D 4.1 Implementation of models of coordination

DYNACITÉ (France)

Final Version

PART I PILOT PROJECT TECHNICAL DESCRIPTION

1. Description of the pilot building

The pilot building is situated at Nurieux Volognat (21, 22 Lieudit sous Matonnax), in the South-East of France. It is situated in a rural area, and has been finalized in 1972. It is a three storey building, composed by 14 dwellings, and dedicated for Social Rental.

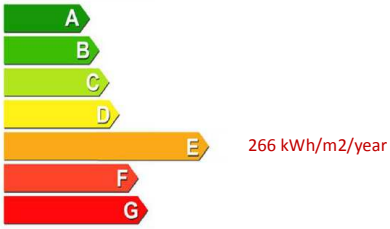
<table>
<tr><th colspan="3">WP4 Pilot project - Nurieux</th></tr>
<tr><td>Address</td><td>21, 22 Lieudit sous Matonnax
01460 Nurieux Volognat, France</td><td rowspan="5">  </td></tr>
<tr><td>Year of construction</td><td>1972</td></tr>
<tr><td>Type of building</td><td>Three-storey building</td></tr>
<tr><td>Number of dwellings</td><td>14 dwellings</td></tr>
<tr><td>Tenure</td><td>Social Rental</td></tr>
<tr><td>HVAC system</td><td colspan="2">Natural ventilation an central collective heating system, used for heating and hot water supply, working with fuel oil</td></tr>
<tr><td>Energy performance before renovation</td><td colspan="2">266 kWh/m2 /year</td></tr>
<tr><td>Expected energy performance after renovation</td><td colspan="2">89 kWh/m2 /year (theoretical calculation)</td></tr>
</table>

Construction characteristics

The quality of the construction and the finishing materials is good. All parts and equipment of the building are from the year of finalization of the building. No important refurbishment has been done since 1972 on the building, except the insulation of two faces of the building with 40mm polystyrene panels, in the eighties. It has single glazed and wood window frames and natural ventilation. It has a central collective heating system, used for heating and hot water supply, which is working with fuel oil.

Energy performance initial situation

The energy performance of the building is currently corresponding to a level E of the French Energy Performance Certificate (266 kWh/m2/year), for the heating and hot water supply.



2. Description of the refurbishment project

General works

A. Improve and adapt the building external aspects with its environment

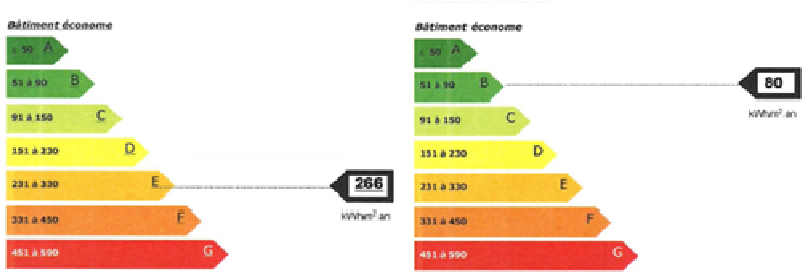
In order to respect its renovation objectives at Nurieux-Volognat, Dynacité has chosen to renovate the car park and walls that delimitate the building area, but also to improve the garbage area and building external access. Renovation includes also improvement of the external walls, windows and doors, and washing of roof tiles.

B. Improve the global comfort and security of the apartments for the tenants

The tenants will enjoy a totally new electric system that complies with actual standards, new kitchen furniture and sanitary, but also new floorings.

Energy performance

To reduce energy charges of tenants, the energy renovation is important. The theoretical objective is to aim to level B of the French Energy Performance Certificate, below 90 kWh/ m2/year (Low energy consumption building).



Before renovation *After renovation*

On the real use, Dynacité aims to guarantee 40% of energy savings compared to the initial situation (e.g reduce energy consumption to a maximum level of 160 kWh/ m2/year), and to guarantee a 50% reduction of greenhouses gas emission after completion of the renovation, for 8 years.

