

# The experience of Local Energy Agency of Osona

Energy management and assessment to Local Governments

Vic, 3th October 2014  
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# Osona

Osona is a county near the Pyrenees.

51 municipalities which are quite diverse: small rural villages, touristic sites or quite industrious towns.

Vic is its capital and it has quite a wide range of services, including a University.



The Consell Comarcal (County Council) is a supramunicipal entity. Among its functions we want to emphasize the establishment of supramunicipal services complementary to the municipal ones and the coordination of municipal services for reasons of regional interest. That is the case of the Local Energy Agency of Osona



- **Local Energy Agency of Osona (ALEO):**

- Department of the Consell Comarcal (County Council) (created 2001–2002)
- First 11 municipalities joined it, **nowadays 48** out of 51 municipalities of Osona.
- Energy management and accounting for the Town Councils of Osona
- Collaboration agreement ALEO – Town Councils + support DIBA, ICAEN, SOC:



- **Each municipality joining the Agency pays an annual fee**

- **Main objectives:**

- To promote energy efficiency and energy savings
- To promote renewable energy production

- **Recipients:**

- Town Councils, other Public administrations
- Enterprises or other private sector
- Citizens

## • **Organization of the ALEO:**

- Nowadays there are 4 technicians with full time job:
  - Technical manager: energy procurement (gas and electricity, renewable energies projects (biomass), Town Councils service and private sector service
  - Technician 1: energy accounting (from invoices to solution of complaints)
  - Technician 2: support, drafting and checking SEAP (33 SEAP)
  - Technician 3: *Desendolla't* project

## • **ALEO funding:**

- Fixed part and variable part:
  - Fixed part: annual fees from Town Councils
  - Variable part: Consell Comarcal d'Osona, DIBA, SOC, ICAEN...

## • Annual fees of Town Councils:

- Annual fees of Town Councils depends on population but with a minimum fee.

Municipality of 100 inhabitants  385,13 €/year

Municipality of 1.000 inhabitants  514,21 €/year

Municipality of 10.000 inhabitants  1.375,95 €/year

Municipality of 20.000 inhabitants  2.995,68 €/year



**Electricity  
(power)  
Thermal energy**

kWh

**Energy consumption - INVOICING**

Files

€

**TOWN COUNCIL**

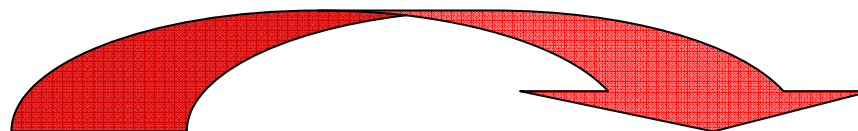
Ok ?

**ALEO : Energy management and accounting**

# 1. Energy management and accounting



## gemweb2.0



### Energy consumption:

- E-Invoicing
- Entry of invoices

### Monitoring:

- Alarms
- Monitoring reports
- Advice
- Municipal benchmarking

<https://www.gemweb.es/>



- **Number of organizations managed:**
  - **49** Town Councils
  - **1** County Council
- **Number of facilities managed:**
  - **812** Public lightings
  - **703** Municipal buildings
  - **237** Pumps of water cycle
- **Number of supplies managed:**
  - **1.498** Electrical supplies (active)
  - **127** Central heating oil supplies
  - **92** Gas supplies
  - **41** Liquid petroleum gas supplies
  - **17** Biomass supplies

## 2. Monitoring of e-invoicing:

- Detection of estimated meter readings
- Checking readings' correlation
- Checking energy prices
- Checking power in meters and invoices
- Checking energy consumption in invoices
- Detection of consumptions increases

**ALARMS from GEMWEB**

### 3. Most common mistakes in invoicing:

- Wrong meter readings
- Misapplication of prices and power
- Surcharges of 20% for not being on the liberalized market
- Prices misapplication
- Incorrect annual adjustments

**CLAIM TO ENERGY UTILITIES**  
(DIRECT CONTACTS WITH UTILITIES)

# ▶ Energy accounting produces money savings:

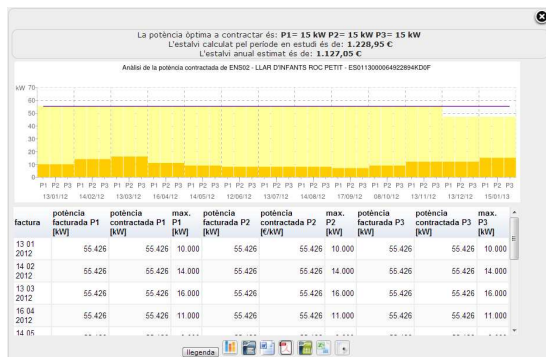
- Results 2013

20.046,49 € recovered (but much more claimed)

