

Building synergies between sustainable forest management certification and carbon certification: what bases are there and for what impact?

APPENDIXES

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Appendix 1. sustainable management and French forestry code

As regards the notion of sustainable management, French forestry law takes up the criteria established after the 1993 Helsinki Ministerial Conference to define the characteristics of sustainable management in France. Enshrined in the French forestry code, the Loi d'Orientation sur la Forêt (forestry guidelines act) of 2001¹ notably introduced documents on the sustainable management of forests.

Depending on the private or public status of the forest plot under consideration, the documents attesting to the sustainability of the forestry management practised differ.

With private forests, the CRPFs² (regional delegations of the National Center for Forest Owners [CNPF]) are in charge of verifying these documents. Approval of sustainable management documents is granted according to an assessment framework defined in the SRGS (regional forestry management schemes)³ drawn up by the CRPFs (pursuant to article L321-1-4⁴ of the forestry code). These SRGS provide precise indications on the species and technical plans fostering the sustainable management of forests

Sustainable management documents vary according to the size of the plot under consideration:

With plots of more than 25 ha, a simple management plan, whose content is indicated in article L312-1 to 3 of the forestry code⁵, is needed. It requires forest owners to draw up an inventory of the consequences of their forestry management as regards economic, environmental and social issues. The simple management plan also defines a programme governing the felling and the reconstitution of forest stands after felling. To be approved by the CRPF, the simple management plan must meet the requirements detailed in the SRGS;

- With each department, a threshold under 25 ha (between 10 and 25 ha inclusive) can be defined by the Ministry of Agriculture for drafting a simple management plan.⁶
- With plots of under 25 ha, to obtain a guarantee of the sustainable management of their forests, owners can:
 - Either submit for the CRPF's approval a "Règlement Type de Gestion" (a management plan) drafted by an accredited forestry expert, a forestry cooperative or the ONF (National Forestry Office)⁷;
 - Or comply with and adhere to the CBPS (forestry best practices code)⁸ drawn up by the CRPF. In this case, an assumption of sustainable management is applied (Article L124-2 of the forestry code⁹).

Public forests – held by the State, territorial authorities or public establishments – are governed by the *forestry regime* and managed in accordance with a planning document.¹⁰

The planning document incorporates sustainable management objectives factoring in its role in the ecological, economic and social balance of territories, and must comply with regional development plans (Article L212-2 of the forestry code¹¹).

With State-owned forests, the planning document is controlled for compliance by the ONF and is then submitted for the approval of the Ministry in charge of forests. ¹² As regards authority-owned forests, the territorial department of the ONF is in charge of assessing its compliance with regional development plans before its approval by the Préfet and the territorial authority.

^{1 (}Act no. 2001-602 of 9 July 2001 on forest guidelines, n.d.)

² Centres régionaux de la propriété forestière.

³ Example of SRGS: http://www.cnpf.fr/bretagne/n/le-schema-regional-degestion-sylvicoles-srgs/n:829

^{4 (}Article L321-1 of the Forestry Code. n.d.)

^{5 (}Article L312-1 of the Forestry Code, n.d.)

^{6 (}Article L312-1 of the Forestry Code, n.d.)

^{7 (}Article L313-1 et L313-2 of the Forestry Code, n.d.)

^{8 (}Article L313-3 of the Forestry Code, n.d.)

^{9 (}Article L124-1 of the Forestry Code, n.d.)

^{10 (}Article L212 of the Forestry Code, n.d.)

^{11 (}Article L212 of the Forestry Code, n.d.)

¹² http://www.onf.fr/gestion_durable/sommaire/action_onf/gerer/instrument/20080506-092100-812136/@@index.html

Appendix 2. labels included in the definition

Sustainable forestry management labels:

We have focused our analysis on the two principal sustainable management labels: the PEFC and the FSC.

Programme for the Endorsement of Forest Certification schemes (PEFC)

The PEFC is an NGO whose purpose is to promote the sustainable management of forests via the certification of forestry practices and the control of the wood supply chain. At the international level, the label defines the eligibility rules for a certification mechanism, in order to be recognised by the PEFC.

Forest Stewardship Council (FSC)

The FSC has the same purpose as the PEFC but does not operate in the same way: FSC International defines the rules on a global level, and FSC National subsidiaries then adapt them at local level.

