



# Warm/Mediterranean Climate Taskforce!

## Leader: Federcasa



**THE PUBLIC AND SOCIAL  
HOUSING OF THE CITY  
COUNCIL OF BARCELONA**

**THE EXPERIENCE OF THE  
MUNICIPAL HOUSING  
BOARD  
ROC BORONAT**

PISA , JUNE 2013

IMAGES FROM CITY ARCHIVES AND MHB

BARCELONA	1,615,000 inhabitants	100 km <sup>2</sup>	16,150 inhab./km <sup>2</sup>
METROPOLITAN AREA	3,220,000 inhabitants	636 km <sup>2</sup>	5,060 inhab./km <sup>2</sup>
CATALONIA	7,565,000 inhabitants	32,000 km <sup>2</sup>	236 inhab./km <sup>2</sup>
SPAIN	47,020,000 inhabitants	505,986 km <sup>2</sup>	93 inhab./km <sup>2</sup>

ESTIMATED NUMBERS STATISTICS 2010-2012 IDESCAT



GOOGLE

## WHAT IS THE MUNICIPAL HOUSING BOARD?



THE MUNICIPAL HOUSING BOARD IS A SELF-GOVERNING ORGANIZATION OF THE CITY COUNCIL OF BARCELONA. IT WAS FOUNDED IN 1927 WITH THE PURPOSE OF PROMOTING AFFORDABLE PUBLIC HOUSING TO ATTEND TO THE DIFFERENT SOCIAL NEEDS OF THE CITY AND IT ALSO ADMINISTERS AND MAINTAINS THE PROPERTY HERITAGE



-MHB PROPERTY, 4,200 UNITS IN 110 BUILDINGS

- INCASOL PROPERTY, 1,300 UNITS IN 16 BUILDINGS  
*INCASOL, is the public promoter of the regional government of Catalonia*

- CITY COUNCIL OF BARCELONA PROPERTY 650 UNITS IN 60 BUILDINGS

THE MHB ADMINISTERS AND MAINTAINS IN TOTAL, MORE THAN 6,200 UNITS

The MHB also, administers 3,100 units on amortization

IMAGES FROM CITY ARCHIVES AND MHB

## WHAT DOES THE MUNICIPAL HOUSING BOARD DO?

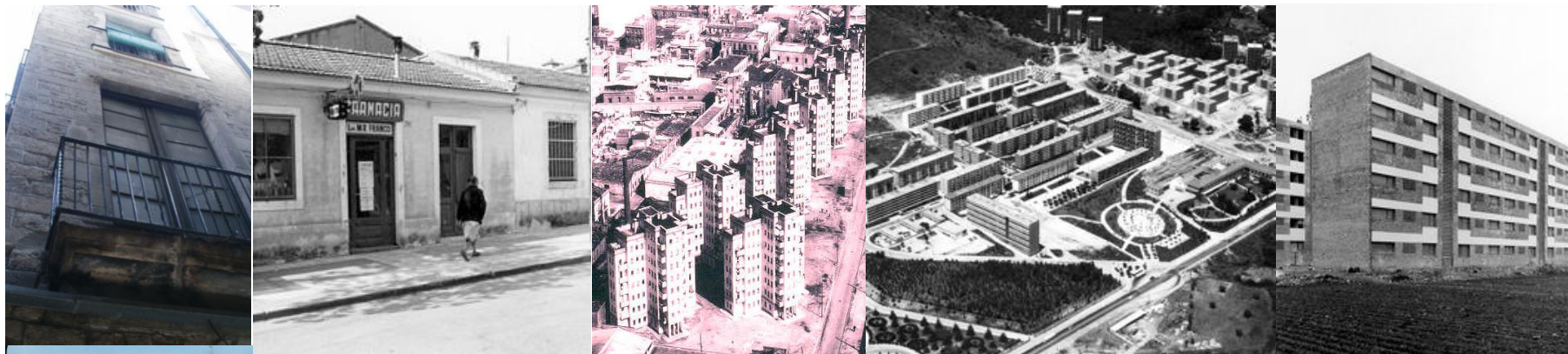
### HOUSING TYPOLOGIES OF MHB:

- RENTAL ASSISTED LIVING FLATS FOR THE ELDERLY
- RENTAL FLATS FOR YOUNG PEOPLE –NOW SOCIAL GROUPS
- RENTAL FLATS FOR SPECIAL GROUPS
  
- RENTAL SOCIAL HOUSING FOR PEOPLE WITH LIMITED RESOURCES
- SOCIAL HOUSING TO SELL THE RIGHT TO THE BUILDING (about 75 years)
- SOCIAL HOUSING FOR PEOPLE AFFECTED BY URBAN PLANNING PROJECTS
- SOCIAL HOUSING FOR PEOPLE AFFECTED BY NEIGHBOURHOOD REMODELLING