Guarantee of performance

Dynacité expects companies to provide good energy advices, by giving manuals to tenants, or working with them to better monitor their energy consumption. The contract forbid companies increase the level of energy consumption for 8 years. But they are encouraged to reduce it more year after year, by working on tenants' behaviour and adding some technical system.

Energy works include:

- External insulation (more than 120 mm of polystyrene panels for the walls, insulation of the roof)
- Low emissive double glazing, PVC frame (4/16/4 low emissive argon, Uw< 1.4 $Wm^2.K$)
- Humidity-sensitive mechanical ventilation, with extractors on the roof
- Renovation of the central system for heating and hot water supply, with the installation of an energy efficient boiler (with gas), control systems, better hydraulic balancing, measurement of energy for heating and hot water, and water consumed by each tenant

Name of the energy saving measure	Saving		Necessary investment	Repayment period	Reduced CO_2 emissions
	kWh/year	*€/year*	*€*	*years*	*t/year*
Insulation external walls	38 981.45	2 144	92 390	26	8.98
Low emissive double glazing, PVC frame	23 183.54	1 275	66 628	31.5	5.34
Roof insulation	2 298.97	126	24 449	116.5	0.53
Mechanical ventilation system	25 337.78	1 394	38 204	16.5	6.47
New central heating system	23 184	1 695	54 505	19.4	5.34
Total:	**120 623**	**6 634**	**276 177**	**25**	**28.63**

Financing scheme

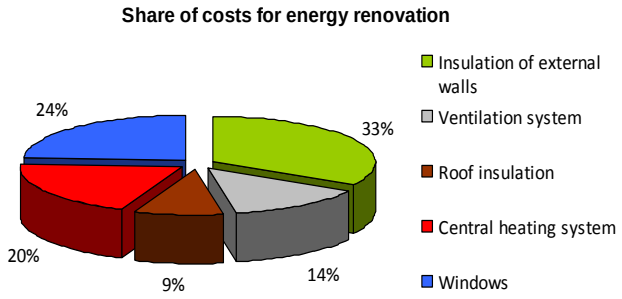
Dynacité will finance its project as other usual renovation projects:

- **Subsidies from Departmental Council ("Conseil Général"):** It gives subsidies for the renovation of old buildings, representing about 6,5% of investment costs.
- **Low rate loans from the Caisse des Dépots** will cover about 80% of the investments costs.
- **Dynacité** will cover about 15% of investment costs on its own funds.

The funds invested by Dynacite will be reduced by two subsidies:

- **The "3eme ligne de quittance":** a percentage (maximum 50%) of the estimated savings on cost of tenants' charges will be given to Dynacité to reimburse investment costs on energy renovation.
- **Energy Saving Certificates:** In France, Energy Service Companies are asked by the French government to reduce their energy consumption to a certain level, within three-year periods. If Energy Service Companies do not respect the Government's targets, they have to pay penalties. That is why Energy Service Companies finance SHOs or companies in their energy renovation, in order to reduce the global energy consumption in France. Energy Saving Certificates paid by Energy Service Companies to SHOs are then used as a proof to be shown to the French Government that they have done the due work to respect energy savings targets. Because Dynacité implements DBM contracts, it has the possibility to increase the amount usually obtained by a percentage equivalent to the guarantee on energy performance. For the project at Nurieux, Dynacité guarantees 40% of energy savings, so the amount will be increased by a 40%. This possibility is only related to DBM contract, with an energy performance guarantee.

Whole renovation investment (euros)		*Energy renovation investment (euros)*		**% of renovation investment dedicated to energy saving measures**
Total	*Per dwelling*	*Total*	*Per dwelling*	*%*
570 000	*40 714*	*276 000*	*19 714*	48%



