An evaluation based on Service Economy theory: the case of an EDF-supported refurbishment program in rural area

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Abstract

Selling services rather than products is a key feature of what is known as the Service Economy theory, which focuses on the performance of a response to functional needs. This theory has other specific key features: the incorporation of external factors in meeting functional needs, a value creation independent from the "physical" production of objects and a deep interaction with local economic development. Such a theory can be used for assessing regional energy efficiency programs beyond the single energy savings in as much as it seems more relevant to consider them in a wider local development scheme. The so-called "MDE 52-55" program seems a relevant application case to this study.

This 5 year program (2006-2010) of several million Euros has as goals: to make this territory an example in the field of energy efficiency, to propose efficient home refurbishment solutions, to boost local craftsmen' work in the construction, and to promote training in renewable energy.

This program is also an opportunity to foster synergy between EDF (commercial and research branches), local authorities and local businesses. It will enable to improve local competencies in building technologies and revitalize the area by boosting employment. It will also encourage customers and partners to view the refurbishment as more than mere goods: what is proposed is comfort, financial services and housing improvements. And selling services rather than products is a key feature of what is known as the Service Economy theory. This theory will be the base of our program description. We also evaluate the realised refurbishment operations (such as wall insulation or heating system upgrades), as well as direct and indirect jobs creation in the studied territory within the building trade. We can hope that this new analyse could inspire new regional refurbishment programs to come. It will certainly underline the major challenge to overcome, especially supporting a new organisation of the local building sector, so that it becomes fully building and energy performance oriented.

Introduction

EDF, in partnership with other local and national economic players, has implemented an economic development program in two areas in the east of France: Haute Marne (code 52) and Meuse (code 55). This program was therefore baptised: "MDE 52-55". It was launched in November 2006.

While energy efficiency is an environmental challenge which is already the subject of incentives for operations on a local level, this program incorporates all aspects of energy efficiency. Unlike other regions, the aim here was not to achieve a reduction in either peak demand or the load curve. The primary goal was to bring about substantial energy savings that will benefit the customers of the offer and, the secondary goal was to boost the building and project management sectors of the regional economy while the local building sector is becoming an important actor in the energy efficiency area. The results of this operation are not therefore solely measured according to the amount of MWh avoided but also according to the project's direct and indirect economic impacts. This original assessment method, which also manages to combine "the environment" and "the economy", draws on parts of the Service Economy

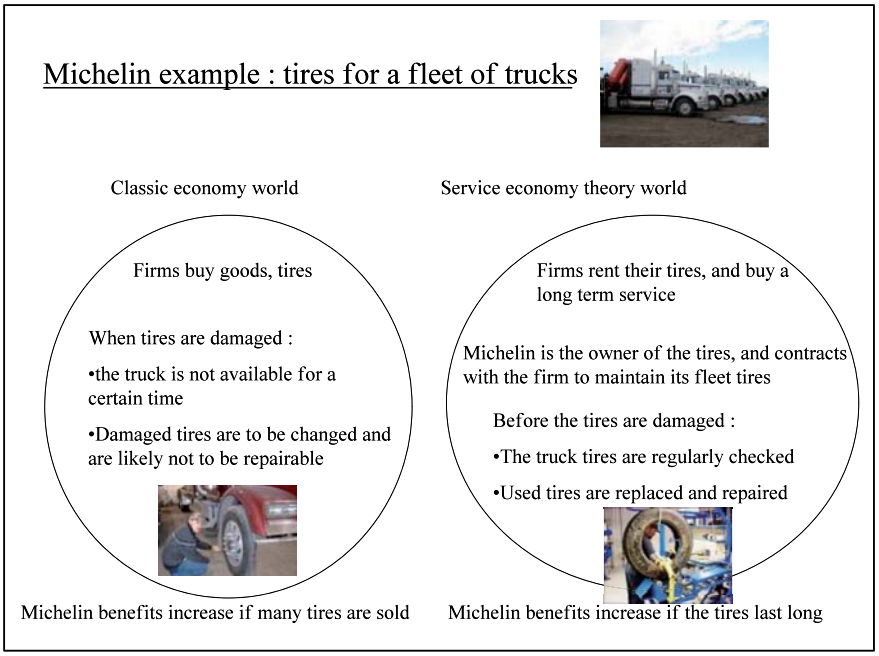

Figure 1. Concrete differences between Service Economy theory and traditional models with the case of Michelin. [Michelin, online]

theory. In this document, we put forward a new framework in which to analyse the MDE 52-55 program which draws on this theory and, we believe, sheds a new light on the subject of Energy Efficiency.

This paper first introduces to the frame of the MDE 52-55 program, then to the Service Economy theory. It explains why assessing this program with this theory is relevant. Then the full assessment process is deployed.

Background and challenge: the MDE 52-55 program and the Service Economy

THE MDE 52-55 PROGRAM FRAMEWORK

EDF, in cooperation with various parties, implemented a five-year (2006-2010) economic assistance program in the Meuse and Haute-Marne. This program is made up of four main thrusts:

1. "Biomass" programs.
2. "Upgrading of local potential in the area of metallurgy".
3. "Installation and development of companies" via their commitment to redevelopment projects.
4. "Energy management" which aims at making the Haute-Marne and Meuse places of excellence for energy saving solutions by focusing on the performance of buildings, by working with small building firms and by contributing to sustainable economic development. EDF R&D department has participated in the development of pilot offers and innovative actions using its know-how and expertise.

A SHORT EXPLANATION ON SERVICE ECONOMY THEORY

A Service Economy [Bourg, 2005, EF, 2008, Stahel, 2006, Tertre, 2006] is based on the production and sale of a solution realised by a service provider. The customer no longer buys goods but rather a service which provides the goods as needed. The service provider contracts with the customer to insure results and performance. This can be easily illustrated with Michelin service (Michelin is one of the biggest actors in tire production) [Michelin, online]: "Michelin Fleet Solution", a service to guarantee a truck fleet to have always its truck tires in working order.