Sustainable production round tables

These round tables are designed to promote to commodity producers, whose production represents a risk for ecosystems, a series of practices for mitigating this risk and reducing the negative impact of production (e.g. deforestation) on these ecosystems. In this study, we have focused on two of these schemes, although others exist for other agricultural commodities (wheat, cotton, biofuels, etc.).

Round Table Responsible Soy (RTRS)

This round table consists of 200 players in the soy production chain (producers, production industries, commodities dealers and distributors). Its aim is to facilitate dialogue between its members, develop a sustainable production standard for soy and ensure the overall monitoring of sustainable soy production throughout the world.

Roundtable on Sustainable Palm Oil (RSPO)

With more than 3,500 members involved in each stage of palm oil production, the aim of this initiative is to develop specifications, promote their implementation and control them. An assessment of the initiative's economic and environmental impact is carried out by the round table.

Carbon labels

Carbon labels fall into two categories: those designed for local application (for example, attached to a quota exchange system), and those designed from their inception to certify projects throughout the world:

Clean Development Mechanism (CDM)

The CDM is one of the flexibility mechanisms stipulated in the Kyoto Protocol. It enables the countries outside of those in Appendix I (developing countries) to host projects designed to reduce emissions and issue certified emission

reduction units (CERUs), which can then be used by the countries of Appendix I to fulfil their commitments. The mechanism is also designed to foster the sustainable development of a host country.

Gold Standard

Founded by the WWF in 2003, this voluntary carbon compensation label has been certifying forestry carbon projects (initially concerning afforestation) since 2012. Up till now, the label has certified projects in the countries of the South.

Verified Carbon Standard (VCS)

The VCS is a carbon label acting on international voluntary markets. This label certifies projects for improved forestry management and REDD+ and afforestation projects.

Woodland Carbon Code

Created by the Forestry Commission, this code lays down guidelines for developing voluntary afforestation projects in UK territory.

Climate Action Reserve (CAR)

The CAR succeeds the California Climate Action Registry (CCAR) created by the State of California in 2001. It accredits projects set up in North America and has also created its own carbon credit unit: Climate Reserve Tonnes (CRT). The CAR does not validate any methodology per se. The institution itself takes charge of the development and updating of "protocols" specific to a given sector, or coordinates the work groups that draft them. The CAR register has also received the approval of the authorities to act as an official register of the ETS in California.

American Carbon Registry (ACR)

This non-profit association has developed a certification framework and constituted a voluntary GHG emissions register in the US. Like the CAR register, the ACR register has also been approved as an official ETS register in California.

Climate Community & Biodiversity Standard (CCBS)

This is a label developed by the Climate, Community & Biodiversity Alliance (created by a group of NGOs in 2003). The label requires projects to have a "clear positive impact" in terms of social and environmental co-benefits compared with a situation where no project was introduced. Since 2012, this label has been associated with the VCS to facilitate the joint certification of projects between the VCS and the CCBS, where any project seeking double certification only undergoes a single validation process.

TABLEAU 1. NON-EXHAUSTIVE LIST OF LABELS IN THE ISO DEFINITION

Type de certification	Nom du système de certification	Type de service garanti par la certification	
Carbon	VCS	Carbon sequestration, if coupled with CCBS certification, a guarantee provided on certain project co-benefits	
	Gold Standard	Carbon sequestration, co-benefits in terms of improved water quality, renewable energy production, health and gender equality	
	Kyoto Protocol mechanisms	Carbon sequestration	
	American Carbon Registry	Carbon sequestration	
	Woodland Carbon Code	Carbon sequestration	
	Verified Carbon Standard	Carbon sequestration	
	Climate Action Reserve	Carbon sequestration	
Sustainable Forest Management	PEFC (and all recognised national certification schemes)	Maintenance (and increase) of forested areas, maintenance as far as possible of all ecosystem services provided by the forest (e.g. biodiversity), guarantee of certain practices (e.g. non-use of GMOs), compliance with the country's current legislation, social and security requirements	
	FSC	Compliance with legislation, integration of biodiversity issues, workers' rights, cultural aspects of the forest, etc., into forest management	
Sustainable Productions (non- exhaustive)	PEFC control chain	Guarantee of wood traceability (enabling its sustainable origin to be certified or not)	
	FSC control chain	Guarantee of wood traceability (enabling its sustainable origin to be certified or not)	
	RSPO	Guarantee of sustainable palm oil traceability (compliance with legislation, biodiversity, workers' rights, rights of populations affected by palm oil plantations, plantation management)	

Source : I4CE

Appendix 3. demonstration of additionality

The demonstration consists of carrying out the following analyses:

- Analysis of current legislation: this involves demonstrating that the carbon project complies with the legislation of the territory and that its implementation does not depend on a legal obligation.
- Financial analysis: this test is to prove that without the granting of gains generated by the sale of carbon credits to the project owner, the project scenario does not constitute the most advantageous scenario from the financial point of view, compared with any alternative scenarios. This test is based on the comparison of economic indicators such as net present value or internal rate of return.
- Analysis of barriers: this analysis consists of showing the existence of technical, cultural, agronomic etc. obstacles that would prevent the project from being carried out if it were not included in the carbon compensation scheme.

