



**UNIVERSITÉ
DE GENÈVE**

INSTITUT DES SCIENCES
DE L'ENVIRONNEMENT

GENERGIE

Evaluation of an Energy Efficiency Program for Low Income Households

Daniel Cabrera, physicist

Jean-Luc Bertholet, econometrist

Bernard Lachal, physicist

September 10th 2014 – IEPPEC Berlin

Plan

- The éco21 and éco-social program
- Data collection and methods used to estimate the savings
- Lessons learned
 - Problems with the reference group
 - Evolution of the stock of inefficient light bulbs
 - A Negawatthour meter

The program



Éco21 is an EE program for
Geneva-Switzerland
population ~ 470'000
electricity consumption ~ 3 TWh/y

The aim of the program is to reduce
125 GWh/y by 2015

Several subprograms, among them :

Doubléco



Communs
d'immeuble



Atelier Negawatt



Optiwatt



éco-social





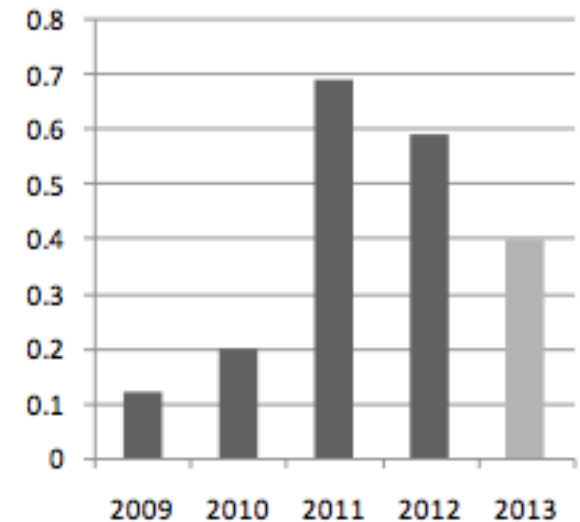
The (sub)program éco-social

éco-social is addressing low-income households in Geneva



The program started at the end of 2009
At the end of 2013, it had reached close to 5300 households

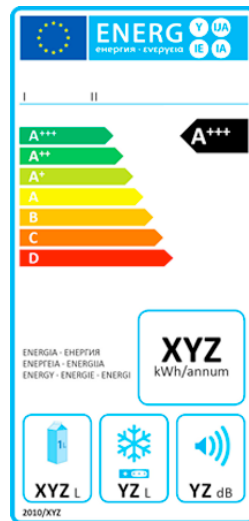
éco-social obtained, through eight campaigns, 2 GWh/year of savings, exceeding its initial objective by 11%.