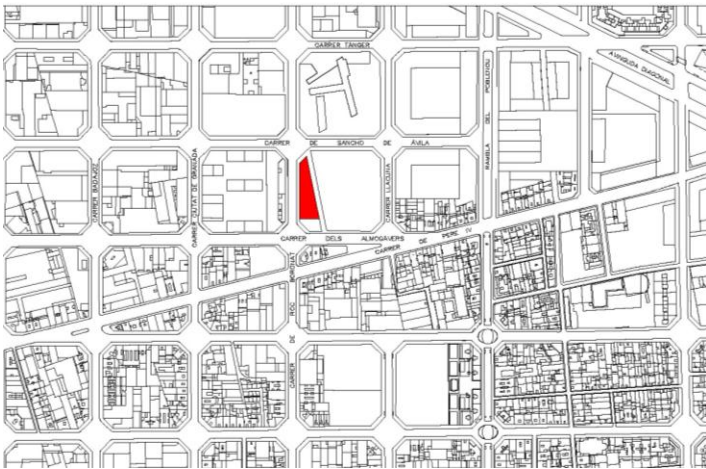
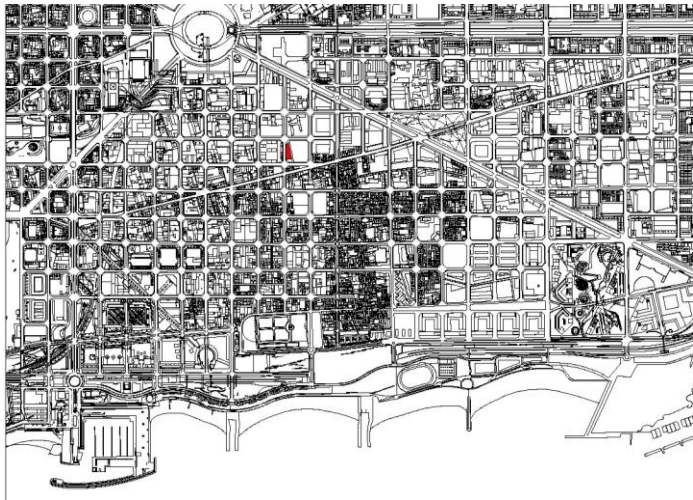
IMAGES FROM CITY ARCHIVES AND MHB

