THE SUSTAINABLE VALUE APPROACH: AN APPLICATION TO THE ENERGY SECTOR IN FRANCE

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Abstract: *This research applies the Sustainable Value approach to the multinationals of the energy sector in France during the period 2005-2007. The sustainable value widens the classic logic of the performance investment evaluation to the environmental and social resources. The cost of the resource is thus defined by its opportunity cost and the company contribution to the sustainability is expressed in monetary terms.*

Key words: *Sustainable Value, Measure, Opportunity Cost, Benchmark.*

1. Introduction

Companies in a general way and multinationals more particularly are important actors of the sustainable development. The European Commission (EC) translates the principles of the sustainable development on the scale of the company by means of the corporate social responsibility (CSR). The definition of CSR used by the EC reflects a concept "whereby companies integrate social and environmental concerns in their business operations and in their interaction with their stakeholders on a voluntary basis" [4].

This ideology breaks with the Friedmanian conception of corporations as a tool of maximization of the ownership returns. There is thus a very real possibility that corporations should in certain cases deviate from profit maximization to pursue ends that are more important from a social point of view. "This does not mean that corporations should abandon profit maximization altogether, in certain cases the efficiency enhancing effects of this pursuit will make them legitimate, but in other cases other interests will take precedence" [16]. " The CSR can be also defined as corporate' contributions to the objectives of the sustainable development and the "global performance" is, in the speeches and the manager literature, a term more and more used to represent this contribution" [3]. Defining and measuring sustainability became more than an academic objective. Corporations must demonstrate how they contribute to the national objectives of sustainability fixed by the government. The problem of measure of corporate contributions to sustainability rises in this context. Formally, the investors and the analysts are interested in the economic capital profitability. However, corporations do not only use economic capital but also environmental and social resources to create a return. Thus, it is necessary to estimate the use of all the categories of resources to measure the level of corporate contributions to sustainability. The terms as "eco-efficiency" or "triple-bottom-line" express the idea that while trying hard to realize an economic prosperity the decision-makers of organizations have to take into account environmental and social consequences of their companies' activities. However, we notice today that commercial decisions are essentially directed to financial objectives. Our economic activity continues to damage the environment and thus the social capital while we need all these types of resources to create a sustainable value. So, only corporations which take into account all these three types of resources in their decision-making can really contribute to the sustainable development. This research has for objective to study the sustainability at the level of companies. A review of the literature surrounding the area of the measurement of corporate

contribution to sustainability will be the object of the first part. A particular interest will be carried in the sustainable added value as new approach of measure, in the second part of this study. This approach will be object of an empirical application in the big groups of the energy sector in France. Indeed, the energy future is one of the essential problems of the sustainable development and major subject of the company today. The increase of the world energy consumption (+55 % between 2005 and 2030; 1.8 % a year, according to the World Energy Outlook, October 2007), allied to an upper limit announced by the fossil energy resources due to the finitude of the reserves constitutes a global preoccupation at double level. On one hand, the supply of energy is a vital challenge in the companies' functioning and the populations' everyday life. On the other hand, the energy activity (production and consumption) generates a considerable ecological footprint.

2. Sustainability and corporate contributions to the sustainability

Since the earth summit of Rio in 1992, the governments of several countries of the world adopted the sustainable development as national objective. The Brundtland Report defined it as "development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs" [21]. The term sustainability was also popularised. Atkinson (2000) distinguishes between two types of sustainability. A "weak sustainability", according to which all the stocks of capital are substitutable between them. So any loss in one of the stocks can, in theory, be replaced by a surplus in the other forms of stocks. However, the partisans of a "strong sustainability" suppose that there is at least a not substitutable stock and therefore, it is necessary to keep a level of critical stock. For example, the natural assets supply complex and crucial ecological functions for the human life and consequently, we cannot substitute them another category of assets [1].

Although all discussions and decisions about the way of reaching sustainability are led at the national or global economic scale (e.g. Kyoto protocol), an increasing number of discussions and researches study sustainability in the perspective of economic entities (such as industries or companies). However, finding relevant measures for the company sustainability, in a static point of view, is far from being easy. This problem can be resolved by adopting a dynamic vision for the sustainability. « From a society's point of view the interesting question can be thought of in terms of the contribution of a given entity (e.g. business or sector) to sustainability defined in the wider sense (e.g. nation)" [1]. According to the macroeconomic reasoning, at the firm level, the degree of substitutability of three forms resources (economic, natural and social) must also be examined. Therefore, the continuum of contribution of the firm to sustainability extends from a weak level to a high level. A "weak sustainability" supposes that there is no substitutability between the three types of resources and thus requires improving the results in one dimension while keeping the performance of two others at least constant. A "strong sustainability" supposes an unlimited substitutability of the capital which can allow a deterioration of the performance of one dimension so that it is compensated with a better performance in one of the other dimensions.