Certain voluntary market labels also authorise a single performance threshold to be set as an assessment criterion for additionality. In this case, the methodology contains an average performance level determined for the context of the project and decrees that any project exceeding this performance by at least a certain percentage is automatically considered as additional.

Lastly, a list of technologies or practices automatically considered additional (because they are not widespread, for example) can be drawn up by the label.

In the two latter cases, proof must also be provided that the project goes beyond what is required by local regulations.

Appendix 4. REDD+ projects and round tables on sustainable commodities

In contrast with the above-mentioned practices, which target the upstream area of the sector, the means implemented to check deforestation can differ very widely.

This diversity partly comes from the large number of players involved in projects designed to reduce deforestation.

If we focus on schemes like round tables on the production of sustainable commodities (beef, palm oil, soy, etc.), the players acting as driving forces in implementing methods for conserving forest ecosystems are the producers of agricultural commodities, who undertake to comply with specifications - forbidding the conversion of forest land, for example.

In its principles and criteria, the Round Table on Sustainable Palm Oil (RSPO) requires palm oil producers to provide proof that "no new plantation has replaced primary forest or any other zone necessary for the preservation or improvement of one or more High Conservation Values (HCV), since November 2005 ".13 Likewise, the Global Round table for Sustainable Beef (GRSB) encourages players in the supply chain that adhere to the initiative to introduce practices that "manage natural resources responsibly and maintain or enhance the health of ecosystems".14

With REDD+ projects, project owners are multiple: they can involve a community, governments, NGOs, private foundations or forest owners.15 While the motivations of these players can differ, the procedures implemented remain similar as a whole. The carbon financing raised by the Green Climate Fund¹⁶ could, for example, be used for the development of its policies prior to the phenomenon of deforestation,17 while an NGO could use the financial manna of carbon credits to improve crop productivity or develop new sources of income for local communities.18

Thus, because of the respective activities of project owners, the approaches employed differ (construction of policies, a commitment by the commodity producer not to destroy any primary forests, an alternative source of income to revenues from forest exploitation, etc.).

¹⁵ Example: see the VCS project register: http://www.vcsprojectdatabase.org

¹⁶ Example: Transfer from the Green Climate fund to Ecuador to implement forest conservation policies

¹⁷ Example: development of a repressive policy towards those perpetrating illegal deforestation

¹⁸ Example: NGO PUR Projet in Peru

^{13 (}RSPO, 2013)

^{14 (}Global Roundtable for Sustainable Beef, 2014)

Appendix 5. monitoring the implementation of sustainable management in France

In the wake of the 1993 Helsinki Conference, the IGN (national institute of geographical and forestry information) published an inventory in 1995 on sustainable management criteria and indicators for French forests. This assessment focused on all the indicators retained at the Helsinki Conference, including carbon.

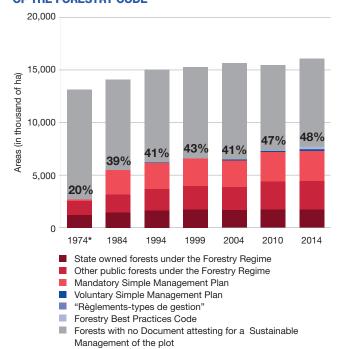
The fifth version of this exercise was published in 2015.19 Here are the trends for some indicators which could be established for all France's metropolitan forests (Figure 1).

The monitoring of sustainable management indicators carried out by the IGN also listed the areas and proportion of forests in France holding a sustainable management document (as defined in the paragraph above, i.e. development as a public forest, and a simple management plan, model management regulation or forestry good practices code for private forests).20

While there is considerable scope for progress, the obligations of the forestry code have nonetheless produced results, because in 2014 nearly half France's forests had a sustainable management document (30% as regards private forests).