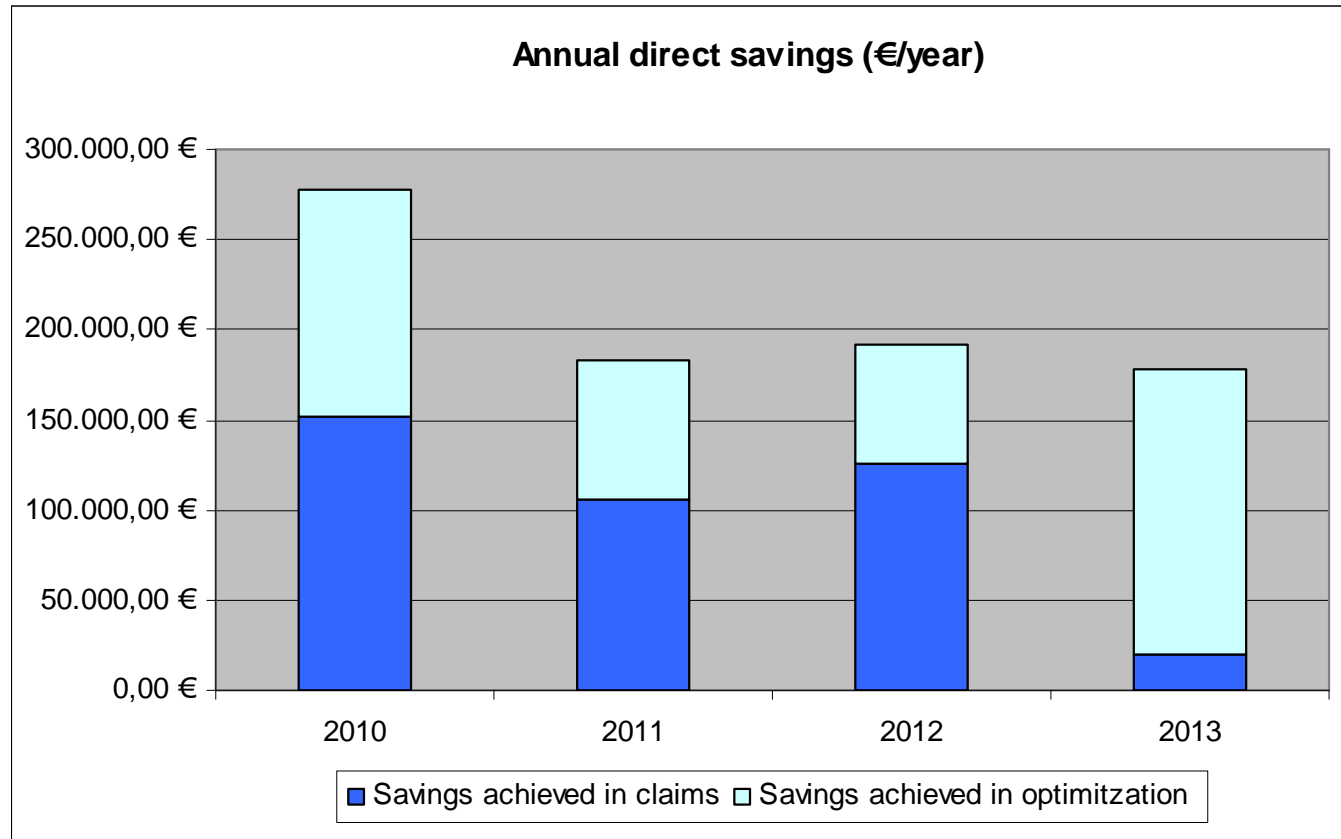


- Results 2013

158.015,57 € saved



## ► Results energy accounting of last four years:



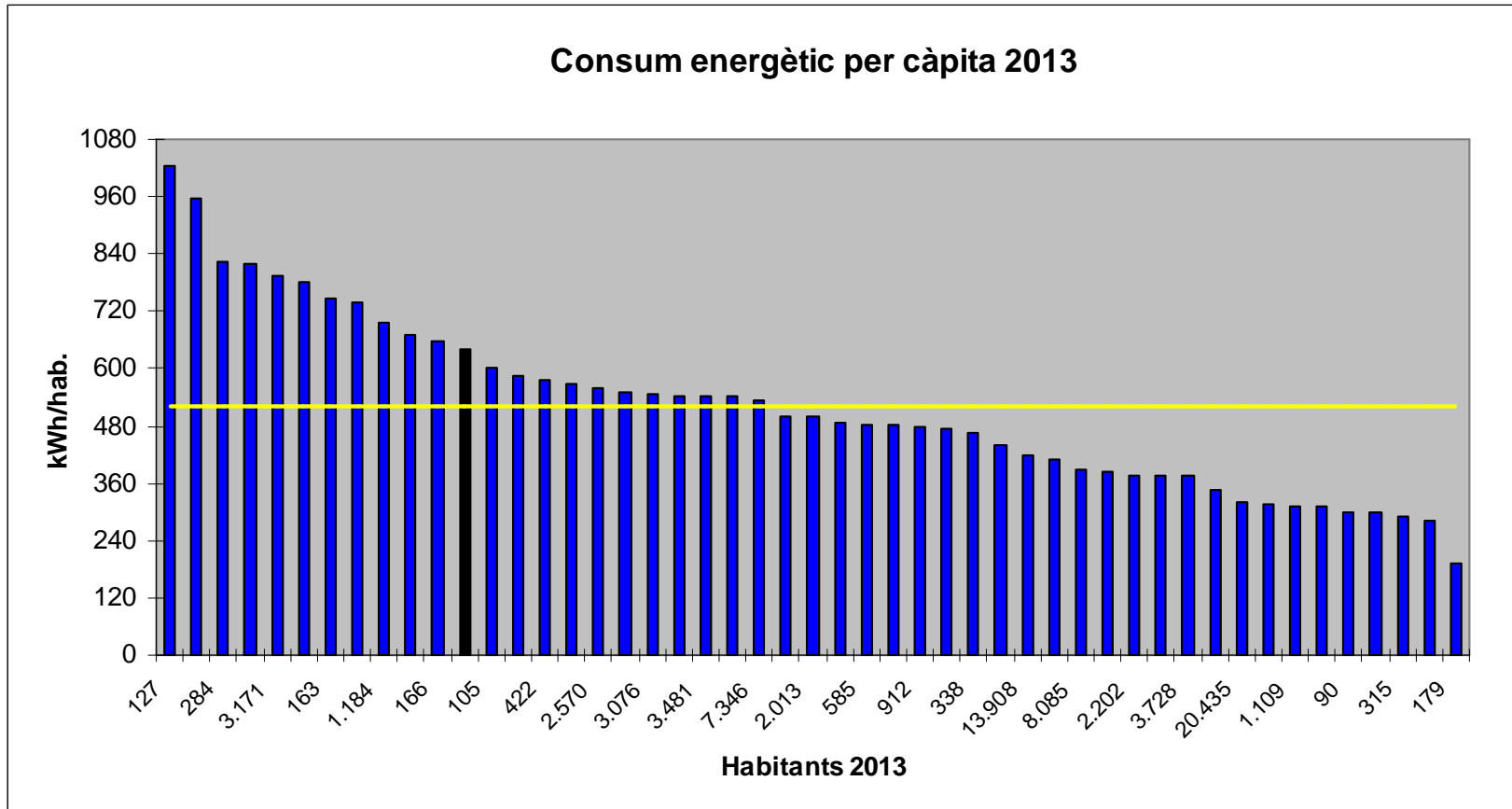
**Average: 4.324,49 €/year to Town Council**

## 4. Annual monitoring reports

- Municipal benchmarking (costs and consumption)
- Distribution of costs and electricity consumption (per types)
- Energy consumption and costs evolution (last 10 years)
- Buildings, facilities and public lighting assessment (benchmarking)
- Comparison: consumption vs. heat degree days or thermal demand
- Evolution of municipal effective prices and comparative
- Detection of abnormal consumption of 20%
- Assessment on GHG related emissions
- Savings achieved in claims, pricing adjustments, power factor and estimated readings
- Proposals for action and improvement

