



Energy Efficiency at local level

Centro de Informação Urbana de Lisboa

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www.lisboaenova.org



European Union
European Regional Development Fund

CONTENTS
LISBOA E-NOVA
TECHNOLOGICAL PROJECTS
URBAN PLANNING AND RES
BEHAVIOURAL CHANGE

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LISBOA E-NOVA

LISBON'S MUNICIPAL ENERGY AND ENVIRONMENTAL AGENCY

Non-profit organization operating under private Law, which seeks the sustainable development of the city of Lisbon

MISSION

- Energy demand management
- Energy efficiency
- Endogenous energy resources management
- Environmental management
- Best practices in Urban Planning and Construction
- Sustainable mobility



LISBOA E-NOVA

AREAS OF EXPERTISE

Energy and
Environmental
Strategy

Energy
Efficiency and
Renewable
Energy

Water

Sustainable
Mobility

Smart Cities

Urban
Planning

Biodiversity

Environmental
Awareness

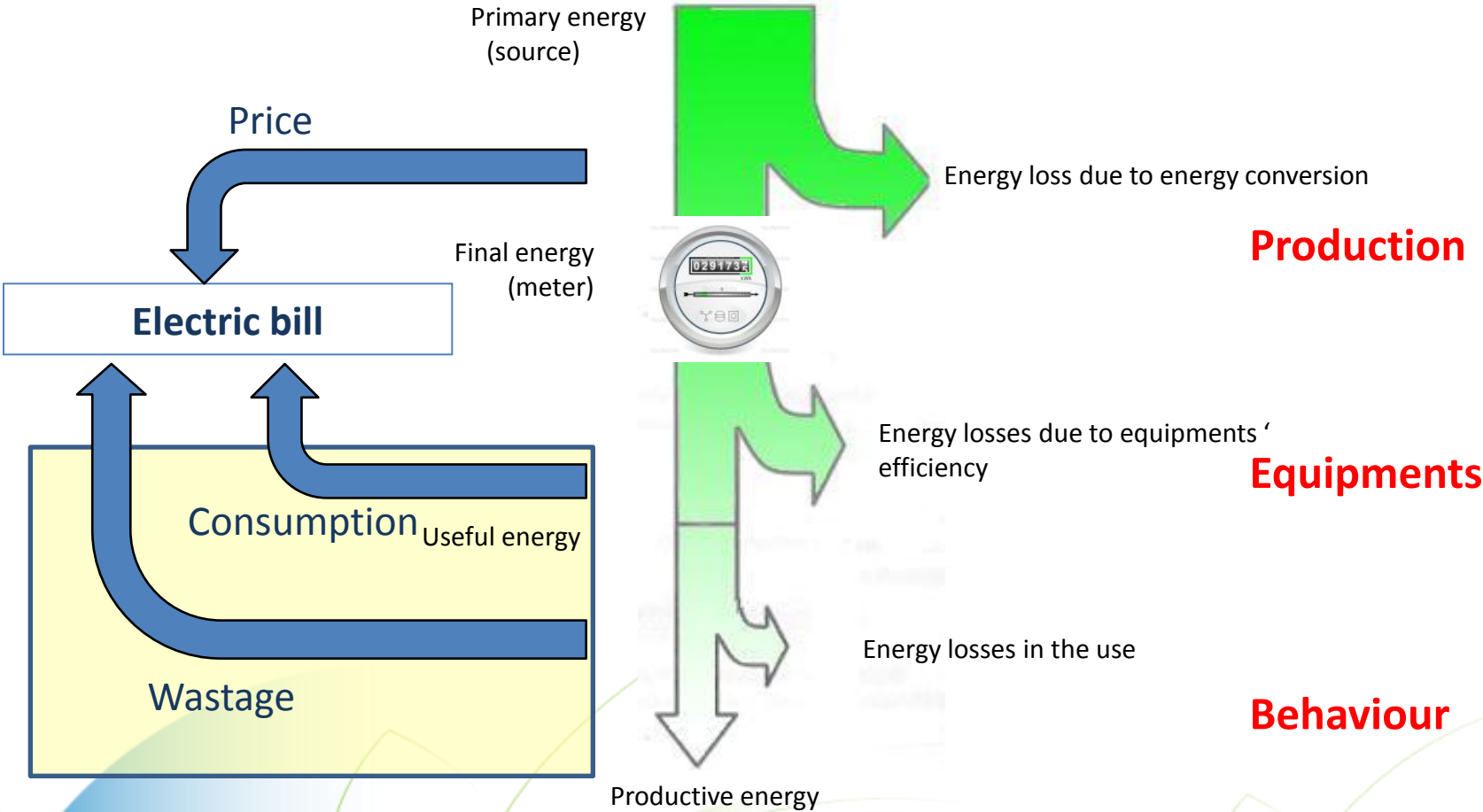
COMMUNICATION

AFFILIATES



CONTENTS
LISBOA E-NOVA
TECHNOLOGICAL PROJECTS
URBAN PLANNING AND RES
BEHAVIOURAL CHANGE

BACKGROUND



Águas, M (2013)

LED IN TRAFFIC LIGHTS

- Replacement of 4000 bulbs for LED in the last 3 years (15%)
- Reduction of 1300 MWh in energy consumption
- Less 48 ton CO₂/year
- Less 130.000 Euros/year in the energy bill of the Municipality



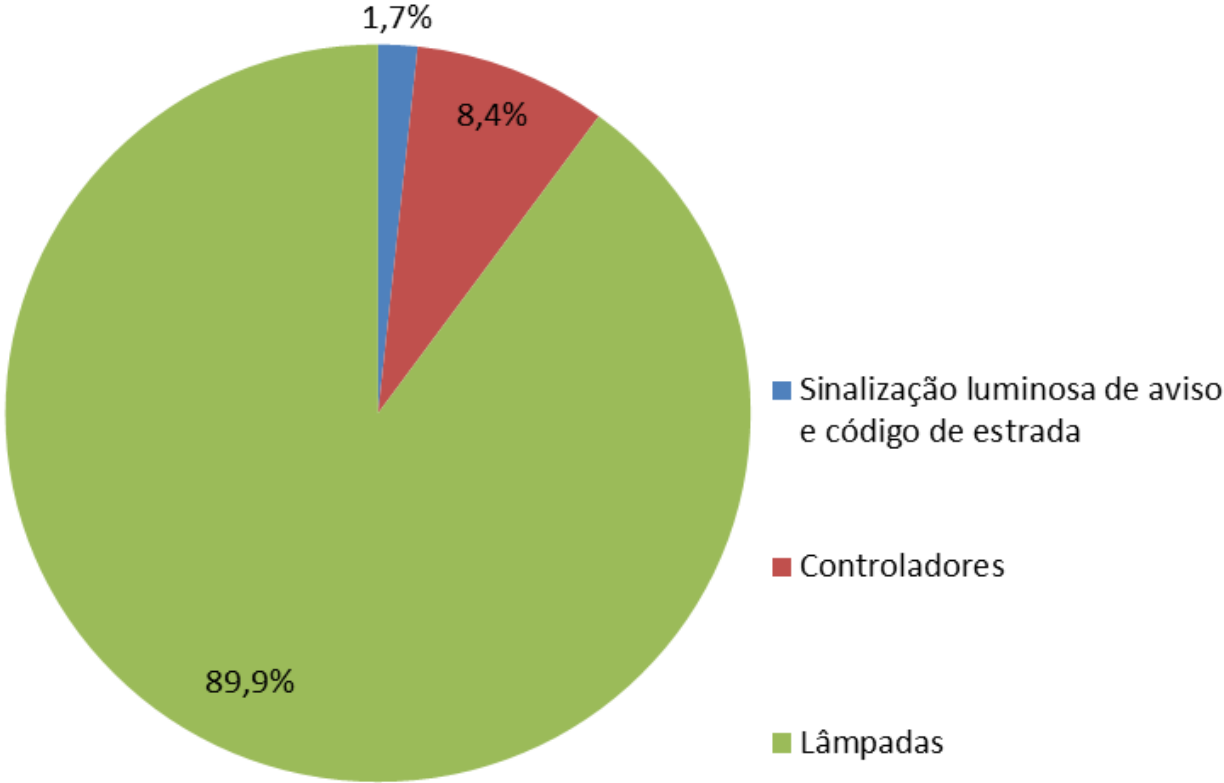
EPC IN TRAFFIC LIGHTS

- Replacement of 22500 bulbs for LED during 2013
- Reduction of 6,2 GWh in energy consumption/year
- Less 230 ton CO₂/year
- Less 700 k Euros/year in the energy bill of the Municipality