This IGN review reveals that 95% of public forests have a sustainable management document (99% with Stateowned forests, and 92% with the rest of public forests).

FIGURE 2. VARIATIONS IN AREAS HOLDING A SUSTAINABLE MANAGEMENT DOCUMENT IN FRANCE **BETWEEN 1974 AND 2014 (THOUSANDS OF HA)** AND PERCENTAGE OF AREAS WITH A SUSTAINABLE MANAGEMENT DOCUMENT WITHIN THE MEANING **OF THE FORESTRY CODE**

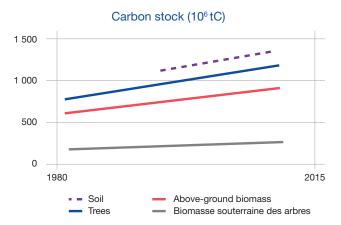


See Appendix 1

Source: Data taken from the 2015 issue of Indicateurs de gestion durable des forêts françaises métropolitaines (2015), IGN

*The total forest area for the year 1974 comes from the following publication: The evolution of French metropolitan forests according to forest statistics, P. Rouss

FIGURE 1. EXAMPLE OF SUSTAINABLE MANAGEMENT INDICATORS TAKEN INTO ACCOUNT BY THE IGN



Species (no. per 20 ares) 1980 2015 Mixedwood stands Hardwood

Source : Institut national de l'information géographique et forestière, 2015

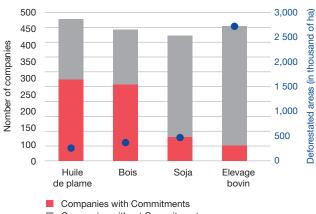
^{19 (}Institut national de l'information géographique et forestière, 2015) 20 (Institut national de l'information géographique et forestière, 2015)

Appendix 6. Companies' commitment with regard to deforestation

Forest Trends carries out an annual study²¹ monitoring companies that have issued commitments in terms of reducing deforestation linked with the production of the "big four" commodities cited above, representing a major risk for forests in Southern countries.

Among the companies questioned, it can be seen that while the majority of them expressed a commitment in the wood and palm oil production sectors, this was not at all the case with beef breeding and soy production. This is partly explained by the media coverage focusing on the wood and palm oil production sectors, which forced companies in the industry to introduce sustainable management requirements (like those defined in the RSPO and the FSC and PEFC standards).

FIGURE 3. NUMBER OF COMPANIES PER COMMODITY THAT HAVE MADE A COMMITMENT REGARDING THE SUSTAINABLE MANAGEMENT OF FORESTS CRITERION



Companies without Commitments

Annual loss of forestry areas linked with the commodity (in thousand of ha)

The percentages are the proportion of companies that have a commitment.

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Source: Forest Trends, 2017; Henders et al., 2015)

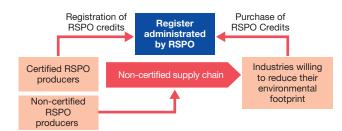
Appendix 7. A shared need for traceability

with carbon compensation, transparency and traceability are ensured by the identification of each carbon credit in a register. This makes it possible to go back to the project and make sure that a project does not sell more credits than it has reduced emissions.

This likewise applies to the PEFC and FSC, which are equipped with certification tools for the supply chain, making it possible to certify the sustainable origin of wood or the percentage of wood from sustainably managed forests used in a product.²² Round tables on sustainable commodity production, like the RSPO and the RTRS,23 have similar traceability systems.

The only difference is the type of assets traced: a material merchandise, wood or soy, for sustainable management labels; an immaterial service - the reduction of emissions or sequestration - for carbon compensation labels. We should note that the RSPO makes it possible to dissociate the "sustainably grown" service from the "palm oil" product: companies that buy untraced soy can buy sustainability credits generated by the "RSPO palm oil" sector to support the initiative (Figure 4).

FIGURE 4. MODEL SHOWING THE WORKINGS OF THE RSPO CREDIT SYSTEM



Source: https://www.rspo.org/certification/supply-chains

This type of compensation resembles carbon compensation schemes in terms of its structure and the players involved.

Appendix 8. case study

Hypotheses

Description of the reference scenario

We consider that the reference scenario consists of a plot of 2,000 ha, on which non-managed hardwood accretions grow, where there is a sole owner as regards ownership and management.

This situation only enables low carbon sequestration (Figure 5).

Description of the itinerary analysed

To enhance his plot of land, the manager decides to change the technical itinerary and replace the accretions with a stand of larches.

