Domestic carbon standards in Europe - Overview and perspectives

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Key messages

This study investigates domestic carbon standards in Europe. In a general context of higher carbon prices and with a growing interest from companies to finance local emissions reductions projects, several European countries have started developing their own domestic carbon certification standards since the early 2010s.

What is the current situation?

The benchmark conducted on nine domestic schemes identifies five key features:

BUSINESS

The market is consolidating: At least 3 $MtCO_2e$ are available to be purchased of which 66% are ex-ante. At least 2.5 $MtCO_2e$ are waiting to be validated or verified. Furthermore, five new domestic schemes have been launched since 2015, which points to an upcoming diversification and consolidation of the current supply of domestic projects in Europe.

METHODOLOGIES & ACTIVITIES

A launching pad for agriculture and land-use projects: 98% of domestic carbon units tracked are from the land-use sector. We identified four categories of methodologies: (1) forestry; (2) peatlands; (3) other innovative carbon removals (wood products, biochar, soil carbon); and (4) agriculture where methodologies are recent and the first projects have yet to be validated.

PRICE AND PROJECT SIZE

Higher prices per tons CO_2. European carbon projects are in average smaller than international carbon projects. They present higher prices with an average of **13 €/tCO_2e** within a range from 6 €/tCO_2e to 110 €/tCO_2e in Europe vs **4.6 €/tCO_2e** on international markets with a price range from 0.4 €/tCO_2e to 72 €/tCO_2e.

GOVERNANCE

European standards are a public affair. Five standards are directly managed by public entities and four are semi-public, with strong partnership with public actors. This is a European specificity when most of international carbon standards are managed by private actors.

MRV

Common guidelines with specific features adapted to national contexts. The "additionality" concept is used by all standards. Nonetheless, the criteria retained for its demonstration are heterogenous. Validation is mostly documentary, and verification is realized mostly five years after the start of project, with field visits. Project duration varies between 7 to 100 years, depending of the methodology used, and determines the need of ex-ante or ex-post crediting.

What are the challenges faced by domestic carbon standards and the solutions implemented?

- **Reduce MRV costs and simplify processes.** To allow the development of local carbon projects, **MRV frameworks have been adapted to fit to small-scale projects and lower costs**: discount rates to manage uncertainty, development of group certification scheme, diversification of auditors to carry out verification. Domestic standards (as well as most other MRV frameworks) are exploring the possibility of using remote sensing data and general information collection systems. Nevertheless, MRV costs are still identified as a challenge across Europe.
- **Deal with land-use specificities.** The land-use and agriculture sectors are subject to specific time dynamics and risks. To deal with these, ex-ante credits are used by most standards for land-use methodologies, and discount rates and buffer pools are implemented as collegial insurance systems to deal with non-permanence risk.
- **Value beyond carbon benefits to allow for higher carbon prices.** Standards need to value environmental, social and economic co-benefits of projects, as well as the contribution to local development, especially to allow for higher carbon prices.
- **Dedicated resources to the standard promotion and dissemination:** If the standards' management by public actors can increase buyer's trust, public institutions might have less resources to dedicate to the promotion of the standard and its dissemination throughout the territory.
- **Bring clear and coherent communication guidelines to support the contribution to national climate targets:** some domestic standards knowingly disregard the "double claiming issue" and are increasingly viewed as a mean to achieve national climate targets and environmental goals. In addition, communication frameworks are slowly being built to differentiate the environmental integrity of projects from the voluntary climate strategy of companies.

What are the perspectives?

- Abroad, carbon projects are increasingly being linked to compliance tools (emission trading scheme, carbon tax or sectorial compliance offsetting) as a way to channel private investments towards concrete climate projects. **Using carbon projects for a compliance demand could be a viable option to trigger climate actions within the so-called 'diffuse sector', but should be explore carefully** in order to not induce unintended "rebound effect" elsewhere in national economies.
- These carbon frameworks developed at domestic level **could also be used to steer subsidies** towards result-based actions. The reform of the Common Agriculture Policy (CAP) could partly (*e.g.* eco-shemes) rely on these standards to attribute subsidies and incentivize transition to low carbon practices in agriculture.
- Synergies between domestic standards on the European level could be developed on several topics:
  - Development of methodologies is one of the costliest activities. **Sharing and disseminating already developed tools and methodologies** would support a wider coverage of practices in Europe.
  - **Technical collaboration around remoted sensed solutions** is seen as one of the biggest steps in making monitoring or verification most cost-efficient.
  - **Common communication guidelines at the European level** on different issues raised by emission reductions projects (double-claiming, context of use of local carbon projects) could be a way to boost buyers' confidence in domestic standards and ensure long-term demand.

1. A European history of domestic projects: from Kyoto to Paris

Since the late 2000's, several domestic carbon standards have emerged throughout Europe, both at the national and regional level. Generally launched by a public entity (government or local authority), their objective is to provide European carbon projects with a credible certification framework, in order to meet the needs of the existing demand for local emissions reductions and removals. If these standards now address a voluntary demand from entities that are not legally bound to reduce their emissions, let's recall that domestic carbon certification in Europe started with the Joint Implementation mechanism during the first period of the Kyoto protocol (2005-2012), which was first dedicated to compliance demand. The actors involved and the dynamics created in several European countries can partly explain how actual domestic standards have been shaped.

1.1. The legacy of Joint Implementation mechanism in Europe

In order to help them comply with their emissions reduction's targets under the Kyoto Protocol, Annex I countries could to a certain extent invest in emissions reduction generated through carbon projects. Two mechanisms were designed to provide a certification framework to carbon projects: the Clean Development Mechanism (CDM) for projects in non-Annex I countries and the Joint Implementation (JI) for projects in Annex I countries. Respectively 2 billion of Certified Emission Reduction (CER) and 871 million Emissions Reduction Units[1] (ERU) have been issued. Even though these two mechanisms collapsed in 2012 as the demand from European companies dried out, JI stimulated interest in domestic carbon projects and helped the development of skills and knowledge in several countries.

JI mechanisms provided the opportunity for countries to acquire knowledge and technical capacity to build voluntary domestic standards

There were two possible procedures for the development of JI projects. On the one hand, **track 1** JI allowed the country to create **its own rules for JI projects approval, verification and ERU issuance** with a limited international supervision. To use this procedure, countries had to comply to several requirements, as for example developing a national registry and a reliable and audited monitoring system for national GHG emissions and removals. The rationale was that if a country has a reliable national monitoring system, it would ultimately have to compensate for a possible leniency in JI supervision by more intense climate mitigation in other sectors to meet its Kyoto target. On the other hand, **Track 2 involved an international body called the Joint Implementation Supervision Committee (JISC), who was in charge of project approval, verification bodies accreditation and ERUs issuances.** In the end, Track 2 only represented 2% of total issued ERUs. Track1 JI was most widely used system because considered simpler (JISC 2016).

Hosting JI projects implied strong institutional requirements for European countries, in order to ensure environmental integrity[2] and buyers' confidence (Mullins 2002). In practical terms, it helped governments to get acquainted with Monitoring Reporting and Verification (MRV) frameworks (setting baselines, reporting processes, designation of external institutions for validation and verification ….). In France, know-how accumulated while supervising JI projects between 2008 and 2012 helped to trigger interest in the development of a domestic carbon certification framework (Lidsky *et al.* 2015) and provided useful feedback for the design of the 'Label Bas Carbone'. More generally, a lot of countries which today manage a voluntary standard (namely Germany, France, The Netherlands or Spain), actually implemented Track 1 JI.

The emergence in some countries of a real and lasting interest from national actors to finance local carbon projects

Countries like France and Germany, in addition to being active in JI projects in Western Europe, presented the specificity of having both domestic offsets projects developers and investors in their territories. Beyond compliance demand, a report assessing the impact of domestic JI projects in France recommended exploring the establishment of a voluntary domestic standard to meet the demand from some French companies to invest in local projects (Lidsky *et al.* 2015). A study conducted in 2016 in France showed that almost 60% of offset buyers would rather finance projects in the region where they are present and especially in France (Tronquet, Grimault, et Foucherot 2017). Furthermore, a survey conducted on voluntary carbon markets in Germany between 2012 and 2013 demonstrated a clear preference for domestic projects from 50% of respondents. However, only 10% of German buyers' retired certificates, representing respectively 0.3 and 0.4 $MtCO_2$ in 2012 and 2013, were issued from German projects (Wolters *et al.* 2015).

In the Netherlands, although no domestic projects were hosted in the country, a call to finance JI projects (trough

1 JI projects have issued ERU units during the period 2008-2015 meanwhile CDM projects are still active and could registered from 2001 onwards.

2 According to Mollins, four institutional requirements were related to environmental integrity (setting rules on how to define baseline projects, defining monitoring and reporting methods, designing respected accredited designated operational entities and guaranteeing transparency of information) and other five institutional requirements were related to investor confidence (defining project eligibility requirements for projects and institution to participate in JI, creating a central co-ordination authority through the national focal point institution, establishing a national registry and strong legal infrastructure and financial institutions).

Emission Reduction Units Procurement Tenders, ERUPT) was launched in 2001, purchasing for example 60% of ERU issued in Czech Republic (OECD 2002; Brohé, Bellassen, et Monceau 2012). In total, a volume of 9MtCO_2 were acquired through ERUPT tenders. While active as an investor in international projects through JI and CDM, the Netherlands did not host JI projects domestically. Instead, within the country, a program was launched in 2001 with a budget of 11.5 M€ by the Dutch national fund for Rural Areas (*National Groenfonds*) gathering domestic 217 landowners who received subsidies to implement afforestation activities. In 2011, the fund opted to have its projects certified by the voluntary carbon standard CarbonFix, with a fixed price of 25 €/tCO_2e (Peters-Stanley 2012). These certificates aimed at being sold to Dutch buyers, stating the interest for developing domestic projects with certificates for domestic use only.

In many European countries, **the end of JI projects meant the temporary end of domestic carbon projects[3], as private standards operating on the voluntary market were not present in Europe**. However, domestic carbon certification frameworks were considered by some national and local authorities a good tool to trigger emissions reduction practices in the diffuse sectors not covered by the EU ETS. Therefore, as described, several countries capitalized on the experience of JI mechanisms in Europe to build their own domestic standards, namely France with the Label Bas Carbone, Germany with MoorFutures or The Netherlands with the Green Deal.

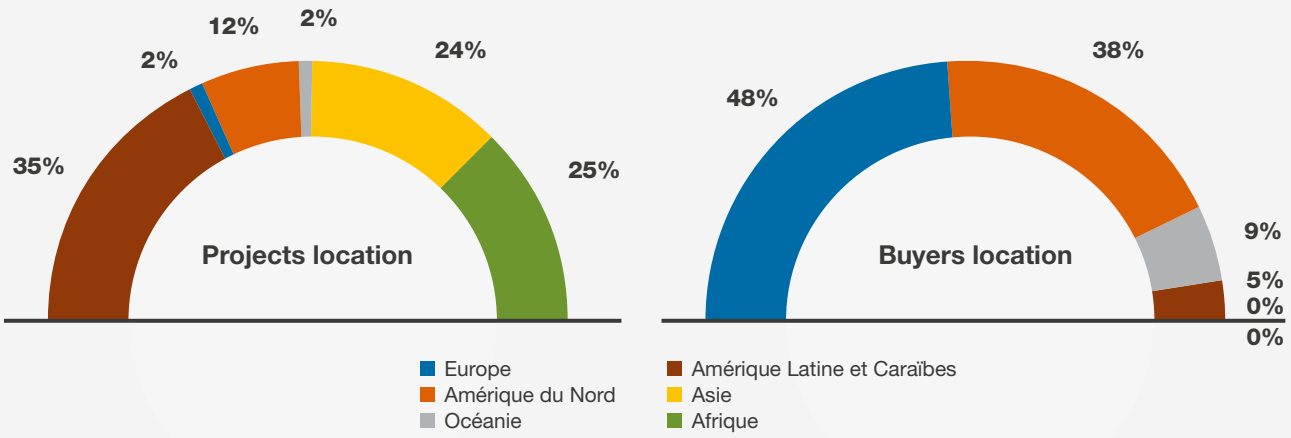
1.2. The double-claiming issue slowed down the development of voluntary carbon projects in Europe

Alongside JI and CDM expansion, voluntary demand has grown and international voluntary standards have massively developed. However, they were mainly focused on non-Annex I countries and never really established in Europe, despite a strong European demand partly interested in local projects.