There are various approaches for measuring corporate contributions to sustainability. The two prevailing approaches are absolute and relative measures [2]. After a brief presentation of these two approaches, we are going to focus on a new approach for measuring corporate contributions to sustainability: the sustainable value added [6].

2.1 Approach of the absolute measures

This approach leaves the principle that the contribution to the sustainability can be estimated by the difference between the advantages created by a company and the internal and external costs engaged for this end. These costs can be diverted from the full cost accounting [12]. According to the absolute measures approach, a company contributes to sustainability, if the advantages exceed the sum of the costs. The result can be called "the net value added" [15] or "the green value added" [1]. The economic performance of a company in terms of value added is adjusted by the external environmental costs caused by the company's economic activity. Or, the costs can be deducted from the advantages only when both columns are expressed by the same unit. It is for that reason that environmental (and social) damages are expressed in monetary term via the concepts of net value added or green value added. From a theoretical point of view, these concepts supply powerful measures for the corporate contributions to sustainability. They translate the requirements of the rule of the constant capital at the macroeconomic level in measures at the micro-economic level. However, certain limits and problems can arise to their application [6]. Indeed, the necessity of expressing the social and environmental damages in monetary terms, limits severely the practical use of the absolute measures [2]. On the other hand, the absolute measures often compare the value created by the company with the environmental and social damages caused. They allow estimating if a company reached a threshold of sustainability, that means if a company is sustainable or not. However, they don't allow determining if the possible maximum of contribution to sustainability was reached. The absolute measures are based on the hypothesis of the full substitutability.

2.2 Approach of the relative measures

The relative measures express the company's contributions to sustainability as the advantages by unit of environmental or social impact and can escape so certain problems of the absolute measures approach. The best example of a relative measure is the eco-efficiency [6]. Today, there are two different uses from the expression eco-efficiency. The first one refers to the reduction of the environmental impacts. The second notion uses the term eco-efficiency to describe the ratio of the value added by the environmental impact (EI) [2]. According to the second notion, Figge and Hahn had appeal to eco-efficiency - and by analogy social efficiency as a ratio, or:

Eco-efficiency = value added / environmental impact added

The value added of a company is defined as the residual value which stays having deducted from the turnover the products and services costs used by the company. The Environmental Impact Added (EAI) represents the sum of all the energies and the streams of materials considered led by the economic activity balanced by their respective harmfulness to the environment. This aggregation is made classifying every broadcast according to its contributions to various environmental problems which are then balanced by their relative harmfulness. The eco-efficiency describes the degree of use of the environmental resources concerning the development of the company economic activity. The partisans of the eco-efficiency demand that improvements in the eco-efficiency strengthen the companies' contributions to sustainability [2]. When we examine the relation between the sustainability and eco-efficiency we can distinguish between weak and strong improvement of the eco-efficiencies [20]. A strong improvement of the eco-efficiency includes an improvement of the economic and environmental performance while a weak improvement of the ratio requires the improvement of one dimension only. The application of the relative measures approach

presents also a number of gaps. Indeed, these measures don't give information about effectiveness. The efficiency informs about the relation between the consequences (e.g. the environmental impacts) and the fixed objective (economic performance). So, the environmental and economic performance of a company, in absolute terms, cannot be determined from the eco-efficiencies' ratios. For example, if a company produces 3€ by ton of CO_2, we cannot neither say how much value the company creates, nor how much CO_2 it emits in absolute terms. The absolute degrees of environmental, social and economic performances are reflected by measures of effectiveness. These measures are necessary for the evaluation of the corporate contributions to sustainability. In fact, the improvement of the eco-efficiency does not guarantee the improvement of the effectiveness [11]. On one hand, a better eco-efficiency could lead to the growth and thus to the greater use of the environmental resources. On the other hand, the environmental resources which are registered thanks to a better eco-efficiency could be used by the other companies which are less eco-effective. It is necessary to underline also that the eco-efficiency does not cover the social aspects [10]. Besides, even if the social aspects are considered by analogy as social efficiency, the relative measures allow only integrating the environmental and social impacts which are expressed in the same unit.

All environmental and social sub-indicators must be balanced and included for obtaining one sustainability indicator (absolute or relative) [19]. Or, it is very doubtful that all the social and environmental impacts can be integrated into a common unit of the environmental and social impact added simultaneously and so be grouped together in a sustainable impact added [2]. The coherence of an integrating measure of performance is, in the instrumental level, very problematic [18].