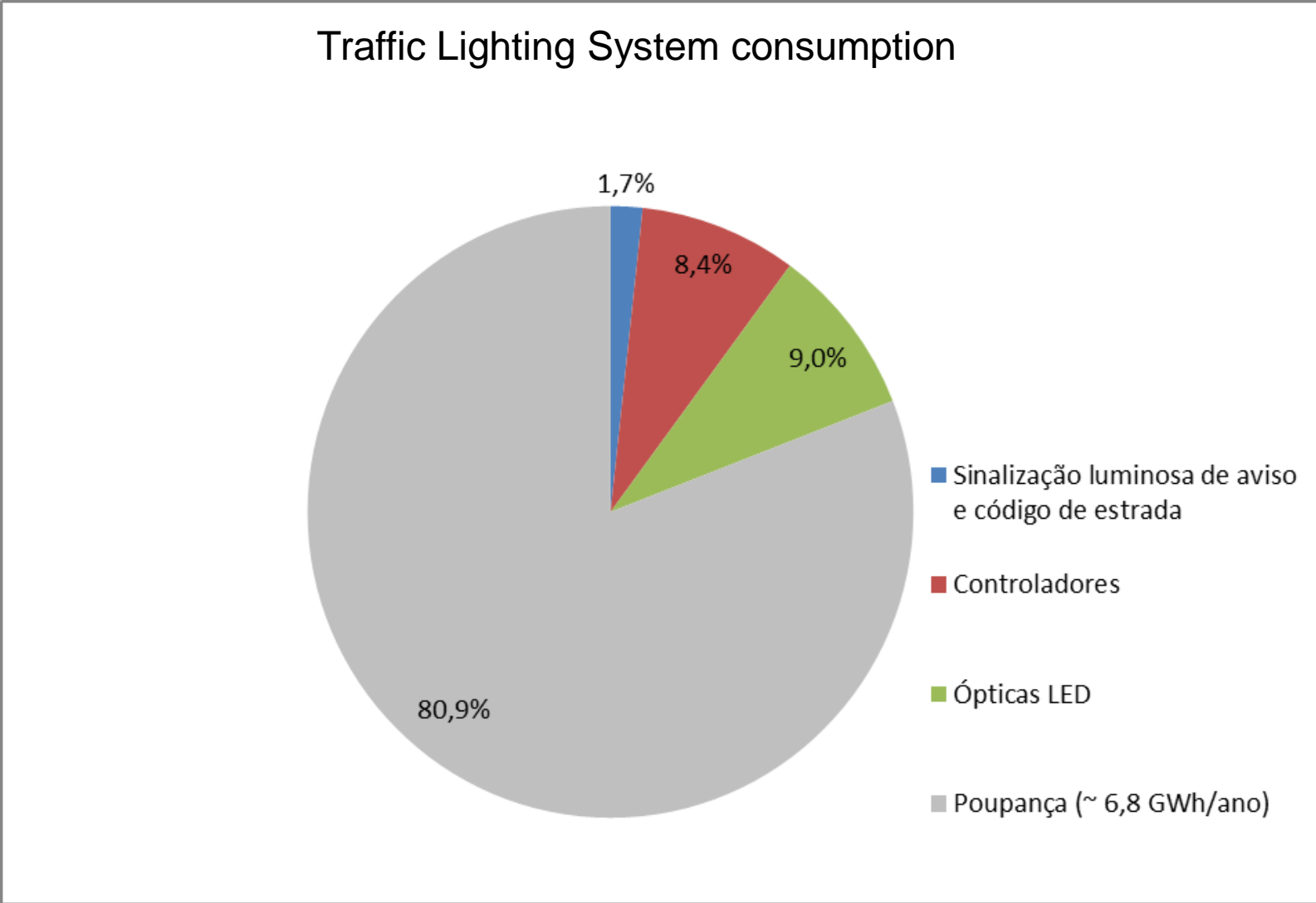


EPC IN TRAFFIC LIGHTS

Traffic Lighting System consumption



EPC IN TRAFFIC LIGHTS



PUBLIC LIGHTING

3 levels of action:

PPEC – Energy Efficiency Promotion Plan (NRA)

- Equipping existing 250 W (HP Sodium-vapor lamps) luminaires with electronic ballasts (light flux reduction and less energy consumption) and remote-management.
- Historical buildings efficient lighting
- Energy consumption reduction - 791 MWh.

Enable

Time based

Location

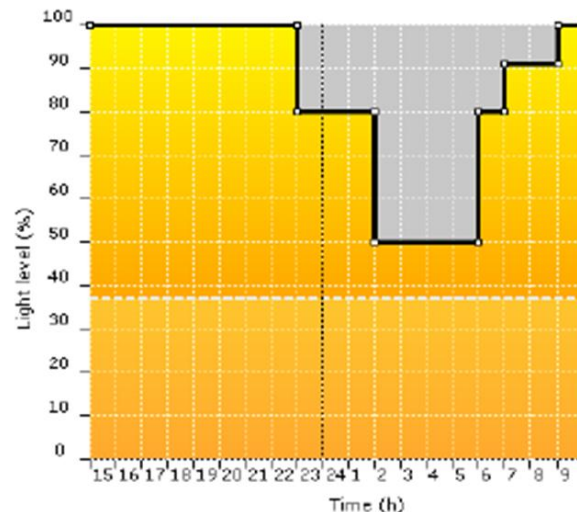
No location

Custom...

Schedule

+ - []

Time (hh:m)	Light level (%)	Fade time (s)
23:00	80	180
02:00	50	180
06:00	80	0
07:00	91	0
09:00	100	0



PUBLIC LIGHTING

EPC in Public Lighting

Preparing an entire District for more efficient lighting under an EPC procedure

LED piloting

Piloting LED technology in several streets of Lisbon



CONTENTS
LISBOA E-NOVA
TECHNOLOGICAL PROJECTS
URBAN PLANNING AND RES
BEHAVIOURAL CHANGE



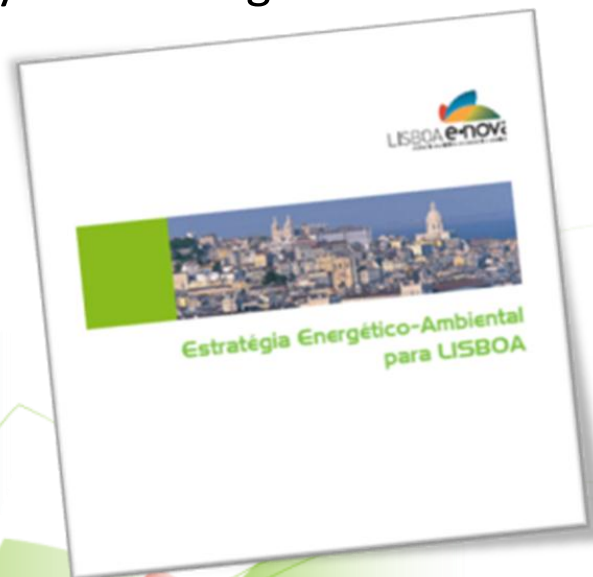
LISBOA e-nova
AGÊNCIA MUNICIPAL DE ENERGIA E AMBIENTE

LISBON'S ENERGY AND ENVIRONMENT STRATEGY

Defined goals to accomplish between 2009-2013 (political mandate) in the sectors: energy; water and materials

COVENANT OF MAYORS

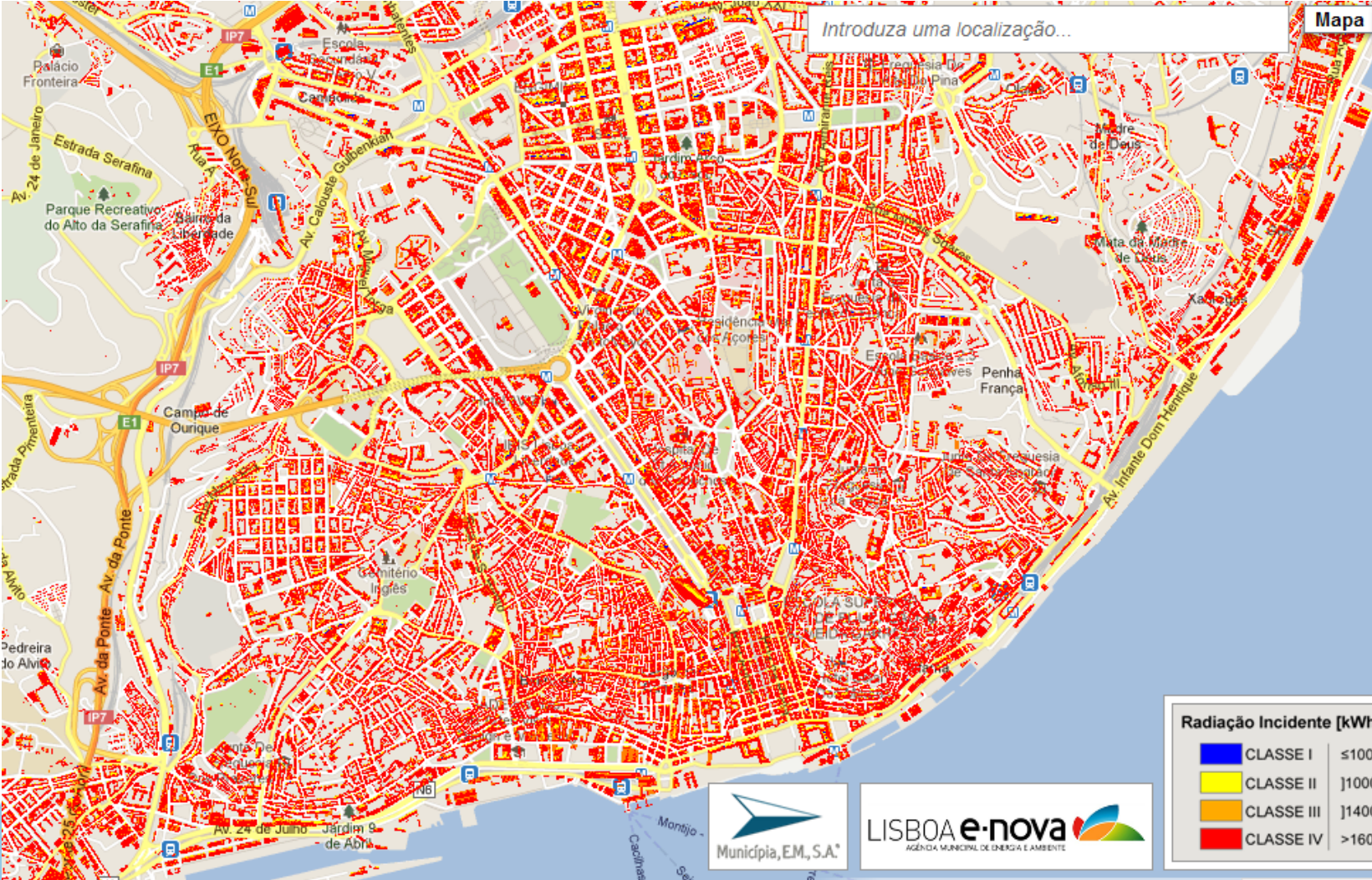
Lisbon undersigned this Document in 2009 and Lisboa E-Nova was responsible for the definition of Lisbon's methodology for the Sustainable Energy Action Plan, and is currently monitoring it.