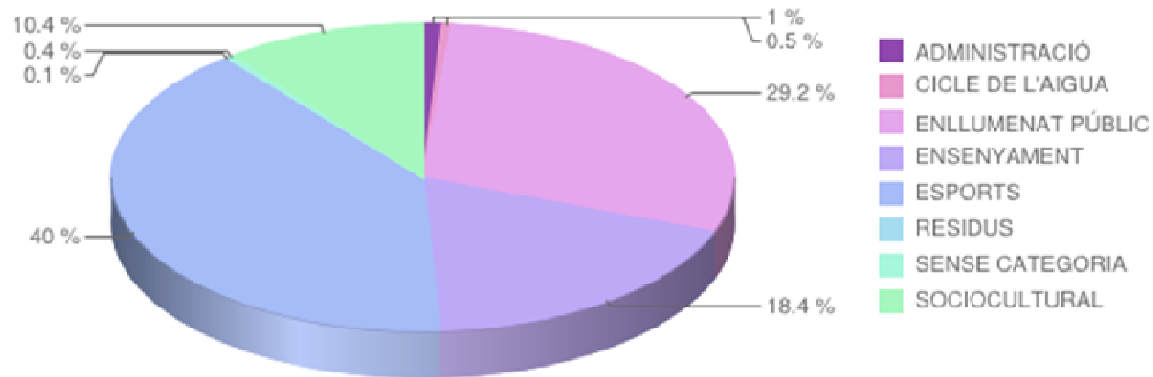
## ► Municipal benchmarking:

Comparison between municipalities: energy consumption per inhabitant



## ► Energy costs distribution:

How does our Town council spend energy??

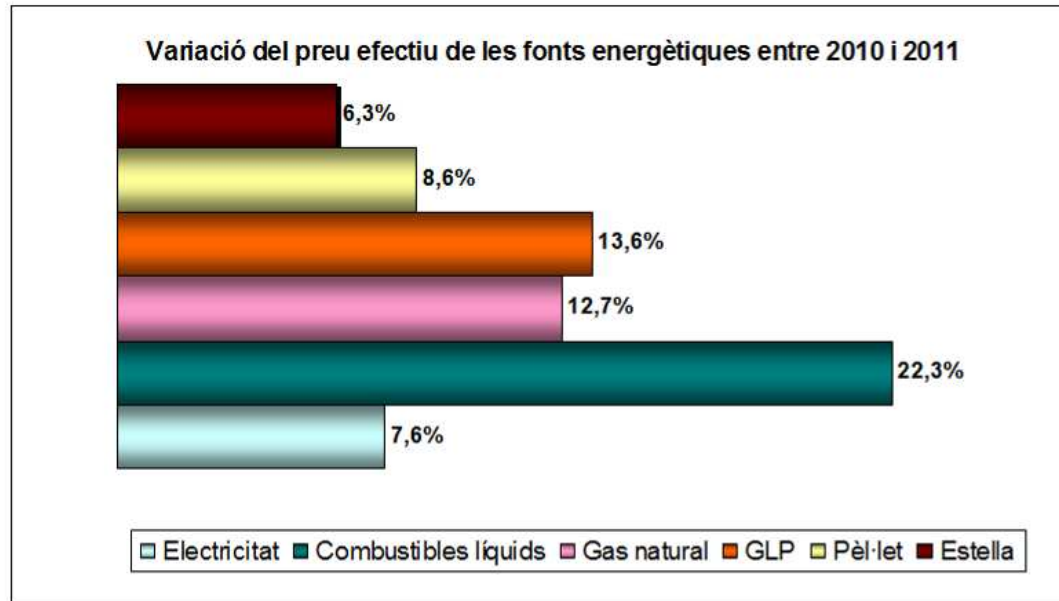


ÚS	COST (EUR)
RESIDUS	476,20
SENSE CATEGORIA	2.202,90
CICLE DE L'AIGUA	2.450,67
ADMINISTRACIÓ	5.113,74
SOCIOCULTURAL	52.497,28
ENSENYAMENT	93.104,14
ENLLUMENAT PÚBLIC	148.081,15
ESPORTS	202.365,00
<b>TOTAL</b>	<b>506.291,09</b>



## ► Effective energy price:

Average energy prices (County) vs Town Council



	Preu efectiu mitjà (€/kWh)	Preu efectiu XXXXXX (€/kWh)
Electricitat	0,183	0,157
GLP	0,103	0,109
Combustibles líquids	0,086	0,087
Gas Natural	0,058	0,056
Pèl·let	0,052	---
Estella	0,030	---

## 5. Other activities and projects: Projecte Desendolla't (Unplugg yourself)

- Public education buildings, schools and nursery school, are **18% of annual energy costs of Town Councils** (1.269.499,50 €).

- In 2004-2005: a benchmarking report comparing public and private schools:

*Private schools: 31,40 €/student-year*

*Public schools: 62,31 €/student-year*

- In 2010-2011: a benchmarking report comparing public and private schools:

*Private schools: 72,93 €/student-year*

*Public schools: 154,72 €/student-year*

- Our hypothesis is: **a 30% of energy consumption of public school could be for a incorrect energy management**

*Energy audits*

*Monographic reports*

*Municipal benchmarking*

...



**EDUCATION SERVICE  
OF COUNTY COUNCIL**

Collaboration between

**ALEO**

## 5. Other activities and projects: Projecte Desendolla't

### - What is it?

It is an energy saving project in public schools. This project depends on the Education Service of County Council and the Local Energy Agency of Osona.

### - Who is its target public?

The target public are public schools. In the first year there were 21 public schools, but in the second year there are 28 public schools.

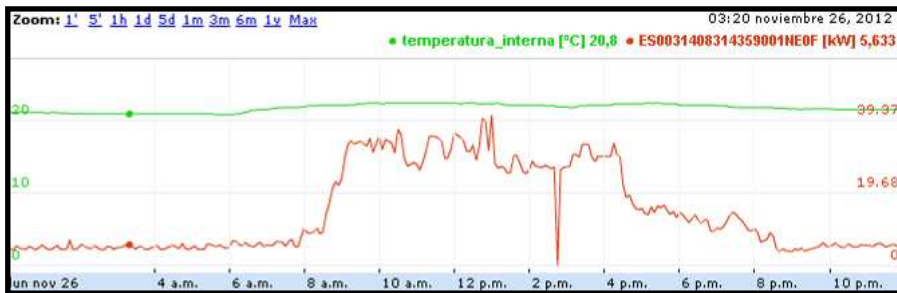
### - What does it encourage?

A triple benefit: environmental, energy saving; economic, economic saving; educational, a 50% of economic savings will returned to public schools.

# 5. Other activities and projects: Projecte Desendolla't



School 11: Before our intervention...



“Vampire” or passive consumption: 5,633 kW

School 11: After our intervention...



