Are your energy efficiency projects enough profitable? Check it from the profitability index method!

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Abstract

Beside the availability of energy efficiency technologies and a favourable framework to overcome non technical and non economic barriers, a large scale dissemination of energy efficiency projects requires a "fair and sufficient profitability" for investors. In order to evaluate if this profitability level is met, and if not in order to calculate what are the required incentives, this paper presents a simple, innovative and reliable economic analysis method, the "Profitability Index Method", from the name of the ratio between the net present value (or the differential net present value) generated by an investment and the initial cost (or over-cost) of this investment. The main advantages of this method are presented:

- Universal linear model of the project profitability index versus the price of energy delivered or saved, defining the cost, the cost structure and the required price of energy services.
- Rational assessment of the minimum value of the profitability index to attract investors.
- Direct determination of required incentives (subsidies, carbon credits, energy efficiency certificates…) if this minimum level is not met.

The preliminary presentation of the method is made from examples of simple sustainable energy. Then the extension of the method to the general case of energy saving or energy efficiency projects is detailed and the interest of this extension is assessed.

Introduction

An economic analysis of sustainable energy projects and policies based on energy efficiency and renewables is necessary in order to check if a sufficient level of economic profitability will be met by investors. This global economic profitability analysis should be made at the very beginning of the definition of a project or of a sustainable energy policy, typically during the feasibility study phase. As its results give an overview of the global profitability of the relevant projects before tax on annual profit from operation, it should be completed during the detailed studies phase by a standard detailed financial analysis which will be centred on the level of return on equity after taxes, which is the main relevant parameter for a private investor before confirming its involvement in a project. The paper will focus only on this preliminary economic profitability analysis, by presenting the basis and the advantages of the "profitability index method". This method is compatible with the main conventional economic analysis method already in use, the Life-Cycle Cost (LCC) analysis of projects (Fuller, Petersen, 1996) consisting in the comparison of the sum of all discounted costs of the energy efficiency project and a reference project during they investment, operation and decommissioning periods. The energy efficiency project will be profitable against the reference one if its life-cycle cost is lower, and in such a case conventional profitability parameters such as Benefit to Cost Ratio (BCR), simple or discounted pay-back period and internal rate of return (IRR) can be defined. The Profitability Index Method is fully compatible with the life-cycle cost analysis of projects incurring only costs and it can gives all the same profitability criteria, including of course the LCC values of both energy efficient and reference projects. But at it will exposed further, it presents more new advantages and interests:

- The profitability index method is designed directly to take into account projects incurring not only costs, but also generating incomes (including for energy efficiency projects), either by selling products (like in the case of CHP: selling both electricity and heat instead of selling only power), or like in the case of "positive energy buildings" selling for example excess electricity generated in the building to the grid, or as it will be more and more used in the twenty first century, by selling on environmental and institutional derivative markets "Carbon Credits" or "Energy Efficiency Certificates" or "White Certificates" generated by energy efficiency projects. Among those environmental markets, the one derived from the Clean Development Mechanism (CDM) of the Kyoto protocol is already in use for energy efficiency projects, and general guidelines for economic analysis for those types of projects based for example on a Net Present Value analysis are available (Spalding-Fecher, 2002).
- For projects with constant cash-flows, the profitability index method gives directly explicit formulas to make directly and easily the relevant economic analysis and related sensitivity studies. For projects with variable incomes and expenses, it gives guidance on how to replace those projects by equivalent constant cash-flows projects giving the same economic analysis results.
- From its related universal linear model and associated graph and formula, the profitability index method can determine directly and by explicit formulas all incentives for sustainable energy projects, such as subsidies, soft loans, environmental bonuses, preferential tariffs, carbon credits or white certificates minimum prices...
- Its extension to energy efficiency projects and more broadly to the "Differential economic profitability analysis" as described here will allow to give an easy and reliable answer to the basic question related to sustainable development "What will be the profitability and how to improve it to a minimum rational level if I invest in an efficient and clean energy project instead of investing in a conventional one?".
- As described further, other new and interesting results for sustainable energy projects are put in evidence from the Profitability Index Method, such as the strategic role of the structure of the overall discounted cost of the delivered or the saved energy or energy services, and in particular the role of the part of the overall discounted cost due to the initial investment cost or the initial investment over-cost in the case of energy efficiency projects.