**Covenant
of Mayors**

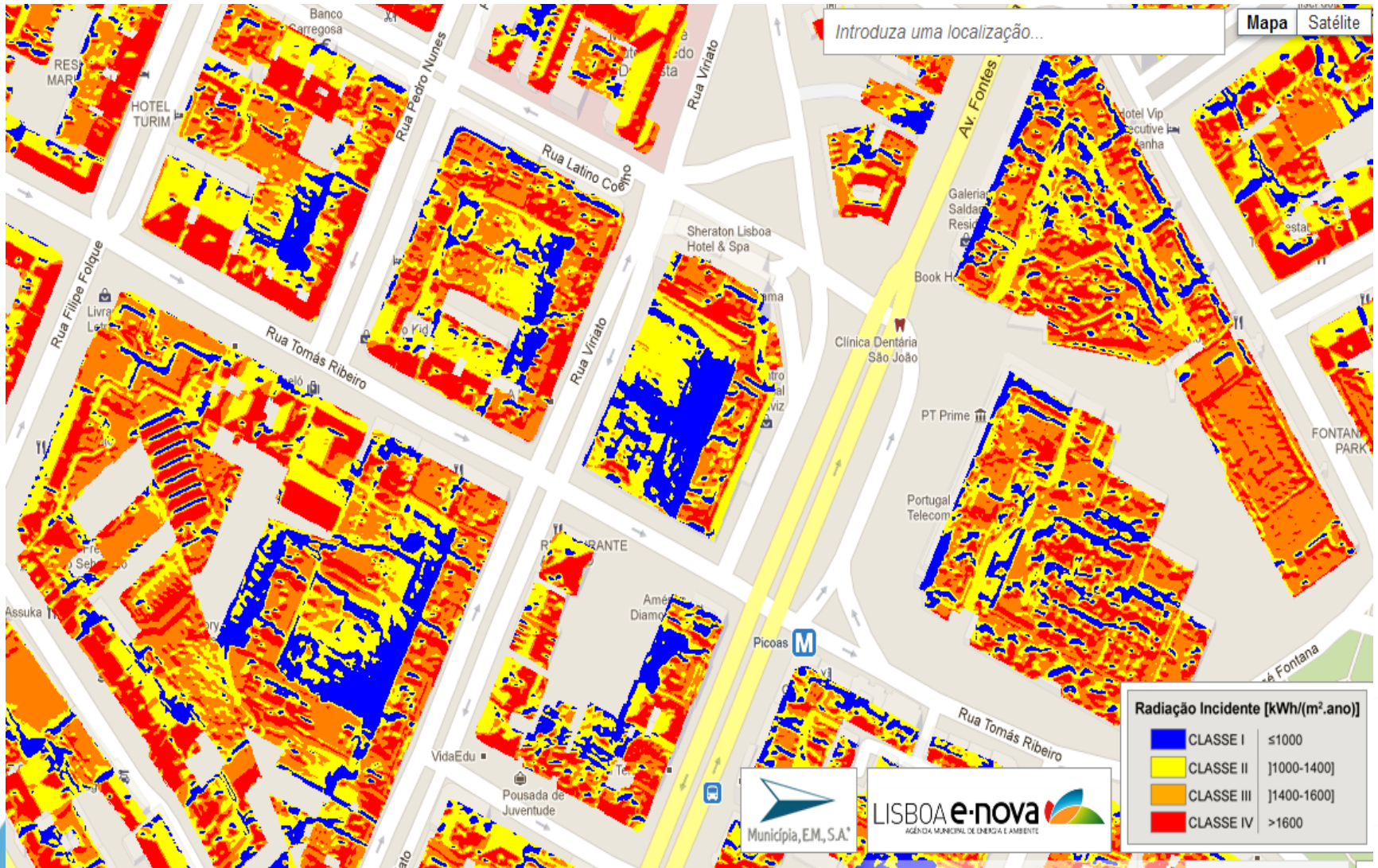
Committed to local
sustainable energy

LISBON'S SOLAR POTENTIAL CHART

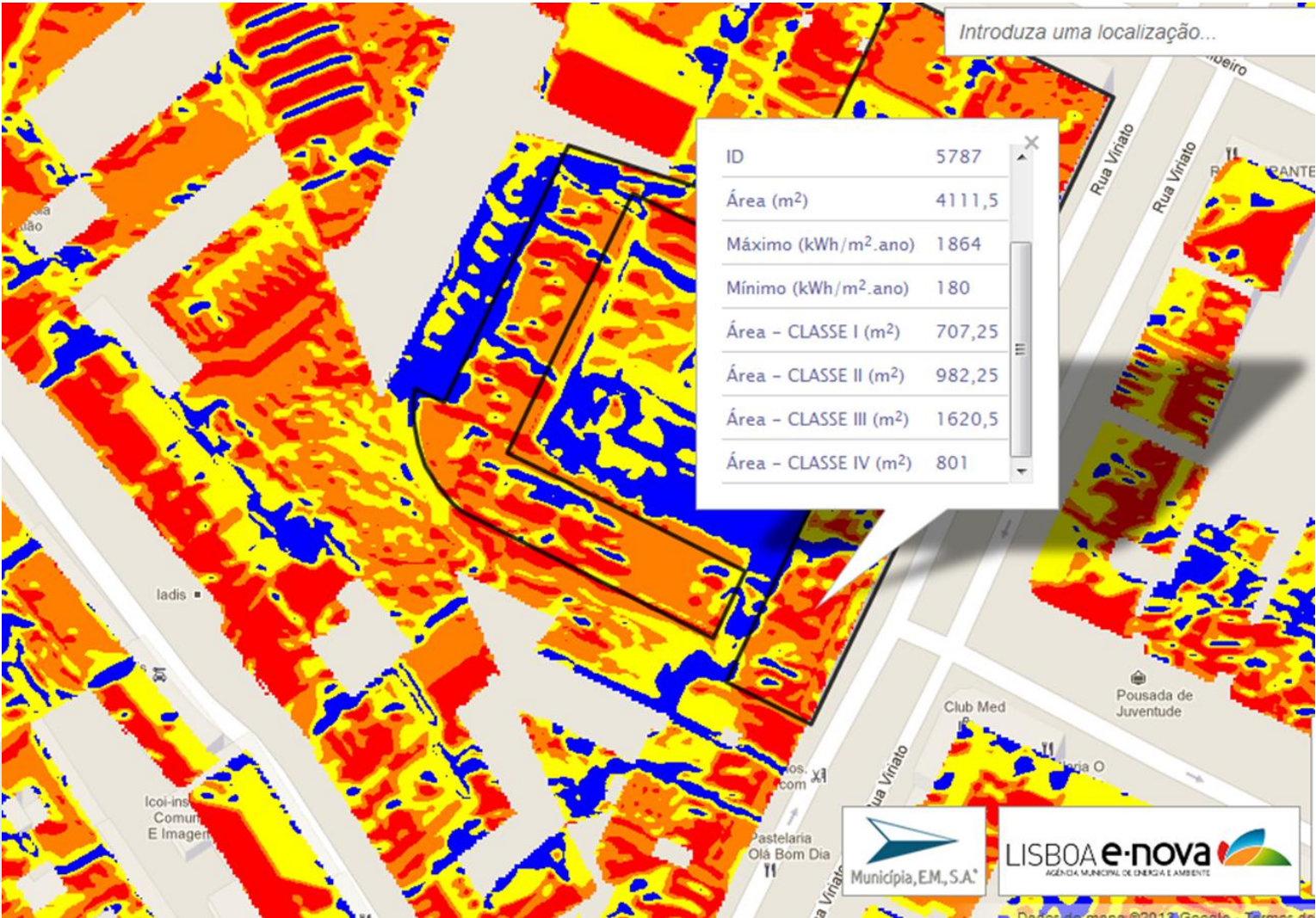


www.lisboaenova.org/cartasolarlisboa

LISBON'S SOLAR POTENTIAL CHART



LISBON'S SOLAR POTENTIAL CHART





URBANSOL PLUS UrbanSol+

Solar Thermal in Major Renovations and Protected Urban Areas



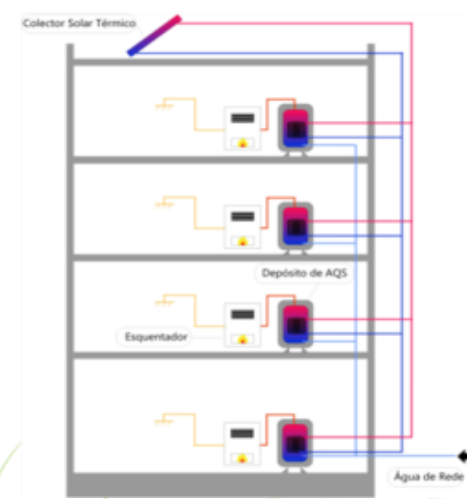
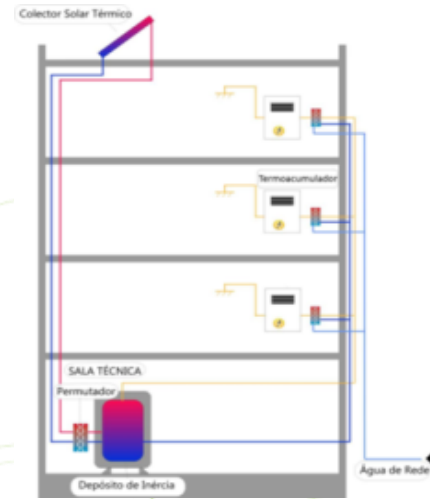
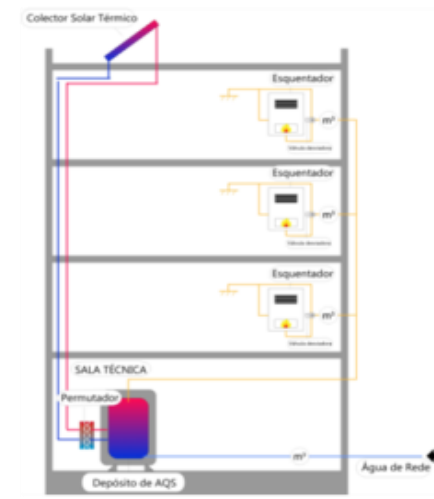
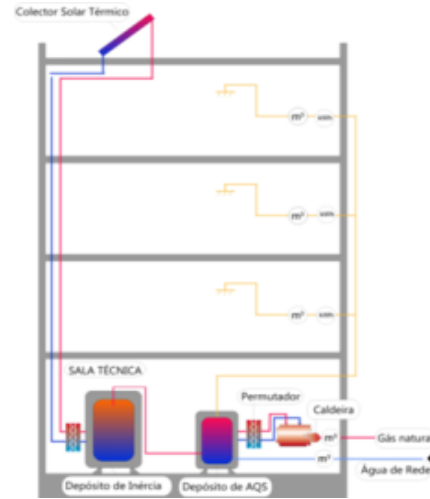
Intents to promote the adoption of solar thermal systems in multi-family buildings and classified areas.

Lisbon will share it's experience regarding the adoption of solar thermal in classified areas and focus on the promotion of collective solar thermal systems in multi-familiar buildings requalification's.



Steps

1. Building identification
2. Solar potential
3. Existing DHW systems
4. Common areas and space availability
5. Results – technical and economical analysis



CONTENTS
LISBOA E-NOVA
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LISBOA E-NOVA DEVELOPPED DIFERENT ENERGY EFFICIENCY SOLUTIONS BASED IN ICT AND BEHAVIOURAL CHANGE