“Vampire” or passive consumption: 1,471 kW

# Smart metering: analysis of electrical consumption (current cost-gemweb2.0)

**gemweb2.0**

01/04/2013 01/04/2014

inventari | gestió | importacions | contractacions

Entitats

Centres de consum

Subministraments

Entitats | Anàlisi | Informes | Alarmes

Incoherències

Crear nous anàlisis | Anàlisis desats

Sense agrupar

Agrupar per:

Tipus de subministrament

Rànquing subministraments

Anàlisi potència contractada

Últims preus unitaris

Simulació canvi contractual

Previsió anual

Tipus subministrament: Electricitat

Origen dades: telelectures

Segons: potència activa

Inicial: 20 Febrer 2014

Final: 10 Març 2014

Tipus d'evolució: cinc minuts

Per data de facturació

Graficar temperatura

Analtzar

Resultats

data	temperatura_interna [°C]	ES003
20/02/2014 0.05.00	18.7	
20/02/2014 0.10.00	18.7	
20/02/2014 0.15.00	18.7	
20/02/2014 0.20.00	18.8	
20/02/2014 0.25.00	19.0	

Dades provinents de telelectures

Exportar | Desar | Widget

Entitat	Centre de consum	Subministrament	Model	Info	Última lectura	Estat	Consums d'ava
BALENYÀ	ENS01 - ESCOLA PÚBLICA JOAN XXIII	ES011300003073041KDFP	Current Cost	77148	09/07/2014 11:30:00		
BALENYÀ	ENS02 - LLAR D'INFANTS ROC PETIT	ES011300006492284KDF	Current Cost	13809	02/09/2014 12:10:00		
CALLDETENES	ENS01 - ESCOLA SANT MARC	ES0031446464579001RDFP	Current Cost	78557	24/04/2014 18:05:00		
CENTELLES	ESC02 - ESCOLA LLDEFONS CERDÀ (ESCOLA DE DALI)	ES019200000326002RZK	Current Cost	77322	26/07/2014 05:25:00		
CONSELL COMARCAL D'OSONA	ADM01 - TERCERA I QUARTA PLANTA CCO	ES0217010140977151ZQ	Wayss	81644	17/04/2013 20:15:00		
QUIR	ESC01 - ESCOLA LES ESCOLES I LLAR D'INFANTS	ES0031409135335001LDFP	Current Cost	77299	02/09/2014 12:05:00		
LES MASIES DE VOLTREGÀ	ENS01 - ESCOLA COMTES DE LACAMBRA	ES003144644458001ALFP	Current Cost	78276	02/09/2014 12:05:00		
LLUÇA	ESC01 - ESCOLA GAFARÓS	ES003144644458001KDFP	Current Cost	72956	10/10/2013 19:30:00		
MANLEU	ADM02 - AJUNTAMENT	ES0031446461083001TFP	Current Cost	113147	02/09/2014 12:05:00		
MANLEU	ADM06 - OFICINA PROMOCIÓ ECONÒMICA	ES0031446462914001YDFP	Current Cost	113208	21/05/2013 19:00:00		
MANLEU	ESC03 - ESCOLA POMPEU FABRA	ES0031446454055001JADF	Current Cost	90587	02/09/2014 12:05:00		
MANLEU	ESC10 - ESCOLA QUATRE VENTS	ES003140817657001GDFP	Current Cost	77480	02/09/2014 12:10:00		
MONTEQUIU	ESC01 - ESCOLA EL ROCAL	ES003144644708001VDFP	Current Cost	96559	17/06/2014 17:30:00		
MUNTANYOLA	ESC02 - ESCOLA MUNTANYOLA I ESCOLA BRESSOL	ES003140354438002CHP	Current Cost	78029	02/09/2014 12:05:00		
OLOST	AIT001 - AJUNTAMENT OFICINES	ES0031446446820001HDFP	Current Cost	114869	02/09/2014 12:05:00		
OLOST	ESC001 - CENTRE CÍVIC ANTIGA ESCOLA	ES0031446448370001TFP	Current Cost	114791	02/09/2014 12:10:00		
OLOST	ESC02 - ESCOLA TERRA NOSTRA-LLAR D'INFANTS	ES0031446441959001WDFP	Current Cost	78123	02/09/2014 12:05:00		
PRATS DE LLUCANÈS	ENS01 - ESCOLA LLUCANÈS	ES0031446453459001KDFP	Current Cost	78140	02/09/2014 12:05:00		
RODA DE TER	ESC001 - ESCOLA HARE DE DÉU DEL SÒL DEL PONT	ES003144645523001ZDFP	Current Cost	77492	02/09/2014 12:05:00		
RODA DE TER	ESC003 - ESCOLA ENRIU TEIXIDOR	ES0031446453965001KDFP	Current Cost	113188	20/05/2014 15:40:00		
SANT BARTOMEU DEL GRAU	ESC01 - ESCOLA LA MONJOIA	ES00314464458001WDFP	Current Cost	90716	02/09/2014 12:05:00		
SANT BOI DE LLUCANÈS	DEP009 - AJUNTAMENT	ES0031446445910001NDFP	Current Cost	90198	24/06/2014 16:50:00		
SANT BOI DE LLUCANÈS	ESC01 - ESCOLA AURORA	ES0031440351418001WDFP	Current Cost	75988	30/03/2014 17:20:00		
SANT DULÇA DE VILATORrada	ENS02 - ESCOLA BELLUGU	ES0031448237270001RDFP	Current Cost	77628	24/04/2014 18:10:00		
SANT MARTÍ DE CENTELLES	ESC01 - ESCOLA WALLENDERU (MÀJULI)	ES0113000005704674TFP	Current Cost	90482	12/08/2014 10:45:00		
SANT PERE DE TORELLÓ	ESC01 - ESCOLA JOSEP MARIA XANDRI	ES0113000032468433CFP	Current Cost	90566	02/09/2014 12:05:00		
SANT QUIZE DE BESORA	DEP015 - ESCOLA SEGIMON COMAS	ES0031446448970001NDFP	Current Cost	90566	31/07/2014 12:10:00		
SANT VICENÇ DE TORELLÓ	ESC01 - ESCOLA LORIANA	ES0031446448970001YDFP	Current Cost	77794	18/06/2014 20:20:00		
SANTA EULÀLIA DE RIUPRIMER	ESC01 - ESCOLA ROURE GROS	ES0031405894743001YDFP	Current Cost	90584	01/09/2014 12:55:00		
EPUGA	ENS01 - ESCOLA S. FERRER I S. PASTOR	ES0113000032387000DF	Current Cost	12730	02/09/2014 12:05:00		

Zoom: 1' 5' 1h 1d 5d 1m 3m 6m 1y Max

mes	Consum [kWh]	Consum anterior [kWh]
Set 2012	0	3392
Oct 2012	0	2870
Nov 2012	0	1893
Des 2012	0	4626
Gen 2013	4781	10336
Feb 2013	6796	9724
Mar 2013	7075	9735
Abr 2013	5682	5970
Mai 2013	10394	6780
Jun 2013	7711	4626
Jul 2013	0	1893
Ago 2013	0	1544
Set 2013	0	3392
Oct 2013	0	2870
Nov 2013	0	1893
Des 2013	0	4626
Jan 2014	4781	10336
Feb 2014	7711	4626

