

JOURNÉE D'ÉTUDE: LE LIFTING TECHNOLOGIQUE D'UN IMMEUBLE CINQUANTENAIRE

HAUTE ECOLE DE LA PROVINCE DE LIÈGE

Monitoring énergétique

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EDF Luminus Solutions is the B2B Service Company of EDF group in Belgium



(*) ESCO = Energy Savings COmpany

EDF LUMINUS SOLUTIONS : CUSTOMERS

1. Government & communities
2. Tertiary sector
3. Health sector
4. Industry



EDF LUMINUS SOLUTIONS : ACTIVITIES

1. Energy Performance Contract

2. Multitechnical maintenance Contract

3. Engineering for B2B Customers



ENERGY EFFICIENCY

THE TECHNICAL SOLUTIONS

- ❖ Replacement or improvement of HVAC equipments ;
- ❖ Relighting ;
- ❖ Installation and maintenance of local generation equipments : PV, thermal solar, cogeneration ;
- ❖ Multitechnical maintenance on site ;
- ❖ Insulation works, windows replacement ;
- ❖ Communication with building users ;
- ❖ **Energy monitoring** and remote control of installation.



ENERGY MONITORING

Energy Monitoring means continuous measurement of energy meters, sub-meters and/or temperature sensors to allow better understanding and analysis of buildings and occupants behaviours.



Why ?