3. The sustainable value added: a new approach for measuring corporate contributions to sustainability

All the sustainable development' theories agree on the fact that the future well-being is determined by the wealth evolution through time. On a national scale, a commission on the measure of the Economic Performance and the Social Progress was created at the beginning of 2008, on the initiative of the French government. The objective of a sustainable measure is to estimate the contribution to sustainability including economic environmental and social dimensions. This vision applies as well on the scale of the nation as on the scale of the company. The absolute and relative measures of corporate contributions to sustainability examined above are limited. A sustainable measure has to envisage the efficiency and the effectiveness of every three dimensions of sustainability simultaneously. Besides, such measure is supposed indicate if an entity reached the threshold fixed, namely if it contributes to sustainability (if question), and where the resources were attributed to achieve the most high possible level to sustainability (where question). The investors are regularly confronted with a similar situation of decision-making. They have to determine if the advantage of an investment possibility exceeds its costs and, if it is more attractive than the other investment possibilities.

By analogy with the investment decision, a sustainable measure has to make the distinction between direct costs and opportunity costs. Indeed, the investments are only made if they cover their direct expenses and exceed the advantage which could be reached, if the capital was differently surrounded. This reasoning can be also applied to measure companies' contributions to sustainability. Consequently, a sustainable measure should, on one hand, allow deciding, if an entity' resource use is sustainable and if the resource should be completely used. It should also reflect where the resource should be attributed for an optimal use, namely where the resource reaches a maximum surplus by unit of resource. Figge and Hahn [6] represent this

decision situation in a matrix and suggest comparing the environmental and social performances of various companies between them to answer the question where the resources must be assigned to reach the highest contribution possible to sustainability. Figge and Hahn elaborated a based value methodology to estimate the companies' contributions to sustainability: the sustainable value added. This methodology is based on the opportunity cost thinking and a model of three actors.

3.1 Framework of the sustainable value approach

The sustainable value added as the value created moreover, when the global level of the environmental and social impacts is maintained constant [6]. This measure represents the value created in more because a company was more efficient than a benchmark and on the other hand, because the resources were assigned to the company and not to the benchmark. This idea of benchmarking is applied by social rating agencies and the social responsibility index. These bodies proceed generally to comparisons at the level of the same sector to make a classification of companies within the sector according to their social responsibility scores. The benchmark can help to advance in the field of measure of corporate contributions to sustainability [17]. The sustainable value of a company is calculated on the basis of the comparison of the value created by a benchmark using the same set of resources. In other words with the same amount of financial, environmental and social resources used by the company during a given period how much value the benchmark would create. The sustainable value approach is in the heart of the management-based value system. For estimating corporate contributions to sustainability, it is necessary to consider the changes in the environmental efficiency, the changes in the economic growth as well as the changes in the social efficiency. If the economic, environmental and social performances reach at least the level of the performances of the previous period, strong contributions to sustainability are also reached. The opportunity costs of the resources use must be considered in the evaluation of the company contributions to sustainability [6]. The level of the economic output which was not realized because of the resources allocation to the company on the place of the benchmark represents the lost value. This lost value is called: opportunity cost. The sustainable value is based on the opportunity cost thinking which dominates financial markets. To create a value added, an economic entity (company, State or region) uses generally diverse resources (financial but also environmental). Naturally, it's better to use least resources to create higher value. According to the financial logic, the financial market focuses essentially on the economic capital. The objective is to find the best combination between the risk and the profitability of the resource use. This, naturally, goes against the logic of the sustainable value, according to which, an economic entity does not use only an economic capital but also environmental and social resources. Of this fact the only focus on the economic return on capital is insufficient. How can we determine if an economic entity creates some value with its economic, environmental and social resources?

Generally speaking, a value is created if the profitability exceeds the committed costs.

Value = Profitability - Costs.

This formula is fundamental for any evaluation of an entity economic performance. The sustainable value approach spreads this basic rule to the environmental and social resources. The sustainable value approach consists in:

- Determining the value created by the use of such or such environmental, social or economic resource;

- Comparing the profitability of alternative uses of these resources (opportunity Costs): when the same resources are used otherwise how much supplementary value can be created? A value is only created if the profitability exceeds the opportunity costs.

The sustainable value approach is thus:

- Value-based;

- Easy to apply;

- Use the financial markets logic;

- Compatible with the manager's way of thinking.