Completesa: 84%

Exportar | Desar | Widget

Zoom: 1' 5' 1h 1d 5d 1m 3m 6m 1y Max

mes	Consum [kWh]	Consum anterior [kWh]
Set 2012	303	1593
Oct 2012	1553	1971
Nov 2012	27684	26215
Des 2012	43004	65898
Gen 2013	33751	73117
Feb 2013	32523	57024
Mar 2013	26425	31300
Abr 2013	11070	20706
Mai 2013	2594	7719
Jun 2013	353	1876
Jul 2013	0	0

Exportar | Desar | Widget

# 5. Other activities and projects: Projecte Desendolla't

## Results

	ΔElectrical consumption (%)	ΔElectrical consumption (kWh)	ΔElectrical cost (€)	ΔThermal consumption (%)	ΔThermal consumption (kWh)	ΔThermal cost (€)
Average Desendolla't (%)	-25,94%			-28,45%		
ΔSubconsumption (kWh)		-282.911			-1.091.550	
ΔSubcost (€)			-48.172,43 €			-93.399,75 €
ΔConsumption (kWh)	-1.374.461					
ΔCost (€)	-141.572,18 €					
ΔSubconsumption/school (kWh/sch.)		-13.472			-51.979	
ΔSubcost/school (€/sch.)			-2.293,93 €			-4.447,61 €
ΔConsumption/school (kWh/sch.)	-65.451					
ΔCost/school (€/sch.)	-6.741,53 €					

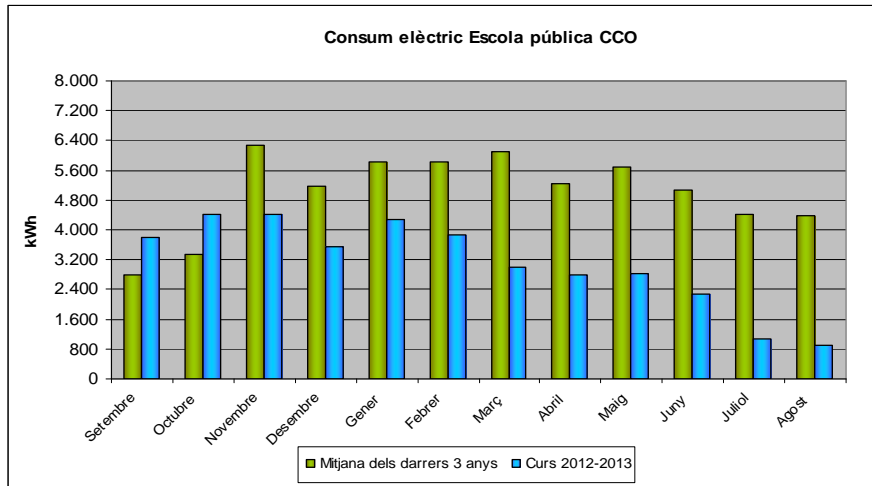
INTERVENTIONS	ΔTOTAL COST (€/year)
Total energy consumption saving (kWh)	-141.572,18 €
Savings achieved in procurement optimization (kW)	-10.121,24 €
<b>TOTAL SAVINGS</b>	<b>-151.693,42 €</b>

**Project cost for Town Council = 640 € (amortization in 1,14 months) 50% - 50%**

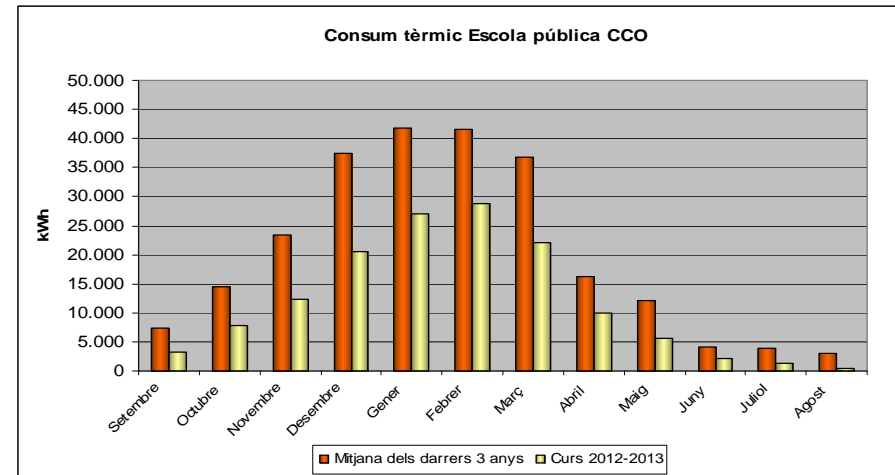
**Every Town Council and school can choose how they want to spend their savings: invest in energy efficiency, buy school supplies...**

# 5. Other activities and projects: Projecte Desendolla't

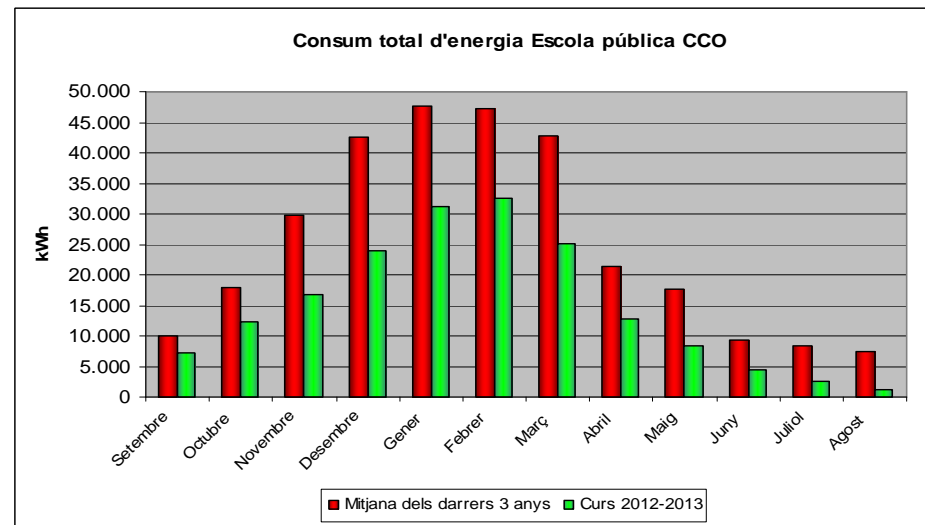
## Individual results



**ΔElectrical consumption: -2.289,90 €/year**



**Δthermal consumption: -4.447,61 €/year**



**ΔTotal energy consumption: -6.737,51 €/year**

## Energy National award EnerAgen

La Asociación de Agencias Españolas de Gestión de la Energía

V Premis EnerAgen (2013)



D. Francisco Javier León de la Riva  
lmo. Sr. Alcalde de Valladolid

Tiene el honor de invitarle, en nombre de la Asociación de Agencias Españolas de Gestión de la Energía, al acto de entrega de los V Premios EnerAgen y posterior cena de gala que tendrá lugar el jueves 7 de noviembre de 2013, a las 21:30 horas en el restaurante El Mirador de Cristal del Museo de La Ciencia. (Avda. Salamanca, 59 - Valladolid).