Rafa Cáceres Roldan&Berebgué Joan Callís Onzain-Nogué-López

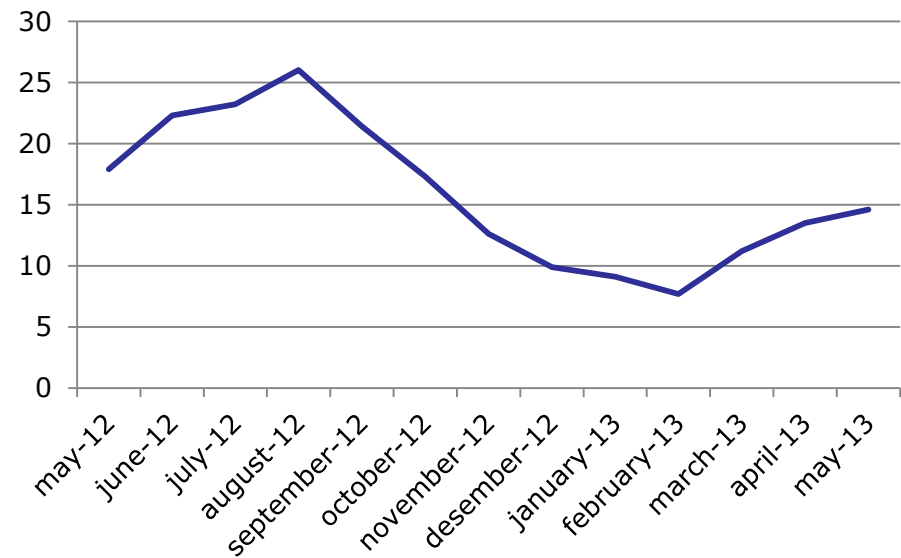


IMAGES FROM CITY ARCHIVES AND MHB

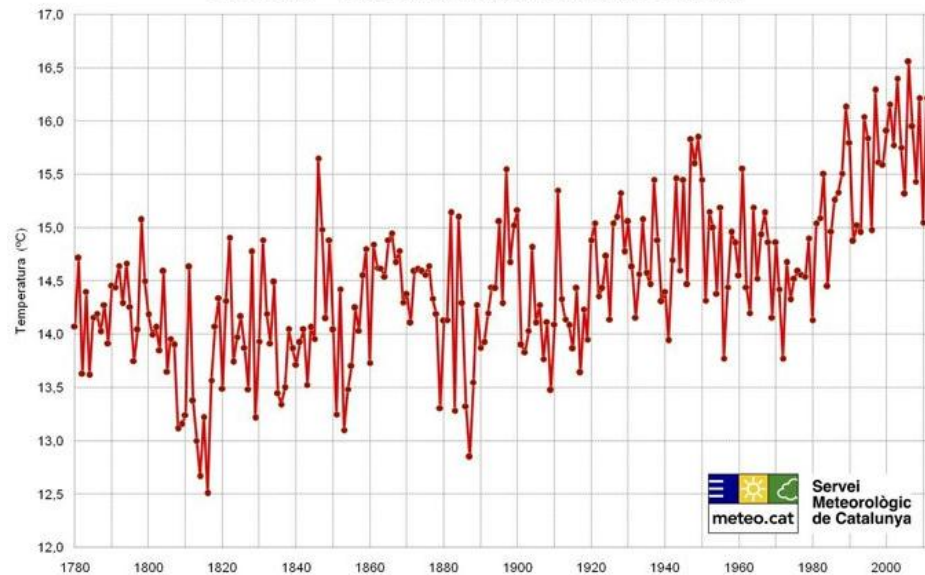
# HOW DOES THE MUNICIPAL HOUSING BOARD WORK? ROC BORONAT - OUR CASE STUDY



IMAGES FROM CITY ARCHIVES AND MHB



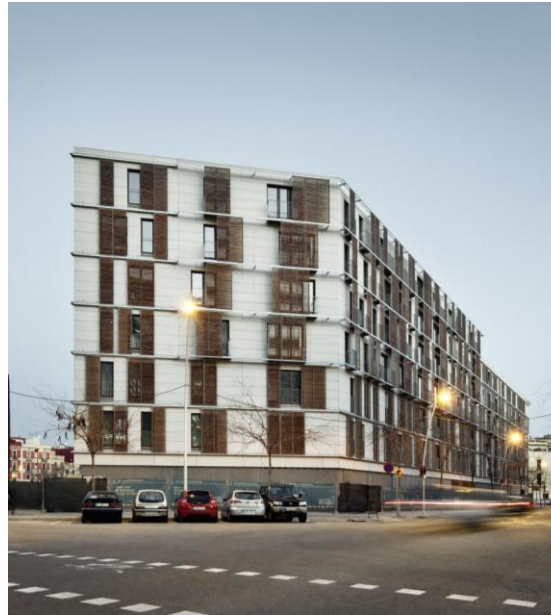
Barcelona - Temperatura mitjana anual (1780-2011)



INFORMATION FROM CITY ARCHIVES AND METEOROLOGICAL SERVICE OF GENERALITAT DE CATALUNYA

## SHORT DESCRIPTION OF ROC BORONAT CASE STUDY

- **AREA:** URBAN
- **STAGE OF DEVELOPMENT:** COMPLETED
- **PROJECT TYPE:** NEW BUILD
- **TYPE OF BUILDING:** APARTMENT IN A BLOCK OF SIX TO TEN STORIES
- **NUMBER OF DWELLINGS :** 95
- **NUMBER OF FLOORS:** 7
- **FLOOR AREA:** 10,846 M<sup>2</sup>
- **GROSS HEATED AREA:** 8,163 M<sup>2</sup>
- **TENURE:** LEASEHOLD OWNERSHIP
- **ENERGY CERTIFICATE:** A
- **CURRENT OCCUPANCY RATE:** 73%
- **ARCHITECT:** JOAN SABATÉ, SAAS architecture
- **BUILDING SURVEYOR:** JOSEP MARIA FORTEZA G3, slp
- **ENVIROMENTAL ENGINEER:** ORIOL VIDALENGINYERIA, S.L.
- **END OF CONSTRUCTION:** DESEMBER 2011