The double-claiming issue partly explains the absence of voluntary standards in Europe. As carbon projects are – in principle – visible in the host country's national inventory, they help achieve the national emissions reductions target. Therefore, the emission reduction can be claimed by both the buyer and the host country. To avoid for a same emission reduction to be counted 'twice', voluntary standards required countries hosting the project to cancel AAUs. Although the rationale behind this position is debatable, as double-claiming between a company and its host country does not undermine environmental integrity in the voluntary context (Tronquet, Grimault, et Bellassen Submitted), it **resulted in very few voluntary carbon projects being certified by international standards in Europe** until recently.

Therefore, several countries started designing their own carbon certification framework, in order to allow local projects to benefit from a credible MRV framework and domestic emissions reductions.

FIGURE 1. VOLUME OF TRADED CARBON CREDITS TRADED ON VOLUNTARY MARKETS ACCORDING TO PROJECT LOCATION (LEFT) AND BUYERS LOCATION IN 2016 (RIGHT)



Source: Hamrick & Galland, 2017, Regional Analysis

3 Except in United Kingdom where the Woodland Carbon Code was launched in 2011.

These domestic initiatives mostly disregarded double-claiming between a country and a firm, with the following nuances issues:

- In France, the "Label Bas Carbone" technical specifications begins by restricting its use to non-State actors with the underlying rationale that France is thus the only country to claim the reductions and that limiting claiming to a single non-State actor is therefore sufficient to ensure environmental integrity.
- In the United Kingdom, the Woodland Carbon Code was created in 2011 in order to certify afforestation projects. It stated that the emissions reductions generated would contribute to the national target. As the UK's emissions reductions target is more ambitious than the European one, the risk of double monetization is avoided. If Kyoto units (AAU or RMU) were to be left after 2020, they will be cancelled and not sold to another country (Nett et Wolters 2017).
- In Spain, a fund called 'FES CO_2' and dedicated to buying domestic emissions reductions from non-EU ETS sectors was created. Units are bought at a fixed price of 9.7 €/tCO_2e and contribute to the national emissions reductions target for non-EU ETS sectors, of -10% in 2020 compared to 1990 levels.
- In Germany, the MoorFutures initiative focuses on peatlands and therefore is not subject to the double-claiming risk (see below).
- In Italy, national forestry actors saw a potential double-claiming issue as managed forests were falling under the Kyoto Protocol accounting, which discouraged potential initiatives at the domestic level (Romano *et al.* 2015). Therefore, different forest initiatives developed in Italy:
  - The creation of a Forest Carbon Code (Codice Forestale del Carbonio) which provided good forest practices guidance without turning into a carbon certification process.
  - The development of forest carbon projects on Italian soil without third party certification (Brotto *et al.* 2018; Hamrick et Brotto 2017).
  - More recently, the development of forest projects going through certification of ecosystem services through the framework proposed by the Forest Stewardship Council (FSC) rather than certification relying on GHG sequestration.

Fortunately, this historical conundrum is being lifted as a growing number of actors from voluntary markets are admitting that double-claiming is not a threat to environmental integrity and that projects could just as well help contribute to national targets. Last July, ICROA[4] changed his position on the matter. The organization publicly took a stance to acknowledge that voluntary action from private sectors do not overlap with NDC's commitment within Paris agreement, if additionality and reporting were correctly addressed by carbon standards (ICROA 2019). We are therefore shifting from an objective of going beyond countries' targets to contributing to them in order to and accelerate the transition towards a low-carbon economy (Tronquet & al (s.d), Gold Standard 2019).

DOUBLE-CLAIMING AS AN OPPORTUNITY FOR PEATLANDS

In Europe, peatlands have been drained for agricultural purposes. Estimate of GHG emissions caused by peatlands degradations are around 41 MtCO_2e/year, 16 MtCO_2e/year, 8.8 MtCO_2e/year for respectively Germany, the United Kingdom and the Netherlands (Gather et Niederhafner 2018; Reed *et al.* 2013; Joosten 2009).

Under the Kyoto accounting, drained peatlands converted in other land uses (croplands and grasslands) were falling under article 3.4, for which reporting was voluntary until 2012. It took time for this sector to draw attention, establish GHG accounting guidelines (IPCC 2013) and dispose of accurate national data to assess the climate impact of peatlands restoration by rewetting. The category "Wetlands Drainage and Rewetting" (WDR) was created for the second period of KP and was also voluntarily reported. Only two Parties chose this category (United Kingdom and European Union) but is currently not reported by any annex I countries (UNFCCC, 2018), in spite of some countries *e.g.* United Kingdom launching extensive research program (Thistlethwaite 2019).

Therefore, this limited inclusion of peatlands in the Kyoto accounting limited the extent of double-claiming. Combined with rather strong mitigation potential, this limited risk could explain the emergence of voluntary peatlands projects in several European countries: the United Kingdom (The Peatland Code), Germany (MoorFutures), The Netherlands (Green Deal) or Switzerland (Max.Moore).

4 ICROA (International Carbon Reduction and Offset Alliance) is a non-profit organization which gathers the leading carbon reduction and offset providers in the voluntary carbon market.

2. Overview of national carbon certification standards in Europe

2.1. General overview

Dedicated to buyers without any GHG emissions compliance targets, voluntary carbon markets allowed since 2005 the avoidance or sequestration of 437 $MtCO_2$ worldwide. As for Europe, a growing number of local initiatives have developed over the last few years to provide local certified emissions reductions projects and answer the buyers' needs. **Motivations behind carbon units purchase is key and several studies have already stated the preference of European buyers** for domestic projects (Hamrick et Gallant 2017; Tronquet, Grimault, et Foucherot 2017; Wolters *et al.* 2015).

As summarized in **Table 1**, many domestic standards emerged in Europe in the last 10 years. In 2019, we identified 12 main domestic schemes in Europe:

- 8 active national or regional schemes: the Woodland Carbon Code and the Peatland Code in the United Kingdom, MoorFutures in Germany, Climate Austria and Okoregion Kaindorf in Austria, Registro Huella de Carbono in Spain and the Label Bas Carbone in France, Max.Moore in Switzerland.
- 1 active private and transnational scheme: Puro.earth, launched by a utility company based in Finland.
- 2 schemes under development: The Green Deal in the Netherlands and Valvocar in Spain.
- 1 scheme that is not active anymore: Carbomark in Italy.

All those standards have in **common being developed for domestic use** (except Puro.earth as described above) and voluntary demand. It is also worth mentioning other preliminary work to launch domestic standards, *e.g.* in Belgium where feasibility studies were carried out. However, the initiative did not materialize for political reasons.

The following benchmark aims at giving a general overview of domestic carbon standards in Europe[5] and highlights key success factors for European carbon projects development.

TABLE 1. OVERVIEW OF NATIONAL CARBON CERTIFICATION SCHEME FOR REDUCTION/SEQUESTRATION PROJECTS IN EUROPE

Country	Name of the initiative	Voluntary/ Com-pliance	Date	Scale	Sector	Eligible activities	Volume of GHG emissions reduced/ sequestered	Price
GERMANY	MoorFutures[a] (MF)	Voluntary	Since 2011	Local	Forestry and land-use	Restoration of peatlands	68,889 tCO_2e validated	Between 40 €/tCO_2e and 67 €/tCO_2e (taxes not included)
UNITED KINGDOM	Woodland Carbon Code[b] (WCC)	Voluntary	Since 2011	National	Forestry and land-use	Afforestation/ reforestation	6.3 $MtCO_2e$ registered whose 3.4 $MtCO_2e$ are validated 1.1 $MtCO_2e$ are verified*	Between 6 €/tCO_2e and 17 €/tCO_2e
	Peatland Code[c] (PC)	Voluntary	Since 2015	National	Forestry and land-use	Restoration of peatlands	6,484 tCO_2e on 77 ha validated with 839 ha of projects pending	Between 6 €/tCO_2e and 10 €/tCO_2e[d]

In development Terminated Active

Source : information compiled by I4CE

a https://www.moorfutures.de/
b https://www.woodlandcarboncode.org.uk/
c http://www.iucn-uk-peatlandprogramme.org/peatland-code
d Price estimation is not representative as carbon units from only one project have been sold (Hoy 2019; Gather et Niederhafner 2018)

5 In the following transversal analysis, we did not include the Puro initiative, Max.Moore and Valvocar, for the following reasons: Puro is not a domestic standard, and we did not have enough information on Max.Moor and Valvocar. We will nonetheless certainly refer to them during the report to point out interesting features.

TABLE 1. OVERVIEW OF NATIONAL CARBON CERTIFICATION SCHEME FOR REDUCTION/SEQUESTRATION PROJECTS IN EUROPE *(CONT.)*

Country	Name of the initiative	Voluntary/ Compliance	Date	Scale	Sector	Eligible activities	Volume of GHG emissions reduced/ sequestered	Price
AUSTRIA	Climate Austria[e] (CA)	Voluntary	Since 2008	Local	Renewable energy Transport	• Biomass heating technology • Alternatives drives • Led lighting • Thermal solar energy	130,000 tCO_2e verified	Between 25 €/tCO_2e and 40 €/tCO_2e
	Ökoregion Kaindorf[f] (OK)	Voluntary	Since 2007	Local	Agriculture	Carbon in agricultural soil	In 2019, around 25,000 tCO_2e** validated	Between 30 €/tCO_2e and 45 €/tCO_2e
SPAIN	Registro de huella de carbono[g] (RHC)	Voluntary	Since 2014	National	Forestry and land-use	• Afforestation/ reforestation • Restoring forest areas degraded by fires	123,590 tCO_2e validated whose 19,159 tCO_2e are verified	At least 25 €/tCO_2e
	Valvocar[h] (Vc)	Voluntary	In development since 2019	Local	Forestry and land-use	N/A	N/A	N/A
FRANCE	Label Bas Carbone (LBC)	Voluntary	Since 2019	National	Forestry and land-use Agriculture	• Afforestation • Restoration of degraded forest areas • Converting coppices to high standing trees • Improvements in livestock management	0 for now	N/A
ITALY	Carbomark[i] (Ck)	Voluntary	2009-2011	Local	Forestry and land-use	• Sustainable forest management • Urban forestry • Wood products • Biochar	2,760 tCO_2e verified	Between 4 €/tCO_2e and 80 €/tCO_2e
SWITZERLAND	Max.Moor (Mx)	Voluntary	2015-2020	National	Forestry and land-use	Rewetting peatlands	Not Known	Around 110 €/tCO_2e
NETHERLANDS	Green Deal[j] (GD)	Volontary	In development since 2017	National	Forestry and land-use Renewable energy	• Peatland Management • Riothermia to substitute natural gas in heating public building (in development)	The Green Deal aims at 0.5 $MtCO_2e$/year (projection)	N/A
NORDIC COUNTRIES (FINLAND, BELGIUM, SWEDEN)	Puro.earth[k] (Pu)	Volontary	Since 2019 legal entity planned for 2019	Several countries	Agriculture Building	• Carbonated building elements • Wooden building elements • Biochar	N/A	Average price of 26 €/tCO_2e[l]

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Source : information compiled by I4CE

e https://www.climateaustria.at/eng/co2offsetting.html
f https://www.oekoregion-kaindorf.at/index.php?id=167
g https://www.miteco.gob.es/es/cambio-climatico/temas/mitigacion-politicas-y-medidas/que_es_Registro.aspx
h https://spain.climate-kic.org/news/valvorcar-creara-el-primer-mercado-voluntario-de-carbono-de-la-comunidad-valenciana/
i http://www.pdc.minambiente.it/en/progetti/carbomark-improvement-policies-toward-local-voluntary-carbon-markets-climate-change
j https://nationaleco2markt.nl/
k https://puro.earth/#section-challenge
l Price observed on the 06/06/2019

2.2. **Business**:a growing market for domestic carbon projects

In 2016, annual transactions on international voluntary markets established **that half of issued offsets were sold to European buyers** (mainly private companies), representing a volume of 8.6 $MtCO_2e$. Despite the theoretical preference from European buyers for domestic projects, **only 4% of these carbon units were issued from European projects**. This discrepancy could be explained by the slow development of a European carbon units supply. In addition to the late development of domestic carbon projects mentioned above (see information sheets in annexes), an assessment of the voluntary European markets conducted through surveys in 2015, pointed out that **92% of European carbon projects were in early phase of validation**, and so had not yet issued carbon units (Hamrick et Brotto 2017).