Se ruega confirmación de asistencia antes del viernes 25 de octubre  
Tel: 983 436 050 - [venm@agen.es](mailto:venm@agen.es)

**Menció d'Honor dins la categoria de:**

***“Millor actuació en matèria de sensibilització i difusió de les energies renovables i l'eficiència energètica”***

***Best practice in raising awareness and dissemination to promote RES and EE***

## Energy excellence awards from Generalitat de Catalunya 2013 (Catalan Gov.)

Institut Català d'Energia (ICAEN)

Premis d'Excel·lència energètica (2013)

**Award on raising awareness and dissemination:**

***“Distingit per les actuacions de difusió i conscienciació en l'àmbit de l'estalvi i l'eficiència energètica”***





## 5. Other activities and projects: Projecte Desendolla't Educational project



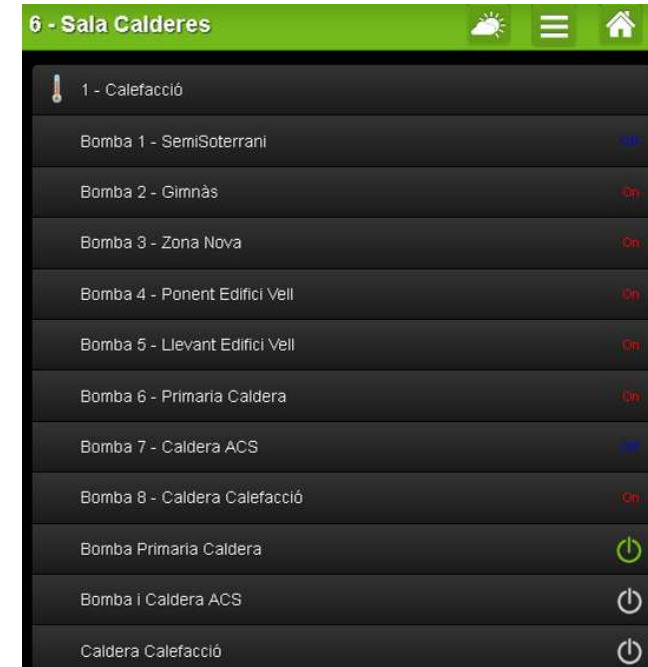
## 5. Other activities and projects: Projecte Desendolla't

Dossier educational project + 50 children's tale + 1 Efergy + 1 CD (digital documents)



# 5. Other activities and projects: smart management

## o Control and management of central heating systems (Loxone)



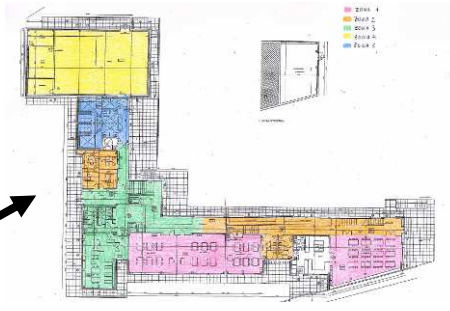
Local access or remote access with PC, Tablet o Smartphone



Programming of central heating system

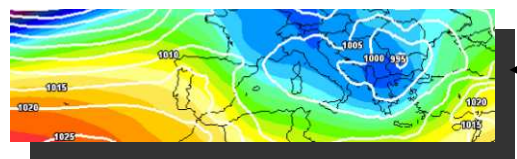
Programació	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Programació																									
Programació																									
Programació																									
Programació																									

Determine the heating spaces



**SMART MANAGEMENT IN 12 PUBLIC SCHOOLS**

Weather parameters (°C)

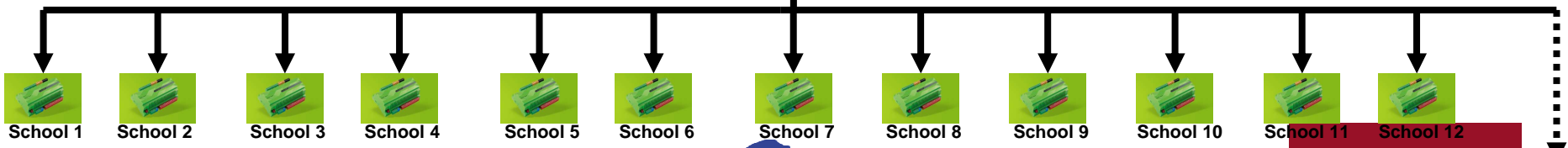


Inside T°/spaces/orientation

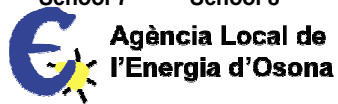


Town Council (caretakers)

Others interventions



Consell Comarcal d'Osona



## 6. Other activities and projects: NiW±

### Energy poverty project

#### - Objectives:

1. Assisting families who have economic troubles related with energy.
2. Trying to decrease energy subsidies (*Prestacions econòmiques d'urgència social destinades*) for each family.
  - 2.1. Trying to assist more families than now.
  - 2.2. Spending money saved for others necessities.
3. Defining "Energy poverty concept" in Osona and its causes

## 6. Other activities and projects: NiW±

### Energy poverty project

#### - This project depends on two departments:

- The Social Service of County Council
- The Local Energy Agency of Osona

#### - The Social Service makes contact with ALEO because:

- There is a high spending in energy subsidies:

Nº Town Councils	Nº total subsidies	%energy subsidies	Total value of subsidies	Total energy subsidies
39 (without Vic)	1.610	<b>51%</b> (827)	162.416 €/year	<b>45%</b> (72.528 €/year)

- Social technicians don't know energy concepts.
- Energy poverty is an breaking matter.