The only difference is that this approach substitutes various forms and various uses of the capital. A sustainable value allows an integrated evaluation of the use of the economic, environmental and social resources into monetary terms. The sustainable value is inspired by the principle of "strong durability" and measures if a company creates a positive supplementary value (extra value) while making sure that each of its environmental and social impacts are constant. It takes into account the ecological and social efficiencies of the company as well as the absolute level of environmental and social resources consumed (the ecological and social effectiveness). The methodology of calculation of the sustainable value will now be explained through its application to the big multinationals of the energy sector in France.

3.2 Methodology of calculation of the sustainable value: application to the big multinational of the energy sector in France

The sustainable value widens the classic performance evaluation logic of an investment to the environmental and social resources. To create some value, the profitability of the used economic, environmental and social resources has to exceed the cost of these resources. The use of the resources by the company is so compared with the use of the resources by a benchmark. The cost of the resource is thus defined by its opportunity cost and the contribution of the company to sustainability is expressed in monetary terms. This approach allows measuring the contribution of a company to the realization of a normative objective which represents the benchmark (or the reference value).

3.2.1 The energy sector and the choice of indicators "triple-bottom-line"

The first stage of calculation of the sustainable value consists in determining the quantity of resources used by a company during a given year. This study concerns economic, environmental and social resources because sustainable value approach can cover the three dimensions [5; 6; 7; 8 and 9].

"Triple - bottom-line" indicators considered in this study are selected on the basis of the GRI. Indeed according to international KMPG survey (2005), the GRI and the ISO 14001 stay references the most used by the energy groups in their sustainability reporting. "90 % of the reports of the energy sector published in 2006 make reference to the GRI against 29 % in 2002". The standard GRI also answers the French legislation which makes obligation for the companies to give in their management annual report the information onto the way these companies take into account the social and environmental consequences of their activities. Our choice of indicators is also based on the reports of TOTAL, classified "Sector Leader" in the Sustainability Yearbook of SAM. "Triple-bottom-line" indicators are the following ones:

Tab. 1: Economic, environmental and social resources examined

Economic resources	Environmental resources	Social resources
Total assets	Total energy consumption	Staff
Investments	Total water consumption	Women managers
	Waste	
	CO2-emissions	
	SO2-emissions	
	NOx-emissions	

The number of the environmental indicators is the most important. Indeed, the environment remains the main subject for which the calculated data are developed (38 % of indicators) (KPMG Study). These indicators concern essentially greenhouse gas emissions (carbon dioxide, the dioxide of sulfurs and nitrogen oxides) and in a lesser measure, the waste and resources consumptions (water and energy). The communication on greenhouse gases is for bound a lot to the various current local legislations to answer the Kyoto protocol.

To cover the main activities of the energy sector in France, we held a sample of six big groups on the basis of consolidated turnovers in 2007. TOTAL from the "Oil" sector; AREVA, EDF and GDF from the "Utilities" sector; LIQUID AIR and TECHNIP from the "parapetroleum" sector.

We wanted to integrate more social indicators. But we were forced by the availability of the information, the covered perimeter and the unit of measure. Our study of information media (web site, annual report and sustainability report), revealed a clear evolution of the practices of social and environmental reporting as well as a trend towards the harmonization of such information within the energy sector. But an item as "the training" for example was removed from our list of resources because it is expressed by different manners from a group to another one (Average number of training days by employee a year, number of training hours by employee a year, % of employees having done a training course, etc.). The same remark can be made concerning the item "accident". Some information on the other indicators is only supplied for the perimeter France and is not thus joined into this study.

This research concerns the period 2005-2007 to see the evolution of the contributions to the sustainable development of multinationals studied during these last three years. We now go to see which resources (economic or environmental or social) are used in a value-creating way through the application of the methodology of calculation of the sustainable) value.

3.2.2 Methodology of calculation of the sustainable value

The sustainable value measures the value created or lost through the use of the resources by the company in comparison to a benchmark. The stages of calculation of the sustainable value will now be explained and illustrated through the example of the multinational TECHNIP.

Efficiencies of the use of the resources by a company

The first stage of calculation of the sustainable value consists in determining the efficiency of the use of all the economic, environmental and social resources by the company. To do it, the quantity of the used resources is compared with the return generated by the company. We first have to fix an indicator to measure profitability. In this study, we are going to use the

Operating Profit (OP). The efficiency of the use of a resource corresponds to the OP generated by unit of resource used. In 2007, TECHNIP generated 120.33 € of OP by m^3 of water used. A particular attention is granted to the correspondence between the scope of consolidation of the resources consumption and the OP. This research is based on consolidated data.