As compared to international projects, the volume of voluntary carbon projects developing in Europe is harder to grasp. Indeed, while JI projects were listed in a central registry managed by the UNFCCC and most international voluntary standards also use a common registry (HIS Markit or APX), each domestic standard tends to have their own registry, which gives a **very heterogeneous and diffuse picture**. From this cross-sectional study and partial data gathered and exposed in **Table 2**, a first assessment gives a volume of **3 $MtCO_2e$ carbon units** that could be purchased[6], **66%** of which **are ex-ante**. In addition to this volume, **at least 2.5 $MtCO_2e$ are in the pipeline waiting to be validated or verified**[7] with data from 2012-2019 in four countries (United Kingdom, Austria, Germany and Spain). Combining these volumes with the average price in each country represents a **total potential transaction value of 70 M€[8].**

The Woodland Carbon Code, operating since 2011, is by far the largest domestic standard in volume, representing 90% of validated carbon units tracked in this report. However, we observe a strong recent dynamic as 6 of the 12 schemes identified in **Table 2** were created in 2015 or after. We can mention for example two recent national schemes which were not included in the above mentioned volumes but are expected to grow in the upcoming years: the French Label Bas Carbone launched at the end of 2018, or the Green Deal in the Netherlands which should be operational in 2020.

2.3. **Methodologies and activities**: focus on land-use projects

Land-use, land-use change and forestry (LULUCF) projects are the most abundant type of projects in European voluntary domestic standards. They represent 98% of carbon units registered/validated or verified from our cross-sectional analysis and are the focus of 15 out of 21 methodologies/ eligible activities. Afforestation (especially with the Woodland Carbon Code) is by far the main activity. However, we should also point out that under some standards (Green Deal or Label Bas Carbone), methodologies are being developed for other diffuse sectors such as agriculture or building.

At the international level, LULUCF projects represent around a quarter of transacted carbon units, second to renewable energy projects. With 22% of volumes in 2016, REDD and avoided deforestation projects are the most represented forest category (**Figure 2**, right), followed by afforestation/ reforestation and improved forest management, both representing 3% of the volumes. Conversely, in Europe, all forestry projects fall into those last two categories (**Table 1**).

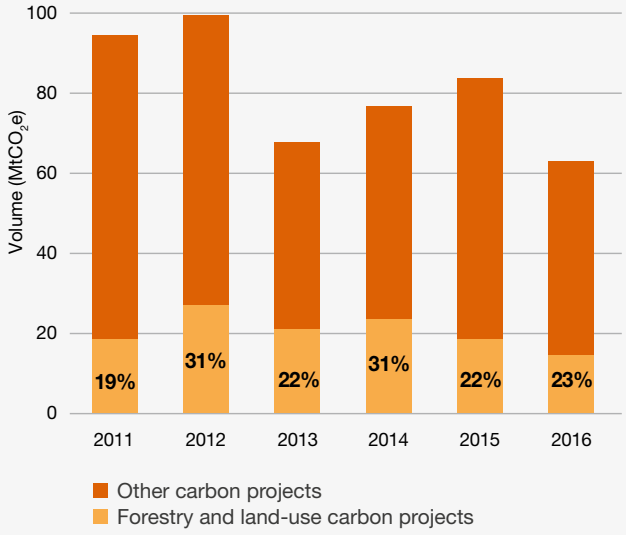
Most European standards focus on one or two practices, and none of them already takes into account all the LULUCF categories.

6 We refer here to ex-ante carbon units that are validated, not verified but can be purchased under certain precautions (see later in the report how non-permanence and other risks are dealt by domestic standards) AND carbons units that are verified.

7 This volume includes projects registered under one of the domestic standards but waiting for projects documents to be validated or for emissions to be verified when ex-ante credits are not allowed.

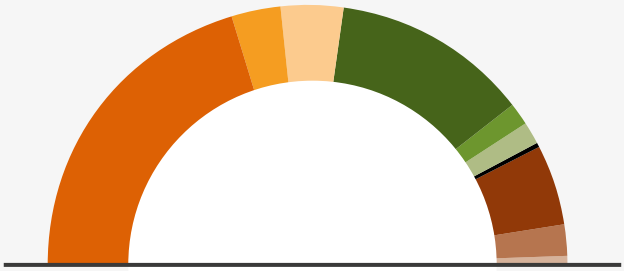
8 These figures are restricted to carbon units that can be sold and do not include those kept in a buffer account.

FIGURE 2. TRANSACTION VOLUMES OF CARBON CREDITS IN INTERNATIONAL VOLUNTARY MARKETS* ACCORDING TO PROJECTS CATEGORY BETWEEN 2011 AND 2016 (LEFT) AND IN 2016 WITH MORE DETAILED CATEGORY (RIGHT)



Source: I4CE according to a compilation of data from Ecosystem Market place

** As explained in the precedent section, this figure does not include domestic carbon credits issued in Europe.*



- Renewable energy **41%**
- Efficiency and fuel switching **6%**
- Households device **8%**
- REDD and avoided deforestation **24%**
- Reforestation **3%**
- IFM **3%**
- Other land-use (urban forestry, grassland management... **0.1%**
- Methane (including livestock) **10%**
- Transportation **4%**
- Other **1%**

Source: Annual Ecosystem market place reports from Hamrick and Gallant.

TABLE 2. PROJECTS TYPOLOGY IN EUROPE

Sector	Project category	Domestic standard	Part in European voluntary markets (2011-2019)	Part in international voluntary markets (2011-2016)
Forestry	Afforestation	LABEL BAS CARBONE, Woodland Carbon CO2.de	93%[1]	5%
	Reforestation	LABEL BAS CARBONE	<1%[2]	5%*
	Improved forest management	LABEL BAS CARBONE, CARBO MARK	<1%**	7%
Land-use	Peatland restoration	PEATLAND CODE, Green Deal, Moor Futures	2%[3]	<1%[4]
	Carbon in agricultural soil	ÖkoregionKaindorf	<1%	<1%[5]
Renewable energy and transport	Biomass heating technology; Alternatives drives; Led lighting; Thermal solar energy	CLIMATEAUSTRIA	4%	40%

Source: (Hamrick et Gallant 2017b)

1 Afforestation and reforestation imply very different activities but are accounted in the same category on international voluntary markets.

2 Idem.

3 Peatlands and soil carbon projects represent too small fluxes to be tracked and we assume they fall in the "Agroforestery-other" category from the classification used by Ecosystem Market Place reports.

4 Idem.

5 Idem.

Several reasons might contribute to explain the massive focus on land-use projects:

- In general, **land use actions present large mitigation potential,** *e.g.* representing one quarter of mitigation options considered for 2030 in NDC's pledges at the global level (IPCC, 2018). It also represents the main removal potential. On a global scale, AFOLU sector harbors 30% of potential mitigation action for a 2°C scenario but attracts only 3% of public finance climate (Climate Policy Initiative, 2017).
- Until 2020, **land-use was not included in the European climate targets.** The LULUCF sector was partly accounted for under the Kyoto protocol but had no binding objective under the European energy and climate package. Therefore, it was not the main sector targeted by European and national climate policies and instruments (Grimault, Tronquet, and Bellassen 2018). The project-based mechanisms therefore appeared as one of the relevant tools to trigger land use mitigation action.
- **A specific interest from private buyers to finance voluntary land-use projects**. Forestry and land-use projects were the second most traded project type on international voluntary markets in 2016 (Hamrick et Gallant 2017b). It was also the second most favored projects from current and potential buyers for voluntary offsets in France (Tronquet, Grimault, et Foucherot 2017). The forestry sector offers a positive narrative and afforestation is easy to promote for a company, through field visits for example. Conversely, in the region Mecklenburg-Vorpommern, the transition from tree planting sponsorship to peatland restoration projects through the MoorFutures standard was considered challenging from a communication perspective, as climate benefits are not visible to the naked eye (Matzdorf *et al.* 2012).

We can observe four trends among methodologies and eligible activities in Europe:

- **A strong use of forestry methodologies** (Woodland Carbon Code, Label Bas Carbone, Registro Huella de Carbono, Carbomark).

In particular, afforestation projects from Woodland Carbon Code and reforestation projects from Registro Huella de Carbono represent almost all the supply with 92% of validated carbon units tracked in this report in 2011-2019. In comparison, afforestation/reforestation represented only 5% of carbon projects in international voluntary markets in 2011-2016 (Hamrick et Gallant 2017c; 2017b). Finally, the first methodologies validated under the French Label Bas Carbone targeted forestry practices: afforestation, restoration of degraded forest stands and conversion of coppices into high forest stands.

- **An interesting development of peatland restoration projects** (Green Deal, Peatland Code, MoorFutures).

If peatland restoration projects are currently a 'niche', as they represent a very small part of both international and European volumes, we can expect a rather important development in the upcoming years. Indeed, the dedicated 'Peatland Code' created in the UK in 2015 has now 11 projects totaling 11 000 ha waiting to be validated, while several peatland projects are expected to be launched very soon by the Green Deal in the Netherlands. In 2019, a methodology for determining emission reduction via peatland projects was approved by the Green Deal and included in their Rulebook.

- **Experiencing other high potential methodologies: carbon storage in wood products and soil carbon sequestration**

Finally, we see the emergence of methodologies covering sectors and practices that are rather poorly represented at the international level. We can mention for example the development of methodologies dedicated to wood products (Carbomark, Puro.earth, and partially Label Bas Carbone), or to carbon sequestration in agricultural soil (Oko region Kaindorf, Label Bas Carbone). More generally, **valorization of practices sequestrating carbon in agricultural or forest soils** encountered strong interests from local stakeholders and methodologies could be further developed by the Registro Huella de Carbono, the Woodland Carbon Code or the Label Bas Carbone.

- **From LULUCF to AFOLU: emissions reductions in the agricultural sector**

If most European projects are related to land-use, we can point out a growing interest for project-based mechanism valuing emission reduction from the agriculture sector. For example, under the Label Bas Carbone, a carbon farming[9] methodology was published in October 2019. It targets all emissions reductions practices in livestock farms.

Finally, if land-use projects are without a doubt the most dominant project type in Europe, it is worth noting that the new standards, like the Green Deal and the Label Bas Carbone for example, actually target all types of diffuse sectors. The first methodologies focus on peatlands, forestry and agriculture, but other emissions reductions projects could later be certified in building, transport and waste for example.

9 The scope of application Includes cattle and dairy farm.

TABLE 3. AVERAGE PRICE AND PRICE RANGE FROM INTERNATIONAL VOLUNTARY MARKETS AND DOMESTIC MARKETS

	Forestry and land-use on international voluntary markets (2017)	All-type projects on international voluntary markets (2017)	Land-use projects under domestic standards in Europe
Average price	4.6 €/tCO_2e	2.7 €/tCO_2e	13 €/tCO_2e
Price range	From 2 €/tCO_2e to 72 €/tCO_2e	From 0.4 €/tCO_2e to 72 €/tCO_2e	From 6 €/tCO_2e to 110 €/tCO_2e

Source: Information's collected by I4CE and (Hamrick et Gallant 2017a).

2.4. **Price and project size**: higher prices for smaller carbon projects

Carbon prices are very heterogeneous among projects, but are in average higher than on international voluntary markets. **The weighted average price for European domestic credits in our case studies, which are mainly from land-use projects, is 13 €/tCO_2e**. This estimation is based on prices publicly displayed by the standards and summarized in **Table 3**. We did not have detailed information on prices per project or vintages[10] of the projects. Prices ranges **from 6 €/tCO_2e to 110 €/tCO_2e** and many projects are still in the pipeline waiting to be validated. The average price is clearly influenced by the Woodland Carbon Code which cover most of the volumes, with prices ranging from 6 €/tCO_2e to 17 €/tCO_2e. A survey conducted by Hamrick and Brotto (2017) reported a higher average price of 15.6 €/tCO_2e for forestry-based projects in 2015, but it was based on partial declarations representing only 13% of the volume tracked on the European market. If we look at wider types of projects and current developments (peatlands, improved forest management…) the average price could tend to rise.

In comparison, on international voluntary markets the average price in 2016 was **4.6 €/tCO_2e** for AFOLU projects (Hamrick et Gallant 2017b). We can underline that half of the unsold volume on international voluntary markets was due to projects developers refusing to sell for a price considered too low. According to projects developers and retailers, an ideal price would be around 9 €/tCO_2e for an average international project.