The Service Economy is a new economic model [Stahel, online] which is in the process of becoming more widely established and which is discussed in many forums, particularly the "Club économie de la fonctionnalité", coordinated by the economic and social research society, ATEMIS, a spin-off from the Paris VII French university, to which EDF belongs [EF, 2008].

Without going into the theory's details, we would like to mention the Service Economy's most important points, which largely reflect the contextual elements mentioned above:

- The incorporation of external factors in meeting functional needs. Most economic models only include an assessment of the direct effects on the economic player who is driving the business. From the outset, the external factors (environmental, social and even indirect economic impacts) are ignored insofar as they do not take the form of an economic value or cost. There are of course methods to incorporate external factors (the "polluter pays" principle, carbon credits, energy saving certificates) but they are often seen and treated as "obligations" that have to be respected and not as value-creating opportunities.
- The creation of value is distinct from the production of objects. It constitutes a real break with current economic models. In the Service Economy theory, value depends, among other things, on gains achieved through integrating operations and valuing positive environmental and social external factors.
- A high level of interaction with the economic development of the local area (in most cases).

Table 1. Sale of tires – comparison of a traditional business model with Michelin model based on the service economy theory

	Traditional business of tires sell	Michelin fleet solution
Offer description	Procurement of tires respecting the specifications set by the client	Ensuring that the customer can continuingly use its business vehicle fleet with suited and reliable tires e.g. in a good state and with the right pressure
Ownership	Tires belong to the customer	Tires still belong to Michelin
Maintenance	Performed by the customer	Performed by Michelin
Customer relationship	One shot	Continuous
Recycling	Obligation that the customer must abide by	Part of Michelin's business model as a resource
Value for the customer	Owning performing tires that are designed to suit customer's use conditions	Using suitable tires Benefiting from reduced operational costs : related to the tires themselves (the integration of the tires-related activities enable an overall cost reduction) due to a decrease in fuel consumption
Value for Michelin	Directly related to the tires sales→ Few incentive to design tires with a long life span	Depends on the contracting period and the tires cost reduction→Michelin is incensed to design and produce tires with a long life span
Environmental impact	Normal	Reduced through optimised operations along the whole life cycle and especially through an on-purpose design for an optimised recycling

Table 2. Goals of the MDE 52-55 program

Market targeted	Renovation target over five years and turnover generated
"Homeowners"	11,000 homes for 50 M Euros / 5 years of work
"Social housing"	5000 homes
"Public services"	700 communal buildings

The Service Economy offers a view different from usual economic models. What we would like to investigate through EDF's offer with the MDE 52-55 program is briefly analysed below.

EDF MDE 52-55 – A MULTI-PARTY ASSISTANCE PROGRAM

Actors

The "MDE 52-55" EDF offer is a multiple-faceted offer, an economic support program that affects:

- Households: by giving them an access to soft loans to renovate their housing and improve their comfort.

  Individual private home owners can benefit from 0% loans, provided that the refurbishment equipment meets the technical criteria (energy performance level) defined by EDF R&D, which are more demanding than the ones required for tax credits (a national measure targeting the same actions). This financial support can, of course, be combined with other regional and national (e.g. tax credits) incentives. The financial terms differ depending on the action planned (e.g. wall insulation, efficient boilers).

  In return, EDF received energy savings (or white) certificates associated with these operations. The financial support is provided by the Bank Domofinance, a subsidiary of EDF and Cetelem (BNP Paribas).

- Craftsmen and local building firms: by boosting their business by promoting renovation work and allowing them to improve their mastery of the latest technologies,

  Craftsmen, holding an EDF offer, get agreements. Those craftsmen would be the individuals to contact for final customers looking for information on how to implement the offer. In order to get an agreement, the artisan pays EDF a small subscription contribute to EDF and follow a proper training on energy efficiency and refurbishment skills. Those acquired skills may allow the craftsmen to propose a better quality service to its customers.

  For industrial: EDF offers support to local industries to help them get certifications for innovative products.

- Area: by giving a good image of the area with ambitious projects, by increasing the economic activity, etc.

  Moreover, two Public Interest Groups ("GIP" in French) [GIP, online] in Meuse and Haute-Marne were formed on the basis of inter-ministerial orders in 2000.

  Multi-annual development agreements were adopted in the general assemblies of the two GIPs which lay down the priority areas to be developed: "encouraging economic activity, preparing future jobs, developing tourism, improving the living environment and public infrastructure, structuring the territories, etc."

  These GIPs are associated with the MDE 52-55 program.

Table 3. Comparison of a traditional energy efficiency program and the MDE 52-55 one.

	Traditional programs	MDE 52-55 Program
Target customers	Households or social owners	Authorities (territories) of the Departments code 52 and 55
Target recipients	Households or social landlords (or housing associations)	Households, local authorities Installers, social landlords
Offer description	Subsidising or loans for determined energy efficiency work, providing they enable EDF to apply for getting white certificates : boiler replacement, insulation, windows replacement… Single or combined EE operations are indistinctly supported Training courses are proposed to large installers in the frame of a national partnership program	Local/regional economy development through the support of qualified energy efficiency work in households. Three components : – for households : Support for EE work with equipment meeting enhanced performance specifications : 0-rate or low-rate loans, subsidies. Larger financial support in the case of combined work in order to encourage integrated renovation work. Financing of the Energy Performance Certificate of the dwelling at the end of the works. – for all local installers : enhanced trainings in order to pass advanced qualification exams and communication support services. – for the region : collaboration with local economic development agency and external promotion.
Evaluation criteria of the program performance	Obtained white certificates Generated turnover	Regional economic development (employment : direct and indirect job increase) Improvement in installer qualification Obtained white certificates Generated turnover

AN APPROACH THAT FITS WELL WITH SERVICE ECONOMY PRINCIPLES

Table 3 underlines the main differences between standard energy efficiency programs already developed by EDF in France and the specific MDE 52-55 project. The discrepancies in the related offer contents are explained by the different overall goals. The targeted customers and the recipients are not exactly the same either and the scope of the MDE 52-55 is wider.