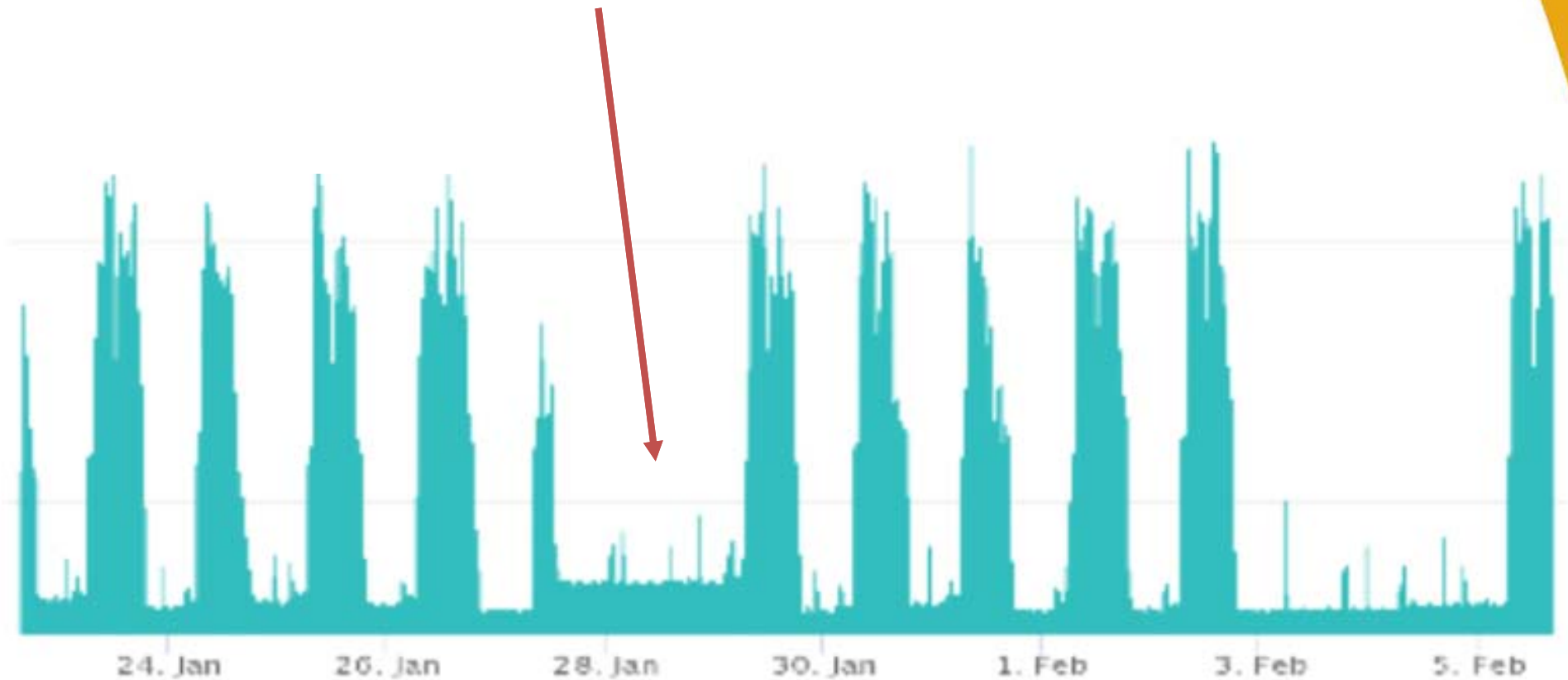
DIAGNOSTIC

CONTROL

COMMUNICATION

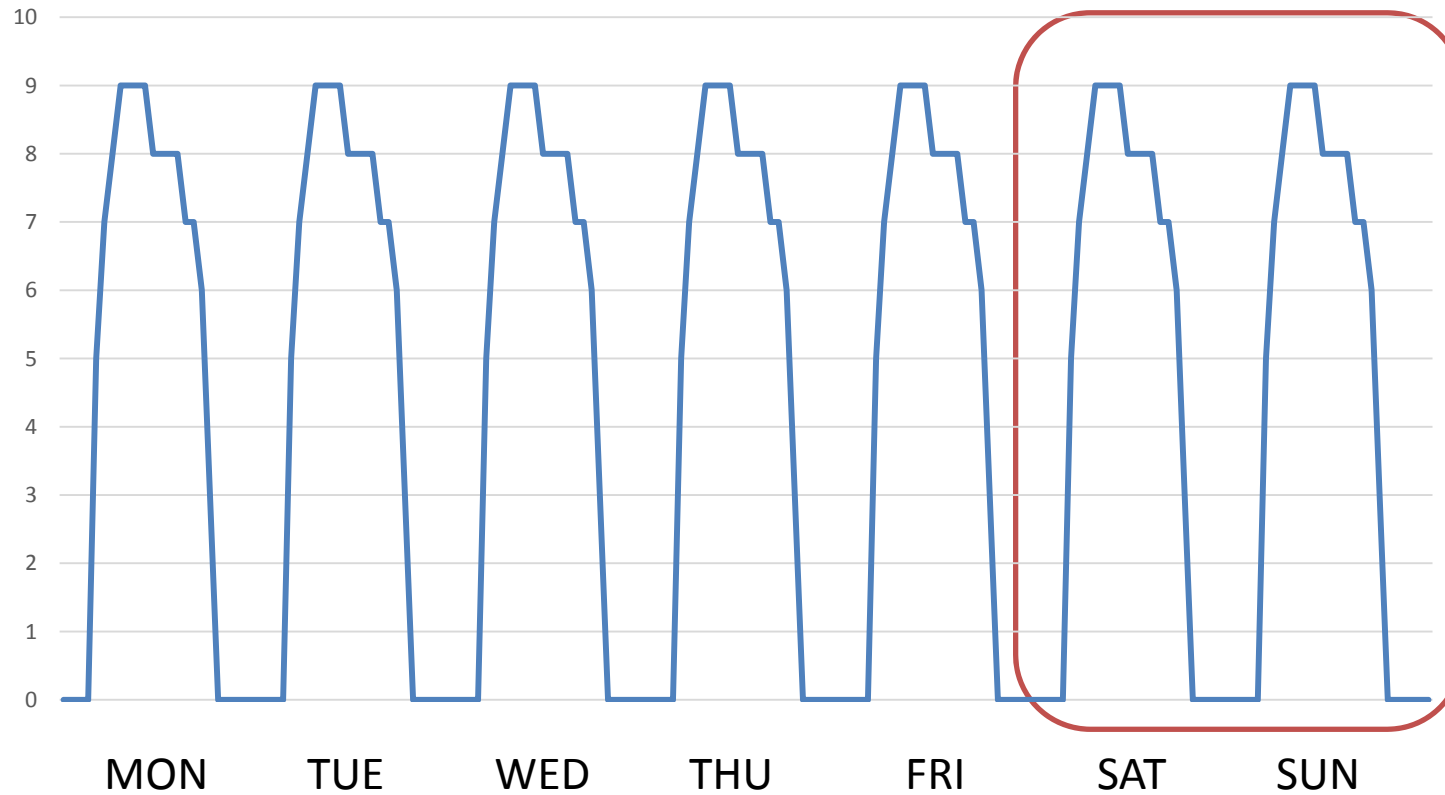
1. With Continuous measurement we can detect :
 - Default of regulation. As an example bad intermittence HVAC parameters ;
 - Schedule defaults ;
 - Bad behaviour of Users ;
 - Non optimized HVAC parameters. Example: Heat curve.
2. We can also follow-up the effect of an energy Efficiency action and objective the result (IPMVP)
3. We can show results and sensitize users.
4. With alarm implementation we increase reaction to deviation.