- For residential or companies consumers
- Diferent investment in metering

	No investment	With investment
Dwellings	Competition	Smartmeter
Service buildings	Remote Manager Tool	Online electrical Disaggregation

LISBOA E-NOVA DEVELOPPED DIFERENT ENERGY EFFICIENCY SOLUTIONS BASED IN ICT AND BEHAVIOURAL CHANGE

- For residential or companies consumers
- Diferent investment in metering

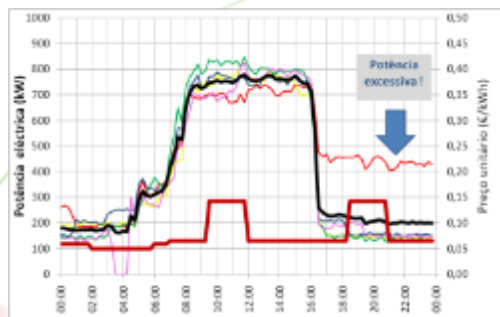
	No investment	With investment
Dwellings	Competition	Smartmeter
Service buildings	Remote Manager Tool	Online electrical Disaggregation

ENERGY Remote management TOOL

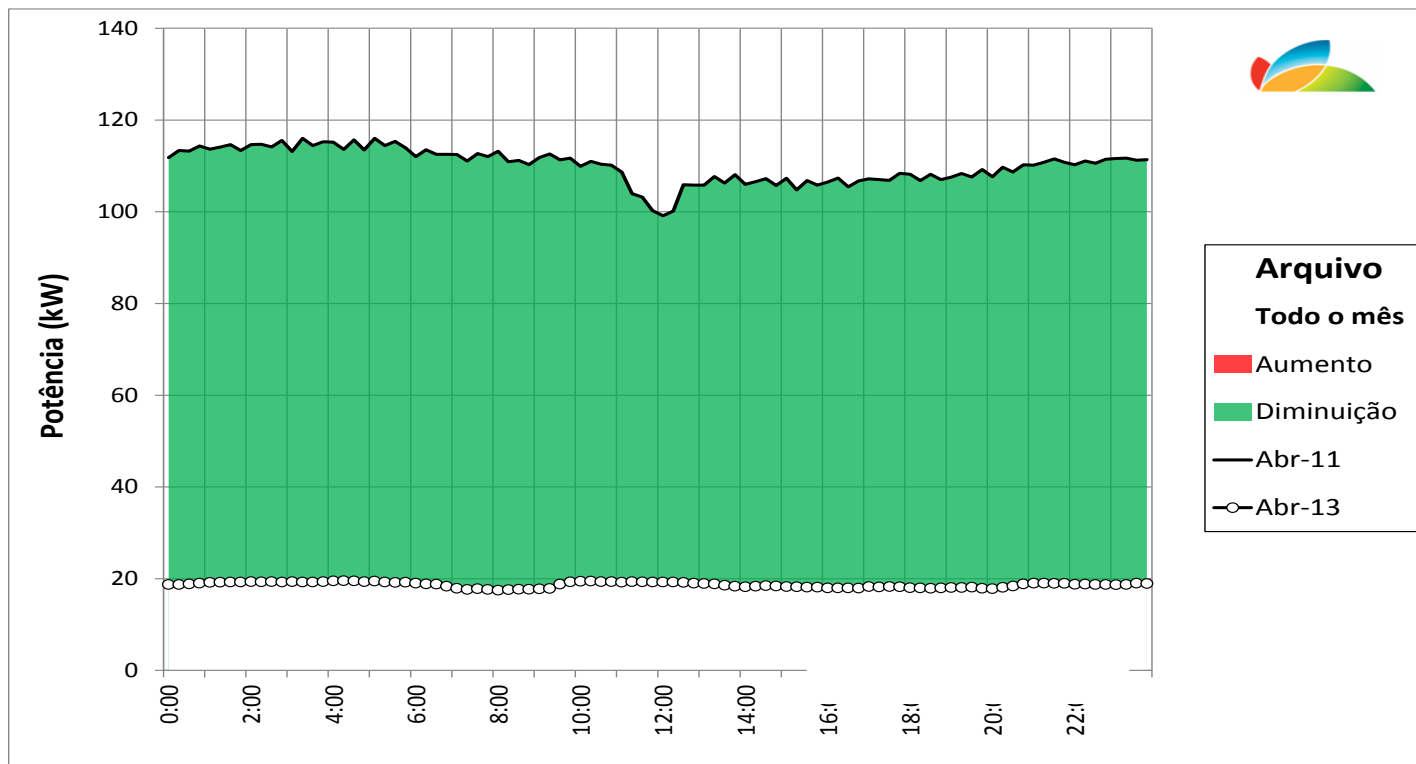
In Municipal buildings and buildings from Lisboa E-Nova Affiliates, Lisboa E-Nova offers the remote manager tool.

Goal: to present energy efficient solutions based on:

- Uses the telemetry system installed by the DSO (near real time data)
- Team work: (Lisboa E-Nova) + (Maintenance and Costs control departments)
- 1 in each 37 kWh consumed in medium (or high) voltage in Lisbon is already analyzed by Lisboa E-Nova.
- For the current pipeline, real/potential savings with low pay-back is up to 15%