The principles of a Service Economy apply to the MDE 52-55 program for several reasons.

First of all, the offer made to private individuals under the program includes a performance-based commitment together with a group of products (materials) and services (fitting and finance) with the aim to improve the dwellings' comfort. For instance, there are different levels of refurbishment support offer: "three stars" for a single operation (e.g. heat pump installation or wall insulation) up to "five stars" for a comprehensive renovation work including both systems, building envelope and renewable energy production units. The offer aims at encouraging the more complete renovation options. For instance, in 2009, the five-star support offer includes a preliminary energy audit, extended financing service and a final official energy audit with a validity period of 10 years (the Energy Performance Certificates, as defined in the EPBD Directive [Directive, online]).

Second, support is given to organize the local industries (manufacturing and installation of equipment) to make sure these energy-efficient solutions meet the needs. The program aims at encouraging multi-pack renovation work, by ensuring that local building companies (from different trades) are able to work together in a consistent way. That leads to a need for enhanced training courses in the field of energy efficiency (e.g. the interaction between building envelope and heating systems).

Territorial economy and local social impacts are key elements of the support program. Its efficiency will be measured regularly by economic and social indicators (discussed further).

All these elements make relevant an analysis of the program with the service economy theory.

A Service Economy chart

The aforementioned "Club Economie de la Fonctionnalité" [EF, 2008] has developed an analytical chart for a business model based on this theory. Five points appear as essential:

- the economic model,
- the marketing,
- the system of actors,
- the measures to accompany the change,
- and the organisation of the work.

This section looks at the questions and topics raised by this chart as well as possible answers. This results in an original assessment method which does not only focus on "quantitative" issues.

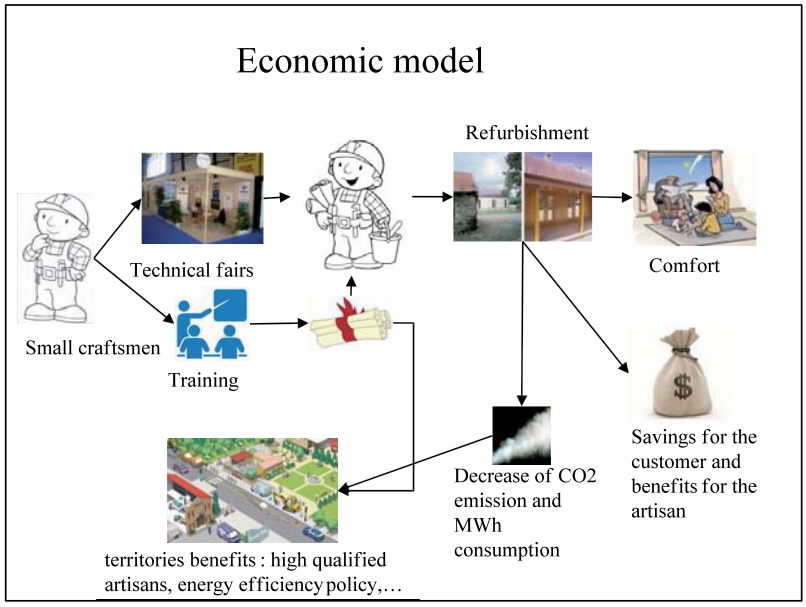

Figure 2: Economic model for MDE 52-55 program

THE ECONOMIC MODEL

What is the added value (in qualitative terms) of the new offer and how can it be assessed financially?

The applied economic model can be seen at a glance in Figure 2.

As there are special energy efficiency incentives in Haute Marne and Meuse, it is important to identify the specific effect of the MDE 52-55 program compared to the general trend of increase in energy refurbishment work due to a nation-wide campaign. Thanks to an economic survey performed by a private consultant, the evolution of the energy refurbishment work can be evaluated on both the regional (outside the two departments) and local scale.

We managed therefore to identify two kinds of effects of the program, a quantitative and a qualitative one. We illustrate the evaluation process with the example of a heat pump installation:

- From a quantitative point of view, if the regional trend (departments 52 and 55 excluded) of the increase in refurbishment work is 88% and it is 143% in Haute-Marne and Meuse, then we consider that without the MDE 52-55 program, the local evolution would have been +88%. The additional work is considered as resulting from the program. In these cases, 647 heat pump installations have been counted in the departments 52 and 55: 227 are considered as resulting directly from the specific MDE 52-55 program.
- We also consider that the MDE 52-55 program led the remaining (647-227=) 420 households to buy a more performing system as if there only was a nation-wide program. It is a qualitative effect which brings extra added-value to the installers.

However, we did not distinguish these two effects when evaluating the energy saved by the households thanks the refurbishment work. All of them benefited from the program whether they planned it independently (opportunity effect) or not.

Added value for households

The new renovation offer is a response to a concern for energy efficiency, performance and comfort. Renovation is encouraged and constitutes more than the simple replacement of a faulty product. The loan is also a response to a need for funding, which is of interest to most customers at the time of substantial work. Compared to other refurbishment programs, the MDE 52-55 program-supported solutions meet higher performance level requirements (e.g. COP for heat pumps, insulation performance). Which should result in better comfort in housings.

Finally, the customer has the same level of comfort at a lower cost or greater comfort for an energy bill which remains the same. The value for the households will therefore either be financial or non-material (a better comfort, which can be seen as a "rebound effect", but this one only shows that the comfort specification of the household was not met before).