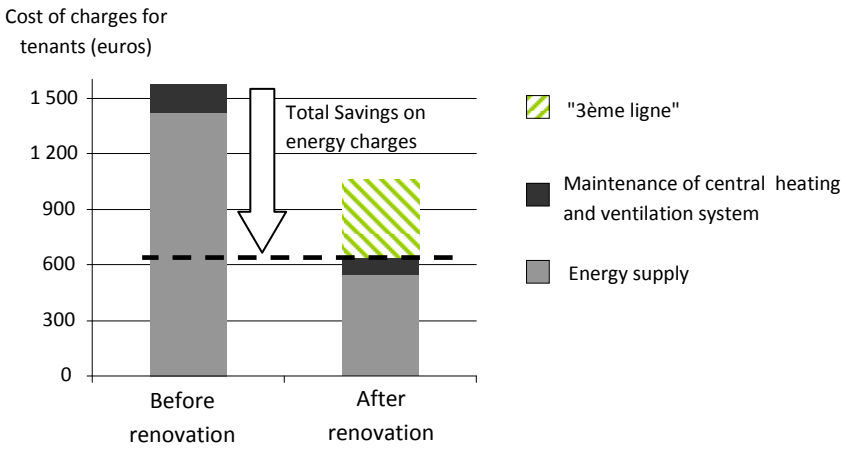
<u>"3ème ligne de quittance": How to share energy renovation costs between SHOs and tenants</u>

Currently, tenants are paying an average of more than 1500 €/dwelling for charges related to heating and hot water supply (including energy consumption and maintenance of the heating system). After renovation, the consortium guarantees a level of energy performance and prices that aims energy charges to 650 €/dwelling for heating, hot water supply, and maintenance of equipment, including new ventilation system. Savings on energy charges will be higher than 800 €/dwelling per year.

In France, a law, called "3ème ligne de quittance", allows SHOs to take about 50% of the "saved costs" for them. This is quietly the same system as "Green Deal" (pay as you save). Instead of enjoying all savings on energy charges, tenants will enjoy 50% of it. SHOs enjoy the other part, to have a refund on their investment costs.

At Nurieux, tenants are currently paying an average of more than 1500 €/dwelling. After renovation, they will pay 1000€/dwelling:

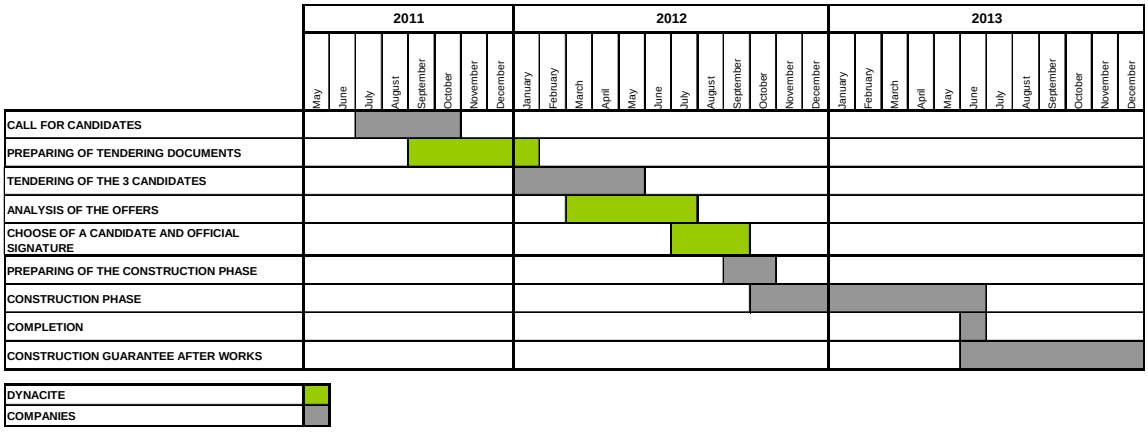
- 650 €/dwelling for heating, hot water supply, and maintenance of equipment, including new ventilation system
- 350 € /dwelling due to the "3ème ligne de quittance" (contribution for investments made by Dynacité)



Tendering procedure: design-construction-maintain + guarantee of performance

The project was tendered for a design-construction-maintenance contract, bringing together in project teams all stakeholders (technical advisors, construction companies, and maintenance companies). Because of the small size of the project, and the relatively low costs, the tendering procedure is what is called the 'Adapted procedure'. The adapted procedure is less formal than the "Open procedure", and Dynacité, as Public Owner, has more flexibility in the tendering of companies.