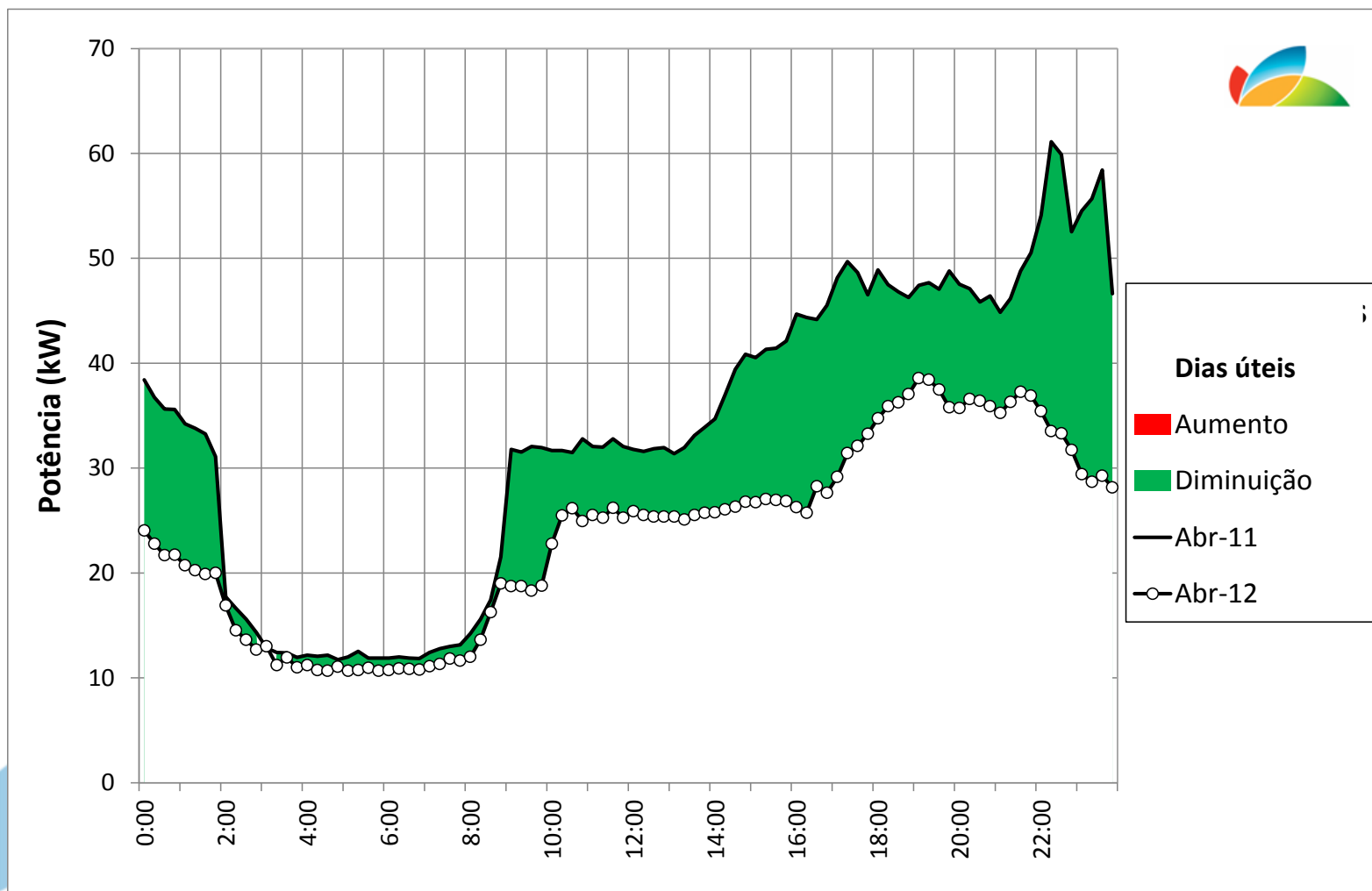
CASE STUDY 1: - 736 000 kWh/year Savings: 72%



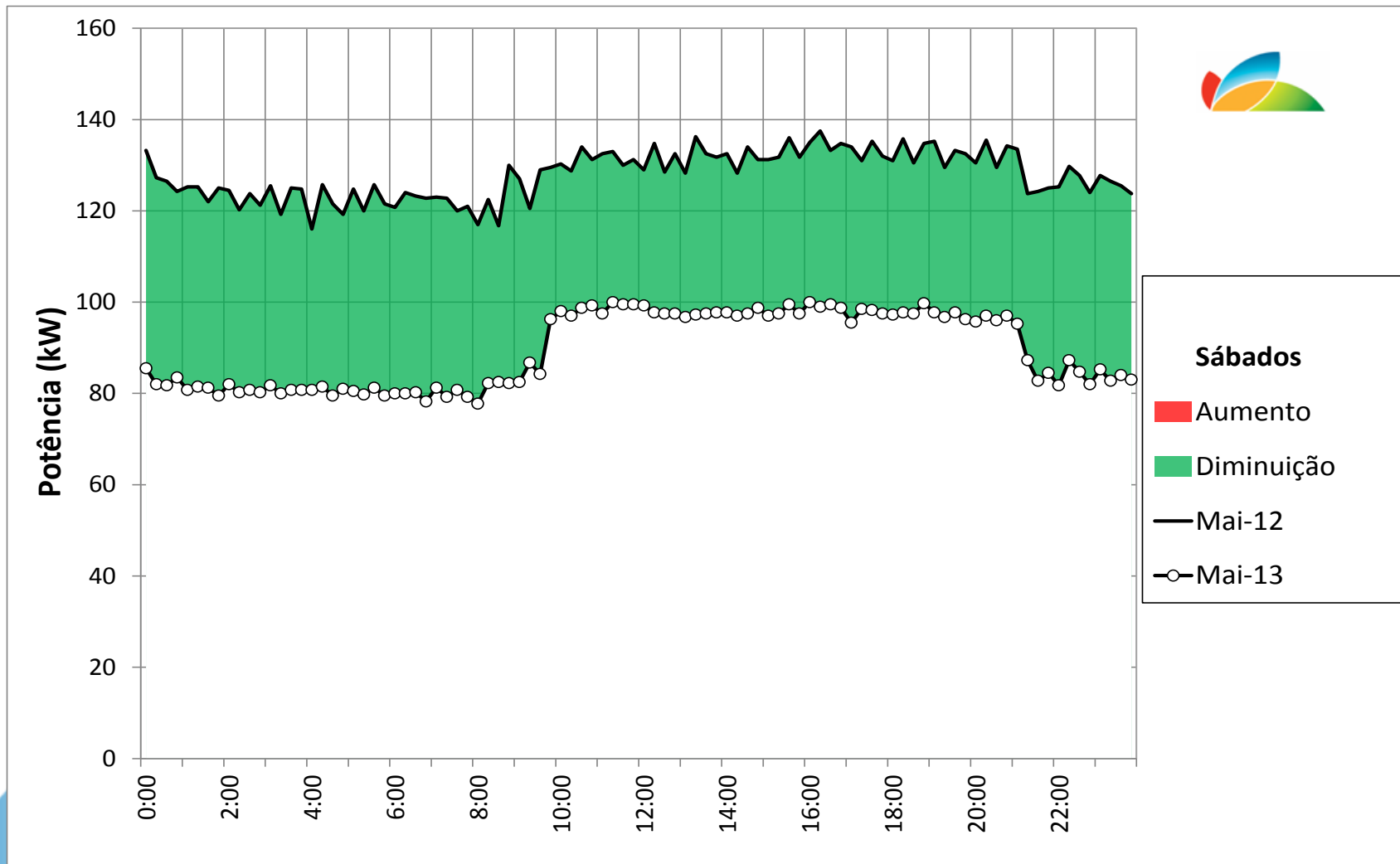
Arquivo	Consumo (kWh/ano)	Factura c/IVA(€/ano)
Mai-10 a Abr-11	1.023.664	108.010
Mai-12 a Abr-13	287.746	56.104
Poupança	-735.918	-80.951
	-72%	-75%

A poupança na factura foi calculada considerando o preço actual só da componente de energia (0,11 €/kWh)

CASE STUDY 2: - 300 000 kWh/year Savings: 28%



CASE STUDY 3: - 150 000 kWh/ano Savings: 12%



DWELLINGS – RESIDENTIAL BUILDINGS

Energy efficiency based in smart metering and feedback mechanisms (user empowerment through information and behaviour change)

Promote energy efficiency and behaviour change through the use of smart meters and practical accompaniment towards the adoption of more energy efficient actions and empowered and skilled households to manage and save energy