As the energy savings made in each household cannot be accurately metered (up to now, we do not have such complete data files but a client survey on a sample of housings is in progress), general evaluation of savings was based on the standardised ratios (kWh saved per action type) used for the French white certificates (see Table 4). It should be noticed here that the aim of this paper is to propose a new methodology of process assessment but providing accurate values of energy savings is not the priority for the MDE 52-55 program. The white certificate forms give an overall assessment of the energy savings over the product life, depending on the work size (e.g. housing size or wall size, etc.) and the local climate. The table below gives some examples of such assessment, expressed either in kWh over the whole system life, or in kWh saved/year.

It is important to underline that the assessment done here doesn't take into account the "rebound effect" as it is based on white certificate estimations. More generally, the white certificates ratios represent average values which are relevant for a big enough number of actions (then possible deviations statistically compensate). But they are rough estimates when looking at particular cases. So the corresponding results are to be taken as orders of magnitude, more than accurate estimates.

Table 4: refurbishment-related Energy Savings assessment according to the white certificate methodology (French ministry of Industry).

System	Considered size	kWh saved over the product life	kWh saved/year
Condensing boiler	100m²/4 rooms for space heating & hot domestic water Assessment for one unit	126000 kWh	10815 kWh/m²
Heat Pump (3,5<COP<4)	100m²/4 rooms Assessment for one unit	135000 kWh	11587 kWh
Biomass boiler	Assessment for one unit	230000 kWh	19742 kWh
Solar hot water system	Per each m² of solar panel	2900 kWh/m²	260 kWh/m²
Loft insulation (R>5 m²K/W)	Per each m² of installed insulation material	1900 kWh/m² in the case of fuel heating 1200 kWhm² in the case of electricity heating	101 kWh/m² in the case of fuel heating 64 kWh in the case of electricity heating
Wall inside insulation (R>2,4 M²K/W)	Per each m² of installed insulation material	3100 kWh/m² (fuel heating) 1900 kWh/m² (elec.heating)	166 kWh/m² (fuel heating) 101 kWh/m² (elec.heating)
Efficient Windows (U<2W/m²K)	Per each m² of double-glazed window	2700 kWh/m² (fuel heating) 1700 kWh/m² (elec.heating)	144 kWh/m² (fuel heating) 91 kWh/m² (elec.heating)

Table 5: hypothesis – considered energy prices (end of 2008)

Fuel	Price/MWh	Comments
Electricity	112,8	When the housing is heated with electricity
Electricity	143,9	In other cases
Gas	59,8	
Fuel oil	64,9	
Wood	32	

Table 6: Qualitative and quantitative effect of the MDE 52-55 program.

MDE 52-55 equipment	Standard equipment	Standard system price Euros	Advanced system price Euros	Quantitative effect (per housing) Euros	Qualitative effect (per housing) Euros
Condensing boiler	Low temperature boiler	5000	8300	8300	3300
Heat Pump (3.5<COP<4)	Heat Pump (3<COP<3.5)	10000	16700	16700	6700
Biomass boiler	Heat Pump (3<COP<3.5)	5000	13700	13700	8700
Solar hot water system	SHWS with lower performance	9100	6000	9100	3100
Loft insulation (R>5 m²K/W)	Loft insulation (2.5<R<5 m²K/W)	6500/housing	4000/housing	6500	2500
Wall inside insulation (R>2.4 M²K/W)	Wall inside insulation 1.2<R<2.4 M²K/W)	6500/housing	4000/housing	6500	2500
Efficient Windows (U<2W/m²K)	Efficient Windows (2<U<2.5W/m²K)	8200/housing	6500/housing	8200	1700

According to an EDF-owned data basis, 560 GWh were therefore saved during the operation (2006-2008) over all of the homes concerned (private and social housings).

The energy saving or the increase in comfort obtained by each home can be estimated at an average of 504 Euros/year, on the basis of the energy prices shown in Table 5.

For the assessment of the added-value for the household, a calculation over the whole product life has been performed. The added value for households is then estimated at 50 M Euro (504 Euro/year per household on average).

Added value for the SMEs in the construction field

Both as a partner and a recipient of the offer, the small building firm benefits primarily from extra business and marketing support, as in traditional economic partnerships. Moreover, a small building firm also has access to activities which require a higher level of qualification (installation of a heat pump or renewable energy production equipment instead of a standard boiler) and which generate a higher turnover.

As explained above, a difference was made between quantitative and qualitative effects. Table 6 shows the prices of installed equipment that have been used to assess the added value for installers.

Given the registered refurbishment work in EDF's database, the additional turnover generated by the MDE 52-55 program is 33 M Euro (15 M Euro is due to the "quantitative effect" and 18 M Euro is due to the "qualitative effect").

The added-value of an installer is assessed as 40% of its turnover (source: Ministry of Industry, no local figure). On this basis, the quantitative effect on the installers added value can be estimated at 6 M Euro and the qualitative effect at 7.3 M Euro.

Moreover, it is estimated that more than 250 small building firms which are approved by EDF have benefited from the information process. With an average value of 1,000 Euro training, the EDF-provided training to the local building sectors is worth about 0.2M Euro.

For the installers, the benefits due to the offer are numerous: trainings which lead to higher qualification levels, a rise in demand, a construction sector in expansion, higher quality work, and higher incomes. The rise in added value associated with the program has been estimated at 13.5 M Euro (among which 11 M Euro due to an increase in quality).

Value for the local authority

The MDE 52-55 program has led to a rise in added value for the small building firm and in investments. These investments, partly made within the geographic areas hereby concerned (among local distribution companies) shall lead to an increase in business within the local building sector. This first indirect consequence is accompanied by the increase in spending by households concerned by the rise in artisan business and the ensuing income.

