

Tiny house for Homeless



Description of the business

Context

In housing terms, the Brussels-Capital Region is the most expensive in Belgium. Terraced or semi-detached houses cost around €400,000 and detached houses can fetch €800,000. This doubtless explains why while on the national level house purchases far outstrip apartments, in Brussels the pattern is reversed, with apartments accounting for 63.2% of purchases and houses 36.8%. Yet it is in Brussels that the average price of an apartment is the highest, coming in at around €250,000.

It goes without saying that not all budgets can stretch that far. At present in Brussels there 4,000 to 5,000 people identified as homeless. Add to these the households whose monthly outgoings exceed their income, in numbers that will significantly increase in the coming months and years (post-Covid economic crisis).

And yet there are numerous unoccupied buildings in Brussels, mostly in the tertiary sector and in levels above commercial units (both residential and tertiary). But refurbishing them as housing, let alone affordable housing, is not necessarily the priority for developers. Furthermore, any such project takes time, and during the incubation period, which may be years, these buildings remain empty. So this is why are seeing the emergence in various locations of temporary occupation projects, like SeeU in the Ixelles barracks, and above all of a structured approach to this sort of operation, with a cooperative like Communa, which aims to "regenerate empty spaces as catalysts for committed citizen projects, and participate in the co-creation of a sustainable and resilient city". Aiming to "promote the transitory use of empty buildings with an approach founded on participation and solidarity, Communa transforms temporarily unoccupied spaces into communal settings". The results are co-working spaces, workshops, venues for shows, shops, and so on.

Alongside these under-occupied buildings, Brussels has numerous "virgin" spaces, land and "free" zones where projects can be developed.

Industrial activity

If this can be achieved for temporary occupancy aimed at activities (professional, artistic or social), the idea is to make it happen for housing too. The aim is to develop the capacity to produce housing units that are economic, healthy, green (low impact) and cost controlled. They must also be modular and easy to (dis) assemble, using a workshop prefabrication approach of relatively standard elements, that can be put together in various configurations. Inspiration comes from the micro or alternative housing concept (habitat léger in Belgium), which is more and more in the news and for which authorities are adapting to make room in (semi-)rural areas, and which could also find a place in the city, whether on brownfield sites or in the "covered environment", meaning inside existing buildings that would serve as a "shell"; rather than knocking everything down to rebuild (which is exactly the long and relatively effortful approach taken by developers).

With the aim of providing every citizen with decent housing, there is room for a construction business building small, independent housing units, mobile or not, self-assembly or not, and very simple. Using (of course) recycled materials for the most part, and low-tech technologies to limit costs and make them easier to set-up.

And if inspiration can be drawn from social projects like the \$300 house, or architecture competitions for the "affordable house" (as in London and New York), there are more local initiatives showing approaches that could be expanded into the housing context. Among them:

- D44 Architecture's "Kite House", a micro housing unit (initially conceived as nature-based holiday accommodation) that is completely prefabricated;
- MODS modular prefabricated wall units, and PailleTech's wood-straw structures;
- Luc Schuiten's Diogène and Archi-Human projects, in Brussels;
- Many other techniques and approaches, in particular using insulation that is effective and circular (see sheet 2);
- The emergence of "pre-cast" wall solutions in lightweight concrete, which are really beginning to boom (although their circular and environmental credentials remain to be assessed).

The offer would therefore involve (a range) of small, comfortable, simple housing units, ready to:

- Be installed in available spaces;
- Be used to divide or re-divide open spaces into smaller units;
- Transform (former) office or storage space into housing.

The model should be able to work as an independent unit and to convert spaces into (collections of) micro-housing. Our feeling at this point is that the transformation model is perhaps more "profitable", and could be used to finance the whole project. The principle is in some way to mass-produce the approach originated by Luc Schuiten with his Archi Human project, aiming to "sustainably re-integrate the homeless into housing of architectural and environmental quality".

The associated business would therefore address the following key steps:

- Identify cheap and available materials (plant-based and recycling channels)
- Design and manufacture modular elements for the construction of housing units by assembly;
- Sales prospecting and "cold-calling", chiefly targeting municipalities and other public actors, as well big real estate development corporations;
- Create projects in response to demand, with rapid reaction capacities thanks to the modular approach using prefabricated elements;
- Install and build orders, with the option of offering kits and partial or complete self-build for suitable projects;
- Associated offer to dismantle and recover elements into stock (after maintenance and reconditioning if necessary).

Technical feasibility

General feasibility needs no further demonstration, but for this sort of project the devil is in the detail of assembly, and so an architectural and technical design effort will be needed to validate the degree of modularity that might be obtained, as well as the best types of materials to use in the context, and the existence of supply channels for these materials, which should as far as possible derive from recycling channels.