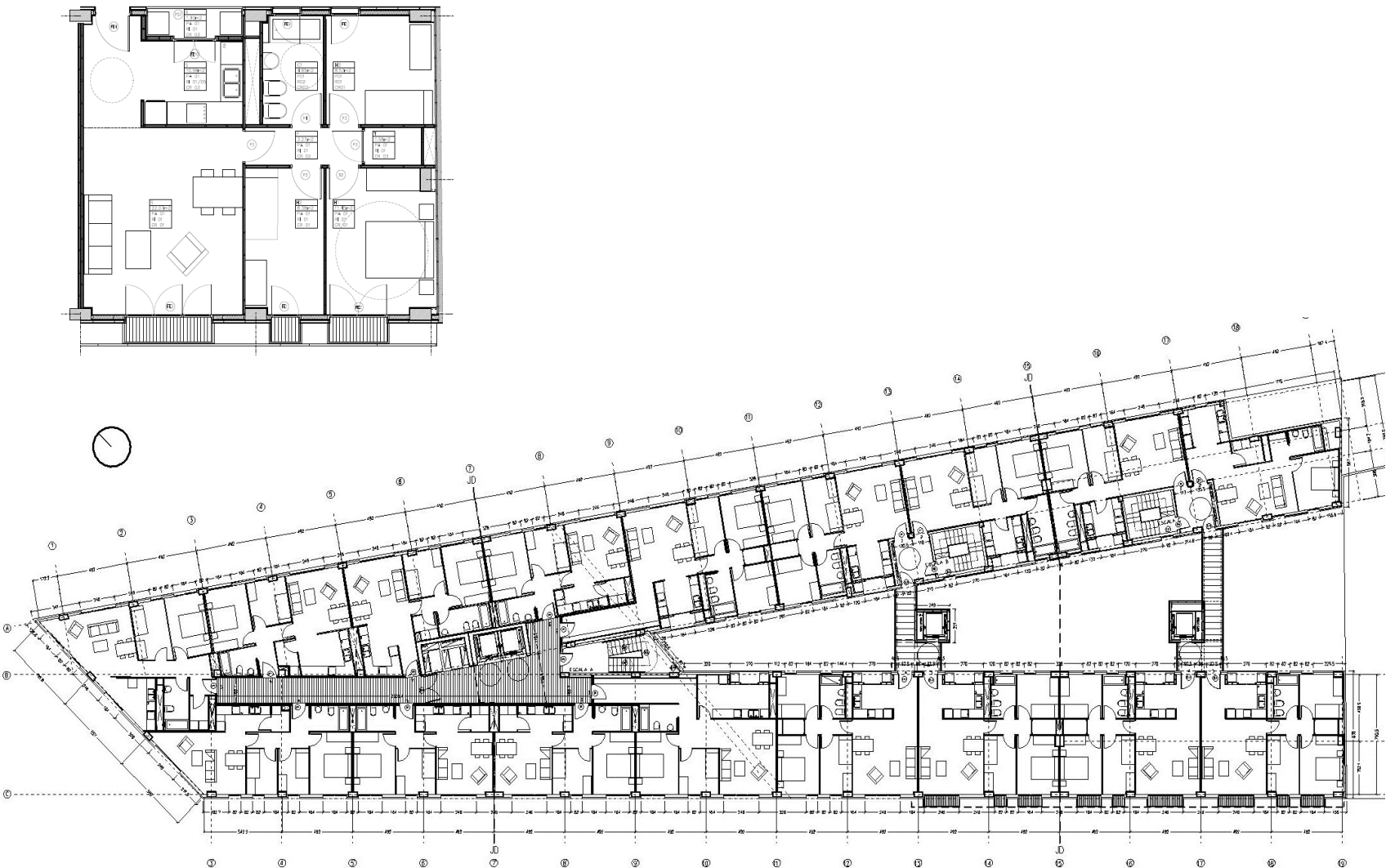


- **TOTAL BUDGET:** 11,619,302.09
- **FINAL CONSTRUCTION BUDGET:** 10,548,574.89 (90.78%)
- **TOTAL PROFESSIONAL FEES:** 965.543,58 (8,31%)
- **SUPPLIES BUDGET:** 105,183.62 (0.91%)
- **GROSS TOTAL AREA:** 12,297.74 M<sup>2</sup>
- **RATIO €/M<sup>2</sup>:** 944.83 857.76 (numbers no VAT)

Qualificació Energètica d'Edificis EDIFICI ACABAT	
<p>Més eficient</p> <p>A</p> <p>B</p> <p>C</p> <p>D</p> <p>E</p> <p>F</p> <p>G</p> <p>Menys eficient</p>	<b>A</b>
<p>Edifici 95 HABITATGES ROC BORONAT</p> <p>Localitat / Zona climàtica Barcelona / C2 Ús de l'edifici HABITATGE PLURIFAMILIAR Consum d'energia anual: 93.758,40 kWh/any 14,40 kWh/m<sup>2</sup></p> <p>Emissions de CO<sub>2</sub> anual: 24.090,70 kgCO<sub>2</sub>/any 3,70 kgCO<sub>2</sub>/m<sup>2</sup></p> <p>El consum d'energia i les seves emissions de diòxid de carboni, per a condicions normals de funcionament i ocupació, són les obtingudes pel programa CALENER VYP</p> <p>El Consum real d'Energia de l'Edifici i les seves Emissions de Diòxid de Carboni dependran de les condicions d'operació i funcionament de l'edifici i de les condicions climàtiques, entre altres factors.</p>	
<p><b>INFORMACIÓ ADMINISTRATIVA:</b> ADREÇA DE L'EDIFICI CARRER ROC BORONAT 102-104</p> <p>Nº DE REGISTRE P5801915I00821310F0 DATA D'EMISSIÓ 19/12/2011 VALIDESA MÀXIMA 18/12/2021</p>	