Planning of the project

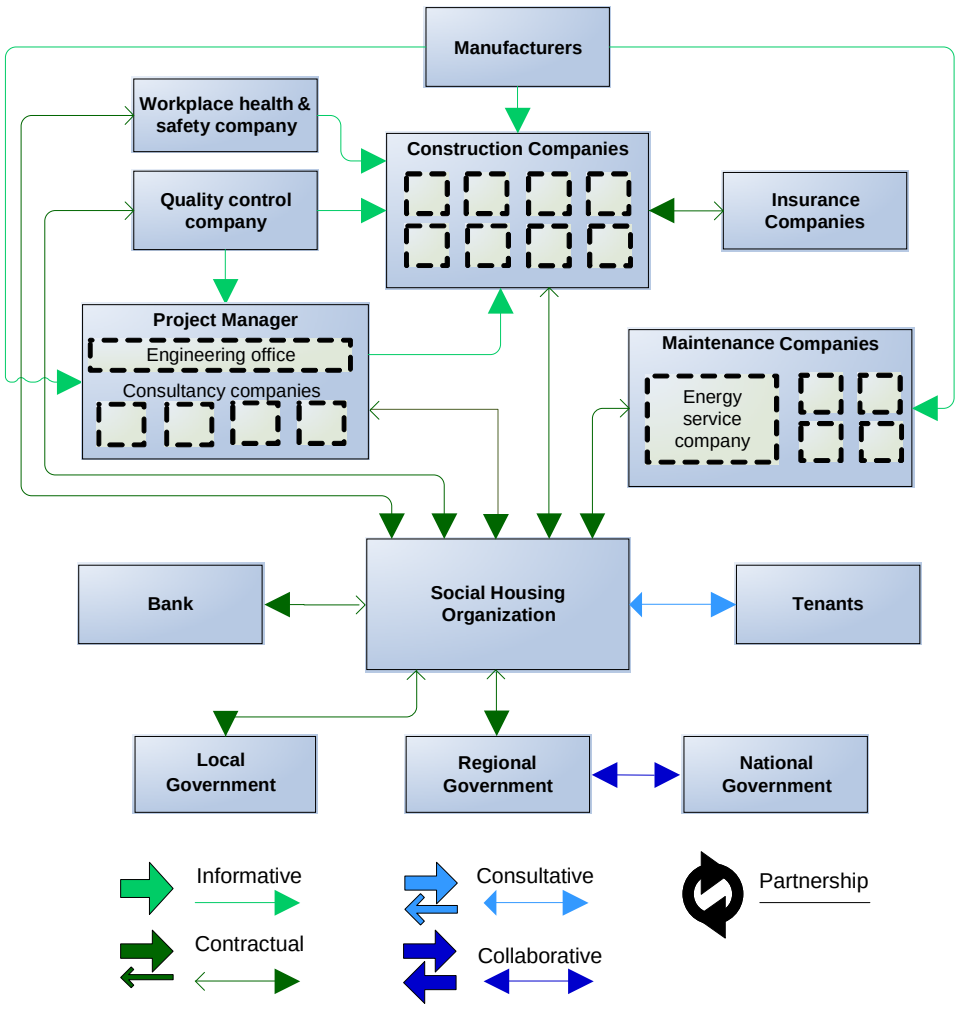


PART II IMPLEMENTATION OF THE ALTERNATIVES TO THE CURRENT COORDINATION MODEL

1. Reminder of main conclusions from TU Delft study and targeted problems that the pilot project will try to overcome

Regarding conclusions of Work Package 3, four main problems have been identified for Dynacité on its usual project delivery method:

- Design decisions
- Tendering and contracting
- Knowledge
- Influence on tenants behaviour



Usual project Delivery Method

For each problem, solutions have been suggested by TU Delft:

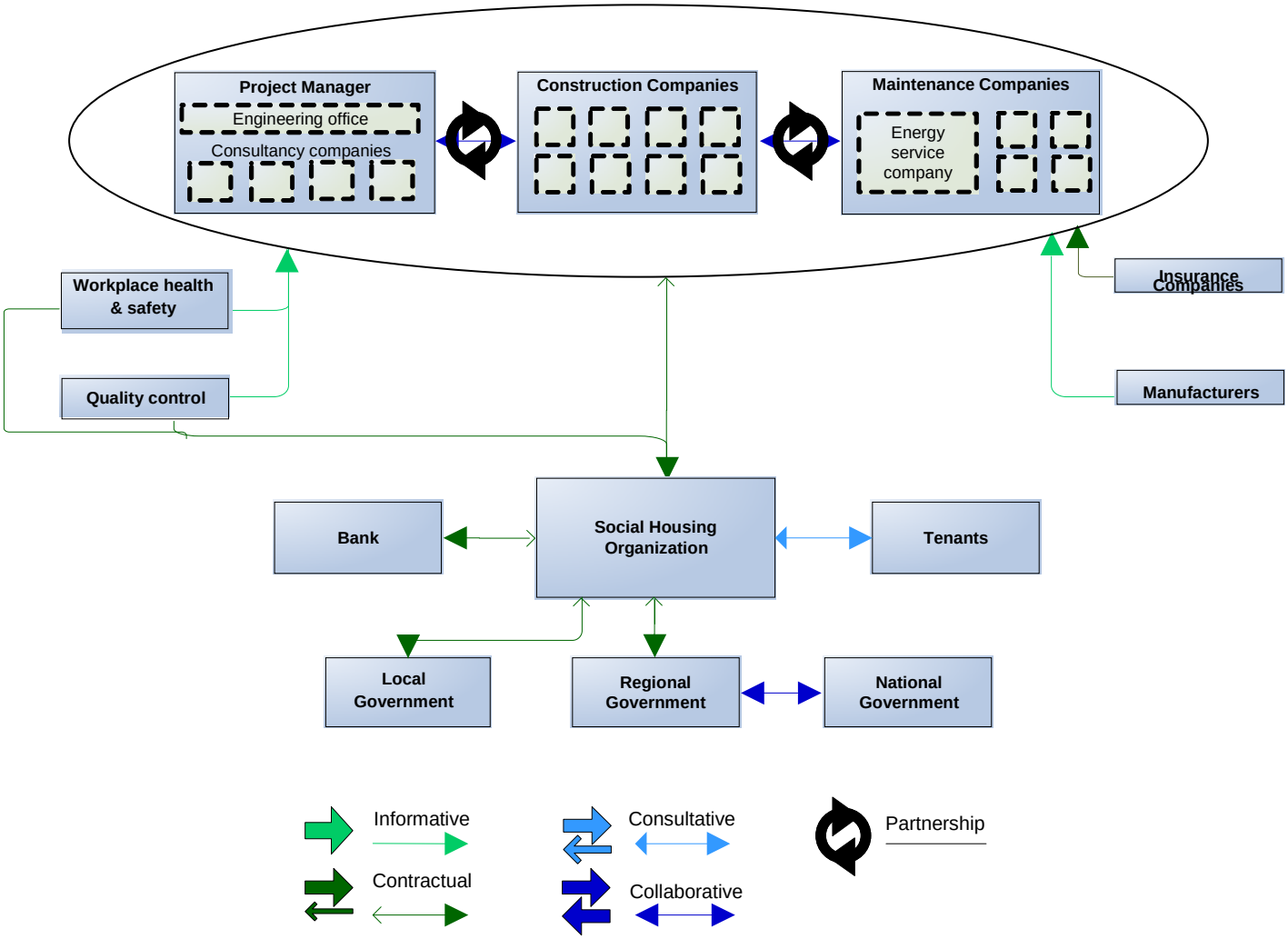
Problem area:	1. Design decisions
Possible solution:	A. Involve more actors in early stages of design
Actions:	A.1. Invite the maintenance companies to participate during the design phase A.2. Tender design-construction-maintain together
Problem area:	2. Tendering and contracting
Possible solution:	B. Define the responsibilities better
Actions:	B.1. Involve more employees in the draw up of the contracts B.2. Use smart selection criteria and award criteria in the tendering B.3. Use performance-based criteria in tendering and contracting
Problem area:	3. Knowledge
Possible solution:	C. Assure that the participating actors have the needed knowledge
Actions:	C.1. Organize a meeting with all the contractors involved in the process by the start of the construction phase C.2. Define a larger transfer time period between construction companies and maintenance companies
Problem area:	4. Influence on tenants behaviour
Possible solution:	D. Set up actions at individual level
Actions:	D.1 Monitor individual use of energy