The Profitability Index of a simple project

By "Simple project", we define an investment option not in competition with an other one. The profitability index of such an investment project (Brealey, Myers, 1996) is simply the ratio between its net present value *NPV* and its initial investment cost *I*. The net present value to take into account in this economic analysis results from the sum of the discounted economic cash flows during the *n* years of operation taken into account for the economic analysis minus the initial investment cost *I* supposed to be made during the "year zero" of the project. Economic cash flows are simply the difference of cash incomes and outcomes (including provisions for big repairs) before tax on annual profits.

Discounting must be made in the Profitability Index Method by using a real discount rate *t* defined as the real averaged weighted cost of capital (AWCC) before tax resulting from debt and equity (and not from an opportunity cost or from a targeted internal rate of return). So, the definition and the calculation of the discount rate are direct and easy from the actual cost of debt and equity and their relative part for financing a specific project.

From the discount rate *t* and the *n* years of operation of the project, we then classically define the Capital recovery factor *CRF*, defined by:

$$CRF = \frac{t}{1-(1+t)^{-n}}$$

Equation 1

This capital recovery factor will be used to replace variable parameters *Xj* of the cash-flow or the variable cash-flow itself of the project by their equivalent constant annual value *X* (in constant money of the year "zero" of the project) giving the same economic effect from the following formula:

$$\frac{X}{CRF} = \sum_{j=1}^{n} \frac{Xj}{(1+t)^j}$$

Equation 2

The "simple energy project", here for example a power plant, will be defined by the following costs and performance ratios:

Iu (Euro/kW), the initial investment cost ratio defined by the initial investment cost *I* (Euro) divided by the rated power *P* (kW).

Nh (hours/year), the mean annual capacity factor, expressed in equivalent hours at rated power and defined by the mean annual energy sold to the grid *Ey* (kWh/year) divided by the rated power *P* (kW).

Kom, the operating and maintenance expenses ratio, defined as the mean annual O&M expenses (excluding fuel costs, and including provisions for big repairs) divided by the initial investment cost *I*.

Cvu (Euro/kWh), the variable cost ratio, in this case the ratio between the annual total expenses for fuel (in Euro/year) and the annual energy output (in kWh/year).

From those projects ratios and using Equation 2, the profitability index *PI* of a simple project can be expressed directly from an explicit formula:

$$PI = \frac{Nh}{CRF.Iu}(TV - Cvu) - (1 + \frac{Kom}{CRF})$$

Equation 3

where *TV* is the equivalent constant selling price of delivered energy (in Euro/kWh) during the *n* years of operation. Of course, from its definition, the Net Present Value (NPV, in Euro) of the project will be easy to calculate:

$$NPV = PI.I$$

Equation 4

As an investment project is profitable only if it generates a positive Net Present Value, the profitability criteria of a simple project based on its profitability index will be: "A simple investment project is profitable if its Profitability Index is higher than zero". As indicated in the introduction, an other conventional project profitability parameter can be used: the "Benefit to Cost Ratio" (BCR), which is the ratio between the sum of the operating period discounted cash-flows (without taking into account the initial investment cost) and the initial investment cost. From this definition, one can see that for a project : BCR = 1 + PI, and the related profitability criteria is BCR > 1. From Equation 4, the advantage of the profitability index over the BCR is that the Net Present Value of a project is directly proportional to its Profitability Index, so it is much more rational to use the Profitability Index of a project than its benefit to cost ratio.

An universal linear profitability graph

From the above Equation 2, it is easy to draw the graph in Figure 1 representing the linear variation of the project profitability index *PI* versus the selling price of energy *TVe*.

The following information can be seen on this graph:

1. The "Overall Discounted Cost" (ODC), of energy (in Euro/kWh). This cost is defined from the condition PI = 0, so from the Equation 3 its value is:

$$ODC = Ci + Com + Cvu = \frac{CRF.Iu}{Nh} + \frac{Kom.Iu}{Nh} + Cvu$$

Equation 5

2. Its structure:
   Its variable cost component *Cvu*, from fuel costs.

   Its operating and maintenance costs *Com* (including provision for big repairs, but excluding fuel costs already taken into account in *Cvu*)

   And its investment cost part *Ci*.

This cost structure is defined from the specifics points M and S being defined by their vertical co-ordinate. In particular, the vertical ordinate of the S point is -1.