Efficiencies of the use of the resources by the benchmark

The second stage of calculation of the sustainable value consists in determining the efficiency of the use of all the economic, environmental and social resources by the benchmark. We thus have to define first of all a benchmark. The average efficiency of the sector can be used as benchmark [14]. This research is thus based on the average efficiency of the energy sector such as it is measured by the average efficiency of the six selected multinationals. To dissipate the size effect, the total Operating Profit will be divided by the total amount of resources used in the energy sector in France. The average OP by unit of resource used is thus calculated for all the considered resources. The average efficiency of the water use in the energy sector is 39.087 € by m^3 used.

Does the company use its resources more effectively than the benchmark?

This stage consists in comparing the company resource efficiency to the benchmark efficiency. The difference between both values defines the contribution by unit of resource generated by the company (in more or less) with regard to the average of the sector (the benchmark). This value allows us to determine which one (company or benchmark) use more effectively all the considered resources. The concept of opportunity cost is so used. The resource value is determined by its alternative use (opportunity cost), namely the value which another entity would create by using the resource. As such, TECHNIP generates +81,245-€ by m^3 in comparison with the benchmark.

Value-creating resources / value-destructing resources

The contributions of the various resources considered are calculated by multiplying the difference generated by the company for a given resource by the corresponding quantity of resources consumed. The result shows the value added (positive or negative) of the use of a quantity of resources by the company in comparison to the benchmark. For example, in 2007, TECHNIP used 2.053 millions of m^3 of water. By multiplying this quantity by the value generated by TECHNIP for the water (calculated during the previous stage), we obtain a 166.769 million € of contribution.

Sustainable value created by the use of all the resources

This stage consists in calculating the global contribution of the company obtained by the use of all the considered resources. It is simply a question of adding contributions of the various resources considered. The obtained value constitutes the sustainable value in absolute term. Now, by following the reasoning of the financial analysis, the performance is often correlated to the size. The large-sized companies may use more resources and thus create more sustainable value (positive or negative). So, to be able to compare the groups of the energy sector on the basis of the sustainable value which they create, we have to take into account the size effect. We chose to divide the absolute sustainable value by the turnover. We call the obtained ratio "marginal" sustainable value and it expresses the value that the company created by euro of turnover realized. In 2007, TECHNIP destroys 1.38 € of sustainable value by 100 € of turnover, that is the group realizes a marginal sustainable value of -1.38 %

4. Results

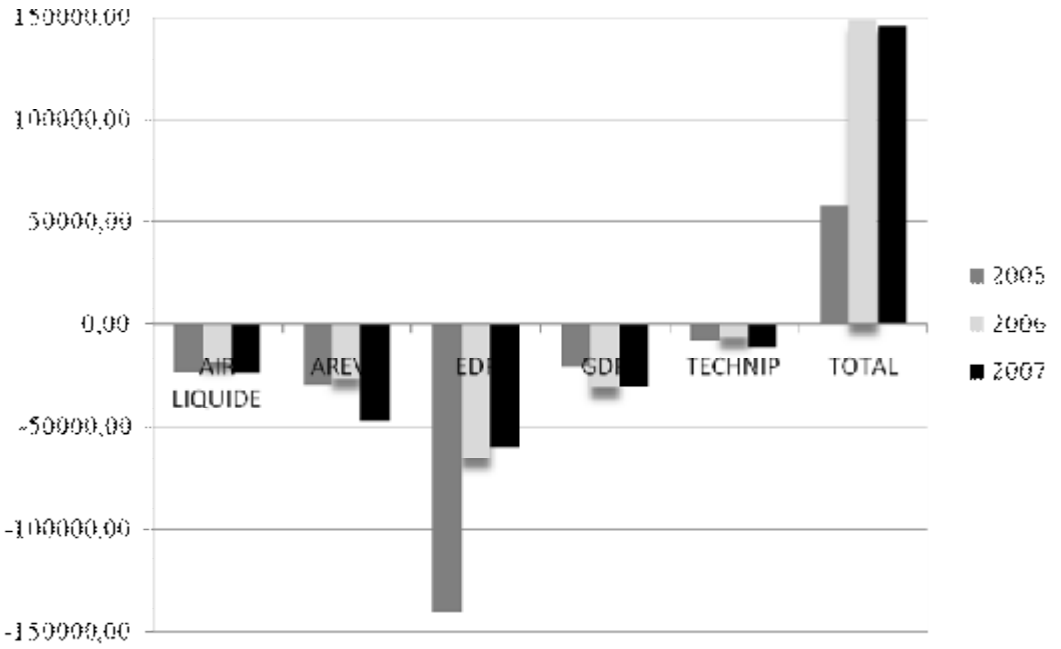
4.1 Absolute sustainable value of the multinational of the energy sector in France

Table 2 below postpones the absolute sustainable values created by the six big multinationals of the energy sector in France during the period 2005-2007. The sustainable value varies between 140.441 billion € (EDF in 2005) and 148.967 billion € (TOTAL in 2006).