First Elements to be analysed by the project team

As well as the technical elements described above, it will be important straight away to analyse the financial aspect, in particular:

- Identify the best route to launch the activity quickly, targeting the type of project/sector most likely to generate demand. To do so contact and hold discussions with social housing companies and the main real estate development corporations in the Brussels region
- Initiate discussions with Actiris on the potential for training and job creation
- On this basis, determine the potential for success and validate the business model

Sources of inspiration

- The Communa cooperative: <http://www.communa.be/>
- Low-Tech technologies: <https://lowtechlab.org/>
- London affordable housing challenge: <https://beebreeders.com/architecturecompetitions/londonhousing>

- NY affordable housing competition: <https://beebreeders.com/architecturecompetitions/newyorkhousingchallenge>
- The \$300 house: <https://www.300house.com/> and the winners of the competition: <https://www.300house.com/blog/2011/06/300-house-open-design-challenge-winners.html>
- D44 architecture's Kite House: <https://d44.be/?p=3642>
- MODS wall modules: <https://www.mods.be/>
- PailleTech: <http://www.pailletech.be/>
- ArchiHuman: <https://archihuman.com/>
- Diogène <http://www.vegetalcity.net/sans-abrisme/>

Business potential

Market

The affordable housing market is a huge topic with many stakeholders working in the field. But in Brussels, there is a very clear connection to social issues.

In March 2020, just before the beginning of the Covid-19 lockdown, Belgian daily Le Soir reported that "47,451 households in Brussels are currently on the waiting list for social housing; that this number keeps on growing (+48% in ten years, driven by population growth and increased vulnerability); that on average 2,000 units come free each year; that the Region is building, in recent years, at the rate of 150 new units per year...".

Aware of the problem, at the start of 2020 Belgian Secretary of State for housing, Nawal Ben Hamou, launched a wide ranging call to the private sector to buy housing off-plan or already built: "In ten years the population of Brussels has increased 15%. With an increase in poverty: nearly one third of Brussels inhabitants live beneath the poverty threshold, one fifth receive social security benefits. Meanwhile, rents have increased by an average 15% in ten years, and the banks are no longer making loans for more than 90% of the value of a property." Several budgets are to be expected, with a public-private partnership approach to accelerate the provision of housing: a call for projects was planned for the summer of 2020 (doubtless somewhat postponed because the coronavirus) to acquire turnkey real estate assets, with an accelerated procedure for obtaining planning permissions. There is also to be a budget for more rapid support for "social-thermal" renovation, with recourse, in future, to grouped public tenders.

In light of this outlook, and in the context of ambitious renovation plans for existing buildings, demand for temporary housing should be affected favourably. The 47 thousand households waiting to be housed represent 10% of available housing in Brussels. We need a genuine and ambitious plan to offer decent, quality housing, at prices that everyone can afford. Aiming to solve the problem in 7 years would mean producing 7,000 housing units per year, which is 45 times the current rate of construction!

Competition

There is currently no other project of this type, and given the social and innovative approach, it is unlikely a competitor will emerge so early. Of course, the success of one operation could inspire others, but given the scale of the need, that should not impede gentle, steady growth.

Circular nature of the business

- The modular and dismantle/re-use aspect of the temporary housing represents a genuinely circular business, which will seek to maximise the useful life of the buildings and the materials used.
- Furthermore, in choosing the materials, it will also be possible to opt for the most circular possible, derived from renewable natural or recycled sources (see sheet 2 on insulation).

Key figures

Assumptions

The average sale price of existing housing in Brussels is between €1,800 and €3,000 per m², with smaller units often tending to be more expensive by the m². New build prices are between €2,200 and €3,000 per m².

The aim is to build housing where cost, and therefore size, is restricted, setting a cost target as proposed below for "terraced" tiny homes (the version for insertion into buildings must be cheaper).

These costs are indicative only, and we are a long way from the \$300 house (see references), but very much in the affordable housing bracket, since the units are paid for with a modest rent over a period of 10 years (120 monthly payments):

# occupiers	m ²	€/m ²	Euros	Rent	# months 7%	Expenses 3%	Profit	TOTAL	€/m ² /months
1	45	1300	58500	488	120	34,1	3,6	535	12
2	60	1200	72000	600	120	42,0	3,6	646	11
3	80	1100	88000	733	120	51,3	3,6	788	10
4	100	1000	100000	833	120	58,3	3,6	895	9
5	120	1000	120000	992	121	69,4	3,6	31065	9
6	140	1000	140000	1148	122	80,3	3,7	1232	9

Of course the aim would be to minimise manufacturing costs so as to keep rental costs as low as possible. In the example below, we have included 7% expenses to manage and monitor the units built, and 3% profit/margin on the financial operation. These figures can be adjusted.

In this configuration, a family of 4 is housed for a monthly rent of €895, which corresponds to 2 rooms in a shared house.

Assuming the construction cost breakdown below, we can quickly see how the costs divide between the various tasks, and can estimate the size of team as a function of volume produced.