The higher prices in Europe could be related to the much smaller size of European projects compared to the international ones. The CDM defines small-scale projects as "Small-size *project activities […] that result in emission reductions of less than or equal to 60 $ktCO_2$ equivalent annually*" (Decision 1/CMP.2, paragraph 28). With data available from MoorFutures, the Woodland Carbon Code, the Peatland Code and the Registro Huella de Carbono, the average volume observed varies from **92 tCO_2/year/project to 236 tCO_2/year/project**, **confirming the smaller and even micro size of domestic projects in Europe.**

2.5. **Governance**: developing a domestic standard in Europe is rather a public affair

We distinguish two categories of governance from our case studies:

- **Public**, if a public administration or regional authority directly administer the standard.
- **Semi-public**, if the standard is administered by a private entity but do work closely with public administrations or regional authorities.

Out of the 9 domestic standards included in our cross-analysis, **five are/were directly managed by public administrations or affiliated entities** (environmental agency, regional authorities…): MoorFutures, the Woodland Carbon Code, the Registro Huella de Carbono, the Label Bas Carbone and Carbomark. The Woodland Carbon Code, Label Bas Carbone and Registro Huella de Carbono are initiatives from national environmental ministries in the UK, France and Spain, while MoorFutures and Carbomark are linked to local authorities (see annex for more details).

As for the next three (Peatland Code, Climate Austria and the Kaindorf ecoregion), **the legal nature of the main managing institution is private but the sense of public service is strongly present.** The Peatland Code is legally managed by the International Union for Conservation of Nature (IUCN) UK Peatland programme but is partly publicly funded and relies on close collaboration with governmental institutions working on peatlands in the United Kingdom. The Kaindorf ecoregion is a nonprofit association reuniting three Austrian municipalities, while Climate Austria is a consulting firm commissioned by the Federal ministry of sustainability and tourism to create portfolios of national and international climate projects.

10 Vintages refer to the year in which emissions reductions occur. The vintage of the offsets may not necessarily match the year in which the offsets are transacted—and the vintage year may be in the future.

PRIVATE STANDARD IN EUROPE: FOCUS ON THE FAST-PACED DEVELOPMENT OF PURO.EARTH

Puro.earth is an original initiative focused on removal technologies (wooden building, biochar or carbonated elements for construction) called Puro.earth. Housed by Fortum innovation venturing (a finish utility company) and with the support of 23 private companies, an online marker platform was launched in 2019. Designed to facilitate the development and funding of sequestration projects, it came with a certification scheme and several methodologies. Auctions are organized in which buyers and suppliers respectively define a cap and floor prices; when prices match, a certificate is sold... The whole framework was developed in a year, which is fast compared to the development of public standards (the Label Bas Carbone or the Green Deal had a three years long development phase).Additionality (see section 2.6 for more detail on how additionality is used by domestic standards) is not explicitely considered and is replaced by stringent baselines to calculate net sequestration emissions from certified projects Prices displayed for CO_2e Removal Certificates (CORC) are around 26 €/tCO_2e (PURO 2019).

Finally, in the Netherlands, the Green Deal is currently under a three years development phase that started in 2017. This process involves 21 private and public stakeholders including NGOs, private companies, carbon banks, the Ministry of Economic Affairs and Climate and local administrations, presenting an interesting case of public-private partnership.

Even if most **domestic schemes are managed by public actors,** the connection with private stakeholders – that is to say not only companies but also landowners and intermediaries – are often seen as **a main cornerstone for the success of those markets**. In this respect, we see that the schemes actually rely on those private local stakeholders: for example, the Woodland Carbon Code is strongly supported by private intermediaries that disseminate it throughout the territory, while the Label Bas Carbone is the result of a bottom-up initiative by French stakeholders from the forest-based and agricultural sectors. It also completely relies on stakeholder's involvement for the development of methodologies.

2.6. MRV: common guidelines with specific features adapted to national contexts

MRV frameworks allow to direct private funds towards result-based projects and give an economic incentive to trigger climate friendly practices. They bring guarantees to the buyers by helping measure emissions reductions and ensuring a few quality criteria. Most standards are inspired from the CDM, but they all have included some specificities to adapt their own local context.

Detailed information can be found in annex, but we will provide below a quick summary of similarities and differences in the MRV frameworks of European standards.

Additionality – A very heterogeneous picture

One of the main feature and unavoidable component of carbon projects is additionality. Projects must prove that they trigger additional emissions reductions or removals which would not have occurred without carbon finance, avoiding at the same time windfall effects as much as possible.

We can distinguish two kinds of additioality demonstration: a **standardized method**, which can be a 'positive list' of eligible practices or technologies, or **individualized tests,** which consists in submitting the project to a set of "tests" in order to demonstrate that the project implantation is not the most likely scenario Common additionality tests are the legal test[11], economic test[12] or barrier test (Grimault, Bellassen, et Shishlov 2018).[13]

11 Legal additionality means projects actions must go beyond what is already required by the law.

12 Economic additionality means that carbon finance is the 'trigger' for the project implementation and will not have happened without it. More specific definitions are given in annex detailed sheet for each of the standards.

13 Barrier additionality refers to technical, cultural or social barriers that could hinder the project implementation.

TABLE 4. ADDITIONALITY USED BY DOMESTIC STANDARDS

	Woodland Carbon CO2.de	PEATLAND CODE	Moor Futures	LABEL BAS CARBONE	2014	Green Deal	CARBOMARK	ÖkoregionKaindorf	CLIMATEAUSTRIA
Individualized methods	×	×	×	×	–	×	×	×	–
Standardized methods	–	–	–	×	×	–	–	–	×

Source: I4CE

1. Label Bas Carbone to use both: if a standardized additionality is used a discount rate is applied (see section 3.1).

Most standards rely on individualized methods to prove additionality, except for the Registro Huella de Carbono and the Kaindorf eco-region. Nonetheless, rather heterogeneous definitions have been adopted: while most domestic standards include economic additionality (Label Bas Carbone, Woodland Carbon Code, Peatland Code, Climate Austria, Carbomark, MoorFutures) others exclusively refers to legal policy additionality (Green Deal). Note that the economic additionality criteria does not forbid an articulation with public funds: carbon finance is mostly seen as a complementary income for the landowner and can be combined – in a certain limit- with public subsidies if necessary (Label Bas Carbone, Peatland Code, Woodland Carbon Code). At the contrario, mobilizing others sources of financing is explicitly excluded within MoorFutures and co-financing is not used in projects from Climate Austria and Kaindorf eco-region scheme.

Finally, **the definition of additionality can also vary within a single standard**. For example, the four Carbomark methodologies implied four different definitions of additionality: 1) for sustainable forest management projects, project activities had to go further than practices observed at the regional level; 2) for urban forestry, only legal additionality was required 3) for wooden products projects, carbon credits could be generated if the ratio of wood in construction was higher than the national average and 4) for biochar projects, economic additionality was required.

Validation and Verification – 'In house' validation and early verification

Most MRV schemes are based on a two-step certification process: 1) a validation step, where the project document conformity to its referred methodology is assessed; 2) a verification step, which usually happens a few years later and triggers the emissions reductions issuance.

In the European case, most validations are based on an internal documentary review by domestic standards themselves (Label Bas Carbon, partly by MoorFutures, Registro Huella de Carbono, Eco region Kaindorf). The Peatland Code and Woodland Carbon Code use a third-party to validate projects. In a few cases, validation also includes field visits of the land/ production facility (Peatland Code and Puro.earth).

For all standards, verification processes occur in the first five years after the validation and are a mix of documentary audit and in-field visit assigned to an accredited independent third party (for more details on validation and verification (see information sheets in annexes).

Duration of projects – Mostly long-term projects

Duration of projects varies from 5 to 100 years depending on the activities implemented. For forestry projects, minimum duration is 30 years (Label Bas Carbone and Registro Huella de Carbono) and goes up to 100 years (Woodland Carbon Code). Duration for peatlands projects varies between 20 years and 50 years (Peatland Code, MoorFutures, Green Deal) with the possibility of a 10 years duration if the peatland is used for agriculture in line with peatlands conservation (*e.g.* paludiculture).

Projects in the agricultural sector are shorter: sequestration in agricultural soils projects with the Kaindorg eco-region range from 7 to 10 years, while the carbon farming projects under the Label Bas Carbone will last for a renewable 5 year term.

3. Challenges and opportunities for the development of local carbon projects in Europe

Despite a dynamic trend in the last few years, the European voluntary market remains small compared to other regions. Based on several interviews conducted with domestic standards and documentary analysis, we identified five main challenges faced by domestic standards in Europe which could be turned into opportunities and contribute to the development of the market:

- **Adapt MRV framework to small scale-projects:** projects in Europe are rather small and MRV costs and processes can discourage project developers. Simplification and innovative ways to lower costs have already been developed by some standards, with the attention of not undermining the framework credibility.
- **Deal with land-use specificities:** most projects are from the land-use sector where risks (non-permanence, carbon monitoring uncertainties) could be higher than for other types of projects. In addition, forestry projects for example present a significant carbon potential in the long run, whereas most of their costs take place at the beginning of the project. Specific tools (ex-ante credits, buffer pool, discount rates) have been developed to deal with these constraints and *not let uncertainty justify climate inaction.*
- **Involvement of public actors contribute to establish a positive and trustworthy framework**: domestic standards presents the specificity of being developed and carried out in part by public actors (local government or ministries), contributing to create a trustworthy context for carbon projects. However, the dedicated human resources can be limited and national ministries cannot bear the costs of territorial animation. Therefore, the involvement of local intermediaries can be crucial.
- **Higher prices for local projects**: carbon projects developed in Europe show higher prices than those observed in the international voluntary markets. One way to advocate for higher prices is better valuing co-benefits. Additionally, projects developed by domestic standards are increasingly related with local and national policies, which is a growing demand from buyerspas
- **Ensure clear communication:** Communication and transparency are key when it comes to voluntary engagement. If past positions on double-claiming have confused buyers on this matter, contributing to a wider common target is now seen as a necessary step forward. On the other hand, the credibility of the climate strategy of buyers before offsetting is also key to ensure the credibility of the certification framework, and initiatives are rising to better frame companies' strategies and claims for carbon neutrality. Questions arise on who and how to ensure the integrity of the entire climate mitigation strategy of private actors.

This section highlights the different key success factors identified for European domestic schemes, and summarizes the solutions and practices already implemented by some standards.

3.1. Adapt MRV frameworks to small scale projects

Costs relative to carbon projects certification, called 'transaction costs' are composed of fixed and variable costs. For forestry projects for example, "fixed costs include for example the costs of transporting monitoring teams into project areas, while variable costs depend on the size of the project and the number of plots (salaries, transportation costs between the plots, data entry and analysis costs). The presence of important fixed costs explain why monitoring costs are proportionally higher for small projects than for bigger ones" (Grimault, Bellassen, Shishlov, 2018). The same goes for the validation and verification steps, where fixed costs are also important: additionality demonstration, third party verification and in-field visit… The more stringent the certification requirements (high monitoring precision, individual additionality demonstration, co-benefits quantification…), the higher the costs. or forestry projects on international voluntary markets (typically under CDM or VCS) MRV costs can be around 0.15 €-1.4 € per tCO_2e (Bellassen et Stephan 2015).

Trade-off and group demonstration for "individualized" additionality

Additionality demonstration and associated baseline determination can represent up to 50% of costs associated drafting projects documents when an "individualized" demonstration is required, while under the CDM, 65% of certification failures were due to an unconvincing additionality demonstration (Grimault, Bellassen, et Shishlov 2018).

We can highlight two procedures developed in Europe to lower additionality costs:

- The French Label Bas Carbone relies on a 'discount principle' in order to lower additionality demonstrations costs. The method developer has two options to set the baseline: require an individual baseline or allow for a regional or national baseline. The second option is easier to implement for the project developer but comes with a higher risk of windfall effect. Therefore, a discount is applied if this second less stringent option is chosen.
- The Peatland Code and Woodland Carbon Code offer several options for the type of additionality tests chosen and allow for group certification for small projects. Projects proponents have to comply with two mandatory

additonnality tests (financial[14] and legal) and a third test which can be a barrier test (social, cultural etc..) or a financial test, therefore giving broader options. Group certification is also allowed to lower costs for small forestry properties[15] as they can present the same material to prove additionality. Projects presenting similar funding models (similar sources of funding, same land ownership…) can carry out a group demonstration for every test except the legal one.

