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# Delivering and operating low-energy buildings in France and Sweden

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# Content of the presentation

- 1. Construction business system in France and Sweden**
- 2. France: the construction of IGN and Météo France headquarter**
- 3. Sweden: a student accommodation for the training of soldiers**
- 4. Practical implications**



# 1. Construction business system in France and Sweden



	<b>FRANCE</b>	<b>SWEDEN</b>
National energy objectives for new construction	Requirements fluctuate between 40 kWh/m <sup>2</sup> /year (primary energy) on the Mediterranean coast and 65 kWh/m <sup>2</sup> /year in the East of France.	90 kWh/m <sup>2</sup> /year (delivered energy) for housing zone III Southern Sweden/ 80 kWh/m <sup>2</sup> /year for non-domestic (55 kWh/m <sup>2</sup> /year if electric heating source)
Dominant procurement procedure	Separation between design, build and operate	Design and Build especially for housing
Structure of the industry	369,100 firms (building construction; installation and finishing; and civil engineering) in 2007; 92.1% with less than 10 employees contributed to 33.44% of the production 3 large contractors	3 dominating contractors (20% of market) / large architect and consultancy offices





## 2. Case studies



## A. Selection of the cases

- **Focus on low energy buildings;**
- **In France the market is still in its infancy (first projects were launched about 6 years ago) – building selected had to be in operation;**
- **In Sweden low energy construction (defined as 25% of the national energy regulation) is becoming normal at least in growth areas. Larger cities have local policies with stronger demand than the national regulation. We have chosen a recent example which reflects contemporary experiences and in which a penalty is applied on performance.**