The value assessment for the local authority is based on several assumptions:

- The distributed income is assessed as 67% of the added value (French National Statistics),
- 64% of the income is considered as spent (French National Statistics),
- The added value of a non-building company is assessed as 30% of its turnover (Expert Words).

Figure 3 stands for the economic flow generated by the MDE 52-55 program, according an on-purpose consultancy study paid by EDF.

The rise in business seen by local building firms has induced an estimated 24 M Euro of business for the local economy (with 21 M Euro for the whole local building sector). At least 70 new jobs in the artisans sector are directly attributable to the MDE 52-55 program, according to a consultancy study paid by EDF.

Furthermore, those areas concerned by the program shall benefit from an attractive stock of renovated housing.

Moreover, local authorities-owned buildings have been refurbished through this program, with an overall energy savings of 50,000 MWh (over the whole system and materials life), which stands for financial savings assessed as almost 3 M Euro.

The program will also contribute to the creation of a Local Climate Plan. On the basis of the assessment of energy saved through the refurbishment work based on the white certificate method, the program effect on the CO_2 balance can be estimated, using the CO_2 content of each kind of fuel shown in Table 7.

With this approach, a general estimate of the MDE 52-55 operation's environmental impact is 11,700 tCO_2 avoided/year. Giving a financial value to avoided CO_2 emissions is always a tough work. The rate of 30 Euro/t CO_2 is used, which is an intermediate value among several assessments (9 Euro up to 80 Euro/t).

The assessment of the offer's added value for the area could be measured on the basis of the added value for local firms (excluding small building firms which have already been assessed), the quantification of the CO_2 avoided, and, finally, an appraisal of the created jobs (on the basis of the social benefits paid to those unemployed which have been saved or through an estimate of the rise in local business taxes due to the increase in business).

Financial assessment of such added value

Initial forecasts (official commitments) predicted a turnover generated by refurbishment work of the order of 100 M Euro and the creation of 300 jobs. The effects are significant in the area of residential work.

An initial financial estimate of the economic value created by the MDE 52-55 program is about 80 M Euro, but this value can not be directly compared with the foreseen 100 M Euro quoted above, as this new assessment takes external costs into account. The Figure 4 shows how this economic value is split between different stakeholders.

How does the financial system evolve with the Service Economy theory?

The trio "EDF – Domofinance – Small building firm" pool their technical, marketing, commercial and financial means to launch the offer. The customer, advised by EDF and the craftsman, is no longer alone in finding an answer to his renovation requirements and financial solutions are also proposed. The customer can focus on what is most important to him: his need for comfort.

EDF's offer accelerates and promotes construction SMEs business. Anyhow, they help them find customers. And high quality work is encouraged . This offer gives the small building firm a bigger sales opportunity. EDF and the small building firm advise the customer and provide information on the technical offer, the available financial plans and prerequisites of these plans.

How does this economic model support a logic of growth which is unrelated to the effects of volume?

Instead of aiming at selling as much boilers (or windows) as possible, the firms are now induced to propose more tailor-made and comprehensive solutions to their final customers. So they will probably cover less customers under the same period, but they will provide them with a better service (including a higher added value).

There is a large building stock to renovate. Things are under way and over time an energy efficiency skills cluster could be formed (on a local scale). As it was explained above, EDF has committed to supporting the local economic development. The EDF-supported energy efficient market was then identified as an opportunity of achieving (partially) this mission. The housing refurbishment industry can develop on a local or regional basis as the market is rather a local one. With advanced skills,

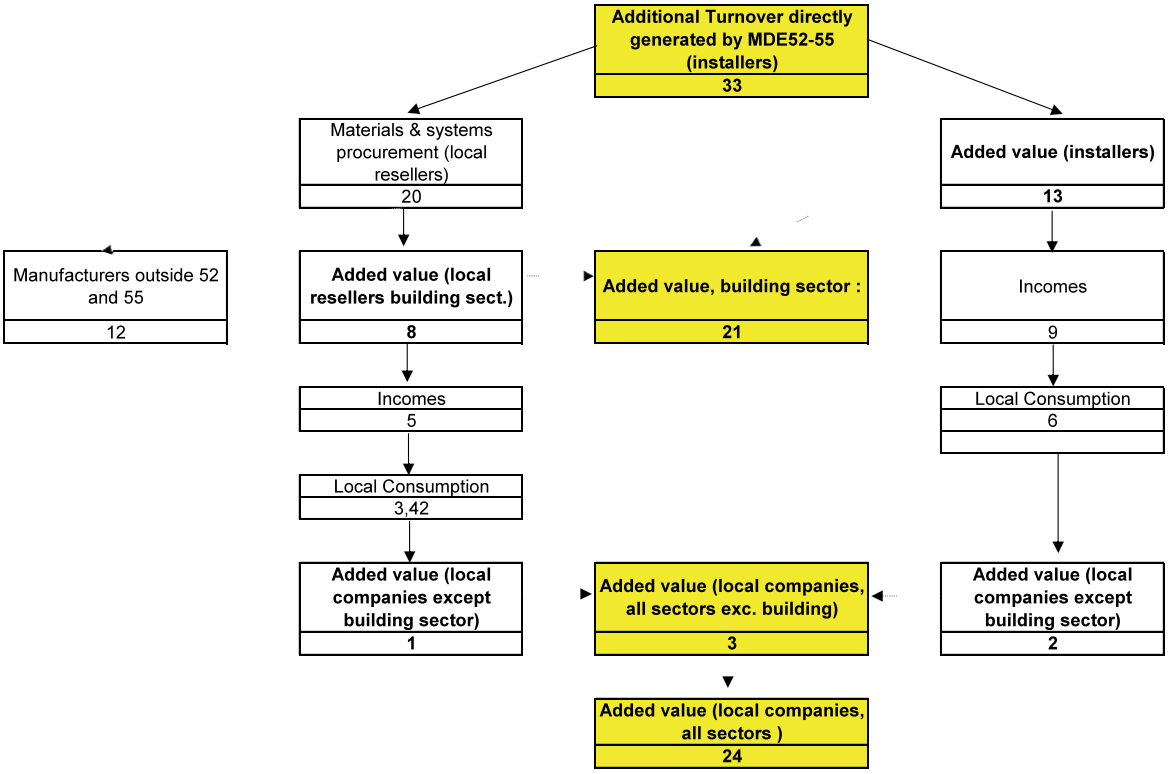

Figure 3. The economic flow generated by MDE 52-55 (values in M Euro)