IMAGES FROM CITY ARCHIVES AND MHB

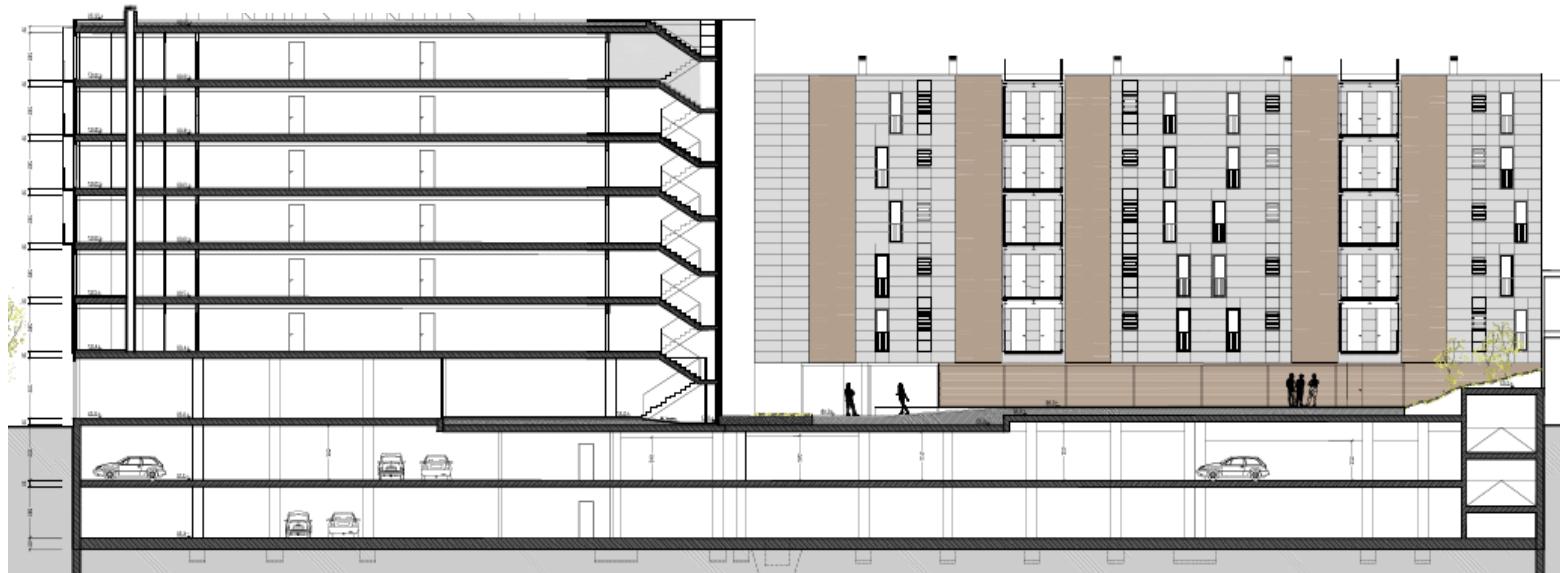
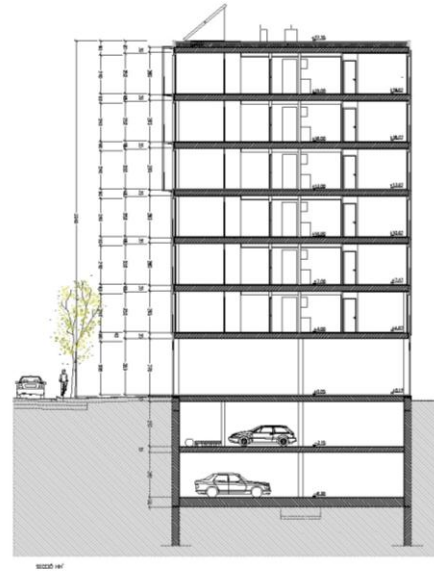
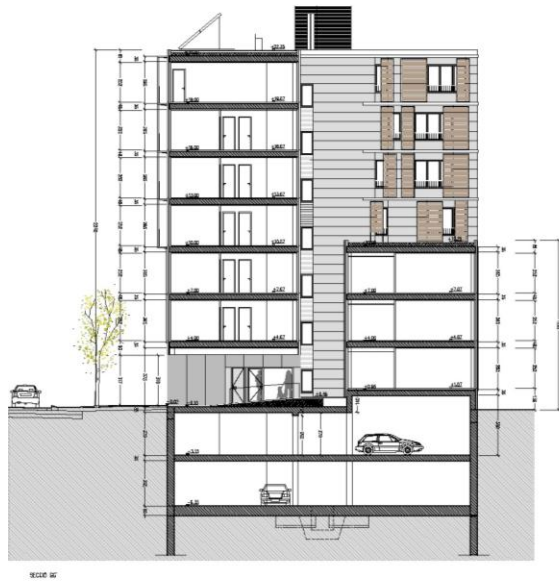