3. The reference profitability index *PIr* corresponding to a reference selling price of energy on the market *TVr*.

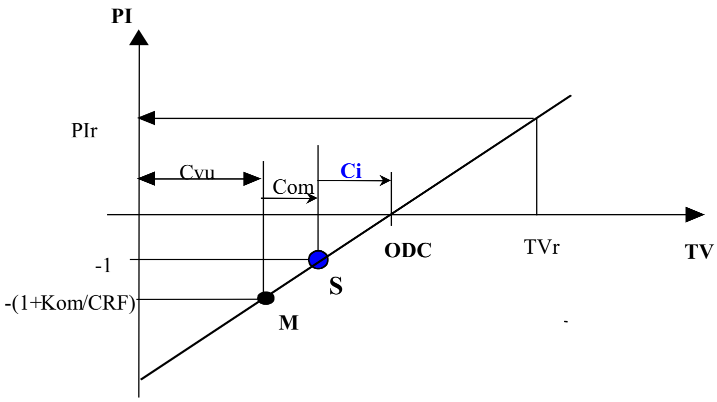

Figure 1. *The linear profitability Graph.*

Such graphs for specific sustainable energy technologies such as wind power and CHP from biomass have already been published (Chabot, 1999).

An "Universal golden rule for investors"

From Figure 1, one can establish a simple relation between the margin on cost (*MOC*) of the kWh and the investment cost part of the cost of energy:

$$\frac{PIr}{1} = \frac{TVr - ODC}{Ci} = \frac{\frac{(TVr - ODC)}{ODC}}{\frac{Ci}{ODC}} = \frac{MOC}{\frac{Ci}{ODC}}$$

Equation 6

This universal direct link between the profitability index of an investment project and the commercial margin on cost of the delivered product shows the strategic importance of the relative part of the cost of the product due to the initial investment cost.

From the analysis of different business sectors, it allows also to put in evidence a "fundamental golden rule" or a "best kept secret" to be used by investors in search of a robust growth within competitive expanding markets:

> *"The Profitability Index of successful investment projects should be at least 0.3"*

And this 0.3 value is "universal" in the sense that, as the averaged weighted cost of capital of a project is taken into account for the calculation of its profitability index, it is always the same numerical value whatever the country or the type of investor or financier involved in the project.

From this "golden rule", the "efficient energy tariff" TV_r can be defined from the targeted value PI_r of the project:

$$TV_0 = \frac{(1+PI_r).CRF + Kom}{Nh} Iu = Cost + Ci.PIr$$

Equation 7

After choosing this targeted value *PIr* in accordance with the "golden rule" philosophy, it is easy to calculate the standard conventional economic profitability parameters such as the Internal rate of Return (IRR), the Discounted Pay-Back Time (DPBT), the Simple Pay-Back Time (SPBT) and the Benefit to Cost Ratio BCR from their following links with the project Profitability index:

$$CRF(IRR,n) = (1+PI).CRF(t,n)$$

Equation 8

$$CRF(t,DPBT) = (1+PI).CRF(t,n)$$

Equation 9

$$SPBT = 1 / (1+PI).CRF(t,n)$$

Equation 10

$$BCR = 1 + PI$$

Equation 11

Taking into account incentives

It is very easy to calculate the impact of specific incentives on project profitability, or to design those incentives in order to make sustainable energy projects more attractive for investors. The following examples cover the case of a subsidy level *si* on the initial investment cost of a project and the case of the impact of selling the "carbon credits" attached to a project on an environmental derivative market.

SUBSIDY ON INITIAL INVESTMENT

The Profitability index *PIf* of an investment project benefiting from a subsidy *si* (in %/100) on initial investment is also defined from its Net Present Value *NPVf* after the effect of this subsidy:

$$Pif = \frac{NPVf}{I(1-si)} = \frac{Nh}{CRF.(1-si).Iu}(TVe - Cvu) - (1 + \frac{Kom}{CRF.(1-si)})$$

Equation 12

From this definition and from the calculation from Equation 3 of the supposed too low value of the Profitability Index *PIi* of the project before benefiting of such a subsidy *si*, it is easy to define the required level of subsidy in order to get the final targeted profitability index value *PIf* (defined from the above "golden rule" for example):

$$si = \frac{PIf - PIi}{1 + PIf}$$

Equation 13

CARBON CREDITS VALUATION AND ITS IMPACT ON PROJECT PROFITABILITY: A FUNDAMENTAL "T-C" THEOREM

A sustainable energy investment based on the use of energy efficiency or renewable energy technologies can avoid greenhouse gas emissions. In this example we will consider a "zero emission" power plant such as a wind power plant, but the result will be the same for all simple investments. Such a wind power plant can avoid *Qc* kg of equivalent CO_2. The value of *Qc* (kgeCO_2/kWh) depends on the local or regional mix of electricity during the *n* years of operation of the wind power plant.