Table 7: CO_2 content of several kinds of fuel in France (source: ADEME, French National Energy and environment Agency)

Fuel	CO_2 content of 1 kWh (g/kWh)
Electricity for heating	180
Gas	234
Fuel oil	300
Wood	13

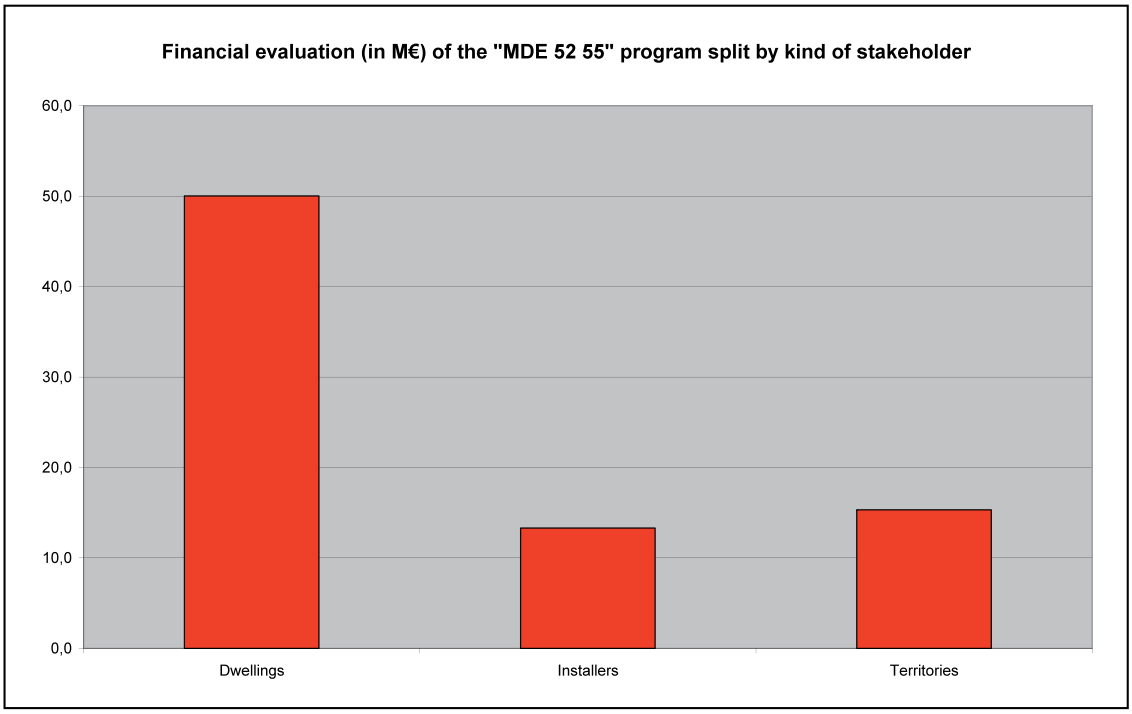

Figure 4. Financial evaluation of the value brought by the MDE 52-55 for each kind of client/stakeholder

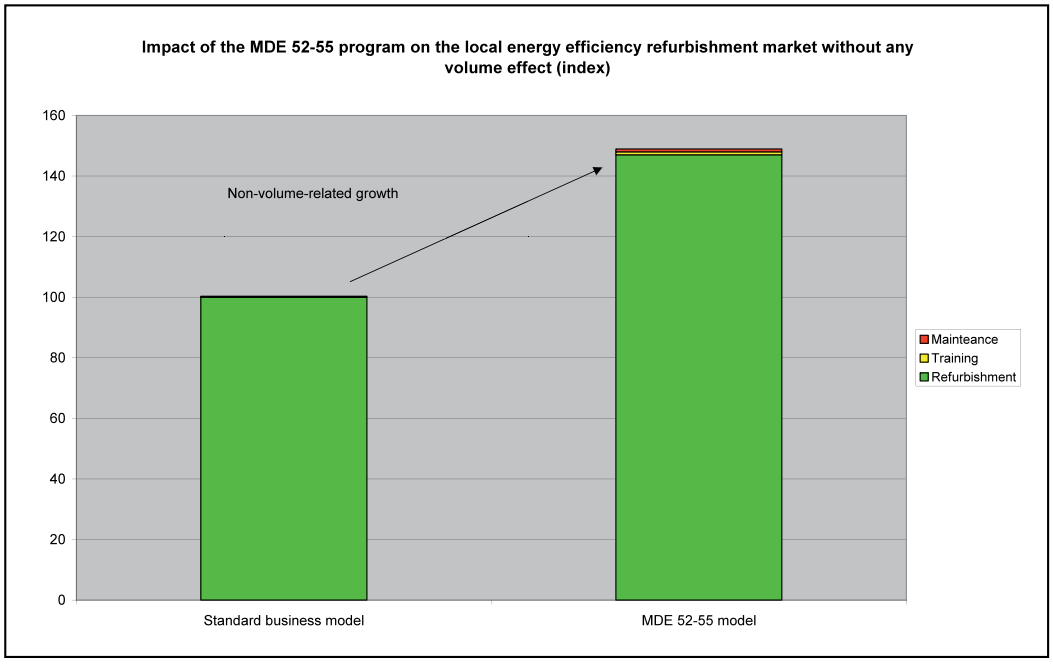

Figure 5. Impact of the MDE 52-55 program on the local energy efficiency refurbishment market

local installers could be competitive on the neighbouring markets out of the departments 52 and 55.