Tab. 2: Absolute sustainable value (Billion €)

Compagnies	2005	2006	2007
AIR LIQUIDE	-23331.75	-18273.79	-24378.59
AREVA	-29610.64	-26686.68	-47125.12
EDF	-140441.175	-65613.16	-59828.32
GDF	-21070.20	-31228.53	-30400.15
TECHNIP	-8085.82	-6682.71	-10920.14
TOTAL	57680.66	148967.26	146106.66

It is advisable to indicate that only TOTAL realizes a positive sustainable value during all the period of study (see Picture 1). Besides, the sustainable values realized by EDF improve in the time from 2005 till 2007. However, we notice a fluctuation in the absolute sustainable value of LIQUID AIR, AREVA and TECHNIP who destroy less value in 2006 in comparison to 2005 and destroy more value in 2007. Besides, GDF destroys more value in 2006 and 2007 with regard to 2005. GDF realizes a light improvement in 2007 with regard to 2006.



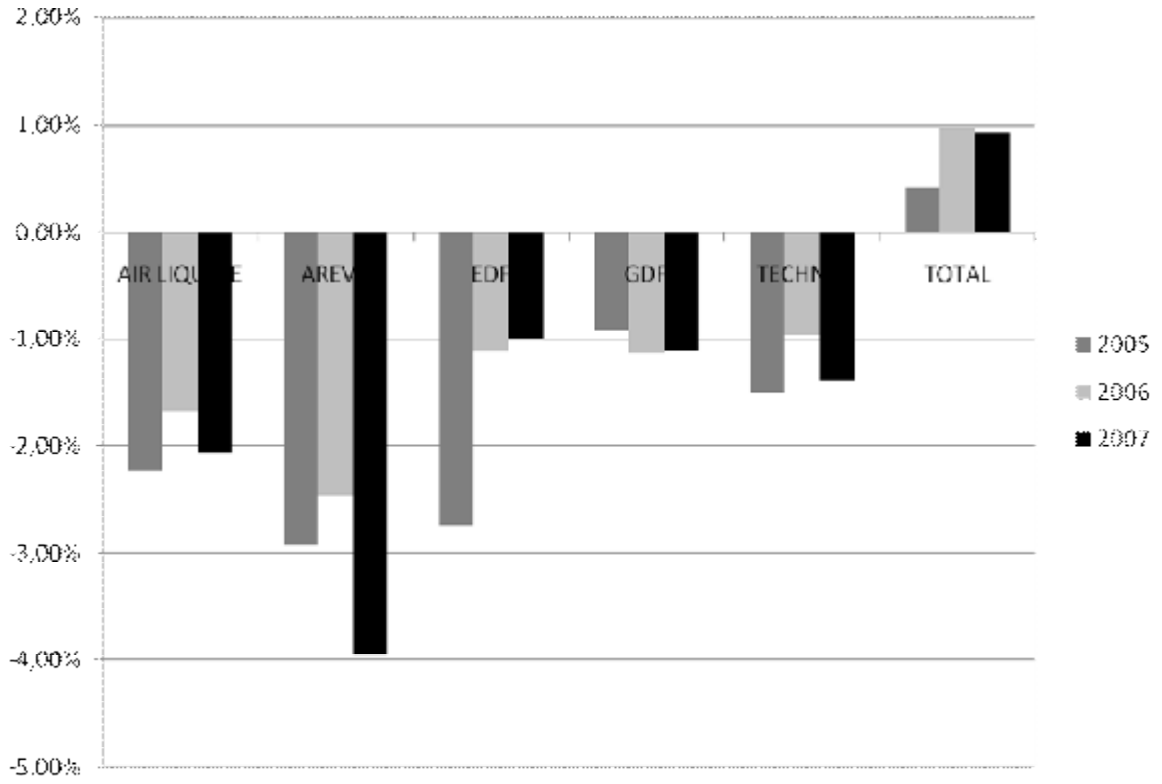
Pict.1: Absolute sustainable value (billion €)

As we evoked it previously, the absolute sustainable value is correlated to the size of the company. We thus had appeal to the calculation of a marginal sustainable value between the absolute sustainable value and the turnover. Table 3 presenting the marginal sustainable values allows a significant comparison of the sustainable values of companies.