2. Analysis of the chosen alternatives (phase by phase)

The pilot project at Nurieux will try to overcome problems identified by implementing different solutions, at each phase.

The law “Grenelle 2” authorizes SHOs to contract DBM in France for the renovation of buildings, only if there is an energy performance guarantee. Dynacité has chosen to tender a design-construction-maintenance contract. This kind of contract is supposed to solve many of the problems identified, by involving all stakeholders of energy renovation at the early stages of design (and to assure that the participating actors have the needed knowledge), better defining responsibilities and involving more employees of Dynacité in the draw up of the contracts.

Dynacité also has looked for smarter selection criteria, and applied performance-based criteria in the tendering. Consortia were asked to offer actions with tenants for energy savings, and monitor the use of energy.



Integrated Project Delivery Method at Nurieux

a) Alternatives affecting the design / tendering phase

- In order to improve the design choices and to guarantee the energy performance, it is advisable for Dynacité to promote the participation of the different actors that will be involved during construction and operation in the design phase. This is why Dynacité has chosen to implement a design-construction-maintenance contract, aiming to involve more actors at the beginning of the design phase. Implementing a DBM contract significantly changes the relation between actors.

Tendering phase

Every company was allowed to tender, but companies that wanted to tender this design-construction-maintenance contract were obliged to form a consortia, including conception skills (architect and/or technical advisor), construction competencies (including asbestos treatment), and maintenance abilities. Tendering a DBM contract locally forced companies to group together for tendering. Only three consortia have tendered the project at Nurieux.

Because companies are used to tender always DBB contracts, for some aspects they were not relevant in their responses for the DBM contract. Some have proposed to guarantee a theoretical level of energy performance; some other did not really take seriously their collaboration with other actors (Maintenance Company, technical advisor…).

This project is one of the first to be applied in France, and due to the "unknown" part of the process, Dynacité made some mistakes, as giving diagnostics which were not complete, or asking for too much information in the tendering. But in a global view, this way of tendering has given opportunities for employees of Dynacité to better work in teams, bringing together the department of Maintenance and the department of Construction-Renovation, while writing the program of requirements. Even though, it has taken more time to valid the contract internally than usual (3 months instead of 1).

Within the tendering procedure, Dynacité has chosen to define smarter technical criteria and use performance-based award criteria. Dynacité expects the criteria to better represent its technical needs, especially in terms of energy performance. Chosen criteria are :

- Price (45%) *(Financial criterion)*
- Works methodology (14%) *(Technical criterion)*
- Energy performance objective (20%) *(Technical criterion)*
- Quality of the maintenance (14%) *(Technical criterion)*
- Tenant's guidance (7%) *(Technical criterion)*

<u>The value for price criterion is a calculation of:</u>
Global Price = X + 2Y where X is the price for design and construction, and Y is the price of maintenance for 8 years. Within this criterion, Dynacité wants to point the importance on maintenance costs.