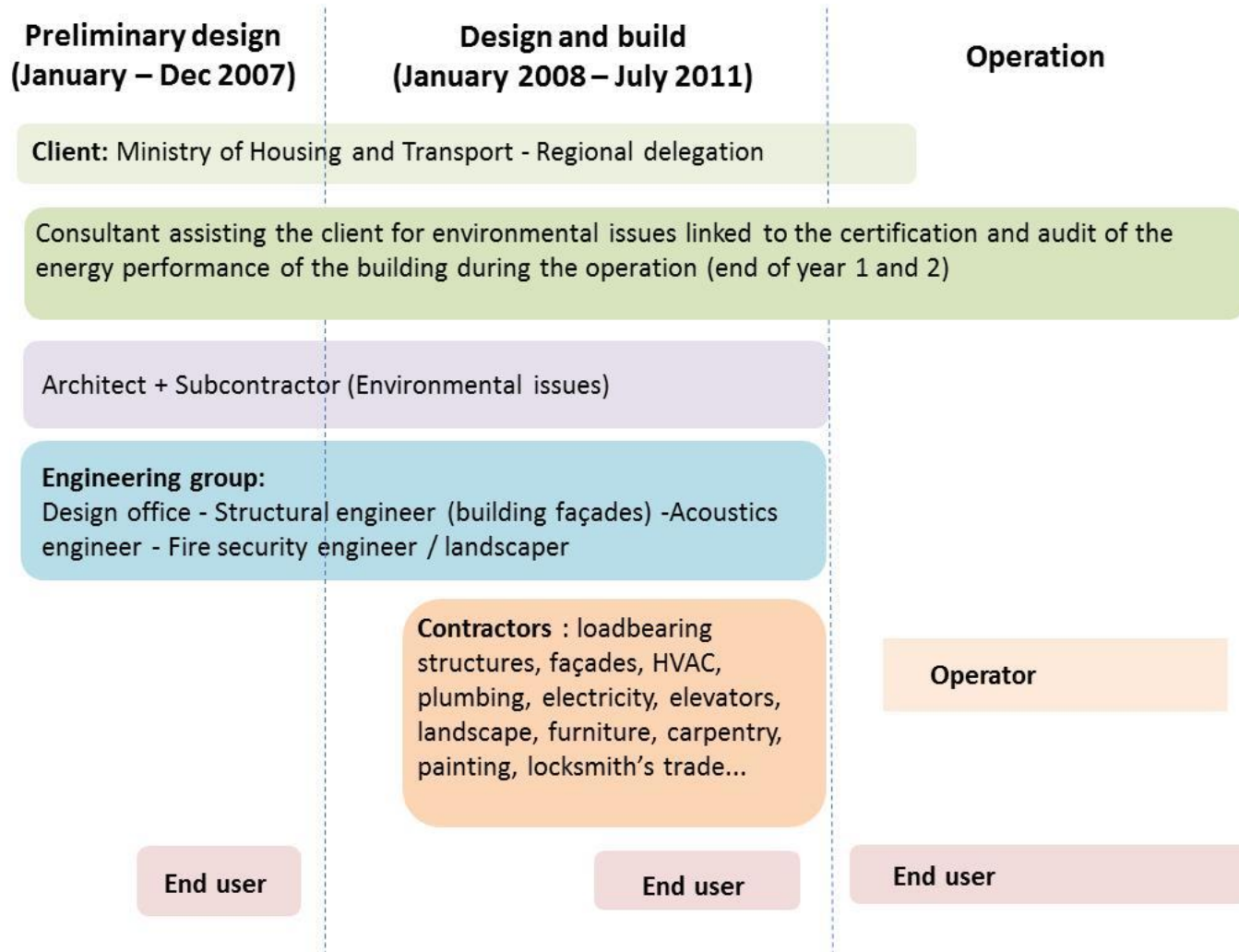


Characteristics	IGN – Météo France	Swedish training centre
Size	14 900 m <sup>2</sup> + parking	4590 m <sup>2</sup> (heated area)
Cost	30 million Euros (2013 €/m <sup>2</sup> )	4 million Euros (871 €/m <sup>2</sup> )
Purpose	Headquarters of 2 national public companies	Training centre and student accommodation for soldiers
Energy goals	50 kWh/m <sup>2</sup> /year	55 kWh/m <sup>2</sup> /year (50% of regulation in 2010)
Procurement process	Traditional (separation of contracts)	Design and Build + Performance contract with penalty
Operation and maintenance contracts	Private operator in charge of maintenance and energy management (1 year renewable 3 times)	Energy Saving Performance Contract
Certification	Environmental (HQE) + label	None