Diversification of third parties involved in validation and verification processes

Simplified validation and verification processes are also implemented to reduce MRV costs. For example, some standards (Woodland Carbon Code, Peatland Code, MoorFutures) allow the same third party to carry out both the validation and verification of a project, whereas the CDM required to use a different entity (Gather et Niederhafner 2018).

One other way to reduce costs is to have a wider pool of potential auditors and to allow wider types of profiles. For verification purposes, the Registro Huella de Carbono have not appointed or selected specific VVBs, so any forest engineer who present the adequate qualification (see information sheets in annexes for more details) can carry out the verification procedure (Ministerio para la transicion ecologica 2019). In the case of the MoorFutures program, the project located in Mecklenburg-vorpommern region had a local university endorse the role of VVB. As an exploratory lead, the Green Deal is currently installing a committee of experts to perform project validation, instead of classic VVBs (JIIN 2019). Finally, the french Label Bas Carbone also allows for an extended choice of VVBs in a perspective of lowering costs. On-going discussion in France address the possibility to incentive common verification between Label Bas Carbon and sustainable management standards (PEFC, FSC).

Finally, **remote-sensing solutions could be a way to reduce MRV costs and especially verification costs.** There are no examples of concrete implementation of those solutions so far, but a strong interest was expressed during the interviews to further explore this potential.

3.2. Dealing with land-use sector specificities

As stated in precedent sections**, the overwhelming majority of domestic schemes are focusing on forest and land use protocols** and to a lesser extent on non-CO_2 emissions reductions in agriculture.

Historically, forest carbon projects were very limited under the CDM for several reasons: **non-permanence risk** (carbon sequestrated could be released in the atmosphere), **long-time period before being able to issue carbon credits** (trees take time to grow), **uncertainties** when it comes to asses GHG emissions and removals fluxes (Houghton *et al.* 2012). Peatlands faced similar uncertainties concerning carbon accounting (Joosten, Tapio-Biström, et Silvius 2012; Gather et Niederhafner 2018).

In order to deal with those specificities and not exclude any carbon action in the land-use sector, international and domestic carbon standards have developed methodological tools throughout the years. We will focus on two of them: the **buffer account** for dealing with non-permanence risks and **ex-ante credits** to provide an economic incentive to long-term projects.

Ex-ante credits for up-front payment

Ex-ante credits are issued before the emissions reductions/ sequestration have actually occurred and has been verified. They are specifically relevant for long-term projects like forestry projects, which need substantial expenditure investments at the beginning (Chenost *et al.* 2010) and for which the actual carbon sequestration benefit can take years or decades. **Ex-ante credits therefore allow to provide the necessary funding to start the long-term projects that cannot really fit into the ex-post classic schemes**. Of course, this comes at the cost of a reputation risk as

TABLE 5. TYPE OF CARBON CREDITS USED BY DOMESTIC STANDARDS

	Woodland Carbon Code	PEATLAND CODE	Moor Futures	LABEL BAS CARBONE	2014	Green Deal	CARBOMARK	ÖkoregionKaindorf	CLIMATEAUSTRIA
Credit	Ex-ante and ex-post	Ex-ante	Ex-ante	Ex-ante and ex-post	Ex-ante and ex-post	Ex-ante and ex-post	Ex-ante and ex-post	Ex-post	Ex-post

Source: I4CE

14 The carbon finance test implies to evaluate if carbon payments are equal to at least 15% of the project's planting and establishment cost up to year 10 whereas the financial test implies demonstrating the project is not the most economically/financially attractive option without carbon finance.

15 Small projects refer to property with 5 ha net planting area or less.

several scandals have demonstrated: "emit today and offset decades later" is an understandable pitch for critical NGOs and journalists. Nevertheless, ex-ante credits are used or meant to be used in seven European domestic standards (see Table 5).

In order to ensure transparency and environmental integrity, diligent transparence must be implemented and can take different forms according to the different European domestic standards. The Woodland Carbon Code, the Green Deal, the Peatland Code and the Registro Huella de Carbono apply specific discounts when ex-ante credits are sold. The discount rate applied (from 10% to 20%) to ex-ante credits serve as an adjustment in case the effective amount of carbon reduced/sequestrated is lower than the one projected. Those credits are kept aside until a diligent verification process is carried out. For example, in the case of the Woodland Carbon Code, 20% are subtracted from the carbon sequestration calculations in case, there are errors in the carbon models.

Two specific cases are worth mentioning:

- As a conservative measure, the Registro Huella de Carbono only allows the anticipated issuance of 20% of projected sequestrated emissions.
- The Woodland Carbon Code created a specific type of unit for ex-ante certification the pending issuance units. They imply specific communication guidelines for buyers and have to be converted later into verified units.

Non-permanence risk and buffer pools: a collegial insurance system to deal with uncertainty

The non-permanence risk refers to the risk of carbon sequestration projects suddenly reemitting carbon into the atmosphere, for example following natural disturbances (forest fire, storm, pest attack…). This risk is inherently linked to the land-use sector and more generally carbon sequestration projects, as opposed to emissions reductions projects, usually considered safer as an avoided emission cannot be reemitted. In this matter, (Gather et Niederhafner 2018) point out that carbon soils projects and peatlands already present clear climate benefits after 10-15 successful years of carbon removals, even if the carbon is reemitted afterwards, advocating not to put aside land-use projects presenting non-permanence risks.

The most common tool used as a mean to deal with non-permanence risk is the 'buffer pool' or 'buffer account', which was initially developed by the private standard Verra in late 2000's. **A part of carbon units is retrieved from every project, put aside indefinitely and sometimes mutualized in a virtually common pot**. The rate of retrieved emissions reductions can be fix or dependent on the level of risk of the project. Carbon units stored in the buffer account or simply discarded from projects allow to balance potential carbon losses occurring on some of the projects. Additional precautionary measures to limit reversal risks are also often required by domestic standards, such as sustainable management plans for forestry projects. For example, every project under the Woodland Carbon Code must conform with good practices included in the United Kingdom Forest Standard (UKFS), including resilience measures as reviewing species suitability, reviewing rotations lengths in response to changing conditions or maintaining diversity of tree species with a maximum of 75% of a single species allowed in the forest plot (Forestry Commission 2017).

3.3. Establishing a positive and trustworthy framework trough involvement of public actors comes with high cost

Public actors – we refer here to ministries from national governments or local authorities- have most of the time initiated or clearly contributed to the development of domestic standards.

A step further in the public commitment would be **to engage public funds to finance projects under domestic standards as a trigger or multiplier of private investments**. In England, only 1 870 ha of projects representing 991 000 tCO_2e are either registered, validated or verified under with the WCC

ZOOM: HOW TO USE EX-ANTE CREDITS ? EXAMPLE FROM THE WOODLAND CARBON CODE

In the case of WCC, a specific carbon unit is created. Between the validation and the verification steps at n+5 and then n+10, units are defined as 'Pending Issuance Units' (PIU) and are concretely a promise to deliver verified units. Until the verification phase, 20% of carbon pending units from the project are immediately removed from the project developer account to integrate potential mistakes in the projection modelling of carbon sequestration and further 20% are permanently off the market to be used as an insurance to cover non-permanence risks. PIU can be purchased by companies and be used in corporate social responsibility claims about the future benefit of an investment but cannot be retired. Today, around 60% of emitted PIU have been bought (West 2018). Once verified by a VVB and converted to Woodland Carbon Units (WCU), they can be retired for use in a company's environmental or greenhouse gas report or in claims of carbon neutrality under PAS 2060*.

* PAS 2060 is a private certification setting requirement to be declared neutral.

while the equivalent figures in Scotland are 15 085 ha of projects representing 4.96 $MtCO_2e$ are under the validation process. In order to increase woodland creation in England, the UK government announced **in 2019 the 'Woodland Carbon Guarantee':** it will take the form of a **public fund dedicated to WCC certified projects and endowed with 50 M£ over 30 years.**

Although we can observe different degree of commitment in our case studies, we identified two main elements coming from the involvement of public actors:

An increased trust from the stakeholders and especially the buyers

In a voluntary framework, the endorsement by national government or regional authorities increases the **reputation** of the scheme and its perceived longevity, both of which can be seen as **a "risk mitigation" action** for private investors. In a survey conducted in France in 2016, 83% and 60% of French respondents were willing to use a standard promoted by the UN or by public national authorities respectively, while 47% were willing to use a private standard promoted by NGOs and only 19% were willing to use a private standard promoted by professional organizations (Tronquet, Grimault, Foucherot 2017). In Germany, MoorFutures benefited from the seal of 'trust' procured by the fact that it was embedded and promoted by the regional authority, and it was considered as a key factor for his success (Matzdorf *et al.* 2012). In the case of the Registro Huella de Carbono in Spain, trust is enhanced by the public management of the label and buyers are eager to finance the whole project once it is validated and before the verification step. 45% are financially supported by private companies and do not need to sell more carbon units to a third party.(Ministerio para la transicion ecologica 2019).

Fewer resources to deal with operational and promotional activities

However, the other side of the coin is the **availability of time and resources dedicated to both the day-to-day operation and promotion of the standard.** Public institutions often have more limited human resources – 2 full time people for the Woodland Carbon Code and for Registro Huella de Carbono - than private entities. In contrast with private standards for which brand and communication is definitely part of the business strategy, domestic standards are sometimes closer to a public policy than a certification brand to be promoted.

Moreover, the connection to a wide network of project developers and buyers can be harder to build. Therefore, a success factor for this type of standard could be to rely on a network of intermediaries to promote the framework to both potential project developers and buyers but also bring technical support to help project developers getting involved in the certification process. In France, a dedicated association called France Carbon Agri was launched in April 2019 with the objective of pooling and supporting project developers, individual farmers or farmer's association for example, in the implementation of the carbon farming methodology. Although, the entity is still defining his scope of action, it could range from expert assistance during the project development phase; support during Label Bas Carbon application submitted to ministries; searching and making connection with buyers and supporting the monitoring required (France Carbon Agri 2019). On the other side of the Channel, in United Kingdom, the Woodland Carbon Code clearly relies on private intermediaries (project developer and carbon retailer), listing them and hosting internet links redirecting towards them if technical support is needed.

3.4. Co-benefits for higher prices and valuation of the "beyond" carbon benefits

One of the conditions of success of project-based mechanisms is ensuring **fairly high prices for projects, in order to provide a sufficient incentive for project developers.**

The price of carbon units depends on the cost of the project, but other factors actually influence it. The Carbomark projects gives an interesting illustration of the different factors that can influence forest-based projects price, depending especially on the targeted forest activities. **For example, they identified that for forest management activities, the main driver for carbon price was the price on international voluntary markets (4-13 €/tCO_2)**, which tend to imply lower prices. For long lasting wood products, the long project durations of 30 years trigger a higher price (20-60 €/tCO_2), while even higher prices are observed for urban forestry projects (30-80 €/tCO_2), which present numerous co-benefits and high maintenance costs. Finally, they also observed that ex-ante crediting usually implied lower prices (Carbomark project 2011).

More generally, we can think of other factors that could contribute to the higher prices of European emissions reductions from forestry projects:

- Smaller scale projects which implies a stronger pressure of MRV costs (see section 2.4).
- Growth speed of temperate forests, which is slower than tropical forests and therefore implies a longer time to reach the same amount of carbon sequestered.
- Labour costs for project implementation, which are higher in Europe than in most tropical forests countries.
- Improved forest management projects imply the presence of an existing forest and therefore a less favourable baseline than afforestation projects, resulting in a lower amount of certified carbon units per hectare.

However, carbon price is not the only decision-making factor for buyers. As pointed out in (Tronquet, Grimault, et Foucherot 2017; Wolters *et al.* 2015), surveys carried out in France and Germany shows the stated importance that buyers give to co-benefits. In France, 73% of buyers considered environmental co-benefits as essential or very important, although it was not always correlated to a much higher willingness to pay.