Tab. 3: Marginal sustainable values and classification of energy groups

Compagnies	2005	2006	2007	position 05	position 06	position 07
AIR LIQUIDE	-2.24%	-1.67%	-2.07%	4	6	5
AREVA	-2.92%	-2.46%	-3.95%	6	5	6
EDF	-2.75%	-1.11%	-1.00%	5	3	2
GDF	-0.92%	-1.13%	-1.11%	2	4	3
TECHNIP	-1.50%	-0.96%	-1.38%	3	2	4
TOTAL	0.42%	0.97%	0.92%	1	1	1

A comparison with the absolute sustainable value (Picture 1) shows that the positive signs / negative are identical. So the company which uses all resources in a more effective way than sector' average and which realizes in consequences a positive absolute sustainable value, reached by the same a positive marginal sustainable value.



Pict. 2 : Marginal sustainable values

The classification based on the marginal sustainable values shows also that TOTAL is in the first position during the period of study. This multinational generates the highest sustainable value by unit of the turnover, using all resources. The position of GDF based on the marginal sustainable value changes sharply. Indeed, being classified in the third and fourth position respectively in 2005 and 2007 according to the absolute sustainable value, GDF passes in the second position on the basis of the marginal sustainable value. We notice the same effect for EDF. Besides, TECHNIP occupies the second position in 2006; AREVA comes in last position in 2005 and 2007.

The individual results for each of the big groups of energy sector studied will be presented in alphabetical order in appendix (table 4 to 9). Every table contains the contributions of each resource (economic, environmental and social), the sustainable value and the marginal sustainable value, for all the period of study 2005-2007.

The table 4 shows that the group LIQUID AIR realizes a negative sustainable value during the three years. These negative values are essentially due to the negative contributions of the energy consumption, the CO_2-emissions and to the social indicators. Nevertheless, we have to indicate that LIQUID AIR realizes positive contributions with its SO_2- emissions and its assets during all the period and with its NO_x- emissions in 2006 and 2007.

The sustainable value realized by AREVA (table 5) is negative throughout the years of study. As for LIQUID AIR, we notice a light improvement in 2006 with regard to 2005. AREVA is less effective than the benchmark in the use of all its economic and social resources. For the environmental resources, the ineffectiveness gets only the energy and water consumptions. The contributions for the different gas emissions are all positive for every year.

Besides, the sustainable value of EDF improves in the time (table 6). EDF realizes a 1.75-€ improvement by 100 € of turnover from 2005 till 2007. The contributions of all the resources with the exception of the water are negative. Contrary to EDF, the contributions of GDF for water consumption are negative and degrade through time from 2005 till 2007 (table 7). GDF uses its water resources in a much less effective way than the average of the sector. The same remark can be made concerning the energy consumption and the waste generated. Nevertheless, the group GDF seems to manage more effectively than the benchmark its CO_2-emissions. The contribution of NO_x-emissions by GDF improved in the time and it, in passing from a negative value in 2005 to a positive value in increase between 2006 and 2007.

Concerning the group TECHNIP (table 8), although an improvement of the sustainable value (0.55 € by 100 € of Turnover) is realized in 2006, we indicate a degradation in 2007. The contributions of all the resources followed this trend, that is an improvement in 2006 with regard to 2005 and degradation in 2007.

The last one in the list, alphabetically, but the first one in terms of creation of sustainable value is TOTAL. This multinational creates a positive sustainable value every year of the period. An improvement of the absolute and marginal sustainable value was realized in 2006 with regard to 2005. Besides, we notice a light decline in 2007 with regard to 2006. All the resources contributions, with the exception of NO_x-emissions in 2005, are positive. All the resources are thus used more effectively than the average of the sector. These results confirm the place of TOTAL as "leader" in the DJSI Sustainability Index.

5. Conclusion

The sustainable value approach seems to supply interesting results concerning the measure of the sustainability performance of companies and allows comparing companies between them. To improve the future results which can be obtained by such measure, it seems necessary to harmonize indicators used in social and environmental reporting. It is also necessary to encourage companies to develop more quantitative indicators expressed by the same unit and concerning the same perimeter. Our research allows underlining the variety of perimeters and units of measure for some social and environmental indicators. This variety forced us to eliminate these indicators from our study. It is advisable to underline also, the importance to audit and to make verify these indicators to guarantee reliable and useful results for the decision-making.