		€ 1000/m ²	€ 1200/m ²	€ 1300/m ²
Materials	35%	350	420	455
Labour	30%	300	360	390
OPEX	15%	150	180	195
CAPEX	6%	60	72	78
Margin	14%	140	168	182

Here is the cost breakdown for 4 of the unit sizes above:

	45 m ²	60 m ²	80 m ²	100 m ²
Materials	20475	25200	30800	35000
Labour	17550	21600	26400	30000
OPEX	8775	10800	13200	15000
CAPEX	3510	4320	5280	6000
Margin	8190	10080	12320	14000
Hours of work	501,43	617,14	754,29	857,14
Weeks eq. 4	3,3	4,1	5,0	5,6

Assuming a fully inclusive salary of €35/h, and a team of 4 workers per project, assembly time would be between 3 and 5.5 weeks, depending on unit size, which seems reasonable. A team of 4 can therefore produce an average of 10 to 11 units a year.

If we want to produce 1000 housing units annually (1/7 of the total needed to solve the social housing problem in 7 years), we need to employ 100 teams of 4 workers.

Job creation potential

The job creation potential therefore amounts to several hundred workers, dozens of site managers (1 for every 5 to 7 builds maximum) and a solid team sourcing materials and handling sales/bids for public tenders.

The total potential is probably 500 employees.

Recycling potential in tons

Assuming every m² "weighs" 600 kg in total, and that 50% of the materials by weight is recycled, at least 21,000 tons of recycled material will be used for the 1000 (70 m²) units built annually.

Made in Brussels

Local procurement

There are not yet any real sources for procurement available locally, especially if the project expands. But this situation will certainly change quickly, whether because of other new projects (see sheets 1, 2, 6), emerging initiatives or sellers of green materials, like Carodec.

Local partners

Partners

- Social actors in housing (for the most part public bodies such as the CPAS (Public Centres for Social Welfare) and social housing companies) are clearly the partners to contact and hold talks with. Not only to understand the needs, but also to identify the potential and generate initial orders.
- The numerous Brussels actors in sustainable construction, and initiatives like Archi Human.
- Financial partners must also be brought to the table, for the scenario where the business retains ownership of the housing and rents it out directly, to AIS (Social Housing Agencies), CPAS, or private individuals.

Suppliers

- See the local sources mentioned above, to which suppliers will undoubtedly be added for the “bulk” materials, if specific needs are identified (pre-cast concrete, pre-worked timber, etc.).
- Recover construction materials from dismantling and demolition, in partnership with actors in the sector (RotorDC, Batiterre, Retrival, etc.).
- Innovative materials (even better if circular themselves) could also bring material gains or simplify the manufacturing process (floor coverings, etc.).
- Some materials could be crowd-sourced from the general public, applying a “social” approach with solidarity and positivity.

Distributors

Rather than distributors as such, it will be more a matter of business finders, and networking above all. In the light of this, the dialogue with actors in sustainable construction mentioned above is important.

Subcontractors

In principle, no subcontractors needed since the aim is to make construction the core of the business. However, the preparation of certain components, whether in concrete, metal or wood, could be subcontracted to specialist businesses equipped for the purpose.

Competitors

None at this time

Location

The space needed will vary considerably according to the development of the project. It therefore seems important to identify from the start a location that could easily extend to several thousand m².

Key factors for success

Operational and commercial barriers

From an operational point of view, the challenge really lies with the modularity that must be achieved so as to be able to pre-fabricate relatively standard (and so re-usable) components, which can still meet diverse requirements.

The advantage of beginning with the occupation of internal spaces is the cost saving related to roofing and, to a degree, reduced insulation.

From a commercial point of view, since it is highly likely that demand will come chiefly from the public sector, there is the challenge of public tenders, meaning not only the need to be ready to bid, but also to get ahead of the process by networking with the relevant contacts and offering them innovative and virtuous criteria that they should include in their calls.

Intellectual property

In principle no patent to worry about, since the project takes more of a low-tech approach. However, in terms of design and drawings, the architectural work (if original) will come under the copyright umbrella. Awareness of existing patents will need to be maintained during research and inspiration phases, and it is possible that the business will need to register its own to protect any “discoveries”.

Legislative obstacles

There are clearly some regulatory obstacles. Both regulations governing public tenders as mentioned above, and those associated with planning permissions.

The call from the Minister quoted above does however constitute an opportunity to launch the business on the basis of demonstration projects that could multiply if successful.

Other risks

None

Project team skills

Alongside the “classic” entrepreneurial skills (management, finance, sales and operations), the team will above all, and right from the start, need architecture and construction skills to identify the right technical solution.

What the RBC (Brussels-Capital Region) can do make it a success

- Integrate this alternative (and potentially temporary) housing into the urban planning scheme
- Promote this sort of social housing using public tenders
- Prepare public tenders for public buyers
- Follow up on the Minister of Housing’s positive action with a call dedicated to the circular and social economy sectors
- Environmental and climate impact calculation

References and links

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