Such a cluster could also encourage the emergence of local high added value products manufacturers or redeployment of others in this constantly evolving sector (local window manufacturers).

MARKETING

The offer's systemic level: the service offer changes

The task here is to identify to what extend the underlying offer strategy and "philosophy" changed.

The offer responds to the question, "how can I lower my energy bill while improving my level of comfort" while the question in the past would have been, "I need to replace my faulty machine which has reached the end of its life". Far from being an "identical replacement", the service offer gives:

- the client at least a greater level of comfort (if the customer could not fully satisfy his need for comfort although a quite high energy invoice: the so-called "rebound effect" is often a translation of this situation) or a promise of lower bills for the same level of comfort;
- local authorities: a smaller environmental footprint and an economic dynamism.

Clarify the elements which remain external but which are nevertheless considered differently

The MDE 52-55 offer has resulted in an increase in the demand for products and services based on the "best technology available". This could boost the upstream eco-efficient product sector, which would then regulate its own production and focus solely on high added value goods. This effect greatly exceeds the offer's geographic framework and it could encourage the emergence of a regional eco-efficient sector, which could have a European scale if such a program was extended or networked.

The know-how acquired by local players (public and private) combined with the new resources which are available and reinvested (increase in added value, and therefore local business taxes) could encourage the emergence of skills or at least a reference cluster in the area of energy efficiency.

THE SYSTEM OF ACTORS

How does the system of actors differ from previous ones?

Most of the players involved in the offer appear quite traditional: customers, SMEs, EDF, Domofinance, professional organisations (FFB and CAPEB). What changes is the type of relations between them: they dot not act on their own, but have to communicate and organise themselves to make the service work. The customer has no more to contact all actors one after each other, the offered service simplifies the approach.

Another difference is the involvement of local authorities and training bodies in the offer, which is original itself. For example, local authorities are involved in advertising campaigns which aim at heightening public awareness of refurbishment and at presenting EDF's offer.

The relationships between actors have been formalised to establish synergies with a specific and common goals: energy savings.

Who has overall responsibility for managing the service? What are this player's legitimate position and its powers? What resources does it have?

EDF has initiated the MDE 52-55 project: its experts have defined technical requirements, commercials made the offers. EDF has committed itself to creating jobs towards the industry ministry.

EDF has a general overview and a view of operations (intended work) and the loan drafts (which may or may not be

granted). EDF is informed of the completion of the work by customers who have taken out a loan with Domofinance. EDF has a legitimate role throughout the project fulfilment process (scheduling, estimate, fulfilment, monitoring of work…):

- through its long-established relationships with the construction SMEs sector (of different specialisations) and local authorities,
- due to the energy saving obligations that it bears as a major energy provider (in the frame of the French white certificates scheme),
- due to the contribution of its Research &Development laboratory (expertises, technical requirement specification, involvement in showcases and demonstrations). EDF wide scope of competences enables the company to design, set, organise and manage integrated building refurbishment offers.

To conclude, assess to what extent this new economic model moves the system of players from a competitive situation to one of renewed cooperation

Initially, those involved in the MDE 52-55 program were not bitterly competing against one another, except for small building firms in the case of certain building sites. The MDE 52-55 project was in fact an opportunity to stimulate cooperation on the basis of the energy efficiency project among players who had until now been cohabiting informally.

A certain degree of competition was nevertheless created between "approved" small building firms who were part of the program and those who were not.

Domofinance is the first on the place, but this doesn't prevent customers to choose other banks for loans (which has happened in some cases). The offer had to face banking competition, but the other banks did not have such relationship with small building companies such EDF has built for decades.

THE PLAN TO ACCOMPANY THIS CHANGE

What levers exist?

The levers which accompany this change comprise the new responsibilities of EDF salespeople, the training of small building firms in the challenges posed by Energy Efficiency, and the raising of awareness in households with regard to this issue through joint EDF, local authority and small building firm action. Cooperation with trade organisations under a national campaign has strengthened these levers.

The training delivered to the installers was approved by the French national building federation (FFB) and has helped them in proposing integrated refurbishment solutions.

In its latest version, the offer includes, on top of an initial thermal diagnosis of the housing, an official energy performance certificate of the housing after the work. This diagnosis gives a mark between A (greatest) and G (worst) for the energy and CO_2 performance of the building. It can enlighten the global energy result after the refurbishment work and it enables to underline that the offer delivers an energy performance more than a single system or window replacement.

R&D-based software was used at the initial diagnosis stage in order to more accurately identify the renovation actions to do first.

In order to promote integrated refurbishment work, EDF has developed several commercial offers. The most advanced offers, with additional low-rate loans possibilities and strengthened support focus on combined renovation work including building envelope and systems.

Moreover EDF has been supporting several certification processes initiated by local window manufacturers and installers.

Is the change in business model based on internal resources? In this case, does it depend on trust?

The MDE 52-55 program depends in part on internal capacities, which identified the suitable Energy Efficiency technologies, but also on the confidence in the ability of the small building firm which installs these solutions. This does not of course rule out the need for experience feedback regarding the operations performed (reject rate, rebound effect, bargain free-rider effect).

How does the company's management use this accompanying plan?

A dedicated regional EDF Sales team takes care of advertising the offer; communication at a local level is carried out by EDF salespeople in the field through the usual channels. A specific call centre manages a dedicated phone number. The regional Sales Department monitors the marketing of the offer on an operational level and implementation and understanding difficulties are dealt with at a national level.

