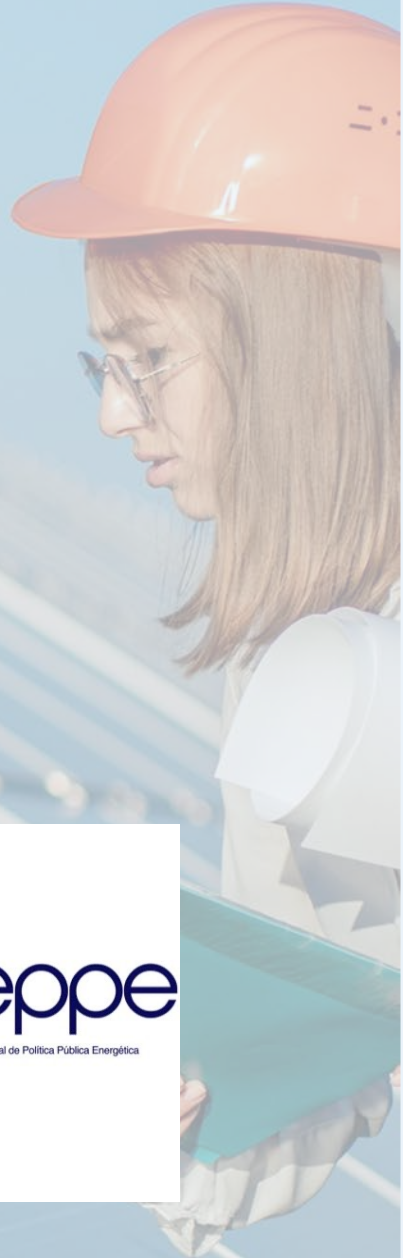


“Ley de Transformación y ALIVIO Energético”

Ley Núm. 57 de 27 de Mayo de 2014, según enmendada

Municipios

se detallan a continuación. Se establecerá una cantidad o tope máximo de la aportación por concepto del CELI computada del promedio de consumo energético de los municipios, en kilovatio-hora por año, de los tres años de más alto consumo desde el cambio a la fórmula en el año 2004 hasta el presente. Los municipios estarán obligados a reducir de esta cantidad o tope máximo la cantidad de cinco por ciento (5%) anual durante los tres años siguientes a la aprobación de esta Ley, hasta alcanzar una reducción de al menos quince por ciento (15%) del tope máximo de consumo. Cualquier



CAPÍTULO IV. — Eficiencia Energética Gubernamental.

Artículo 4.1. — Ahorro energético en las instrumentalidades de la Rama Ejecutiva y en las dependencias de la Rama Judicial.

(a) En cumplimiento con la política pública del Estado Libre Asociado de Puerto Rico, todas las agencias, instrumentalidades y corporaciones públicas de la Rama Ejecutiva y todas las dependencias de la Rama Judicial ejecutarán toda aquella gestión e iniciativa dirigida a reducir o

eliminar aquellas actividades, prácticas o usos en las instalaciones, edificios y oficinas que redunden en desperdicio o uso ineficaz del recurso energético.

(b) Será deber y responsabilidad de todas las agencias, corporaciones públicas e instrumentalidades de la Rama Ejecutiva y de todas las dependencias de la Rama Judicial implementar estrategias dirigidas a reducir el consumo de energía eléctrica de las dependencias e instalaciones bajo su jurisdicción. A tales fines las agencias, corporaciones públicas e instrumentalidades de la Rama Ejecutiva y las dependencias de la Rama Judicial deberán ejecutar e implementar aquellas gestiones e iniciativas que reduzcan anualmente el consumo total de energía eléctrica hasta lograr un ahorro promedio mínimo de un cuarenta (40%) por ciento durante los próximos ocho (8) años luego de la aprobación de esta Ley.

(e) *Contratos de Rendimiento Energético*. — Para cumplir con los propósitos de esta Ley, la Rama Judicial y toda agencia, instrumentalidad o corporación pública de la Rama Ejecutiva deberá promover como estrategia la contratación de un servicio de rendimiento energético (conocidos en inglés como “Energy Savings Performance Contracts” (ESPCs), con un proveedor

Rev. 14 de septiembre de 2015

www.ogp.pr.gov

Página 52 de 96

de servicios de energía calificado, como primera alternativa para producir ahorros de costos energéticos, o de operación y mantenimiento, según lo establecido en la Ley 19-2012, según enmendada, conocida como la “Ley de Contratos de Rendimiento Energético”. Si luego de un análisis de costo-efectividad en relación a la composición y características de los edificios que albergan instalaciones de las entidades públicas, la entidad determina que resulta muy oneroso el cumplimiento con esta disposición, podrá solicitar una exención de la misma a la Comisión. En

Cumbre de Industria Energética

FSG's ESCOPR Support Team offers Energy Service Companies turnkey energy retrofit packages for Government, Municipal, and Commercial facilities. FSG employs more than 2000 employees nationwide with annual sales over \$1.3 Billions



THE PORT AUTHORITY OF NEW YORK
AND NEW JERSEY

Newark Airport

FSG Upgrades Lighting and Chillers

Energy Savings **\$1,986,378** a year

Number of Fixtures Replaced **26,262**

Annual kWh Reduction **12,443,631**



FSG Upgrades Lighting in More than 65
GM Buildings Nationwide with over 20
million square feet.

Energy Savings **\$5,000,000** a year

Annual kWh Reduction **80,000,000**



DARDEN-Red Lobster
477 Location Nationwide

Energy Savings **\$2,000,000** a year

Annual kWh Reduction **15,000,000**

Goals achieved energy savings,
proper interior lighting, and
reducing maintenance costs
associated with lighting

HOW TO DO IT ?

1. AUDIT

Perform initial energy savings audit for
(Lighting, HVAC and Water systems)

2. PROPOSAL

Submit a preliminary proposal to client
summarizing savings

3. MEASUREMENT AND VALIDATION

Third party Measurement and Validation
audit performed to verify energy savings

4. FINANCIAL VERIFICATION

Financial application completed and
approved

5. SERVICE AGREEMENT

Services Agreement signed

6. CONSTRUCTION AND INSTALLATION

Coordinate installation with the facility
the retrofit to new technologies

La mejor energía renovable es la eficiencia energética y conservación



Feel Free to Contact Us:

Jorge A. Hernandez, PE, CEM
President & Energy Manager

Tel: (787)638-7893

E-mail: jorgehernandez@escopr.net

Luis A. Fernandez, BS M.E.

Energy Manager

Tel: (787) 951-5569

E-mail: luisfernandez@escopr.net

Jose M. Hernandez, BS B.A.

Energy Consultant

Tel: (787) 564-9698

E-mail: josehernandez@escopr.net



¡GRACIAS!

Síguenos en:



www.camarapr.org

[#CamaraEnAccion](https://twitter.com/CamaraEnAccion)