The introduction of this management plan implies felling the accretions in year 0, thinning in years 19, 25, 30, 36, 42 and 48 (hence a drop in the plot's carbon sequestration) and a final cut in the 60th year. As the FSC standard does not authorise a clear-cut in an area of more than 10 ha,24 for this final felling we will carry out a clear-cut over 10 ha and extractions of around 50% on the rest of the plot.

The carbon sequestration permitted by this itinerary exceeds that of the reference scenario starting in the 14th year after plantation (Figure 5).

We will suppose that the introduction of an alternative plan to the reference scenario (reforestation of larches) is additional (e.g. its introduction was to deal with financial, cultural and technical barriers, etc.).

Description of costs

Work-related costs

Table 2 sums up the cost of forestry work retained to calculate the different net present values.

Because various data have been difficult to establish, the costs linked with work to achieve the standards required for sustainable certification will not be considered.

24 (FSC, 2017b)

FIGURE 5. CARBON SEQUESTRATION FOR DIFFERENT MANAGEMENT PLANS SCENARIOS (FOR A PLOT OF 2,000 HA)



Source: Sequestration data supplied by the Centre National de la Propriété Forestière

Costs of sustainable management certification costs far lower than for carbon certification

In our case study, as concerns sustainable management certification, we have considered that that the forest owner envisaged certifying his plot with the FSC label. In line with information provided in part II.D.1 of the study, certification costs are assessed at €8,200 for the entire plot. Certification is carried out every five years, which for a period of 60 years and an area of 2,000 ha corresponds to €0.61 €/ha/year (discounting these costs at a rate of 1.5%.

As regards the cost of carbon certification, we have considered the cost of drafting all the initial project documents, revision by the certification label and the monitoring, notification and verification process for the generation of carbon credits (Table 3).

In this case study, we have not considered the possibility of carrying out double audits in the double certification scenario.

TABLE 2. COSTS OF FORESTRY WORK

Type of work	Detail	Cost	Source
Clear-cut of the unmanaged plot		€1,670/ha	According to CNPF expert, VOCAL project pilot sites
Cost of plantation	Creation of worked holes	€834/ha	According to CNPF expert, VOCAL project pilot sites
	Purchase of plants	€676/ha	According to CNPF expert, VOCAL project pilot sites
	Planting	€393/ha	According to CNPF expert, VOCAL project pilot sites
Maintenance costs	Over a period of 5 years	€152/ha	Guyon (1998)
Thinning costs	Felling	€15/m³	2016 summary, FCBA
	Unloading	€13/m3	2016 summary, F, FCBA

Source: I4CE based on FCBA and VOCAL pilot project data

TABLE 3. REVIEW OF TRANSACTION COSTS OF FORESTRY COMPENSATION PROJECTS IN AMERICAN MARKETS*

Type of task	Details	Cost	Source
Development of a Carbon project (Project design document, schedules)		€8,640 **	Galik et al. (2009)
Pre-project calculations (risk, leaks, social impacts, etc.)	One-off cost	€4,320**	Galik et al. (2009)
Carbon capture modelling for the first years	One-off cost	€518**	Galik et al. (2009)
Conversion of plan to the reference scenario	One-off cost	€3,456**	Galik et al. (2009)
Selection of samples, Monitoring	Costs at a rate of one in five years, stating in year 15	€46.38 /ha	Galik et al. (2009)
Annual verification report	Costs arriving each year	€13.82 /ha	Galik et al. (2009)
Total cost of certification (at a discount rate of 1.4%) for a period of 60 years for a 2,000 ha project			i.e. around €14 /ha/an

^{*} Markets studied: the California Climate Action Registry, the Chicago Climate Exchange (CCX), the Regional Greenhouse Gas Initiative and the USDOE 1605(b) programme. (Deheza and Bellassen, 2010)

Description of profits

Profits arising from the sale of wood

As regards profits arising from the sale of wood, events to be considered are: 1) revenue from the wood harvested during the clear-cur of unmanaged plot at the start of the project; 2) revenue from successive thinnings; 3) revenues from the final clear-cut.

The use of the wood harvested differs according to the age of stands. The older the plot, the more the proportion of wood intended for timber production increases, to the detriment of firewood.

Sale prices of €40/metric ton for firewood and €75/m³ for timber²⁵ were retained. An operating loss rate of 10% was set.26

Carbon profits and profits linked with a premium on the sale price of certified wood.