Another challenge domestic standards are facing is therefore to assess **the 'beyond carbon' benefits of projects, in order to address buyers' needs without increasing MRV costs too much**. In Europe, some standards have implemented tools to try and integrate co-benefits:

- In the UK, the WCC **created a tool to facilitate the assessment of positive impacts of woodlands** through four sections: wildlife, water, community and economy. Each section is composed of four objectives and each objective is divided into two questions. The document contains a total of 24 questions that the project developer must answer to define whether the project is a Wildlife haven, Freshwater friendly, a benefit to the local community (Community asset) or an economic driver. This qualification is based on declaration from the project developers (Woodland Carbon Code 2014; AECOM 2016).
- In Spain, **the RHC provides an exhaustive list of possible environmental co-benefits that forest-based projects can present beyond carbon sequestration** (Ministerio deagricultura y pesca, alimentacion y medio-ambiente 2018a). For example, it can include adaptation measures through tree species selection, a location on a Natura 2000 zone or in a high risk zone for desertification or erosion.
- In France, **forest methodologies integrate a list of actions generating socio-economic or environmental benefits**, and which provide 'bonus points' for the projects. They will be included in the verification procedure through indicators that are not supposed to increase additional costs for the VVB (CNPF 2019). Those co-benefits includes for example: involving a local sawmill in transforming wood products, subscribing for fire insurance, reducing soil disturbance, enhancing plantation of natives species, restoring riverside vegetation...

3.5. Clear and coherent communication: towards the Paris Agreement and the contribution to national targets

Clear and transparent communication framework is key to stimulate investments from private actors in project-based schemes.

Confirm domestic standards as a mean to achieve national climate targets

In the previous years, double-claiming in voluntary market was considered a risk for environmental integrity by some standards, which contributed to projects development slowdown in Europe and created some confusion for buyers. In England for example, the WCC units were not recognized by the International Caron Reduction and Offset Alliance[16] (ICROA) as offsetting units, which probably made it look less attractive and reliable to buyers. In the context of the Paris agreement, this historical stance on double-claiming is become untenable and is therefore being abandoned: under the impulse of the Gold Standard, ICROA recognizes that carbon projects can contribute to national NDCs, without creating an environmental integrity problem (ICROA 2019). This is coherent with the existing position of most domestic standards, which are often built as public policy tools meant to contribute to national climate targets.

Indeed, several standards **clearly and publicly took the stance to associate domestic schemes to national or local climate and environmental goals**:

- In the UK, the Woodland Carbon Code is quoted in various national strategic plans as a way to support greater levels of woodland creation, support demand for domestically grown timber and achieve 12% forest cover by 2060 (Government of United Kingdom 2017; 2018).
- As for the Peatland Code, the national strategy to manage peatlands mentions peatland management as an opportunity to attract private investments and help incentivize sustainable management and restoration of 80% of degraded peatlands in UK (IUCN 2018).
- In Germany, the restoration of peatlands in Mecklenburg-Vopommern is part of the climate regional strategy for 2020 (Ministry of agriculture and environment of Mecklenburg-Vorpommern 2009).
- In France, the label Bas Carbone is one of the tools of the 'National Low-Carbon Strategy', especially for forestry and agriculture sectors.
- In Spain, the decree enacting the Registro Huella de Carbono establishes the objective to reduce GHG

16 ICROA is a non-profit organization gathering main actors from the voluntary carbon market.

emissions and enhance natural sinks in Spain in order to contribute to international climate change commitments (Ministerio de agricultura y pesca, alimentacion y medio-ambiente 2014).

Moreover, **private actors are increasingly expressing the willingness to contribute to climate national objectives** as in Netherlands (JIIN 2019) or with the Peatland Code in United Kingdom (Hoy 2019). More and more companies are happy to contribute to collective effort against climate change and want to make sure their contribution is actually seen in the national inventory.[17]

Oversight on the overall climate strategy of buyers and over their claims?

Framing environmental and climate benefits claims from private investors also contributes to **guaranteeing the environmental integrity of the process in which they are part**. Indeed, green-washing accusations of a company or of a carbon neutrality claim can also undermine the credibility of the carbon standard. However, in most cases, carbon standards are 'project standards', and are not meant to control the buyer's climate strategy and communication. Most of domestic standards analyzed here focus on the certification of the quality and additionality of projects. **They are neither involved in financial transactions nor in assessing the climate strategy of buyers**. **This could be the role of 'approach' standards**, which give guidance on the climate or offsetting targets of firms. Those approach standards are the other side of the coin for 'projects standards' and have been historically underdeveloped and under-used. We can observe several alternative developed by domestic standards to frame the use and communication on voluntary credits. On one side, a voluntary label is granted by the Ministry of environment in Spain is used, requiring to load on a public platform company's carbon footprint, company's carbon emissions reduction or company's use of domestic carbon project. On the other side, legal obligation for disclosure on carbon information in United Kingdom (see below). We can point out the recent development of standards assessing companies climate strategy (Science-based target, Assessing low-carbon transition…), climate neutrality claims (PAS 2060) or framing more broadly company climate claims (Net-Zero Initiative).

In order to ensure this overall quality and credibility, some standards have however created tools to assess the buyers' thoroughness and eventually control the access to carbon project financing. An example of integration of the whole process of voluntary offsetting is the Carbomark initiative which was operational between 2011 and 2013. It implied the certification of four forest-based activities: wooden products, biochar, sustainable forest management and urban forestry. An innovative feature was that **the access to the local carbon market was part of a wider approach**: in order to buy carbon units, companies **had to reach out to the 'Kyoto observatory' managed by local authorities and apply**. They had to declare their intent to implement emission reductions activities, which at best were defined in a reduction plan and followed by the purchase of forest credits to offset unavoidable emissions. However the initiative did not last in time (Dissegna *et al.* 2011).

17 Which is not often the case as carbon projects are often too small or too specific to be accounted for in national GHG inventories.

HOW TO FRAME VOLUNTARY BUYERS' COMMUNICATION ON FINANCING DOMESTIC CARBON PROJECTS? EXAMPLES FROM SPAIN AND THE UNITED KINGDOM

Here are two examples of initiatives from the United Kingdom and Spain to manage companies accounting and communication about avoided emissions.

In the United Kingdom, only quoted Companies[a] were legally required to report information on greenhouse gas emissions in their director's report since 2013. Since the 1st of April 2019, a new regulation applies to quoted, large unquoted companies and limited liability partnership (LLP's)[b] and require them to present an energy and carbon annual report, which also includes avoided emissions from projects *e.g.* coming from the Woodland Carbon Code (Government of United Kingdom 2019).

TABLE 6. INFORMATION COMPANIES ARE LEGALLY REQUIRED TO DISCLOSE

	Quoted companies	Large unquoted companies or LLP's
From October 2013	• Annual GHG emissions from scope 1 and 2 • One intensity ratio that allows comparisons between companies from the same sector[c] • Methodologies used to calculate GHG emissions	N/A
From April 2019	• Global energy data used to calculate GHG emissions (in kWh)	• UK energy use (at least electricity, gas and transport) and associated GHG
	• Information about energy efficiency action taken by the organization • One intensity ratio that allows comparisons between companies from the same sector • Methodologies used to calculate GHG emissions • Previous year's energy use and GHG emissions	

Source: (Government of United Kingdom 2019)

In order to ensure transparency, 12,000 companies are since April 2019 legally required to disclose carbon information as for example their annual gross emissions or GHG emissions associated to energy use in their director's report. They also have the option to disclose a net figure of their emissions including avoided emissions through voluntary funding of domestic projects outside their perimeter using the Woodland Carbon Code or the Peatland Code. This increased transparency legally required could be seen as a mean to stimulate interest from companies to finance local projects (West 2018).

In Spain, the RHC encourages the companies to take part in the broader offsetting process, by integrating the 3 steps procedure "measure-reduce-offset". It is structured in three modules, which deliver a different label each:

- One for calculating the company carbon footprint and uploading it in the public platform,
- One for reducing GHG emissions on a three years period,
- One for offsetting part or all of its own emissions with national forestry projects.

Each of the three public labels must be renewed every year. If a company wants to use one of the labels, they must comply with the requirements and data is made accessible through a public platform. In this way, companies' claims are 'softly' (since it's on a voluntary basis) supervised.

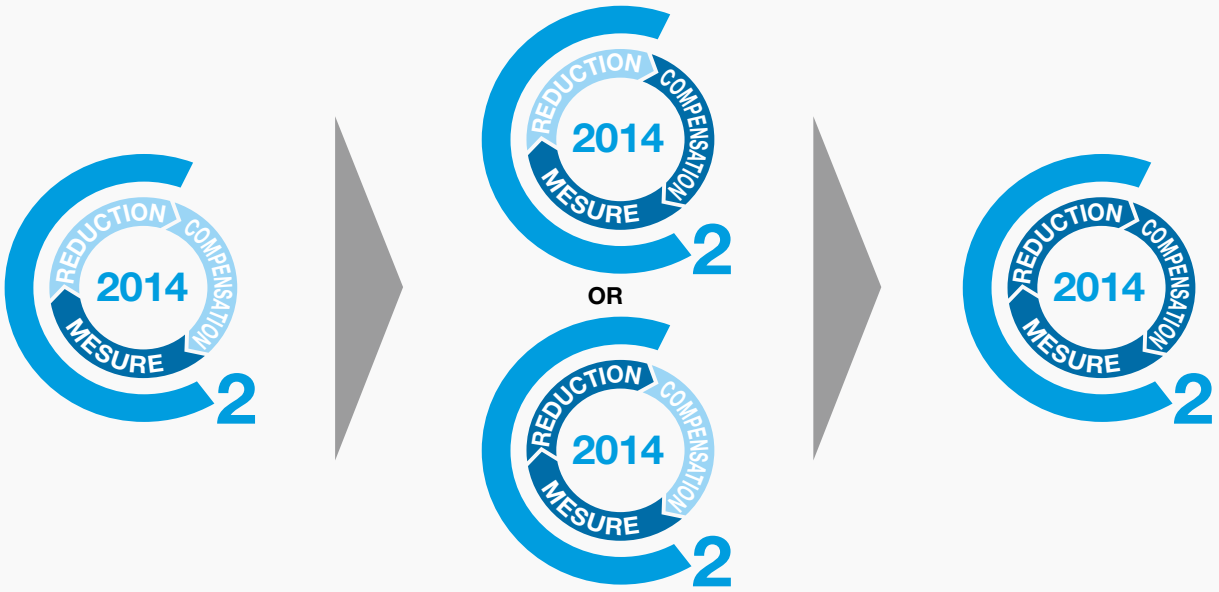
a. Quoted company is defined as a company that is UK incorporated and whose equity share capital is listed on the Main Market of the London Stock Exchange UK or in an EEA State, or admitted to trading on the New York Stock Exchange or Nasdaq.(Parliament of the United Kingdom 2006).

b. Unquoted companies and LLP's have to present at least two of the three following requirements: 250 employees or more; a total balance sheet of £18 million or a turnover of £36 millions or more.

c. *e.g.* tCO_2/t.km for the transport sector or gCO_2/Litre for beverages industries.

(Continued) >

FIGURE 3. PUBLIC LABELS MANAGED BY REGISTRO HUELLA DE CARBONO IN SPAIN



4. Perspectives

After this overview of European domestic carbon standards, this section focuses on what could be future prospects and opportunities for collaboration between standards. This final section will be divided into three parts.

1. First, as a result of the analysis carried out in the report and the interviews conducted, we present a **summary of possible areas of work at the European level with the aim of addressing some of the challenges identified**. It is not a question here of defining whether collaboration at this level is the most relevant, but very modestly of pointing out the "potential".
2. Secondly, a brief opening on the potential of deployment of a compliance demand, with some examples from abroad.
3. At last, in a very open way, we propose several working paths for the use of carbon certification frameworks beyond carbon offsetting.

4.1. Opportunities for European collaboration

Some of the challenges are common to all standards which could justify the creation of an institutionalized space for knowledge sharing and learning, as already proposed by (Nett et Wolters 2017).

Based on the interviews, the following options for possible collaboration between countries were identified:

Sharing and disseminating existing methodologies and tools developed by the standards

One of the most costly and time-consuming activities is the development of methodologies (Chenost *et al.* 2010). In practice, costs associated with methodology development were often reduced through the recycling of methodologies elaborated by the CDM, other standards or through R&D activities undertaken by public/private partnerships. For example, MoorFutures used the methodology developed by Verra called 'Wetland restoration and conservation', and adapted it to suit their specific regional conditions (Reed *et al.* 2013). The Peatland Code (United Kingdom) and the Green Deal (The Netherlands) in turn picked up part of the peatlands methodological tools developed by MoorFutures. Capitalizing on methodologies development in Europe could contribute to support a wider coverage of practices across European countries.