<u>Other criteria, which are considered as technical criteria,</u> are composed of detailed sub-criteria (see Tables), evaluated as below:

Missing information and/or misunderstanding	0
Correct offer, but some information are missing	2,5
Interesting offer	5
Very good offer	7,5
Excellent offer	10

Works methodology (14%)	**Coefficient**	**Maximum**
Relation between the offer and program of requirements	6	60
Quality of solutions proposed to reduce noises and problems due to works in the dwellings	2	20
Methodology used for good realisation of works, respecting delays and quality of service required for this project	2	20
Total		100

Energy performance objective (20%)	**Coefficient**	**Maximum**
Level of guarantee for energy performance and environmental performance (comparison between proposed guarantee and initial objectives)	6	60
Quality of the proposed equipments and products, maintenance capacity, changing opportunity	4	40
Total		100

Quality of the maintenance (14%)	**Coefficient**	**Maximum**
Methodology and procedures for exploitation-maintenance (given possibilities for performance and consumption monitoring, process and tools proposed for information and follow-up of defects)	4	40
Tools and organisation allowing continual improvement of exploitation-maintenance phase	4	40
Quality of the measure and verification protocol proposed	2	20
Total		100

Tenant's guidance (7%)	**Coefficient**	**Maximum**
Quality of the relation with tenants during works (information on the works, way of advertising and of working with tenants…)	4	40
Quality of the relation and awareness of tenants after works (giving of a guide, methodology used for education of tenants)	6	60
Total		100

Example :
For the sub criterion "Relation between the offer and program of requirements":

- Consortium 1 presents an offer corresponding to the program of requirements, and respecting all aspects: it is considered as a *"very good offer"* and we give them 7.5 points for this sub criterion.
- Consortium 2 presents an offer disconnected to our program of requirements, proposes internal insulation instead of external, do not change the sanitary even though we have asked for it in the program of requirements : it is considered as *"Missing information and/or misunderstanding"*, and we give 0 points for this sub criterion.

Finally, for the first sub criterion, Consortium 1 will have 7.5 * 6 = 45 points. Consortium 2 will have 0 * 6 = 0 points (maximum is 60 points).

The criterion for Energy performance objective helps Dynacité choosing the best offer on this aspect. By using a criterion for Tenant's guidance, consortia think about the tenants, and how to work with them to improve their behaviour. Favouring maintenance costs within the price analysis helps us to better focus on this aspect, which is usually not seen as very important.
We have concluded that we have used too much criteria, implying difficulties to compare the offers.

Design phase

By implementing a design-construction-maintenance contract, Dynacité affected the maintenance/exploitation phase. Indeed, with this kind of contract, maintenance companies are involved at the earlier stage of the project. They are aware of equipment that will be installed, and can anticipate on future maintenance. Within the definition of criteria, Dynacité chose to involve the tenants in the maintenance/exploitation phase, and asked consortia to think about tenants, and how to work with them to improve their behaviour.

3. Legal/technical expertise

Because it is a new experience, and for a good implementation of the pilot project, Dynacité contracted legal and technical expertise. Legal expertise is helping Dynacité for the tendering of companies in a design-construction-maintenance contract. Technical expertise sees the different possibilities in the improvement of the energy performance of the building. It helps Dynacité in studying the important technical points (especially energy performance objectives) in the offers and sees if these offers respond to Dynacité objectives, in terms of quality, and guarantee of energy targets.
Dynacité has asked for help through the forum, especially for the choice of award criteria in tendering, criteria that could represent as best as possible Dynacité's needs and objectives. Dynacité also asked for feedback on how to improve the participation of small enterprises in design-construction-maintenance contracts, because it wants to take advantage of the local network that is still represented.

PART III CONCLUSIONS

1. Impact (See annex 1)

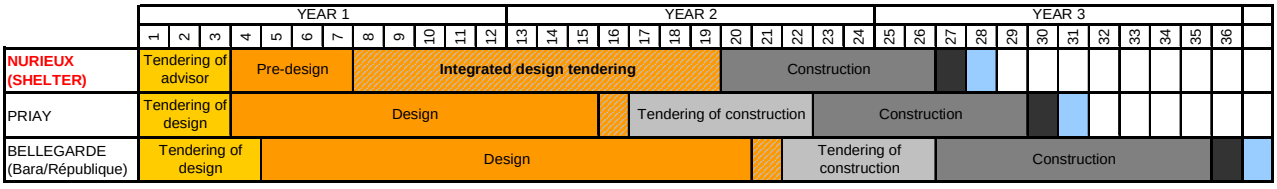
ENERGY SAVINGS	COST	TIME	QUALITY OF THE WORKS
42,5% *From 266 kWh/m²/y to 160 kWh/m²/y*	***570 000 €*** *(276 000 € for energy works)*	***3 months saved*** *global planning, compared to usual project*	***Too early to determinate***