Example of deviation detected by the Monitoring



Electrical consumption in a school (1/4h)

Example of regulation default



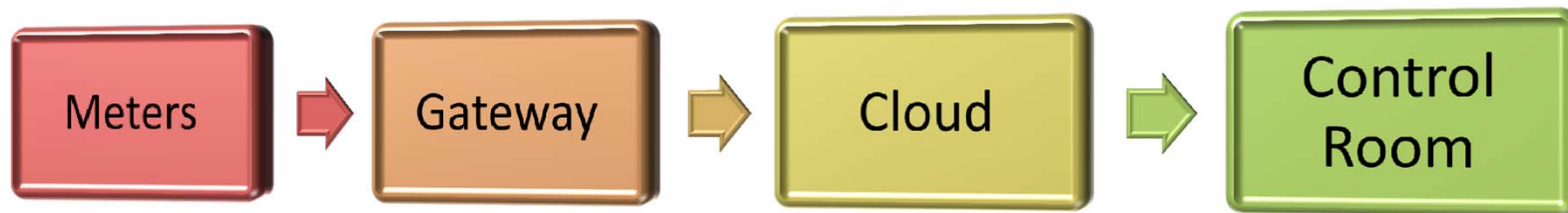
Example of communication tool



Horloge Énergétique de EDF

How ?

1. Installation of digital meters and sub-meters
 - Heat
 - Gas
 - Electricity
 - Water
 - + Temperature sensors
2. Transfer of the data via a gateway to our server or cloud solutions.
3. Analysis results via a web interface and dash board
4. Generate reports for the customer.



Metering solutions



Gas meter



Thermal meter



Electrical meter

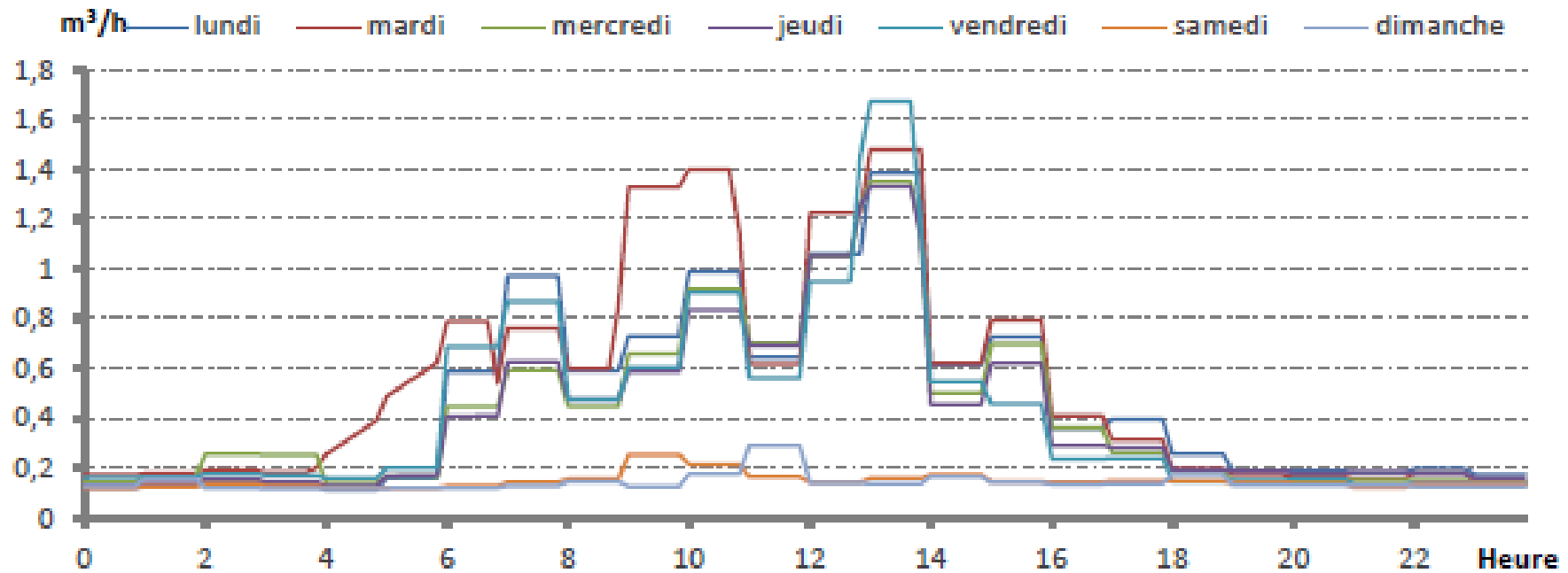
Monitoring @ the Engineering school of the Province of Liège