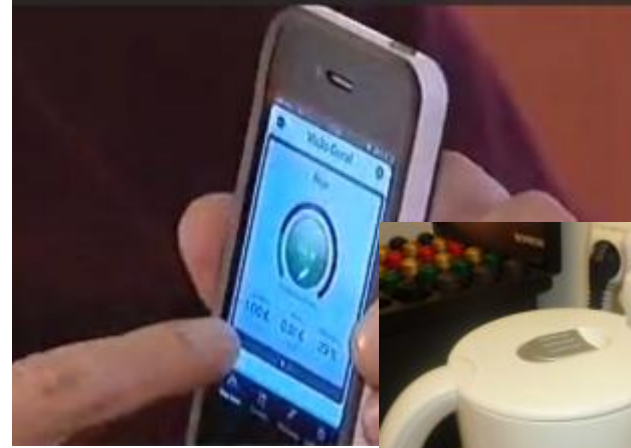
Annual savings: 0,4 – 0,8 GWh/y

Total investment: 250.000 €



Empowered consumer

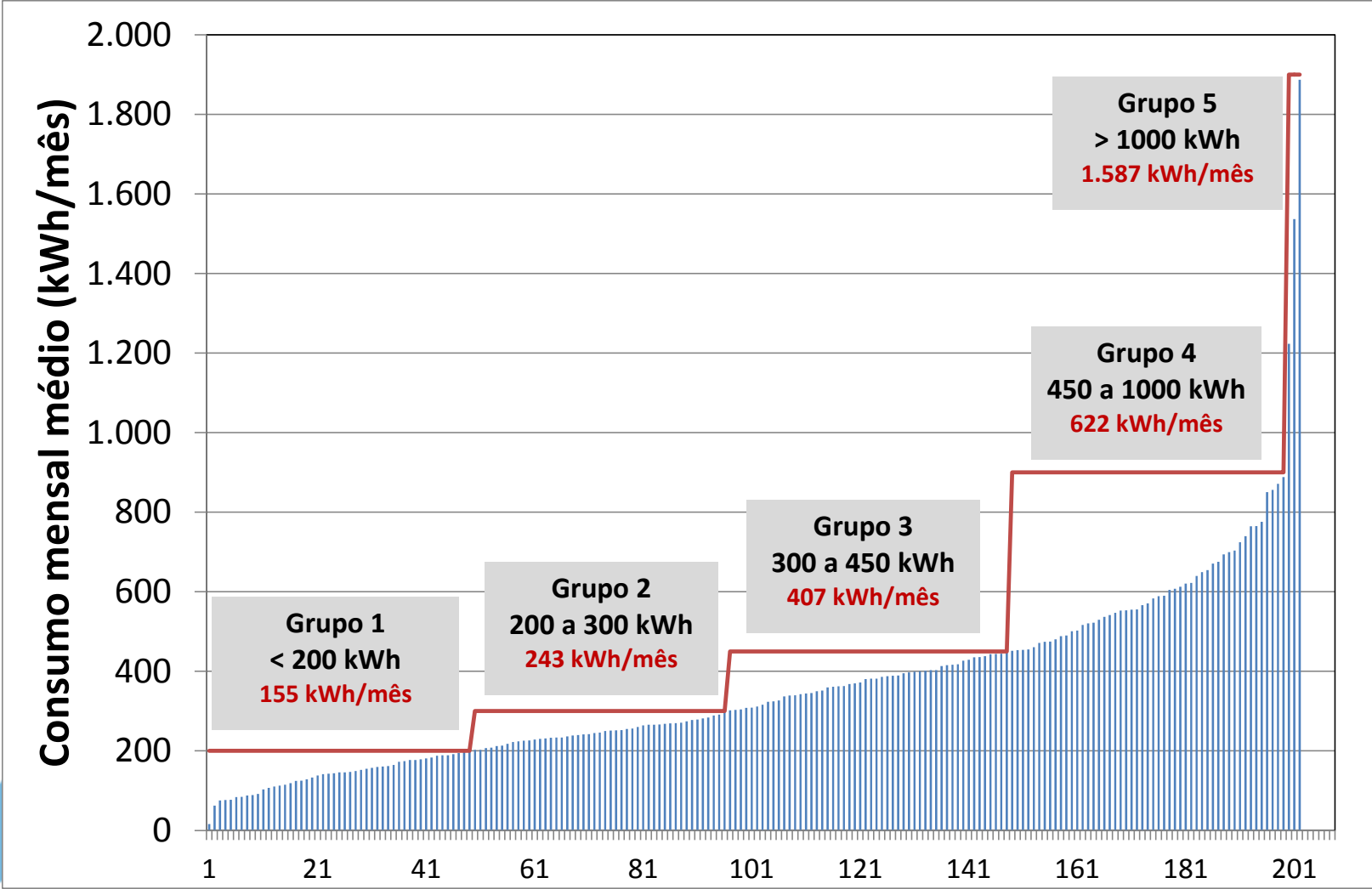
- ICT
- Information (Informative billing)
- Continuous motivation
- Results (Energy savings and decreasing energy costs)



USERS' CONSUMPTION RANGE

Grupo	Consumo mensal (kWh/mês)	Número de Participantes	Consumo médio (kWh/mês)
1	Menor que 200	35	155
2	De 200 a 300	40	243
3	De 300 a 450	49	407
4	De 450 a 900	39	622
5	Mais de 900	3	1587
	Sub-Total	166	386
	Não disponível	84	
	Total	250	

USERS' CONSUMPTION RANGE



PERSONAL FEEDBACK GIVEN

- Facebook group for knowledge and experience sharing;
- Monthly workshops with users;
- Permanent and individual technical support;
- COOPETITION;
- Monthly graphical reports.

Contadores Inteligentes para Decisões Eficientes PROGRAMA "COOPETIR"

Evolução da sua classificação de Março/2013 para Abril/2013:

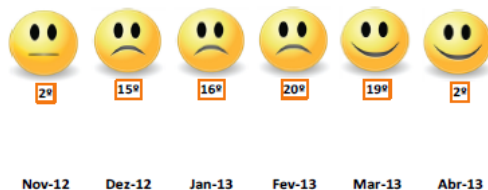
↑ Em Abril-13 subiu da 19ª para a 2ª posição.

A sua classificação de eficiência eléctrica no Grupo 2

A expressão do smile indica a sua evolução em relação ao mês anterior.

Legenda:

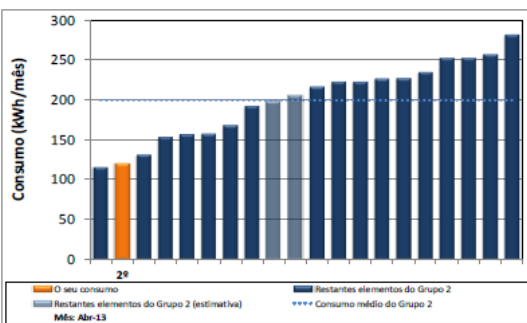
- 😊 Subiu de posição
- 😐 Manteve a posição
- 😞 Desceu de posição



Consumos em Abril de 2013 Grupo 2

Note em destaque a representação do seu consumo.

As barras de cor transparente correspondem a participantes que apresentam dados incompletos, cujos consumos foram reconstruídos por estimativa.



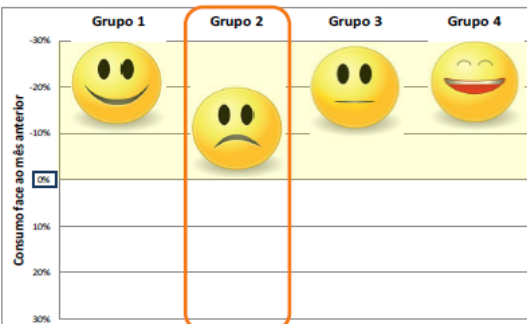
Dinâmica de poupança eléctrica entre Grupos

Legenda:

- 😊 Maior poupança
- 😐 2ª maior poupança
- 😞 3ª maior poupança
- 😄 Menor poupança

Grupos - critérios:

- Grupo 1: até 200 kWh/mês
- Grupo 2: 200-300 kWh/mês
- Grupo 3: 300-450 kWh/mês
- Grupo 4: 450 kWh/mês ou mais



Informação enviada ao participante com melhor evolução no Grupo 2

Contadores Inteligentes para Decisões Eficientes PROGRAMA "COOPETIR"

Evolução da sua classificação de Fevereiro/2013 para Março/2013:

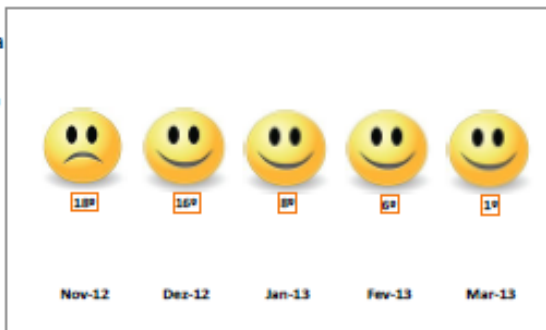
✓ Parabéns, em Março-13 subiu da 6ª para a 1ª posição.

A sua classificação de eficiência eléctrica no Grupo 3

A expressão do smile indica a sua evolução em relação ao mês anterior.

Legenda:

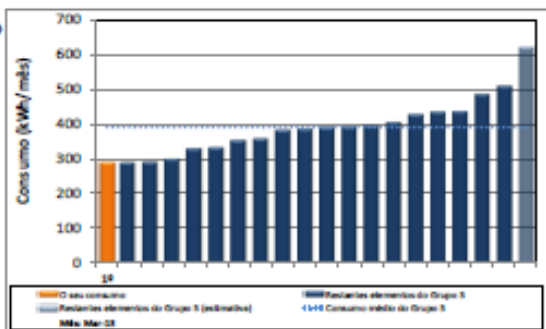
- 😊 Subiu de posição
- 😐 Manteve a posição
- 😞 Desceu de posição



Consumos em Março de 2013 Grupo 3

Note em destaque a representação do seu consumo.

As barras de cor transparente correspondem a participantes que apresentem dados incompletos, cujos consumos foram reconstruídos por estimativa.