Energy savings GWh/y

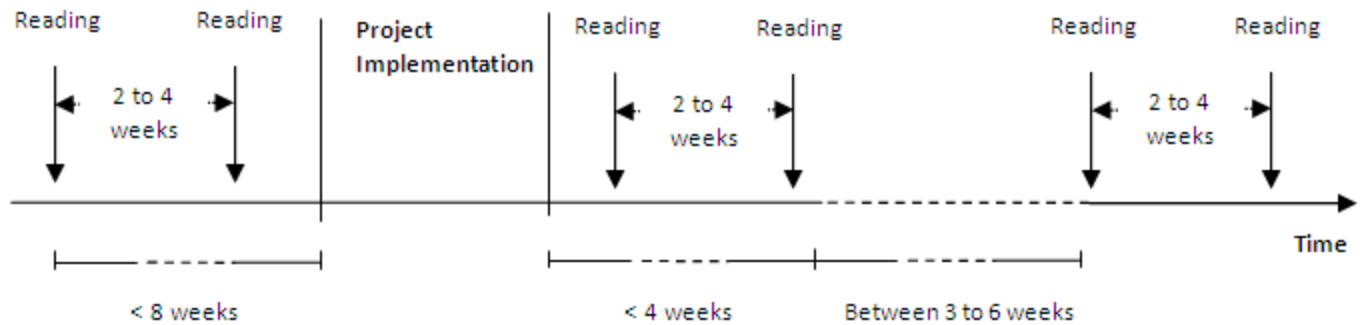


The (sub)program éco-social

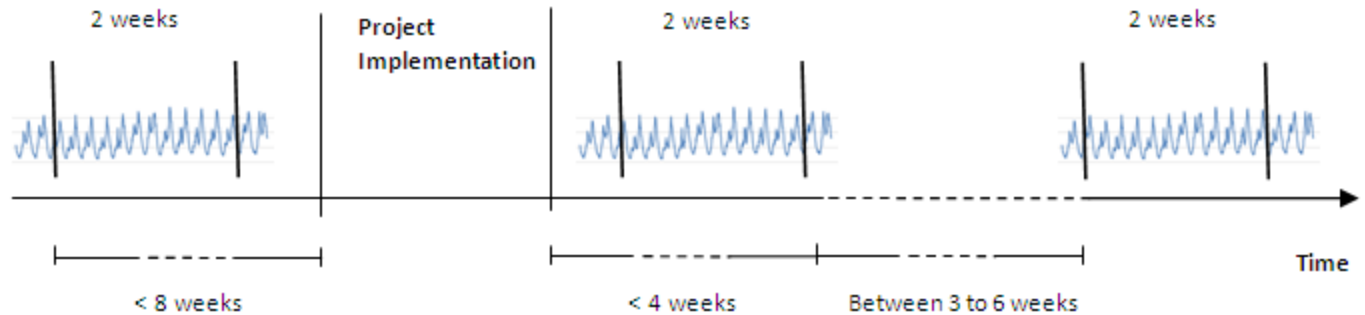


Data collection and methods used to estimate the savings

Ex post individual meter readings

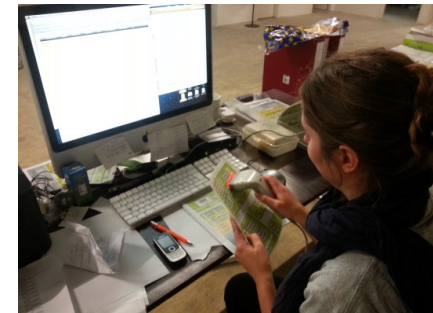
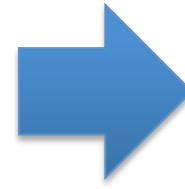


Ex post grouped load profiles



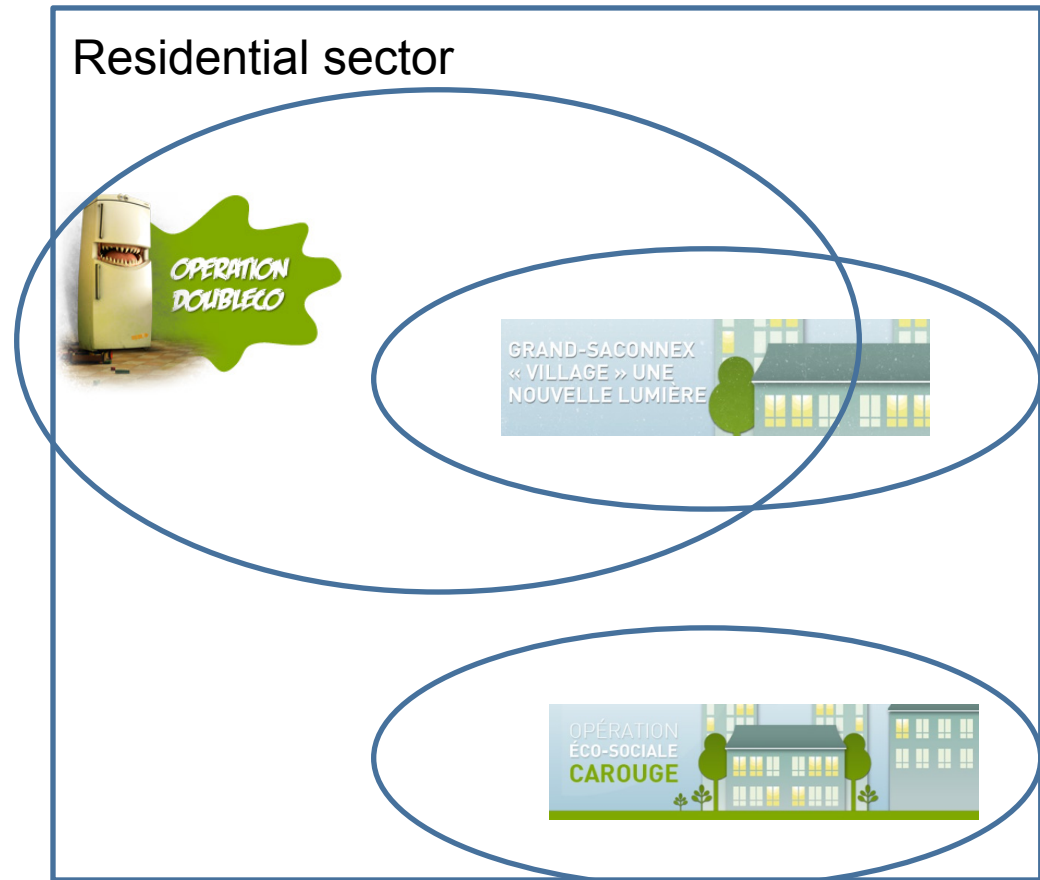
Data collection and methods used to estimate the savings