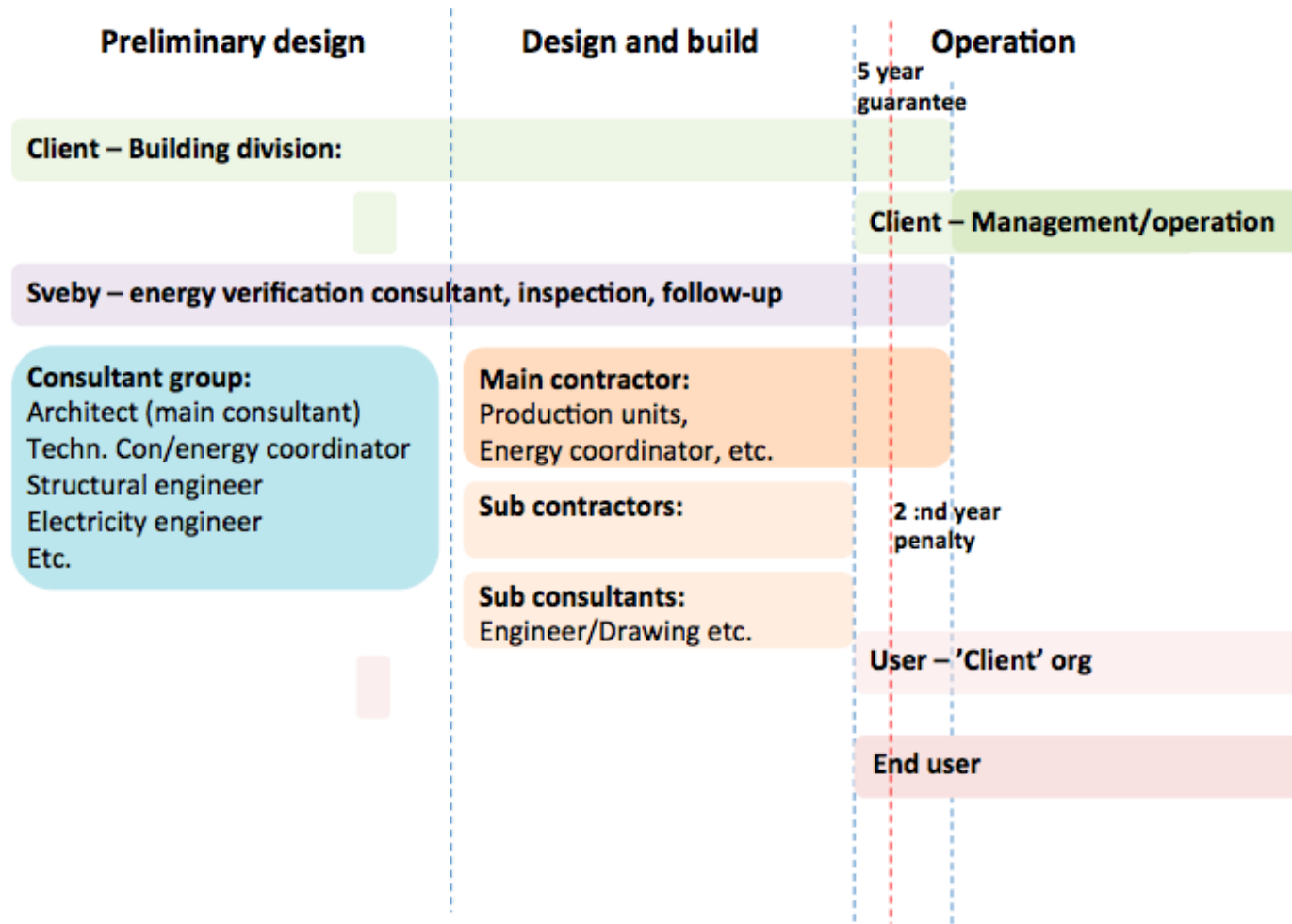




# C. Organisation of the project from design to operation: IGN – Météo France (1)



## C. Organisation of the project from design to operation: Swedish training centre (2)



## D. Building in operation: IGN – Météo France (May 2012 to April 2013)

Uses	Objectives (kWh/year)	%	Consumptions in operation (kWh/year)	%	Gap
Heating	56 428	7.39	327 014	21.32	+ 479,5%
Air conditioning	63 812	8.36	287 017	18.72	+349.79%
Hot water	2 933	0.38	-	-	-
Lighting, office automation	573 461	75.1	743 234	48.46	+29.6%
Ventilation and auxiliaries	66 949	8.77	176 332	11.5	+163.38%
<b>Total without PV</b>	<b>763 583</b>	<b>100</b>	<b>1 533 597</b>	<b>100</b>	<b>+100.84%</b>
Photovoltaic	17 652		12 047		-31.75%
<b>Total</b>	<b>745 931</b>		<b>1 521 550</b>		<b>+103.98%</b>


## D. Building in operation: Swedish military training centre

Uses	Original calculation 2012 (kWh/year)	%	Corrected Calculation 2014 (kWh/year)	%	Consumptions in operation 2013-2014 (kWh/year)	%	Gap
Heating	71 215	48,2	83 660	51,6	120 464	72,1	+ 44%
Building related electricity	19 670	13,3	21 383	13,2	15 149	9,1	-29.2%
Hot water (standard value)	45 660	30,9	45 660	30,9	45 660	30,9	-
Reduction for airing	-11 344	7,7	-11 344	7,7			-
Correction for low utilisation	-		-		-14 158	8,5	+3,5%
<b>Total</b>	<b>147 889</b>	<b>100</b>	<b>162 047</b>	<b>100</b>	<b>167 115</b>	<b>100</b>	<b>+3,1%</b>
Objective	167 324						-0,1%





### 3. Discussion and conclusion

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- 1. Did energy and sustainability objectives modify the relationships between the actors of a building project?**
  - 2. How successful is this move toward energy performance?**



- **Both cases are examples of new national ambitions regarding energy performance**
- **Cases illustrate a shift of power within the project team (engineers specialised in energy performance versus architects)**
- **Gap between theoretical and real energy performance**
- **Risk in focusing on good energy performance – and thus neglecting other functions of a building which in the end might contribute to the failure of the energy objectives.**

# Thank you for your attention



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