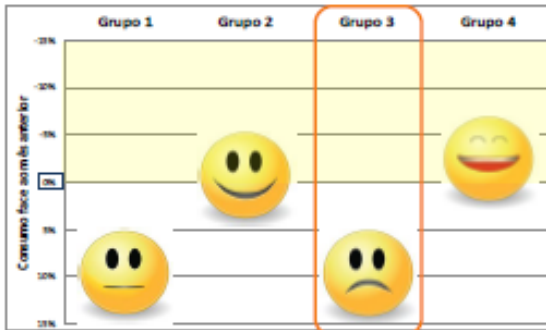


Dinâmica de poupança eléctrica entre Grupos

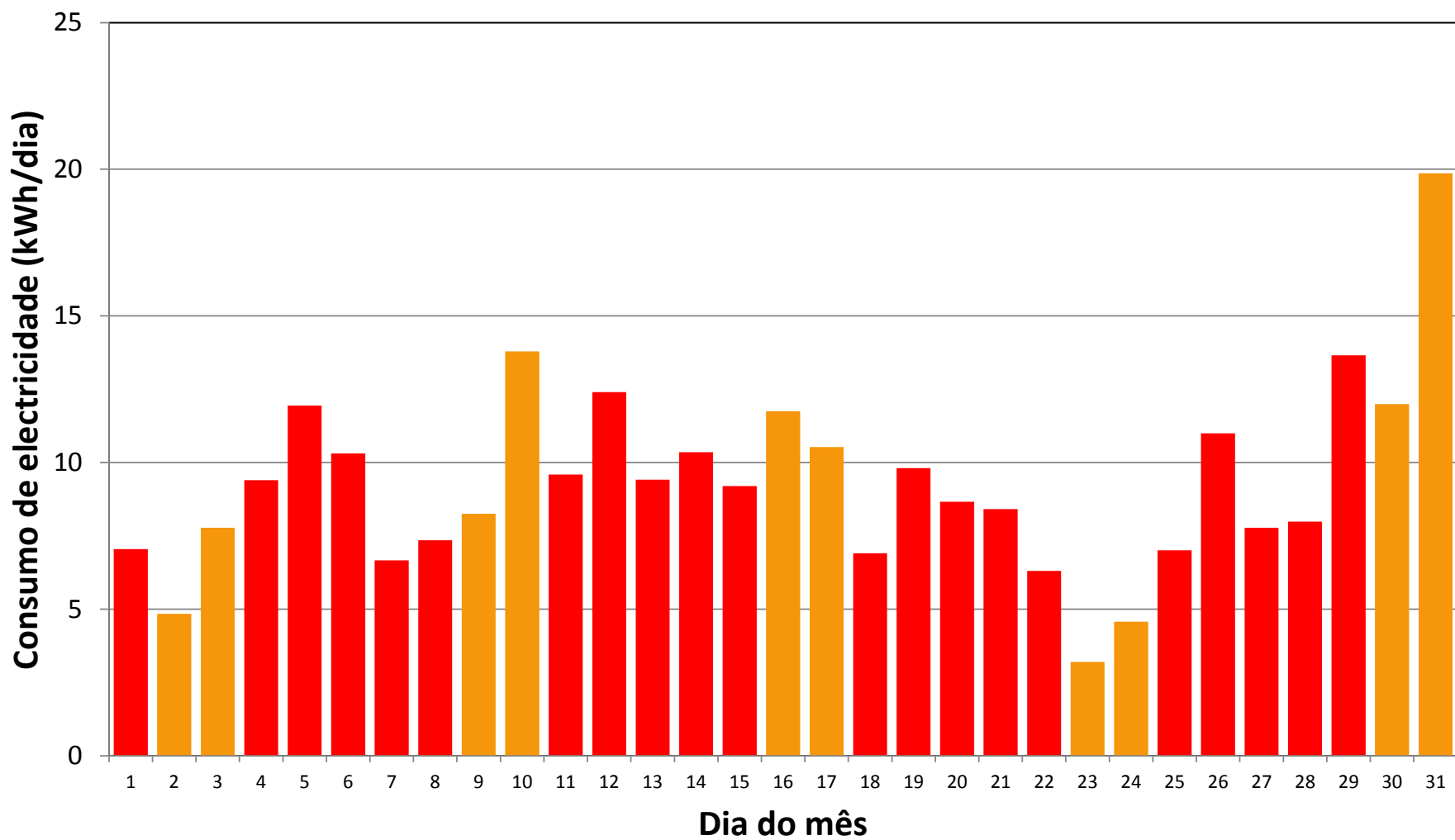
Legenda:

- 😊 Maior poupança
- 😐 2ª maior poupança
- 😐 3ª maior poupança
- 😞 Menor poupança

Grupos - critérios:
Grupo 1: até 200 kWh/mês
Grupo 2: 200-300 kWh/mês
Grupo 3: 300-450 kWh/mês
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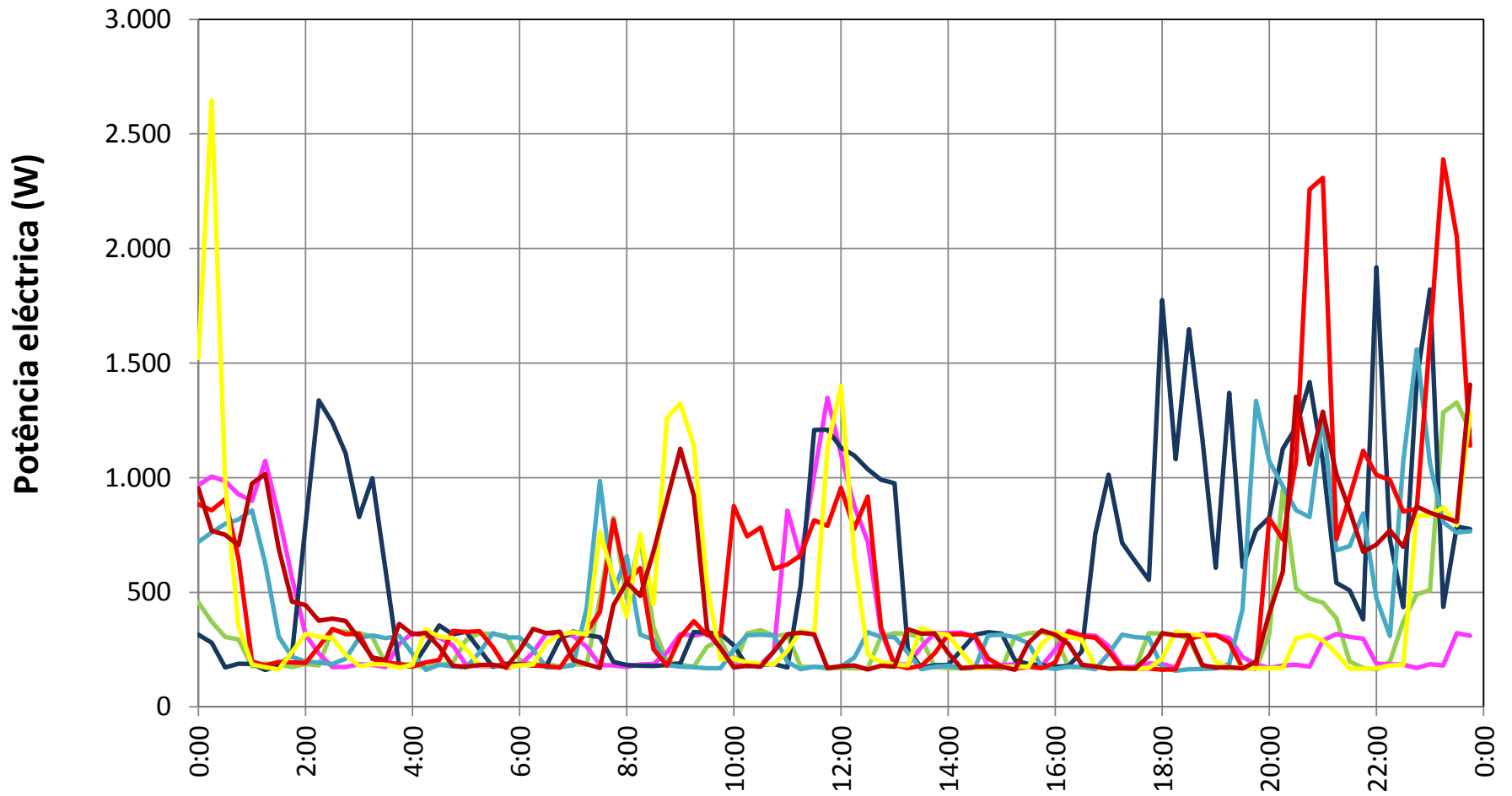
Informação enviada ao participante com melhor performance do Grupo 3



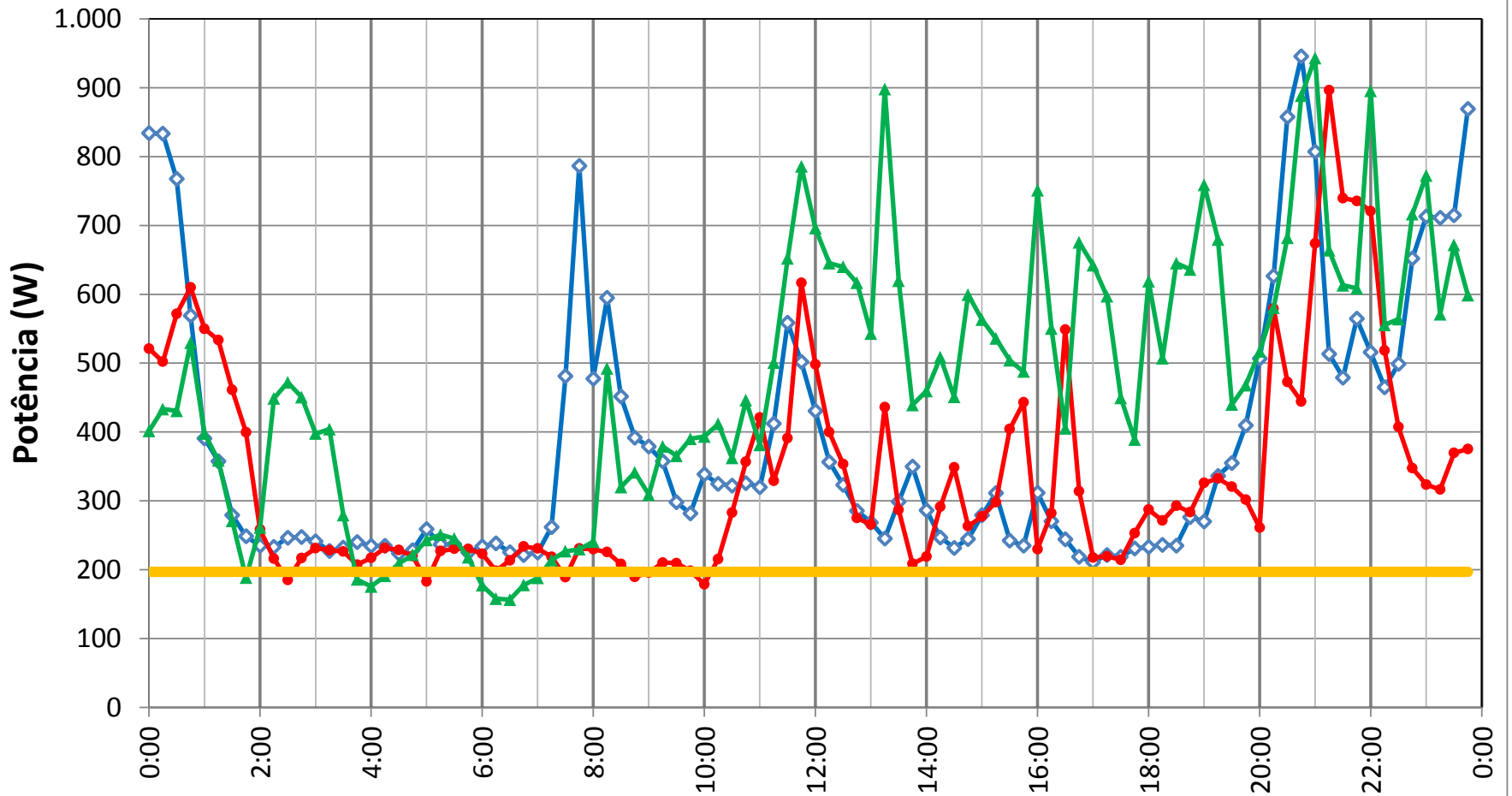
Mar-13

■ Dia útil

■ Fim de semana



— 08/Mar (Sex) — 09/Mar (Sáb) — 10/Mar (Dom) — 11/Mar (Seg) — 12/Mar (Ter) — 13/Mar (Qua) — 14/Mar (Qui)