TABLE 4. BREAKDOWN OF THE USE OF WOOD (ACCORDING TO A CNPF EXPERT)

		Durantian	Duamoution of
Thinning years	Details	Proportion of harvest used for timber production	Proportion of harvest used for firewood production
0	Unmanaged plot's wood	0%	100%
20	Larch wood	0%	100%
26	Larch wood	10%	90%
30	Larch wood	20%	80%
36	Larch wood	30%	70%
42	Larch wood	50%	50%
48	Larch wood	60%	40%
60	Larch wood	70%	30%

For the carbon profits arising from the sale of carbon credits, a price of € 6.1/MT tCO_ae was chosen. This price per metric ton corresponds to the price noted in the international voluntary forest carbon markets²⁷ for afforestation and reforestation projects. This price is assumed to be constant throughout the life of the project (60 years).

The volume of credits generated by the project was assessed using the Average Storage Method, where the maximum threshold of credit that could be issued by the project corresponds to the difference between the two longterm sequestration averages between the project scenario and the reference. This calculation is used by the VCS, for example. It factors in the impact of felling and particularly the final cut. With this method, the credit generation limit value is achieved in the 22nd year.

A 15% credit buffer is applied, to factor in the risk of nonpermanence.

As regards benefits linked with membership of sustainable management certification and in line with the intervals presented previously, we have retained a 20% premium on the sale price of wood. This consists of a median premium in comparison with the one presented in part 2.D.2 of this study.

Sensitivity analysis

A sensitivity analysis through a variation in the discount rate (reflecting the players' preference at present) has been carried out:

- An initial discount rate has been set at 1.4%.²⁸ This low rate reflects the considerable importance accorded to future financial flows in the long-term;
- A second rate set at 4%²⁹ expressing a stronger preference rate for the present in the economic analysis.

^{**} Fixed costs in the hypothesis of a 2,000 ha project.

²⁵ https://www.arborea.com/category/vente-et-cours-du-bois/cours-du-bois/ resineux-nobles/

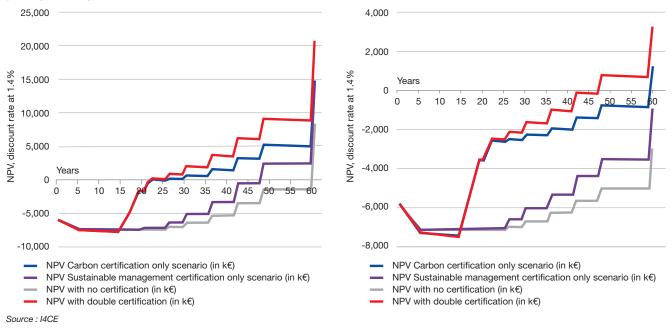
^{26 (}Thivolle-Cazat and Le Net, 2014)

^{27 (}Hamrick and et al., 2017)

²⁸ Stern et al. (2006), « Stern Review on Economics of Climate Change ».

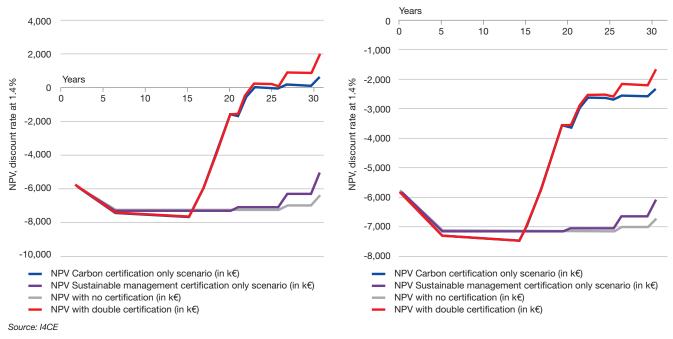
²⁹ http://www.strategie.gouv.fr/debats/taux-dactualisation-levaluation-projetsdinvestissement-public





The choice of a particularly high discount rate for forest management projects (4%) economically excludes the viability of the non-certification and sustainable management certification scenarios. For the rest of the scenarios with discount rates of 1.4 and 4%, financial profitability is achieved within varied timeframes. At the end of the rotation, the highest NPV, independently of the choice of discount rate, is that of the double certification scenario (Figure 6). It is also the scenario that most quickly achieves economic profitability for the two discount rates.

FIGURE 7. TOTAL NPV FOR THE VARIOUS SCENARIOS ENVISAGED (IN €K) FOR THE FIRST 30 YEARS



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