The implementation of the pilot project is on-going, so impacts of implementation of alternatives in terms of real energy savings will be difficult to evaluate. We are sure to reduce costs corresponding to energy supply and maintenance, because the chosen consortium has engaged on a 42,5% reduction of consumption, compared to the initial situation.

In terms of costs, the implementation of the pilot project shows that differences are not so important compared to a usual projects. Conception and construction costs are similar. The difference is on the indirect cost, related to addition of time and resources dedicated for administrative actions. We usually take less time internally at Dynacité to work on tendering documents. Here, 3 employees have worked deeper on the project and the analysis of the offers, and we encounter more indirect internal costs. This is difficult to quantify, but we are just conscious that this implies more time internally to work on documents for DBM contract.

An impact easy to point in terms of costs is the price of energy we buy to the maintenance company for the DBM contract, compared to the usual exploitation-maintenance costs.
Usually, Dynacité has a global contract for the maintenance/exploitation of all heating systems (representing 4 contracts on more than 3500 dwellings). Because of the amount of energy consumption, Dynacité benefits from low costs in terms of unit energy prices. By having a small contract for one building, the scale of energy consumption is smaller, and the unit price of energy is higher for the pilot project. The difference between unit prices of energy is more than 10%, disfavouring the pilot project. This difference is compensated by the guarantee on energy performance, but if we multiply projects with DBM contracts, this will modify our global maintenance/exploitation prices compared to the actual situation.

In terms of time, Dynacité expect to save 3 months in delays, compared to usual projects. The time saved is due to the reduction of tendering. Even though we take more time internally to define the DBM contract, we only have one tendering to follow. In a DBB, we have to tender at first architects/technical advisor, then to tender construction companies.



Tendering a DBM allows us to “combine” delays and to continue to finalize the program of requirements while tendering consortia.

2. Future possible improvements and replication

Within the implementation of the pilot project, Dynacité has identified some possible solutions to improve the design-construction-maintenance contract. Indeed, because we are involving all stakeholders at the early stage, it is important to know our needs, and clearly define the program of requirements, diagnostics and objectives of the project. This implies more time and resources internally, but this may be reduced in the replication, due to experience.

A DBM contract for energy renovation is very specific. We think replication is possible if projects concern buildings with a certain number of dwellings, to reduce the share of conception and engineering costs in the overall operation costs. Based on the experience of the pilot project, it seems that such contracts would be more cost effective while renovating buildings or groups of buildings with 50 dwellings or more.

Based on the experience of the pilot project, Dynacité has identified some points to improve. First, at a national level, we think it is important to help small enterprises tendering in DBM contracts, by favouring consortia and training of professionals. Second, we think it is important, for energy performance objective, to use technical criteria related to energy performance engagement for a better assessment of the offers.

We think it is very important to support Social Housing Organisations financially, for energy renovation of buildings. Dynacité invests more than 20 k€ per dwelling to improve the energy performance of buildings. But reductions of energy charges impact the tenants. By implementing an energy savings guarantee, we are sure to reach a certain level of energy performance. This enable us to ask for a share of costs savings between us and our tenants, with a system like the “Green Deal”, called “3ème ligne de quittance” in France.

Dynacité is also used to ask for European Regional Development Fund (ERDF): we think it is important to increase the amount given by Europe for energy renovation of dwellings, and facilitate access for SHOs to ERDF, with easier procedures to apply for. Level of subsidies could also be increased if the energy savings are guaranteed for the tenants.

Finally, we propose to develop possibilities of asking for energy savings certificates while implementing energy performance contracts. This kind of measure is supported by the new Directive on energy efficiency.

1. Annexes:

- PowerHouse template (Shelter customized)