IMAGES FROM CITY ARCHIVES AND MHB

Joan Sabaté -SAAS-, ARCHITECTURE

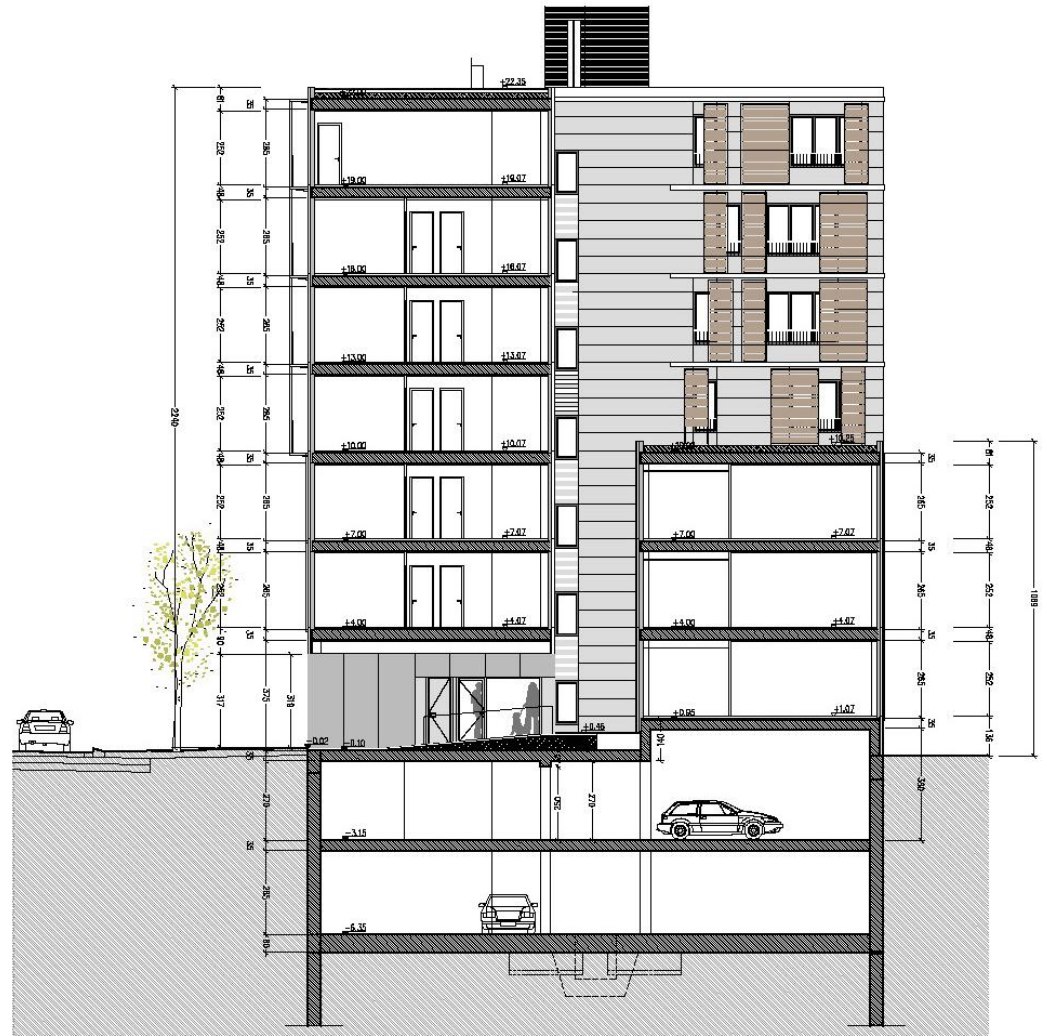




IMAGES FROM CITY ARCHIVES AND MHB

Joan Sabaté -SAAS -, ARCHITECTURE

- **HEATING AND DHW:** FOR HEATING AND HOT WATER, THE BUILDING IS CONNECTED TO THE DISTRICT HEATING NETWORK DISTRICLIMA
- **COOLING:** THERE IS NO COOLING. NOW A GROUND FLOOR COMMERCIAL IS PLUGGING.



SECCIÓ 66'

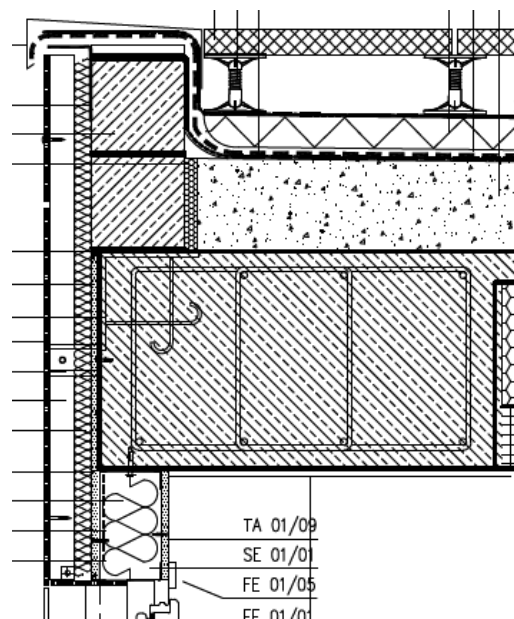
IMAGES FROM CITY ARCHIVES AND MHB

- **THERMAL ENVELOPE:** THE FAÇADE CONSIST OF A SANDWICH PANEL STRUCTURE AND A GALVANIZED DRYWALL (10 CM INSULATION ROCK WOOL), DOUBLED EXTERNALLY WITH A VENTILATED SYSTEM (4 CM INSULATION ROCK WOOL).  
**WINDOWS:** 6 +14 +4 GLASS CLIMALIT AND LAMINATED TIMBER

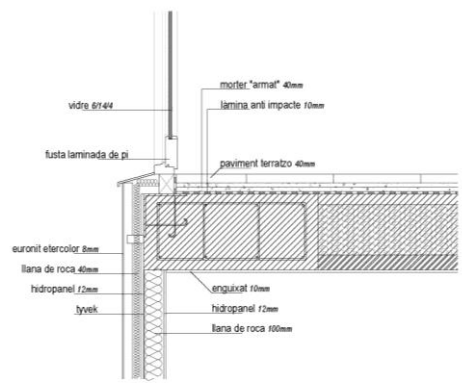
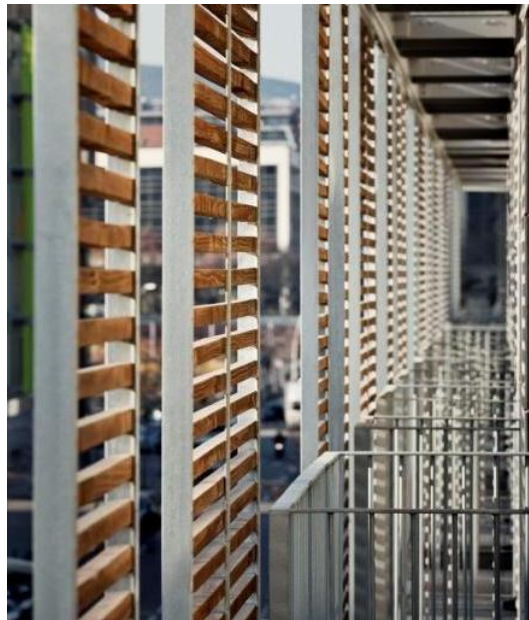
ROOF: FLOATING PAVEMENT, 10CM

INSULATION XPS

THE WINDOWS HAVE SUNSCREEN SLIDING WOODEN SLATS THAT CREATE A SECOND SKIN WHICH CAN BE MOVE DEPENDING ON THE NEEDS AND PREFERENCES OF THE USERS.