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Appendix: tables of individual results

Tab. 5: Contributions, sustainable value and marginal sustainable value of **AREVA**

		2005	2006	2007
		Contributions in M €		
Resources	Total assets [M€]	-1856.941	-2313.854	-2721.856
	Investment [M€]	-357.777	-877.983	-4183.915
	Total Energy consumption [GWh]	-260.883	-581.035	-511.390
	Total Water consumption [Mm3]	-1257.516	-442.923	-208.781
	Waste [tons]	-16100.647	-10816.490	-25186.185
	CO2- emissions [Ktons]	215.527	43.497	201.338
	SO2- emissions [tons]	633.332	330.398	481.914
	Nox - emissions [tons]	230.880	339.592	470.433
	Staff	-4340.292	-3861.213	-6768.746
	Women managers	-6516.323	-8506.666	-8697.935
	Sustainable value	**-29610.640**	**-26686.679**	**-47125.123**
	Marginal sustainable value	**-2.92%**	**-2.46%**	**-3.95%**

Tab. 6: Contributions, sustainable value and marginal sustainable value of EDF

		2005	2006	2007
		Contributions in M €		
Resources	Total assets [M€]	-9970.159	-9462.479	-9740.794
	Investment [M€]	-7942.486	-9209.514	798.897
	Total Energy consumption [GWh]	-2526.555	-1523.941	-1195.110
	Total Water consumption [Mm3]	4532.491	7746.994	6770.260
	Waste [tons]	-7719.718	-2378.075	
	CO2- emissions [Ktons]	-917.864	-11604.703	-10980.721
	SO2- emissions [tons]	-5898.589	-15071.852	-14858.720
	Nox - emissions [tons]	-99437.138	-18207.726	-18552.381
	Staff	-6005.453	-1576.203	-7714.877
	Women managers	-4556.280	-4325.658	-4354.871
	Sustainable value	**-14044.750**	**-65613.158**	**-59828.318**
	Marginal sustainable value	**-2.75%**	**-1.11%**	**-1%**

Tab. 7: Contributions, sustainable value and marginal sustainable value of **GDF**

		2005	2006	2007
		Contributions in M €		
Resources	Total assets [M€]	-1370.852	-1637.733	-1020.868
	Investment [M€]	-344.792	676.674	-567.947
	Total Energy consumption [GWh]	-2503.083	-1412.265	-1436.134
	Total Water consumption [Mm3]	-13473.631	-26014.214	-26261.809
	Waste [tonnes]		-8406.760	-5571.206
	CO2- emissions [Ktons]	855.547	2385.432	2550.127
	SO2- emissions [tons]			
	Nox - emissions [tons]	-2465.815	3081.560	3341.875
	Staff	-1767.574	98.777	-1434.192
	Women managers			
	Sustainable value	**-21070.200**	**-31228.529**	**-30400.153**
	Marginal sustainable value	**-0.92%**	**-1.13%**	**-1.11%**

Tab. 8: Contributions, sustainable value and marginal sustainable value of **TECHNIP**

		2005	2006	2007
		Contributions in M €		
Resources	Total assets [M€]	-534.924	-514.108	-611.526
	Investment [M€]	14.046	171.532	-48.339
	Total Energy consumption [GWh]	-7.485	-42.083	-241.290
	Total Water consumption [Mm3]	77.373	247.553	166.769
	Waste [tons]	-5548.963	-5055.377	-7215.858
	CO2- emissions [Ktons]	145.499	256.184	86.304
	SO2- emissions [tons]			
	Nox - emissions [tons]			
	Staff	-1579.718	-1209.296	-2395.712
	Women managers	-651.643	-537.111	-660.493
	Sustainable value	**-8085.815**	**-6682.706**	**-10920.144**
	Marginal sustainable value	**-1.51%**	**-0.96%**	**-1.38%**

Tab. 9: Contributions, sustainable value and marginal sustainable value of **TOTAL**

		2005	2006	2007
		Contributions in M €		
Resources	Total assets [M€]	13027.676	13073.095	13265.654
	Investment [M€]	7372.299	8149.285	5450.257
	Total Energy consumption [GWh]	24110.650	24069.160	25237.639
	Total Water consumption [Mm3]	11822.037	18189.055	19047.136
	Waste [tons]	24133.428	24089.303	25252.248
	CO2- emissions [Ktons]	3038.597	10156.198	9659.257
	SO2- emissions [tons]	-105.062	8298.140	7561.357
	Nox - emissions [tons]	-51685.699	12354.012	12240.019
	Staff	14388.712	17489.967	14537.068
	Women managers	11578.021	13099.046	13856.021
	Sustainable value	**57680.660**	**148967.261**	**146106.655**
	Marginal sustainable value	**0.42%**	**0.97%**	**0.92%**

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