Carbon credits will result from those avoided CO_2 emissions, and we will consider that the owner of the wind power plant will be able to sell those carbon credits during the *n* years of operation of the wind project at a net equivalent constant selling price of *Vc* Euro / tCO_2 on environmental derivative markets. Such markets could derive from the European Trading System (ETS) opened in 2005 or from the Clean Development Mechanism (CDM) of the Kyoto protocol.

The resulting supplementary income per kWh of wind energy sold to the grid will be:

$$Tc = 0.001 Qc.Vc \quad (Euro / kWh)$$

Figure 2 shows the impact of this supplementary income on the linear profitability graph : the effect is to translate the "*PI* versus *TVe*" line horizontally towards the left by a value of *Tc* Euro / kWh:

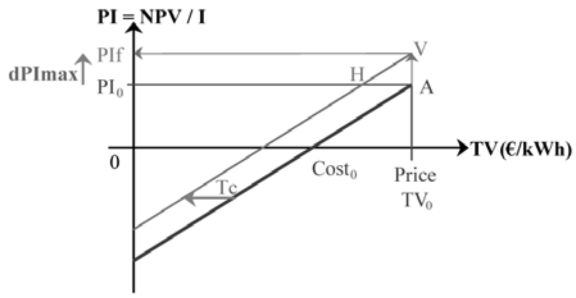

Figure 2. *Impact of selling carbon credits on the PI versus TVe line.*

So, for a fixed selling price of energy TV_o, the initial PI_0 value of the project profitability index will be increased to a

PI_f final value and the corresponding increase in profitability *dPImax* will be:

$$dP\,\mathrm{Im}\,ax = PIf - PIo = \frac{Tc}{Ci}$$

Equation 14

which can be expressed as the "T-C theorem":

> "The maximum increase of profitability of a sustainable energy project expressed as its maximum change in profitability index equals the ratio of the supplementary income per kWh resulting from selling the carbon credits to the investment part of the cost of delivered clean energy".

MIXING INCENTIVES

If a simple project benefits from different incentives, for example both from a subsidy on initial investment *si* and from valuation of carbon credits like in the former example, its final Profitability Index *PIf* will be

$$PIf = \frac{si + PIi + PIs}{1 - si}$$

Equation 15

where *PIs* is the "*Supplementary Profitability Index*" generated from carbon credits, equals to *dPImax* defined by Equation 14.

Applying the method and its advantages to energy efficiency projects

DEFINING AN ENERGY EFFICIENCY PROJECTS VERSUS A "CONVENTIONAL ONE"

We will consider the general case in which the potential investor has the choice either to invest in an energy efficiency project (index "e") delivering an annual energy service or to invest in a conventional project (index "c") delivering the same energy service, and of course he will invest at the end in only one option. Such projects covers for example energy saving projects with or without fuel switching or designing an advanced efficient energy service system compared to a conventional one. Generally speaking, this model covers all ways to generate "negaWatts", which are avoided kW and avoided kWh when delivering such a final energy service.

The two projects are defined in Figure 3. Both of them will be discounted at the same actual discount rate *t* (defined as the averaged weighted cost of capital of the potential investor) under the same number *n* of years of operation. The operating and maintenance annual costs include provisions for big repairs and reinvestment costs in case of replacements of main sub-systems with a shorter lifetime than *n*. The *Dom(i)* versus time profile under the *n* years will be replaced by the constant equivalent value *Dome or Domc* value which gives the same economic effect using the Equation 2.

We will consider that the energy service is directly delivered to the owner of the system and not sold to an energy service market. So the "cost of negaWatts" generated by the efficient project will have to be compared to the purchase cost of the commercial energy used to deliver the efficient final service (*Tfe* in Figure 3).