The MDE 52-55 program required specific support to be implemented within the Research and Development Department. Among other things, this support comprised scientific and technical assistance during showcases, technical and financial references adapted to local rather than national circumstances, instrumentation to monitor energy consumption on several sites and also support to analyse and quantify the jobs created and savings made in energy and CO2.

ORGANISATION OF WORK

The change in the economic model to a Service Economy implies a different relationship with work.

To what extent does this change alter the company's capacities?

EDF has become a player which is committed to decision-making in the field of energy efficiency work but it is also committed to the economic and social impact of these decisions. EDF accompanies its customers in their energy choices and their energy saving actions throughout the entire process; it has thereby moved from being an energy distributor/supplier to an expert in the incorporation of energy efficiency and the local economy. This shift has come about through the acquisition of a differentiating know-how which lets the company provide complex offers which affect several technical features of a building together with a territorial approach; it is no longer a firm that "simply" sells solutions to private individuals. Although professionals from different building trades attended special trainings in order to learn how to submit integrated of-

Table 8: Benefits and costs related to the MDE 52-55 program (for each kind of stakeholder)

Actors	Benefits	Costs
EDF	Experimentation of new energy efficiency offers White certificates Experience in large-scaled energy efficiency programs	Financial and technical support
Local authorities	Local economic development Increased attractiveness Competence network	Communication expanses
Local building firms	Improved skills Integrated refurbishment work with higher added-value Competence network	EDF Network subscription Personal investment during training sessions Additional staff expanses (included research for skilled people)
Households	Improved comfort Easier refurbishment work planning	

fers, the comprehensive vision of the energy efficiency features of the building remains mainly the matter of commercials.

Of course, not every operation was developed in such an ideal way, as it is underlined later in the paper.

R&D expertise is promoted (expert appraisals and monitoring of renovated/new build sites, thermal simulations of buildings, consultations on complex solutions and innovative products, etc.). The sales force no longer comprises sellers of offers but energy efficiency advisers with a broad view of energy problems and awareness raising goals. This strengthens their ability to build relationships.

The integrated renovation work have occurred rarely, but its proportion has been increasing steadily (from almost 0% to 7% at the end of 2008).

What systems exist to accompany these abilities?

EDF and its partners encourage partner small building firms to train in the installation of adapted solutions and new technologies. In two years, more than 250 local building companies have taken FEEBAT courses which means almost all of the 275 partner companies (1500 small building firms in this area).

Furthermore, EDF guarantees access to its R&D teams by providing all of its know-how to the fulfilment of energy renovation solutions in residential and tertiary sector buildings. EDF R&D also keeps a long-term view of the MDE 52-55 program through scenarios (evaluation of the turnover generated, local jobs created, etc.) so as to regularly gauge the effectiveness of spending, customer promises kept and, if appropriate, to offer new approaches to encourage the spreading of more effective solutions and to inform the players in the field.

How are the tools to assess human resources altered?

A redefinition of performance management systems is a key subject within the Service Economy. Financial performance is no longer the sole factor which is assessed (or at least a factor given great importance). Under the MDE 52-55 program, the performance of "energy and finance", which is expressed in the form of the cost of one MWh saved is of course observed. Nevertheless, the assessment also covers:

- technical/commercial support, associated commercial reporting, technical references and therefore changes in the best technologies available and its suitability in relation to a local market in a given area,
- direct jobs created in the building sectors - heavy work, technical light work, finishing light work,
- indirect jobs in the selling of material, training, design offices, inspection offices, architects.

Challenge to face and overcome

The comprehensive approach of energy efficiency refurbishment is the main challenge of MDE 52-55 program.

In spite of delivered trainings, installers still feel uncomfortable in promoting products beyond the scope of their ability although needed to realize multi-pack offers.

If craftsmen knew each other better, it would be easier to plan multiple-pack. Moreover, they sometimes feel reluctant to advice renovation work beyond the initial customer expectancies. Their role as energy efficiency advisors has to be strengthened or at least clarified: are craftsmen the best people to act this role, unless a specific actor is engaged.

Conclusion

This article has put forward another possible view on energy efficiency related offers. These offers have already made a considerable impact on an energy level but the value created (both financial and qualitative) greatly exceeds the impact on energy savings.

Table 8 proposes a short cost/benefits synthesis of the "MDE 52-55 program".

The Service Economy theory offers a methodological approach for the development of this offer and encourages the development of new tools to assess them. However, the financial estimate of the value created under the MDE 52-55 program needs further research. An accurate energy savings assessment should be processed in potential new programs to strengthen the results enlightened by this methodology. At least, an energy bill analyse in the concerned buildings could be planned before such a program is deployed. Local economic ratio should be used to the possible extent to do such an assessment with more accuracy. That can be achieved if local authorities are committed in such a program a long time before the program opera-

tional stage, so that they can do the relevant surveys and get the useful key economic data and ratio.

Besides, this article analyses a regional refurbishment program with a new sight, although the program itself had not been developed on such a theory. That is why some discrepancies between the program features and the pure service economy theory can be pointed out. This can also explain why some effective results do not meet the optimistic expectations of the theory.

However, this new analyse could inspire new regional refurbishment programs to come. It will certainly underline the major challenge to overcome, especially supporting a new organisation of the local building sector, so that it becomes fully building and energy performance oriented. That will not be done in one night, but this article deals mainly with a research topic. All the researchers have a dream, this is one.

Glossary

EDF: Electricity de France, the French leader in electricity production and supply

CEA: Commissariat à l'Energie Atomique, a state-owned research institute in atom-linked scientific fields

MDE: Maîtrise de la Demande en Energie (Energy Demand Management)

COP: Coefficient of Performance

FFB: Fédération Française du Bâtiment (French Building Federation)

FEEBAT: Formation des chefs d'entreprises, salariés et artisans du Bâtiment aux économies d'énergie (Standardized training to energy savings for employees in the construction domain)

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