- **Enhancing cross-border collaboration to mutualize knowledge** and foster the development of methodologies for new areas of interest (carbon in soils, agro-forestry, new improved forest management practices…).
- **Technical collaboration on MRV cost reduction** through, for example, Remote Sensing Solutions. Almost all standards have mentioned the importance of developing connected technologies to reduce MRV costs.
- **Develop common communication guidelines** on the financing of emissions reductions projects and the contribution to national targets and potentially share guidelines for framing buyers' communication and claims.

Even if this idea of European collaboration between standards raises positive reactions, we note that adaptation to local context and realities remain key and that finding the adequate level of collaboration to secure valuable inputs might be a delicate task.

4.2. Towards a new compliance demand?

During the Kyoto era, the EU ETS was the main source of demand for compliance carbon offsets. The compliance market used to be seven times bigger than the voluntary one until the European compliance demand dried out in 2012 ((Stephan, Bellassen, et Alberola 2014). Today, half of certified projects are purchase by firms which don't have any mandatory emissions constraint (Hamrick et Brotto 2017). However, other compliance schemes using project-based mechanisms have emerged in the past 5 years. We reviewed three cases (Colombia, Switzerland and California with more details in Annex of the report) where **domestic compliance certification schemes are used to channel private investments towards concrete climate projects**.

- In California, a cap-and-trade system which covers approximately 80% of GHG emissions is in force since 2013. Participants must meet emissions reductions targets set by the Californian state and have three options: reducing their own emissions, buying carbon allowances trough auctions or **purchasing carbon offsets from climate domestic projects**. However, participants can only purchase carbon offsets up to 8% of their obligations until 2020 and this ratio will decrease to 4% between 2021-2025.
- In Switzerland, a legal obligation from 2013 to 2020 **requires fuel-importing companies to offset a small part of their emissions through the financing of national climate projects**. 43 companies under this legal obligation regrouped under an entity, the Klik foundation, whose purpose is to make sure the requirement is met. Climate projects are divided into four major "programs" under the Klik foundation: transport, business, buildings and agriculture. The foundation purchases carbon 'attestations' from project developers, with an average price of 88 €/tCO_2e. In return, the law allows these companies to increase the selling price of fuel by up to 5c/l but fuel prices were only increased by 1.5c/l as a result of the regulation (Fondation Klik 2019). At the end of 2018, a total of 6.5 MtCO_2e of carbon 'attestations' were delivered to the foundation and 12.6 MtCO_2e are under contract.

- In Colombia, a carbon tax of 5$/t$CO_2$ was introduced in 2016 for companies importing and marketing fuels. However, **these companies can be exempt from the carbon tax if they offset their emissions through the financing of carbon projects**. In 2017, 4 MtCO_2e was tracked as financed though this system (Soffia Alarcon-Diaz *et al.* 2018). These projects must be carried out on the Colombian territory since 2018.

Those three examples show that a new source of compliance demand for local emissions reductions can be channeled by **different tools:** carbon tax, national cap-and-trade trade system, sector-specific obligation to offset emissions**.** This could be an interesting way to boost projects development in Europe. If the EU ETS does not plan on using carbon offsets from 2020 onwards, national policies like taxes on fossil fuels for example could be an interesting tool to direct funding towards domestic carbon projects.

We can underline that for example **the volume of domestic projects for compliance represents twice is two times bigger than te volume tracked in this report** for domestic projects in the European voluntary market.

Finally, we see that requirements to finance national carbon projects often applies to a small part of the emissions concerned**.** Except in Colombia where the whole tax can be avoided through project financing, **the use of project-based mechanisms does not necessarily prevent strong emissions reductions** targets for the sector covered by a legal obligation.

4.3. Expand the box: MRV frameworks to steer national and European policies?

If carbon certification frameworks are mainly a way to guide voluntary action from firms, **they could also be a useful tool to drive public funds** towards impactful projects**, at the national or European level.** As a reminder, the objective for the 'diffuse sectors' not covered by the EU ETS is to reduce their emissions by 30% in 2030 compared to 2005 levels, as defined by the Effort Sharing Regulations[18]. The LULUCF sector must also respect a 'no-debit' target (Grimault, Tronquet, et Bellassen 2018).

By the end of 2018, countries handed out draft National Energy and Climate Plans (NECPs) to the European Commission, which assessed them. Aggregation of all the measures presented in the NECPs of 28 member states results in the achievement of 28% emissions reductions for non-ETS sectors, which is 2% under the target. Additionally, several NECPs **lacked details on the strategy to be followed for reaching non-ETS climate targets** (European Commission 2019).

Carbon MRV frameworks to guide payments from the CAP?

The Common Agricultural Policy (CAP) will represent 30% of the next pluri-annual budgetary period (2021-2027). In the last European Commission proposal for post-2020 CAP, **at least 40% of overall CAP financial envelope is meant to be climate relevant,** and possibly transition **from compliance and rules towards results and performance**.

A recent report (Alliance Environment 2018) analyzed the mitigation and adaptation impacts of measures and financial tools within the CAP. Although an overall net climate impact of direct payments was impossible to evaluate because of a lack of data, a first assessment identified 7[19] out of 20 measures presenting a mitigation effect of 26 MtCO_2e/year[20]. However, it also identified measures which likely increased emissions, such as the **Voluntary Coupled Support (VCS) which can be used to support livestock farming**[21].

A wide set of climate aligned practices have already been identified in previous studies (Martineau *et al.*, s. d.). **Several of those practices (Table 2) actually overlap with the ones covered or about to be covered by existing European MRV frameworks,** *e.g.* peatland conservation, woodland planting, livestock farming but also agroforestry. Considering the methodological simplification already carried out by domestic standards, they could serve as a basis for guiding CAP resources towards climate aligned projects, through the 'eco-scheme' architecture for example.

Nonetheless, several considerations can be highlighted:

- The eco-scheme that will allow Member States to finance farmers for shifting to low carbon practices would be part of pillar 1, with no requirement to member state to set a minimum budget on this item.
- Domestic standards simplified procedure compared to the CDM and adapted existing methodological framework for carbon projects to their national contexts. Consequently it would be rational to use these existing carbon frameworks and rely on several years of know-how accumulated to find synergies for carbon payments within the CAP (eg. First pillar). If needed, the certification might need to be adapted for large-scale subsidies.

18 Regulation (EU) 2018/842 of the European Parliament and of the Council of 30 May 2018 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No 525/2013.

19 Under Pillar 2, six measures have been assessed (M12;M10;M11;M08;M04) and two greening measures included in Pillar 1 (Ecological focus area and environmentally sensitive permanent grassland).

20 Calculated for 2016.

21 In 2017, VCS subsidies support for 41% beef and veal production, milk for 12%, sheep and goats for 12% and protein crop production for 10.6%.

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Annexes

Annexes are divided into two parts.

The first part is composed of four case studies showcasing how domestic carbon projects are used for compliance purposes, through different carbon mechanisms (Emission trading system, carbon tax, mandatory offsetting, ...).

The section *4.2 Towards a new compliance demand* is based on those short case studies.

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The second part introduces ten information sheets summarizing the main characteristics of carbon standards in Europe (volume, price, project duration, MRV process etc.).

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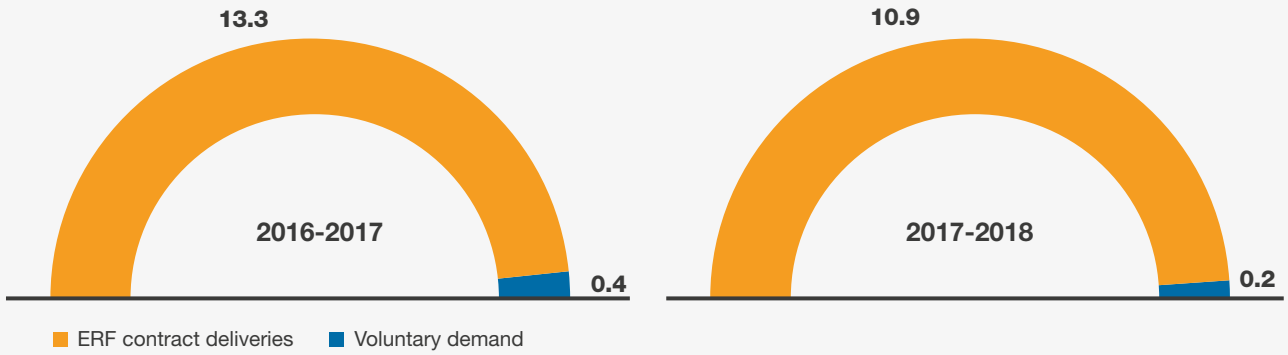
Annex 1 – Short case studies: 4 examples of domestic carbon projects used for compliance purposes

AUSTRALIA'S *EMISSION REDUCTION FUND*

The Emissions Reduction Fund (ERF) managed by the Clean Energy Regulator was launched in Australia in 2014 to encourage emissions reductions and **help achieve national climate targets. The ERF**. The ERF disposes of 37 methodologies (waste management, vegetation management, transport, mining, oil and gas, energy efficiency and agriculture), **which allow carbon projects certification and the generation** of Australian carbon credits units (ACCU's). Twice a year, the Clean Energy Regulator organizes reverse public auctions. Project developers place a bid on the **expected price of future ACCU's generated by the project**. Projects with the most competitive prices are selected and awarded a carbon abatement contract in order to finance the project activities. Summing up all the reverse bid auctions since 2015, 2.55 billion AUSD has been used to buy 193 $MtCO_2$. 59 $MtCO_2$ representing 30% has been effectively delivered for an amount of 476 million AUSD. The rest of the budget is being committed until carbon credits are verified and ACCUs delivered.[1] Land use carbon credits (agriculture and forestry) represent 83% of all units bought by ERF. The price paid in average by the ERF is 12.4 AUSD[2] (equivalent to 7.6 €].

Alongside this fund, a **growing but still marginal voluntary demand for ACCUs is coming since 2016** from state and territory governments but also private companies. (Clean Energy Regulator 2018). The price for ACCUs advertised on the national voluntary market is 15.22 AUSD (equivalent to 9.6 €) which is a slightly higher than the price paid by the Emission Reduction Fund (ERF). This demand is mainly linked to organisations seeking carbon neutrality certification under the National Carbon Offset Standard (NCOS).

FIGURE 4. VOLUME OF ACCU'S ACCORDING TO SOURCE OF DEMAND (IN $MTCO_2E$)



Source: Clean Energy Regulator (2018) and I4CE.

1 http://www.cleanenergyregulator.gov.au/ERF/Auctions-results/december-2018
2 Price average observed in all the eight public auctions since April 2015.

CALIFORNIA' EMISSION TRADING SYSTEM

Initiated in 2012, the California Cap-and-Trade Program started the first compliance period in January 2013.The program is structured around compliance period of two years; during which allocation and auction of allowances occurred between participant to meet emissions reductions targets set by the Californian state. Approximately 80% of the state's GHG emissions is covered.

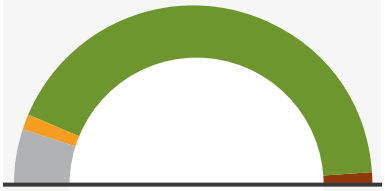
Since 2014, entities participating can **use offsets up to 8% of their obligations with only domestic projects**. Six protocols are recognized, 2 of which are for forest projects and two others for the agriculture sector (Methane management from livestock and rice cultivation project). In this case, offsets are clearly use as a tool to meet state emissions reductions target which is to return in 2020 to 1990 emissions level and in 2030 reduce GHG emissions of 40% comparing with 1990 levels. (California energy commission 2018).

Methodologies were developed by the following private labels: American Carbon Registry, Climate Action Reserve and Verra. They are recognized by the Air Resources Board (ARB) as **offset project registries** but the final issuance of California Carbon Offsets (CCO) usable in the cap-and-trade system is carry out by ARB.

In 2017, legislation (Assembly Bill [AB] 398) introduced a set of reform to be applied in the period post 2020, regarding market stability provisions with price containment points. It also introduced new requirements concerning the use of offsets in the cap-and-trade program:

- The share of offsets that can be used will be reduce to 4% between 2021-2025 and remain at 6% thereafter;
- At least 50% of offsets used in the period post 2020 should result in Direct Environmental Benefits (DEBS) for the state of California. If projects issuing offsets and implemented outside of the state result in DEBS based on scientific evidence, they will be accepted in the cap-and-trade program.