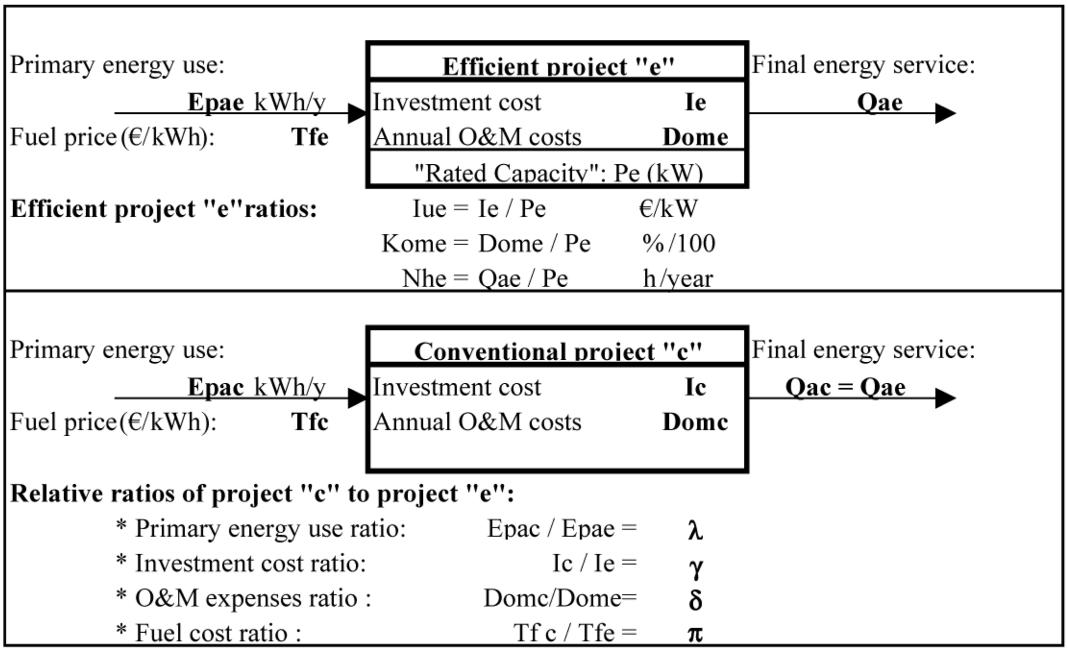

Figure 3. *Definition and characteristics of the energy efficiency and the conventional project.*

DEFINING THE PROFITABILITY OF THE "ENERGY EFFICIENT OPTION" VERSUS THE "CONVENTIONAL ONE"

We will define the "differential Net Present Value " (*dNPV*, in Euro of year "zero") resulting from the comparison of the two options:

$$dNPV = NPVe - NPVc = -(Ie - Ic) + \frac{CFe - CFc}{CRF(t,n)}$$

Equation 16

where *CFe* and *CFc* ar the constant annual equivalent economic cash-flows of each options.

Investing in the energy efficiency option instead of investing in the conventional one will be profitable for the investor if the "differential Net Present Value" (*dNPV*) is higher than 0.

From this differential net present value we will now define two "Profitability Indexes":

- The "Apparent Profitability Index" *PIa* defined as : *Pia = dNPV / Ie.*
- The "Differential Profitability Index" *PId* defined as *PId = dNPV / (Ie-Ic).* Of course, this parameter is to be used only if the investment cost of the efficient option is higher than the one of the conventional option. If it is not the case, the profitability of the efficient option versus the conventional one is obvious in most cases, as fuel costs of such an option and then its cash-flows are lower than those of the conventional option.

The above "profitability rule" translates simply in the following rules using those profitability indexes:

"Investing in an energy efficiency option instead of investing in a conventional one is profitable if the apparent profitability index is higher than zero and/or if the differential profitability index is higher than zero"

Defining two profitability indexes for a profitable energy efficiency project and calculating their respective values give a strong advantage:

- The "Differential profitability index" gives a "rational view" on the "mathematical" profitability when investing in only the energy efficiency option: as the investor will not invest in the conventional one, he has "rationally" to consider only the differences in investment costs and cash-flows.
- The "Apparent profitability index" is more related to the "psychological resistance of the investor": "of course I will invest only in the energy efficiency option and I will not spend my money in the conventional one, but I have to finance all the investment cost of that option to implement this energy efficiency project, so I need to see how much money I will earn in the end under the form of differential net present value for each Euro Invested in this energy efficiency project".