Ex ante based on the data collected by ambassadors



Data collection and methods used to estimate the savings

Additionality :
Isolate the impact of
the éco-social
program from other
initiatives



The reference group

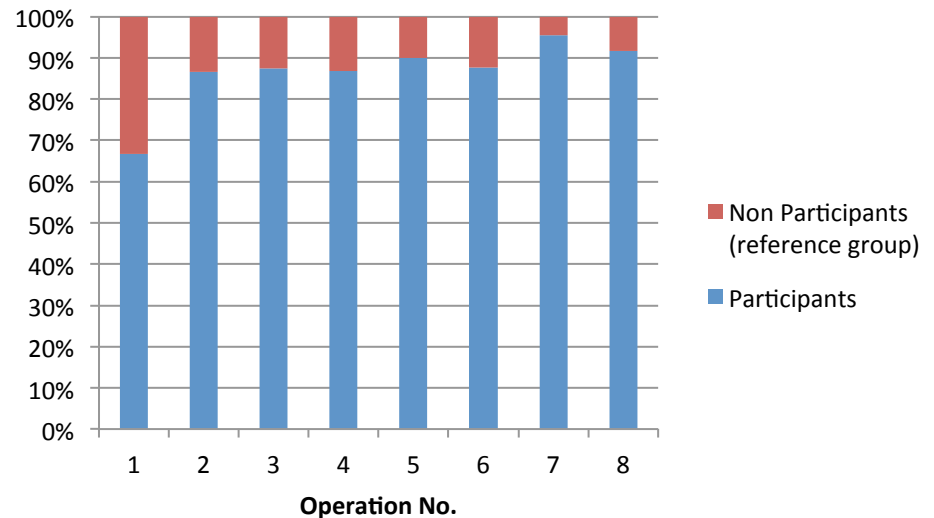
Non-participants group was the reference group

Campaign	simple engineering ex-ante	enhanced engineering ex-post individual meter readings	enhanced engineering ex-post load profiles	availability of reference group	biased
1	x	x	x	yes	yes
2	x	x	x	yes	yes
3	x	x		yes	yes
4	x			no	-
5	x		x	no	-
6	x			no	-
7	x			no	-
8	x		x	yes	no

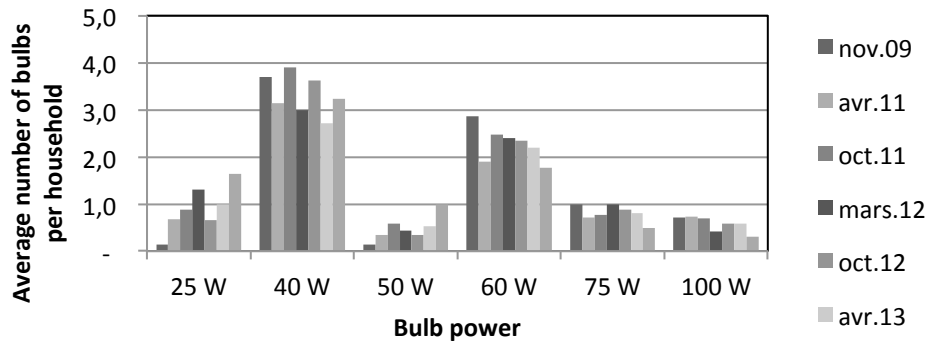
High participation rate
-> small reference group

Reference group biased !