- Gas metering (1 meter from the grid operator)
- Electricity metering (7 meters)
- Water metering (1 meter)
- Thermal metering in distribution (11 meters)

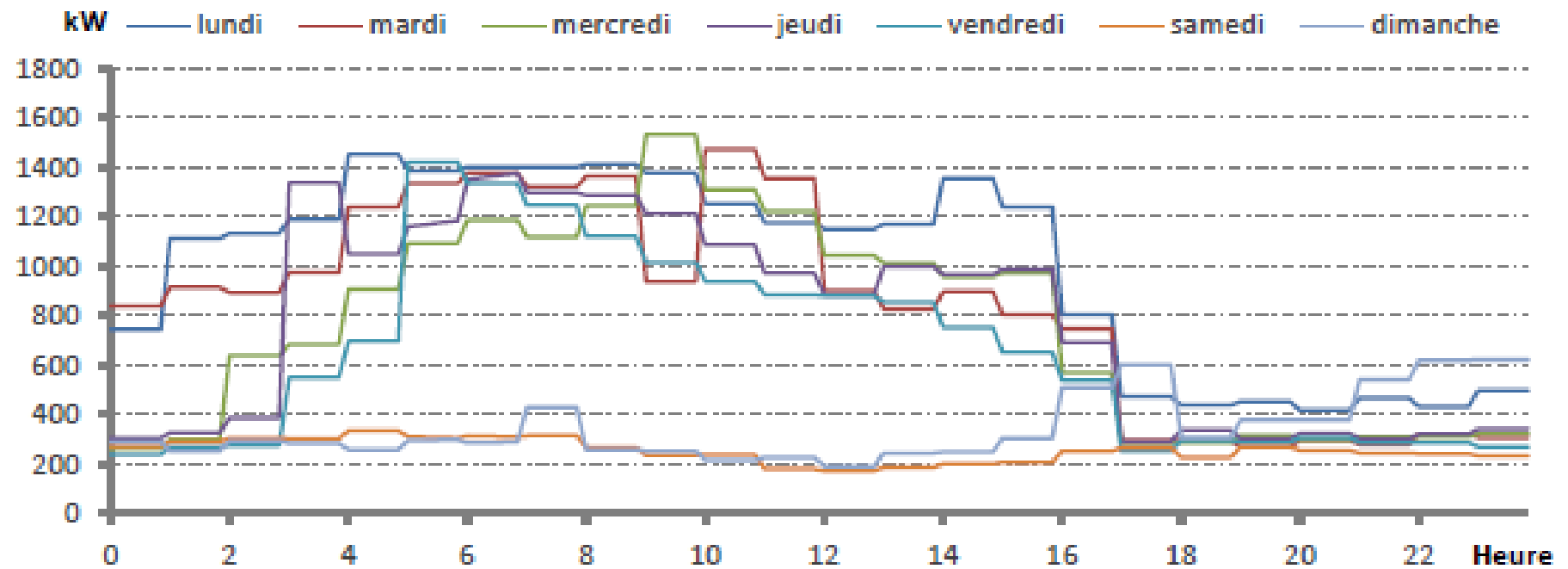


Water consumption Nov. 2017

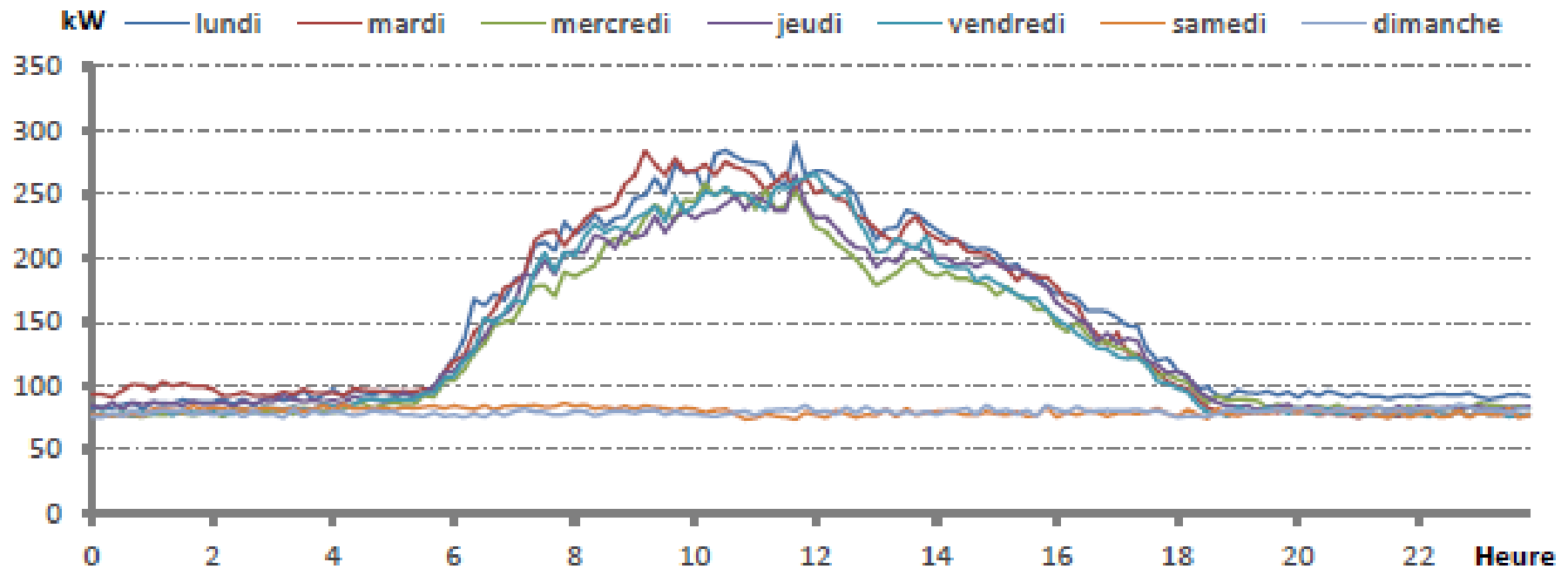
Novembre



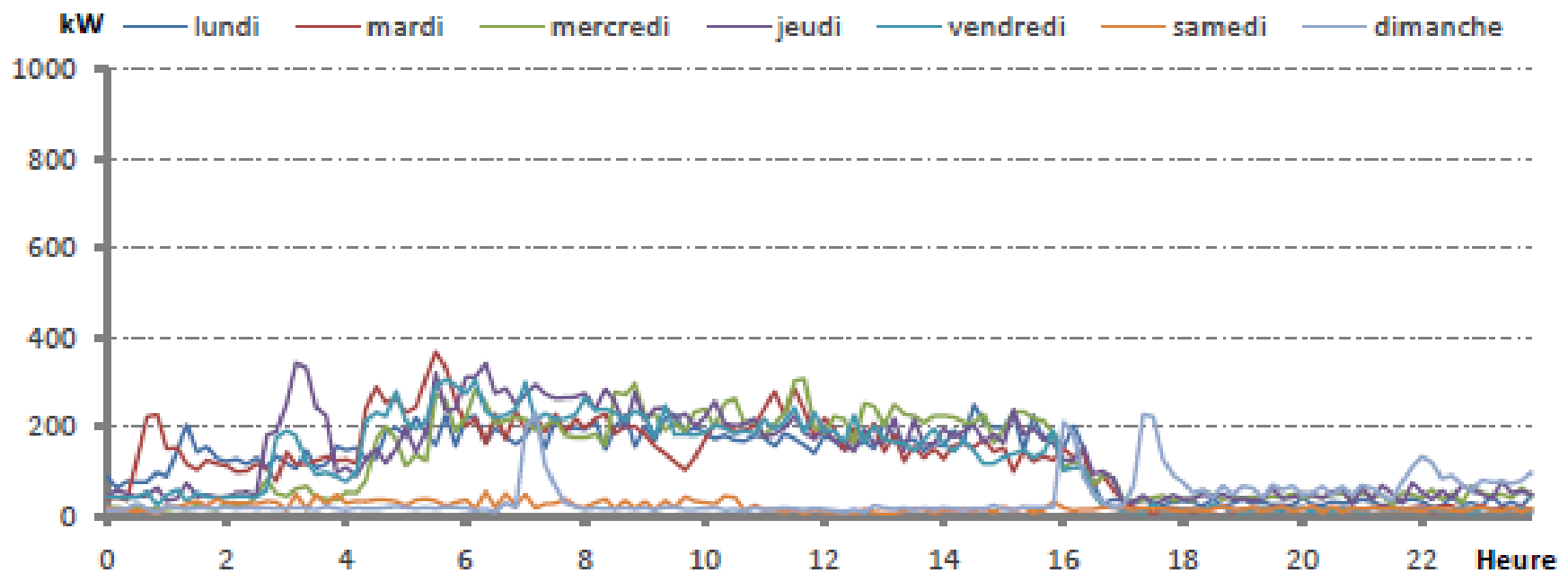
Gas Consumption Nov. 2017



Electrical Consumption Nov. 2017



One of the Thermal departure in nov. 2017

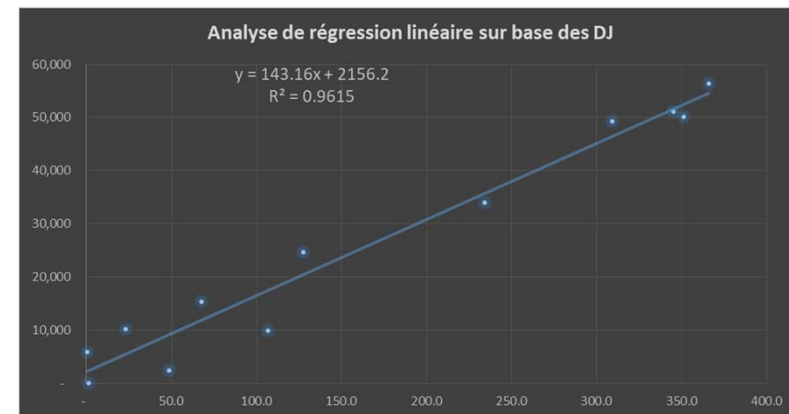


Manual metering

- If no digital metering is installed ;
- Useful before work phase to build reference curve ;
- Write manually meter index ;
- Automatic report in the metering tool



étape 1: Collecte des données							
nbre de mesure	Date début	Date fin	yi conso PCS	xi Degrés-jours	Vérification		
					Selon modèle	résidu	résidu ²