Those two profitability indexes are not independent, from their definition, they are linked by the following formula:

$$PId = PIa \frac{Ie}{Ie - Ic}$$

Equation 17

USING THE APPARENT PROFITABILITY INDEX

Beyond its "psychological" interest for the investor discussed before, the apparent profitability index can be used (if its value is known) to calculate the differential net present value between the two options:

$$dNPV = PIa.Ie$$

Equation 18

There is not a simple way to define a "golden rule" to fix a minimum value of the apparent profitability index like in the case of a "simple project". Nevertheless, if a market regulator wants to promote effectively an energy efficiency technology, in order to attract private industrial and commercial investors, a "safety rule" should be here also to ensure a minimum value clearly above zero, for example between 0.2 to 0.4. If such a range of value is not possible, a required subsidy level *sie* on the initial investment cost of the energy efficiency option *Ie* can be easily calculated as in Equation 13:

$$sie = \frac{aPIf - aPIi}{1 + aPIf}$$

Equation 19

where *aPIf* is the targeted final apparent profitability index value and *aPIi* is the insufficient initial apparent profitability index before subsidy.

USING THE DIFFERENTIAL PROFITABILITY INDEX

From its definition, it is also easy to calculate the differential net present value of an energy efficiency project from its supposed known differential profitability index:

$$dNPV = PId.(Ie\text{-}Ic)$$

Equation 20

The differential profitability index is also to be used to define the "differential" internal rate of return (*dIRR*), the differential discounted pay-back time (*dDPBT*) and the differential simple pay-back time (*dSPBT*) of the energy efficiency project option :

$$CRF(dIRR,n) = (1+PId).CRF(t,n)$$

Equation 21

$$CRF(t,dDPBT) = (1+PId).CRF(t,n)$$

Equation 22

$$dSPBT = 1 / (1+PId).CRF(t,n)$$

Equation 23

The "physical" interpretation of the differential internal rate of return is very simple: it is the virtual annual constant real interest rate to serve on the (*Ie-Ic*) sum on money on *n* years to generate at the end the differential net present value *dNPV.* If the difference (*Ie-Ic*) is very small and if the dNPV value is large (resulting from a big differences in cash-flows for example), one can see that both the *dPI* and the *dIRR* values can be extremely high. That is why the *PId* value must not be considered alone, but must be also completed by an assessment of the *PIa* value.

The "differential discounted pay-back time" *dDPBT* is the minimum years of operation of the energy efficiency project to change its *dNPV* value from negative values to positive ones. Of course its value must be lower than *n* to get a profitable energy efficiency option. Its maximum value should be compatible with those considered by the kind of investors who are potentially interested to invest in the project.

The "differential simple pay-back time" *dSPBT* is the ratio between the difference between the investment costs of the two options to the difference between their cash-flows. As it does not take into account the discount rate, its use should be avoided. The only way to determine if a project is profitable from this parameter is to check if the differential simple pay back time is lower than the *1/CRF(t,n)* value: if not, the project if not profitable.

DEFINING THE DIFFERENTIAL PROFITABILITY INDEX FROM THE DATA AND THE RATIOS OF THE TWO OPTIONS

From Equation 16 and its definition, the differential profitability index can be expressed from the parameters defined in Figure 3 as:

$$PId = \frac{EPac.Tfc - Eae.Tfe}{(Ie - Ic)CRF} - (1 + \frac{Dome - Domc}{(Ie - Ic)CRF})$$

Equation 24

where both cost and energy parameters of the efficient and the conventional project are used.

If we use the relative ratios λ, γ, δ and π of the conventional project to the efficient project as defined in Figure 3, we can get a new form of Equation 24 without direct reference to the absolute levels of energy consumption and costs:

$$PId = \frac{(\pi\lambda - 1)Nhe}{(1 - \gamma)IueCRF} Tfe - (1 + \frac{(1 - \delta)Kome}{(1 - \gamma)CRF})$$

Equation 25

DEFINING THE "NEGAWATT COST AND COST STRUCTURE"

The cost of saved commercial energy, which is the "negaWatt cost" is defined as the value of the purchase cost of commercial energy *Tfe* which gives a zero profitability level. So from Equations 24 and 25 it will be:

$$ODC = Ci + Com = \frac{Tfe}{Tfc.Epac - Tfe.Eae}[(Ie - Ic)CRF + (Dome - Domc)]$$

Equation 26

or using the ratios defined in figure 3:

$$ODC = Ci + Com = \frac{Tfe}{Tfc.Epac - Tfe.Eae}[(Ie - Ic)CRF + (Dome - Domc)]$$