## 6. Other activities and projects: NiW±

### Energy poverty project

#### - Interventions:

1. Workshop on energy: Can users save money in their energy invoices? How? (more 20 sessions, more 215 families)
2. Energy Assessment Visits (EAV) of homes with economic troubles (> 15 EAVs)
3. Cooperation agreement between County Council and an electricity utility.
4. Joint interventions related with energy

## 6. Other activities and projects: NiW±

### Workshop on energy

#### - Who is its target public?

- Social technicians
- Final consumers suffering energy poverty
- Volunteers of other entities

#### - Framework:

1. Understanding energy invoices (electricity, gas...)
2. Knowing choices in energy procurement
  - 2.1. Changing contracted power
  - 2.2. Choosing the best electrical tariff
  - 2.3. Contracting Social Tariff
  - 2.4. Changing electrical utility
3. Knowing choices of energy saving at home
4. Individual assistance



## 6. Other activities and projects: NiW±

### Energy Assessment Visit

#### - What do we do?

##### A) First visit:

- Collecting invoices (electrical and thermal)
- Installing a consumption meter (Efergy or EnviR)
- Analyzing central heating system and sanitary hot water system
- Analyzing lighting system
- Analyzing electrical appliances
- Analyzing energy management of users

##### B) Second visit:

- Picking up the consumption meter
- Implementing some easy actions
  - Replacement of lightings
  - Installation of multiple connectors
  - Installation of timers
  - Management of heating

## 6. Other activities and projects: NiW±

### Cooperation agreement

**- We are preparing a cooperation agreement between the County Council and electricity utility to protect vulnerable users.**

**- In the agreement there will be...**

- 1) Contracting of Social Tariff for vulnerable users
- 2) Not cutting off electrical supply during winter
- 3) Before cutting off some electrical supply, electrical utility has to inform social technicians
- 4) Facilitating change of contracted power and change of electrical tariff
- 5) Including 30-40 vulnerable users in collaboration agreement

## 6. Other activities and projects: NiW±

### Joint interventions related with energy

- **Along the Energy Assessment Visit, we can detect some difficult actions.**

- **These interventions can be implemented by Social Service of County Council:**

For example:

- Replacement of electrical heating to biomass stove
- Joint purchase of biomass, heating oil....
- Changes of windows, doors...
- ...

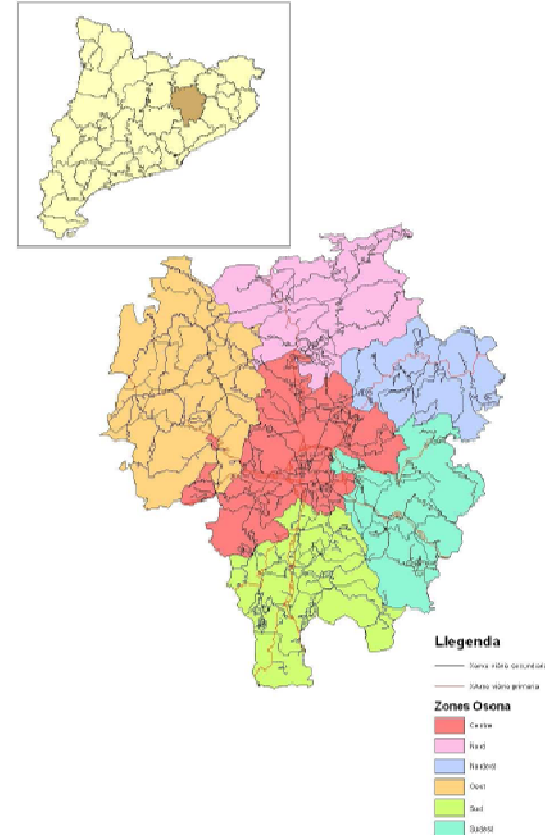
**Interventions adapted in Osona!!!**

## 7. Other activities and projects: Biomass

### Biomass study in Osona

- Study of biomass as an energy source in Osona.
- Coordination: Servei de Gestió Forestal (DMAH).
- Drafting: Centre Tecnològic Forestal de Catalunya (CTFC), Centre de Recerca Ecològica i Aplicacions Forestals (CREAF) i Servei de Gestió Forestal (DMAH).
- Collaboration: Agència Local de l'Energia del Consell Comarcal d'Osona, oficina comarcal del DMAH, Centre de la Propietat Forestal (CPF) i Consorci del Lluçanès.
- Study published in:

<http://www.ccosona.es/index1.php?idF=2&idSubF=480>



## 7. Other activities and projects: Biomass

### Biomass study in Osona

- Biomass destined to energy comes from different origins: forest biomass, clean wood, pruning and industrial derivatives.
- **In Osona there are 75.000 tons/year of biomass (30%H.), with a torn of 15 years, and 84.000 tons/year of biomass (30%H.), with a torn of 20 years.**
- Every year 9.850 tons of industrial clean wood are produced (ARC).
- Every year 720 tons of pruning are produced (ARC).
- Every year 1.000 tons of industrial derivatives are produced (ARC).

# 7. Other activities and projects: Biomass

## Promotion and training about biomass

**Training courses**



**Meetings, conferences...**

# 7. Other activities and projects: Biomass

## Promotion and training about biomass

**Personal advising: new companies, individuals, collectives, Town Councils...**



**Technical visits to facilities**  
(architects, environmental technician, engineers...)

**Collaboration in the Organization of the Fair of Forest Biomass Vic**



# 7. Other activities and projects: Biomass

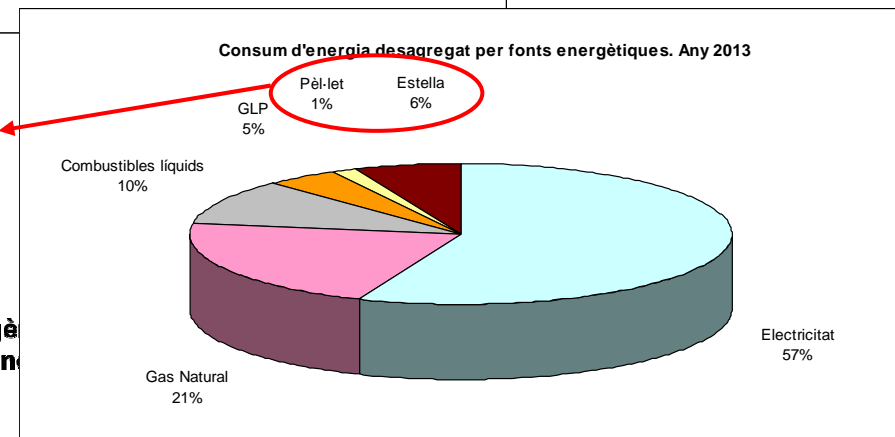
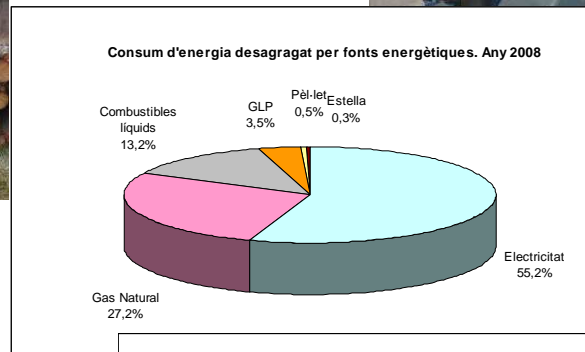
## Municipal facilities