1	24/03/2018	23/04/2018	24,717	127.5	20,409	- 4,308	18,555,551
2	22/02/2018	23/03/2018	56,366	365.8	54,525	- 1,841	3,389,358
3	25/01/2018	21/02/2018	51,156	345.3	51,590	434	188,486
4	21/12/2017	24/01/2018	50,165	351.1	52,420	2,255	5,087,244
5	23/11/2017	20/12/2017	49,312	309.0	46,393	- 2,919	8,518,483
6	08/11/2017	22/11/2017	33,962	234.0	35,656	1,694	2,870,238
7	06/10/2017	07/11/2017	9,866	106.5	17,403	7,537	56,805,986
8	30/08/2017	05/10/2017	2,451	48.5	9,100	6,649	44,203,306
9	01/08/2017	29/08/2017	-	1.4	2,357	2,357	5,553,605
10	29/06/2017	31/07/2017	5,905	0.3	2,199	- 3,706	13,733,472
11	08/06/2017	28/06/2017	10,184	23.1	5,463	- 4,721	22,285,648
12	29/04/2017	07/06/2017	15,266	67.6	11,834	- 3,432	11,778,912
359 jours			309,350	1,980	309,350	-	192,970,289
Nombre de variable indépendante (p)			1	Standard deviation	20.919	4.188	
Nombre de mesures (n)			12	KURTOSIS	1.803		
Année normale			2121 DJ	ASYMETRIE	1.582		
Consommation réelle sur la période			309,350 kWh				
Consommation normalisée			329,464 kWh				



Points of attention

- **Cost of installation & reliability :**
 - Material
 - Installation
 - Gateway connexion (GPRS or ADSL)
 - Local data storage
- **Follow-up and analyse :**
 - Time-consuming
 - Maintenance of equipment

CONCLUSIONS

- ❖ Energy Monitoring is an efficient diagnostic tool. In this approach it is recommended to limit the number of meters and sensors for budget reason.
- ❖ Energy Monitoring is also a useful tool to control efficiency of implemented solutions, for instance in case of EPC contract.
- ❖ Finally, Energy Monitoring is an efficient tool for communication with users to incentive change in behaviour.



Thanks