The last (8th) operation benefited from a different reference group

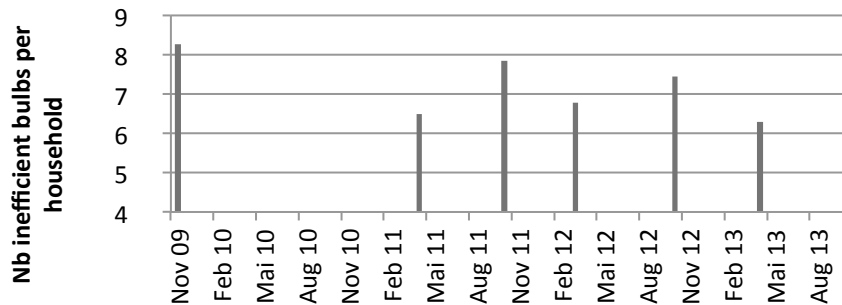
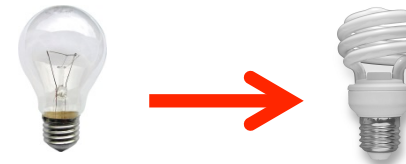


Evolution of the stock of inefficient light bulbs

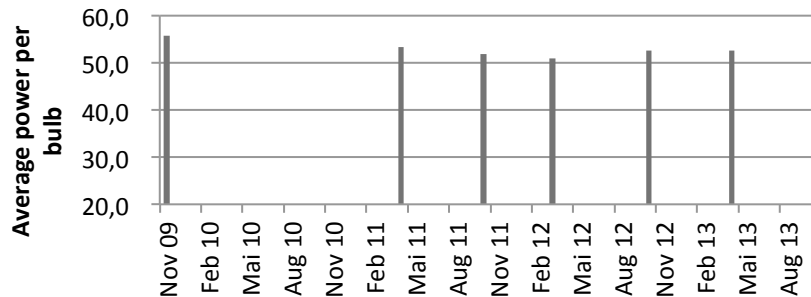
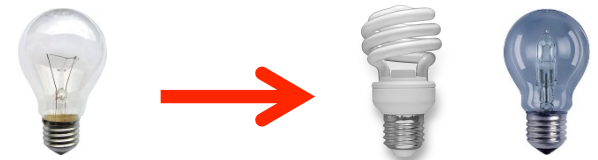


Ban of incandescent bulbs started in 2009

What it was expected



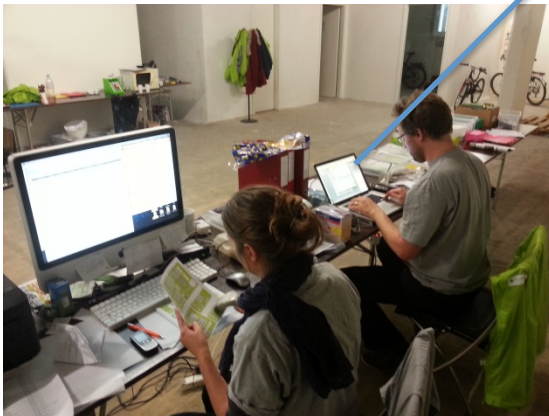
What we are observing



A Negawatt hour meter

Development of a software tool to estimate the savings almost
in real time

Basé sur la ligne "TOTAL effectivement placé *6" CHEQUES FROID + FRIGOS DÉJÀ LIVRÉS
ampoules : $207677W * 500 h / 1000000 = 103.8385 MWh$
(chèques froid : $314 * 0.3 * 280 kWh + frigos livrés : 119 * 280 kWh$) / 1000 = 59.696 MWh
multiprises : $515 * 30 kWh / 1000 = 15.45 MWh$
bouilloires : $204 * 50 kWh / 1000 = 10.2 MWh$
total $103.8385 + 59.696 + 15.45 + 10.2 = 189.1845 MWh$



Questions ?