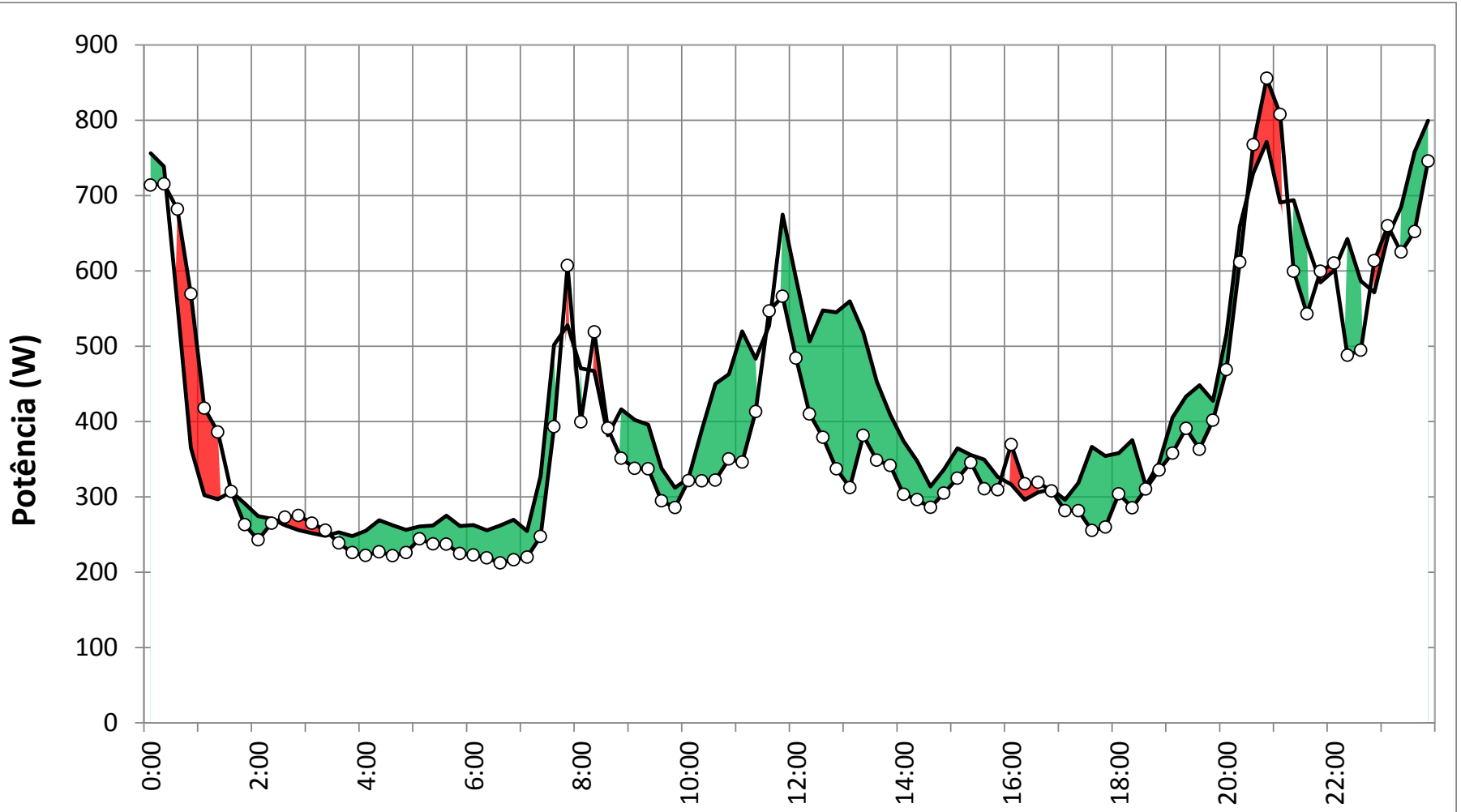
◆ Dias úteis (21)

● Sábados (5)

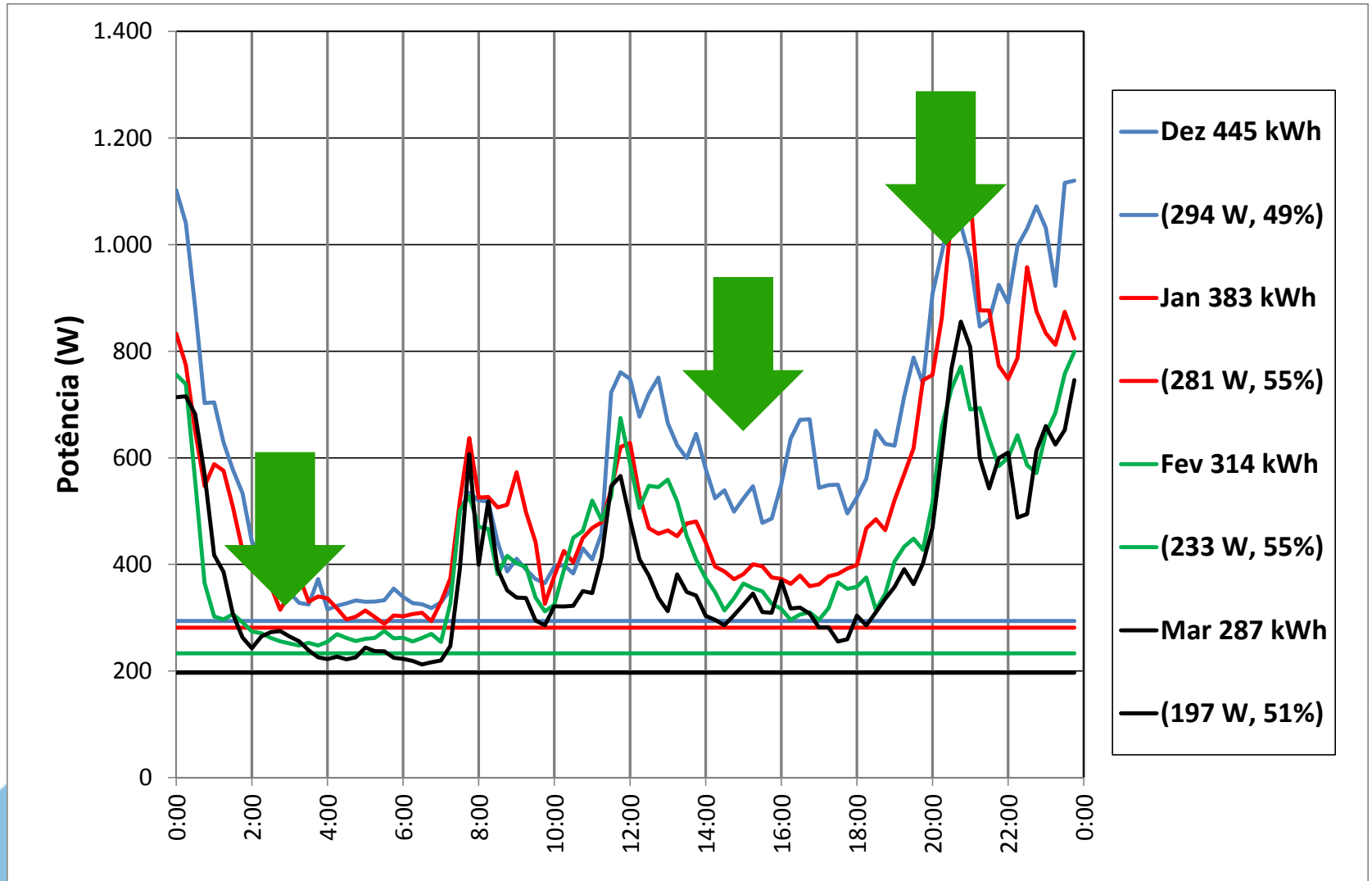
▲ Domingos (5)

■ Mínimo (197 W, 51%)

Mar-13



CONSUMPTION PROFILE: Best practice case



SOME RESULTS:

- Minimal power:
 - Individually, 41% of the total consumption;
 - Consumption groups, 66% of the total consumption;
- Average power between 0h-7h is 85% of the average power between 7h-24h
- Average consumption ~ 400 kWh or ~ 70 €

ACTIONS – BEHAVIOURAL CHANGE

- Standby reduction
 - Turning off modems, boxes, etc.
 - Use of stand-by killers
- Smart plug programming
- Temperature control
 - Heating system
 - Water heater
- Contracted power reduction
- Lighting technology changing



THANK YOU!

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