### ➤ OSONA INVESTS IN BIOMASS



#### EXACT AMOUNTS:

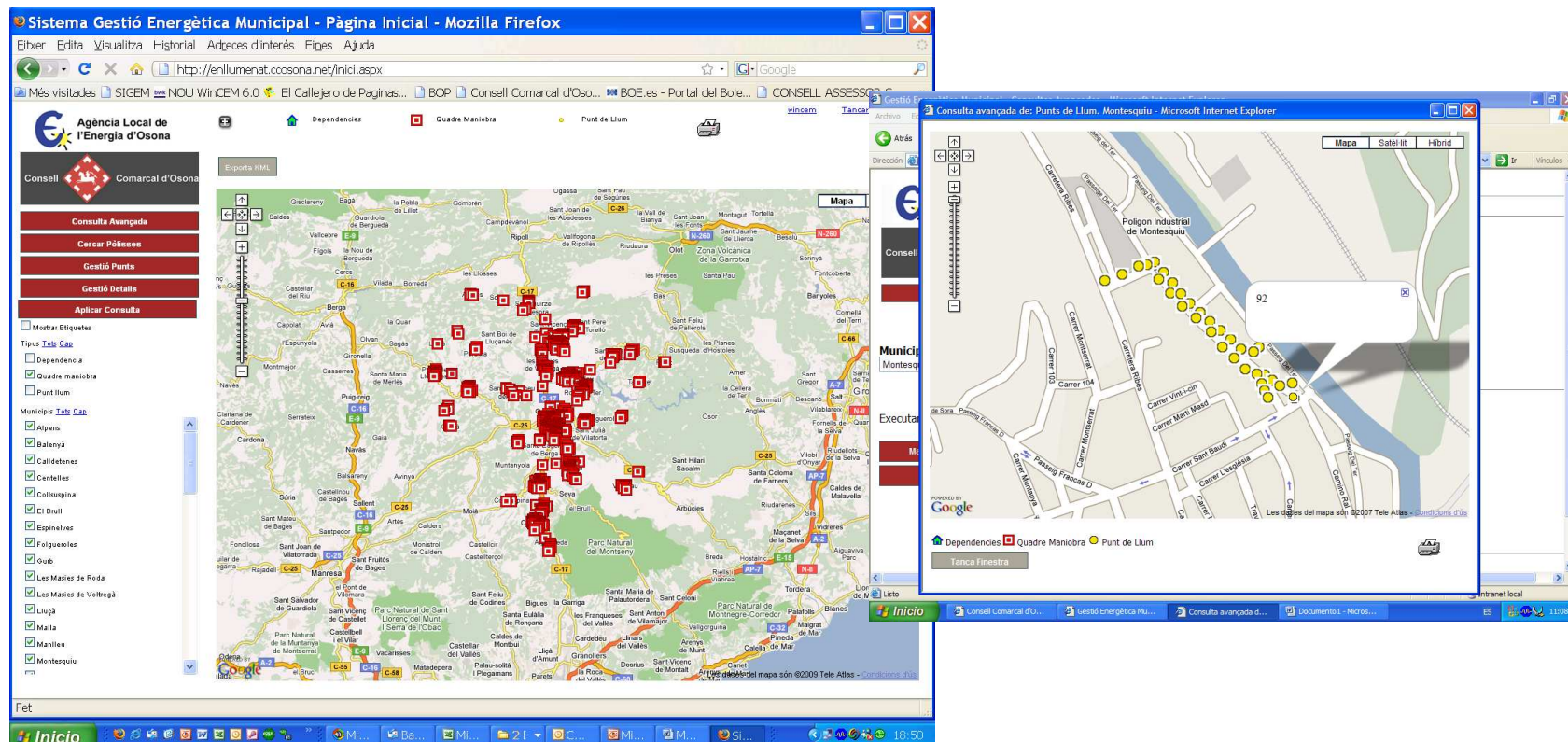
- 25 facilities in 17 Town Councils
- 3,8 MW of contracted power
- 10 chip facilities and 12 pellet facilities
- Consumption is better than 4.000.000 kWh (local economy increases little by little!!!). A 7% in total.
- 5 facilities projected





# 8. Other activities and projects: SIGEM

- Information geographic system of the municipal public lighting (SIGEM)



## 9. Other activities and projects: subsidies

- Information and processing of grants and subsidies to Town Councils

ICAEN – DIBA – DMAH – ...



## 10. Other activities and projects: SEAP

- Support on SEAP development and implementation
- Implementation and analysis of energy efficiency and saving measures through the **ELENA** facility (ERDIBA project) of the Province of Barcelona : ESE, roof renting for photovoltaic, biomass heaters and district heating...
- Energy audits in municipal buildings, facilities and public lighting. In 2013 – 26 audits (21 buildings and facilities and 5 public lighting).
- Support and advice to introduce energy sustainable measures for new buildings or renewal of old ones.

## 11. Other activities and projects: dissemination session

- Training of municipal energy managers: 60h for municipal officers, to improve communication and facilitate tasks between ALEO and Town Councils.
- Training courses for installers, architects and engineers in renewable energy: biomass (4 editions), geothermal (2 editions), solar thermal ... (along with the Guilds and Professional Associations of Osona)
- Conference to promote energy efficiency and / or renewable energy: 3 - 4 days per year.
- Collaboration in the Organization of the Fair of Forest Biomass Vic.

## 12. Main saving measures

- Rate and power adjustments
- Power reduction in public lighting and use of ITC, there is too much light in the street!!!
- Good practices among workers
- Passive consumption reduction. Often more than 20%.
- Use of renewable energy and more efficient technologies
- Team work: architects, engineers, energy managers and politicians

## 13. Conclusions and future projects

- There is still a long way to go to achieve energy savings with low cost measures.
- First step, and VERY important, to straighten energy matters: what do we have?, how much do we spend?, where do we spend and how do we spend? -> the basis for energy management!!!
- Nowadays we must be imaginative and work on good practices
- Once savings are achieved, those savings must be invested to improve energy management and efficiency
- We must act courageously against injustice in the energy sector
- Today: Invoicing control (months delay) – Future: smart management and control in real time

# Thank you very much

## Technicians of the Local Energy Agency of Osona (ALEO)

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