IMAGES FROM CITY ARCHIVES AND MHB

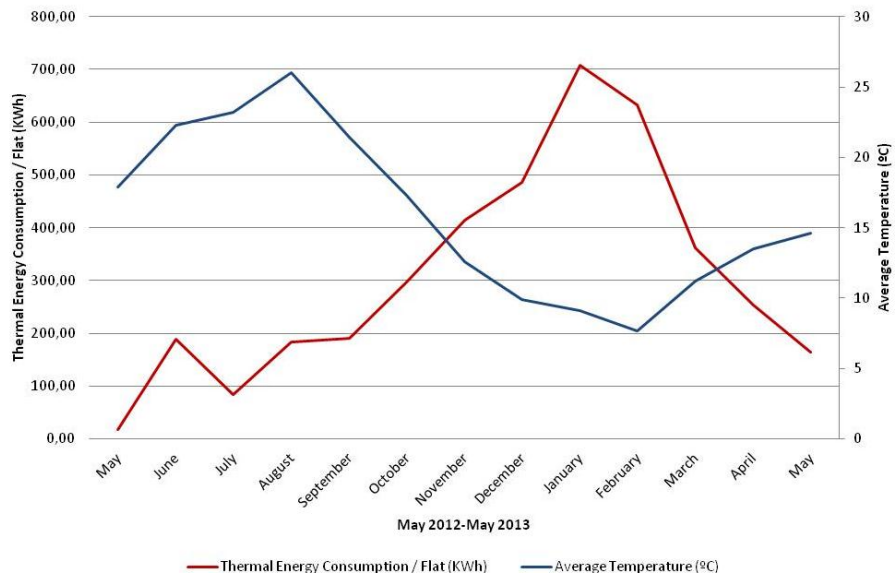


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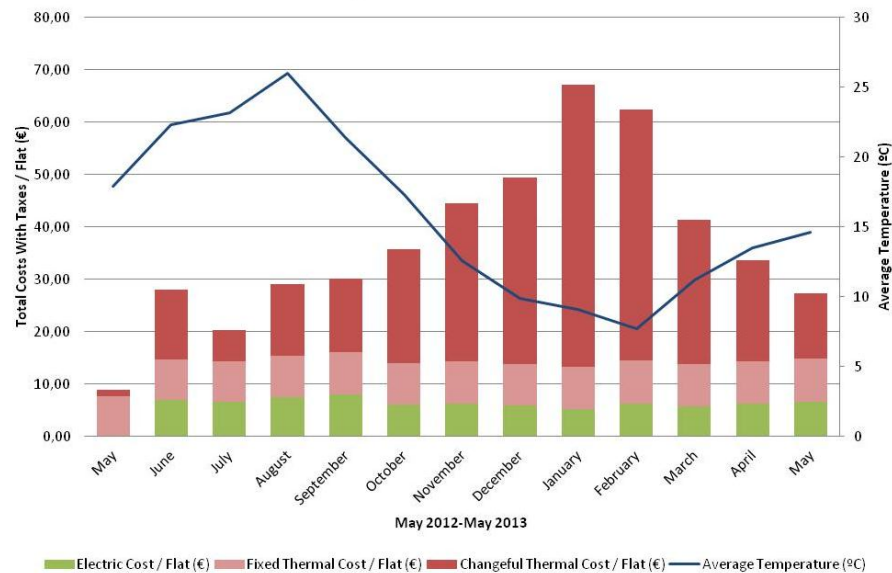
MONTH	OCCUPANCY RATE %	NUMBER OF HOUSINGS	AVERAGE MONTHLY TEMPERAURE °C	TOTAL ENERGY SUPPLY MWh	NET AREA HOUSINGS	ENERGY USE/ HOUSING UNIT (kwh)	ENERGY USE/M2 (Kwh)	PRICE WITH TAX SERVICES €	AVERAGE PRICE FOR HOUSING €	TOTAL COST WITH TAX SERVICES €	TOTAL COST WITH TAX SERVICES €	TOTAL PRICE / HOUSING UNIT €	TOTAL COST/M2 €
may-12	24,2	23	17,9	0,4	1454,26	17,39	0,14	761,57	8,96		761,69	8,96	0,14
june-12	26,3	25	22,3	4,7	1586,57	188,00	0,33	1067,89	21,11	661,49	1.729,58	28,07	0,44
july-12	31,5	30	23,2	2,5	1938,10	83,33	0,22	913,32	13,72	632,59	1.545,91	20,38	0,32
august-12	31,5	30	26,0	5,5	1938,10	183,33	0,34	1158,33	21,47	715,58	1.873,91	29,00	0,45
september-12	32,6	31	21,4	5,9	2005,39	190,32	0,34	1187,91	21,98	768,91	1.956,82	30,08	0,47
october-12	37,8	36	17,3	10,7	2344,05	297,22	0,46	1534,75	29,66	573,66	2.108,41	35,70	0,56
november-12	44,2	42	12,6	17,4	2763,25	414,29	0,59	2025,06	38,23	601,94	2.627,00	44,57	0,69
desember-12	62,1	59	9,9	28,7	3940,45	486,44	0,66	2852,01	43,51	564,10	3.416,11	49,45	0,75
january-13	62,1	59	9,1	41,8	3940,45	708,47	0,93	3946,34	61,92	491,50	4.437,84	67,09	1,02
february-13	62,1	59	7,7	37,3	3940,45	632,20	0,85	3604,78	56,13	601,84	4.206,62	62,46	0,95
march-13	62,1	59	11,2	21,3	3940,45	361,02	0,54	2390,33	35,50	543,98	2.934,31	41,27	0,63
april-13	62,1	59	13,5	15,0	3940,45	254,24	0,42	1908,51	27,38	591,13	591,13	33,60	0,52
may-13	62,1	59	14,6	9,7	3940,45	164,41	0,32	1507,50	20,58	635,30	635,30	27,27	0,42
june-13	75,8	72	19,5		4707,02	0,00		0,00					
<b>AVERAGE</b>	<b>48,32</b>	<b>40,79</b>	<b>16,16</b>	<b>15,45</b>	<b>2897,88</b>	<b>306,21</b>	<b>0,47</b>	<b>1775,59</b>	<b>30,78</b>	<b>615,17</b>	<b>2217,28</b>	<b>36,76</b>	<b>0,57</b>