Equation 27

DEFINING A "LINEAR PROFITABILITY GRAPH" FOR AN ENERGY EFFICIENCY PROJECT

From Equation 25 we can see that the linear model linking the differential profitability index *PId* and the cost of purchased commercial energy *Tfe* is the same than in Equation 3. The only difference is that we did not consider other variable cost than *Tfe.*

So, this linear model will permit to draw the same universal linear profitability graph than for a simple project, with all its advantages. The potential difference is that for very efficient options versus very inefficient ones, the overall discounted cost of saved energy (the "cost of negaWatts") may be lower than zero, as shown in the example in Figure 4, where the investment cost part of the negaWatt is positive (from the fact that the investment cost ratio *Ie* is higher than *Ic*) and its operating and maintenance part is negative (from the fact that the cash-flows of the efficient option are less negative than the ones of the conventional option), leading to a negative negaWatt cost.

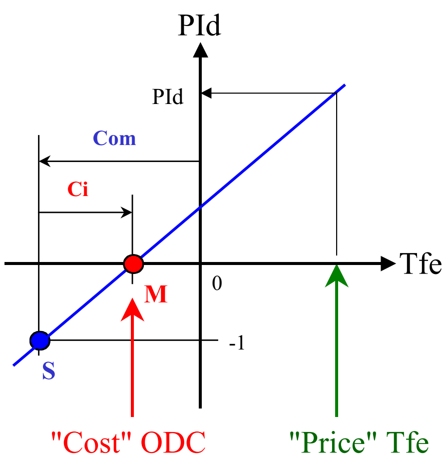

Figure 4. *The linear differential profitability graph.*

So from this graph we can see at a glance:

- The "negaWatt cost" ODC.
- Its stucture: part *Ci* of cost due to the initial investment difference between the two options and part *Com* due to

differences in operation and maintenance costs between the two options.

- The difference between the "cost" and the "price" *Tfe* paid for commercial energy used for the efficient option.
- The profitability level *PId* resulting from this difference between cost and price, which is directly proportional to the differential net present value resulting from investing in the efficient option instead of investing in the conventional one: $dNPV = (Ie - Ic).PId$.

TAKING INTO ACCOUNT INCENTIVES IN FAVOUR OF AN ENERGY EFFICIENCY OPTION

From the linear model defined by Equation 25, we can also assess the potential impacts of incentives such as a subsidy level *si* on the investment cost *Ie* of the efficient option.

In this case the definition of the apparent profitability index *PIaf* after subsidy will be : $PIaf = dNPV / Ie(1\text{-}sie)$ and the required level of subsidy to get this targeted final profitability instead of the too low profitability level *PIai* before subsidy will be:

$$sie = \frac{PIIaf - PIai}{1 + PIaf}$$

Equation 28

We can also consider the sale of the environmental advantage of the efficient option on a derivative market. Such derivative markets may be based on exchanges of "carbon credits" or "white certificates" or an "energy efficiency certificates" attached to the efficient option. In all case, at each "negaWatt" defined as each avoided kWh of commercial energy (*Epae-Epac*), a supplementary income *Tce* will be generated resulting from the sale of the relevant certificate attached to this negaWatt.

Here also, the effect of this valuation on environmental derivative markets will be to translate the "PId versus Tfe" differential profitability line to the left from an horizontal value of *Tc* Euro/kWh, and the "T-C" theorem can also be used from the definition of *Ci* in Equation 27 and the differential profitability index *Pio* before selling certificates:

$$dPId\max = PIds = PIdf - PIdo = \frac{Tc}{Ci}$$

Equation 29

Conclusions

The profitability index method gives clearly a competitive advantage for the assessment of the project economic profitability of investment options, both in the case of simple projects or in the case of the choice to invest either in a clean and efficient option or in a conventional one.

Its ability to integrate easily and straightforward incentives for sustainable energy projects is also a clear advantage when decision makers and energy and energy services markets regulators have to define such incentives in order to boost clean and efficient projects such as those based on renewables and energy efficiency.

As it is based on very simple and reliable principles, rules and explicit formulas, it can be used after a short training period even by project managers without economic background and it is very easy to build dedicated software based for example on simple spreadsheets to facilitate its implementation.

In the case of energy efficiency projects, this method and its associated rules and formulas can participate to their large scale development and can ease the design of ambitious and robust dissemination programmes for related technologies and applications.

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