IMAGES FROM CITY ARCHIVES AND MHB

### Thermal Energy Consumption (Heating and DHW) and Average Temperature in Barcelona



### Total Costs With Taxes / Flat (Heating and DHW) and Average Temperature in Barcelona



IMAGES FROM CITY ARCHIVES AND MHB

## ROC BORONAT, OUR CURRENT CONCLUSIONS:

- TO ACHIEVE A GOOD ENERGETIC QUALIFICATION –A- **IS NECESSARY TO DESIGN A BUILDING WITHOUT ENERGETIC LOSES (GOOD ISOLATION)** AND TO CONNECT TO SOME DISTRICT HEATING NET
- BARCELONA AVERAGE CLIMATE -FOUR SEASONS- DOESN'T NEED BIG ENERGETIC EFFORTS TO ACHIEVE A COMFORTABLE USE. **WE HAVE 4 COLD MONTHS AND 2 HOT MONTHS AND NOT FULL TIME.**
- THE MUNICIPAL HOUSING BOARD –THE CITY COUNCIL- PROVIDES SOCIAL HOUSING –TO RENT OR TO SELL- FOR PEOPLE WITH LIMITED RESOURCES THEN WE HAVE TO DESIGN **ECONOMIC EFFICIENT CLIMATE FACILITIES.**
- DISTRICT HEATING IS A BIG CLIMATE FACILITY AND HAS BIG ENERGY LOSES. ROC BORONAT **ABOUT 35%.** HOUSING CLIMATE FACILITY HAS FEW ENERGY LOSES.
- FINAL PRICES KWH WITH TAXES: DOMESTIC ELECTRIC 0,2121 €, DOMESTIC GAS 0,0982 € AND **DISTRICT HEATING ROC BORONAT, 0,1201€**
- WE NEED MORE TIME, AT LEAST, ONE COMPLETE YEAR WITH FULL OCCUPATION **TO KNOW IF THIS SOCIAL PROMOTION IS ENERGETIC AND ECONOMIC ENOUGH EFFICIENT.**



THE PEOPLE THAT BOUGHT A FLAT AND LIVE ON ROC BORONAT SOCIAL PROMOTION SPEND LESS MONEY FOR GOOD ARCHITECTONIC AND DESIGN CONDITIONS THAN NOT FOR DISTRICT HEATING NET. WE THINK THAT IN THE NEXT FUTURE -1 OR 2 YEAR- WITH A FULL OCCUPATION THEY ARE ABLE SAVE MORE MONEY BECAUSE WILL BE ECONOMIES OF SCALE WITH THE COMMON EXPENSES.

WE ARE NOT SURE IF IN THE NEXT FUTURE WE WILL PROJECT AND PROMOTE MORE SOCIAL HOUSING BUILDINGS WITH BIG CLIME FACILITIES –DISTRICT HEATING, COGENERATION SYSTEMS OR, EVEN DHW AND HEATING CENTRALIZATION FOR ONLY ONE BUILDING-.

**WE ARE SURE IN THE NEXT FUTURE WE WILL PROJECT AND PROMOTE SOCIAL HOUSING BUILDINGS WITH A MINIMUM CLIMATE DEMAND, GOOD ISOLATION –THIS IS MEDITERRANEAN PASSIVE HOUSE-, IN OUR CURRENT CLIMATE AND FOR PEOPLE WITH LIMITED RESOURCES.**

# ARCHITECTURE CONSTRUCTION SUSTAINABILITY

With proportion and economic balance in all our technical projects and activities

## END USER

**The MEDITERRANEAN PASSIVHAUS concept for each type of user,**

## IS IT THE ANSWER?

**NOW, WITH OUR CURRENT EXPERIANCE, OUR END USERS AND THE WEATHER OF BARCELONA, MAYBE YES**

**GRAZIE A TUTTI, GRACIAS A TODOS, THANK YOU ALL  
WWW.PMHB.CAT**



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