FIGURE 5. COMPLIANCE OFFSETS CREDITS ISSUED BY ARB SINCE 2013



ODS **12 577 266**
Livestock **3 960 076**
US Forest..... **108 290 754**
MMC..... **2 983 324**

Source: California Air Resources Board (2019)

Supply side

ARB issued 127 millions[3] CCO since the beginning of the cap-and-trade program, most of the carbon credits are from forest projects (up to 80%, see **Figure 2**).

At the end of 2018, 65% of the carbon credits issued were still available, the rest being placed in buffer pool in the case of forest projects, retired by final user or invalidated. The average price of California Carbon Offset (CCO) is generally lower than California Carbon Allowances (CCA) making of carbon credits a cost-effective way for entities to comply with their obligations (California Carbon info 2018).

In 2018, the average price for CCO was between 13 $/tCO$_2$ and 14 $/tCO$_2$ (ClimeCo 2018).

Demand side

The demand of CCO is fuelled by entities participating to the program and having to meet their emission reduction target at the end of each compliance period. As illustrated in **Figure 3**, the share of offsets allowed in the cap-and trade program fluctuated between 4% and 8% since it started.

3 It includes credits forest credits placed in a buffer account and offsets subsequently invalidated.

COLOMBIA'S CARBON TAX

In 2016, a reform of the Columbian tax system (Republica de Colombia 2016) led to the establishment of a carbon tax on fossil fuels, at a price of 5 USD/tCO_2. However, companies who could claim carbon neutrality could be exempted from this tax. This carbon neutrality claim could be achieved by financing carbon projects, nationally or internationally.

From 1 January 2018, those carbon projects must be located on the national territory. Eligible credits can be certified by the Clean Development Mechanism (CDM), the Colombian National Accreditation Body (ONAC) and the ISO 14065:2013 compliant bodies, including Verra, Gold Standard and the American Carbon Registry. Accepted methodologies include afforestation, improved forest management (IFM) and REDD+ projects as well as agricultural and grassland management projects (Hamrick and Gallant 2017).

This concept of replacing the payment of the carbon tax by the purchase of national carbon credits seems rather innovative and a good way to trigger local mitigation actions by ensuring a demand. In Columbia, it encouraged the emergence of a demand for national credits totaling 2 $MtCO_2$ during the first half of 2017 (Soffia Alarcon-Diaz *et al.* 2018) and 4 $MtCO_2$ for the entire year 2017, i.e. **twice the demand from voluntary French stakeholders estimated in 2015 in France** (I4CE, 2017). As a comparison, when the carbon tax was introduced in 2016, the amount of international forest offsets acquired by voluntary buyers from Colombia was estimated at 0.1 $MtCO_2$ (Hamrick and Gallant 2017).

SWITZERLAND'S MANDATORY OFFSETTING SYSTEM

In Switzerland, a **national offset system**[4] is jointly administered by the Federal Office of the Environment (OFEV in French) and the Federal Office of Energy (OFEN). It is used as a complementary public policy tool for companies GHG emissions, in articulation with a national carbon tax. Since 2008, the carbon tax is applied to fossil fuels with a price of 96 CHF/tCO_2 (Postic et Métivier 2018). The CO_2 law voted in 2012 formulate **a legal obligation for some companies to offset a share of their emissions with domestic offsets projects** (Assemblée fédérale de la confédération suisse 2011). For companies importing and selling fuels, the global objective is to compensate 5% of the GHG emitted on average between 2013 and 2020, which represents a total volume of 6.5 $MtCO_2$ 'attestation' delivered to the Klik Foundation. We can point out that half of these reductions (around 2.8 $MtCO_2$) comes from carbon allowances accorded to swiss companies during the previous period (between 2008-2012), hence do no result from national carbon projects.

The rate of domestic compensation has varied during the period. National carbon projects have to use one of methodologies approved by the OFEV and summarized in. National carbon projects have to use one of methodologies approved by the OFEV and summarized in **Table 2**.

Table 1. National carbon projects have to use one of methodologies approved by the OFEV and summarized in **Table 2**.

Companies importing and selling fuels have created in 2012 the Foundation for Climate Protection and offsetting (Klik), whose objective is to fulfil the legal obligation to compensate part of their emissions as establish by the CO_2 law.[5] Currently 43 companies are affiliated to the foundation. In order to achieve economies of scale, the swiss law allow to regroup similar national carbon projects in thematic programmes.

If projects comply with the requirements defined in the programmes, they do not need to start an individual process to have their project approved by the national authorities. Under the Klik foundation, there are four thematic programmes by the Klik foundation: Transports, companies, building and agriculture.

The price of domestic certificates is negotiated by each project developer directly with the Klik foundation. Usually, the price both parties agree on is the one required to make the project economically viable. According to the foundation, the price varies between 60 CHF/tCO_2 and 120 CHF/tCO_2, which represents a price range between 53 and 108 euros. Higher prices are for projects from the agriculture program. Overall, the Klik foundation should contribute to the reduction of 6.3 $MtCO_2$ between 2013 and 2020 (Fondation Klik 2019).

TABLE 6. SHARE OF DOMESTIC COMPENSATION FOR COMPANIES SELLING FUEL

Years	Share of GHG emission compensated with domestic projects
2013	0%
2014/2015	2%
2016/2017	5%
2018/2019	8%
2020	10%

Source: I4CE according to information on OFEV website

TABLE 7. METHODOLOGIES APPROVED FOR NATIONAL PROJECTS

Sectors	Methodologies for emissions reductions/ sequestrated
Industry	Reduction of fluorinated gas used;
Energy	Energy efficiency; renewable energy (biomass, solar, biogas)
Waste management	Methane emissions avoided ; substitution of nitrous oxide.
Transport	Use of biofuels; improvement of transport efficiency
Agriculture	Methane emissions avoided through food additives
Forestry	Carbon sequestrated in wood products

Source: I4CE according to information on OFEV website

4 https://www.bafu.admin.ch/bafu/fr/home/themes/climat/publications-etudes/publications/projets-programmes-reduction-emissions-realises.html

5 Fondation pour la protection du climat et la compensation de CO_2 KliK, https://www.klik.ch/index.html

Annex 2 – Information sheets: 10 domestic carbon standards in Europe

Austria

KAINDORF ECOREGION

Date of foundation: Since 2007.

History and description: Humus certificates is a program launched in 2007 by the 'Kaindorf eco-region'.

GOVERNANCE AND RESSOURCES

Public/private: Semi-public.

Name of the institution in charge and affiliation: Managed by the association nonprofit and nonpartisan 'Kaindorf eco-region', which reunis three Austrian municipalities.

Resources: Not known.

PERIMETER

Sectors covered: Forestry and land use change.

Methodologies: Farming practices favoring carbon in agricultural soil

NATIONAL CARBON MARKET

Certified Volume: 2 500 ha of faming lands are participated to the scheme in 2019.

The potential for additional carbon sequestrated in soils in whole Austria is estimated at 13 $MtCO_2$.

Price range: The price objective set by the eco-region is 30 €/tCO_2e but not guaranteed.

Measures to stimulate demand: Transparency of transactions ensured by an online platform.

CONNECTION WITH NATIONAL CLIMATE POLICIES

Objectives pursued by the scheme: Promote sustainable farming practices.

Secto covered: Forestry and land use change.

Methodologies: Farming practices favoring carbon in agricultural soil.

CERTIFICATION PROCESS

Brief description of certification process:

- **Validation:** Samples are taken from participating farmers plots and analyzed by a third party.
- **Verification:** after 2 to 5 years, a second sample is taken to estimate the volume of CO_2 sequestrated in soils after implementing sustainable farming practices. The carbon concentration has to been at least 0.3% higher.
- **Ex-post control:** 5 years later a third sample is analyzed as a control procedure.

MRV costs are paid in advance by the eco-region, and cost is covered when humus certificates are sold.

Duration of the project: To go through the whole process and obtain humus certificates, the project has to last at least 7 years.

Eligible VVB: Certified civil engineer's office and/or an independent and certified testing laboratory.

Ex-ante/ex-post credit: Ex-post, humus certificates can be issued after the 2nd sample.

Management of the risk of non-permanence: 1/3 of the sale revenue is put aside until the third sample is controlled.

Additionality (type of addionality and baseline): Not mentioned.

Co-benefits: Several co-benefits have been identified correlated with the adoption of sustainable farming practices *e.g.* reduction of use of diesel for agricultural machines, time spent in tillage is reduced...

EXTERNAL COMMUNICATION & OTHER

Management of double-claiming: N/A.

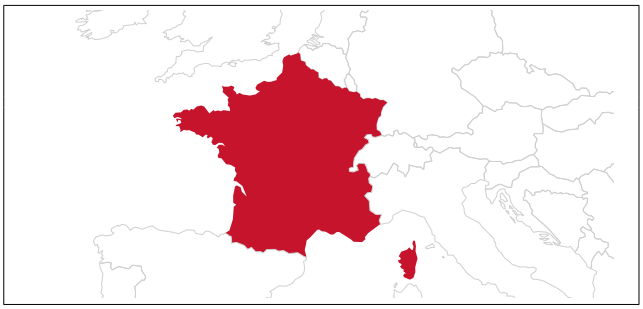
Guidelines for external communication: Not known.

France

LABEL BAS CARBONE

Date of foundation: 2018.

History and description: The Label Bas Carbone (low carbon standard) is the result of a three-year multi-stakeholder program (2015-2018) called VOCAL (Voluntary Carbon Land Certification). Financed with both national and European funds, it was managed by I4CE in close collaboration with the French ministry and several actors from the agriculture and forestry sectors (CNPF, IDELE, GIP Massif Central…).



GOVERNANCE AND RESSOURCES

Public/private: Public.

Name of the institution in charge and affiliation: Managed by the French environment ministry (*Ministère de la Transition Ecologique et Solidaire*, MTES).

Resources: (HR and budget): Not defined yet.

PERIMETER

Sectors covered:

Forestry and agriculture, for now.

All sectors outside of the EU ETS (diffuse sectors) can be eligible and additional methodologies are being developed.

Methodologies:

Methodologies: validated
- Carbon Agri – Cattle farming (targets all actions aiming at carbon emissions reduction and sequestration on a cattle farm);
- Afforestation;
- Restoration of degraded forests;
- Conversion of coppices in high-standard trees.

Several methodologies in development:
- Hedges and agroforestry;
- Soil carbon in agriculture;
- Building;
- Mangroves;
- Methanization.

NATIONAL CARBON MARKET

Certified Volume: First projects submitted in August 2019.

Price range: Not known.

Measures to stimulate demand: Not known.

CONNECTION WITH NATIONAL CLIMATE POLICIES

Objectives pursued by the scheme:

Mentioned as one of the tools of the "National Low-Carbon strategy", meant to trigger emissions reductions/sequestration, especially for agriculture and forestry sectors.

CERTIFICATION PROCESS

Brief description of certification process:

Forestry methodologies:
- **Validation:** Project design documents submitted and validated by the environment ministry;
- **Verification:** Documentary validation and in-field verification (in option) from n+1 to n+5 by a VVB (depending the methodology).

Carbon agri methodology:
- **Validation:** Project design documents submitted and validated by the environment ministry;
- **Verification:** Documentary validation and in-field verification in farms by sampling (in option) at n+5 by a VVB.

Duration of the project: From 5 years (Carbon agri methodology) to 30 years (forestry methodologies).

Eligible VVB: VVBs already accredited as such by the UNFCCC, the COFRAC, VCS, FSC, PEFC…

Ex-ante/ex-post credit:
- Ex-post for carbon-agri;
- Ex-ante allowed for forestry methodologies.

Management of the risk of non-permanence:
- Forestry methodologies: a 10% to 25% discount is applied depending on the project risk level.
- Carbon Agri: a 10% to 20% discount is applied.

Additionality (type of addionality):
- Legal additionality;
- Economic additionality.

Co-benefits: Different co-benefits are considered in forestry methodologies (biodiversity, socio-economic, soil conservation water management) and in Carbon agri (short circuit commercialization, air quality…).

EXTERNAL COMMUNICATION & OTHER

Management of double-claiming: Emissions reductions or sequestration resulting from the project can be visible in the national GHG inventory, and therefore contribute to the national climate target. The double-claiming between a company and the State in voluntary offsetting is not considered a risk.(Tronquet, Grimault, et Bellassen Submitted).

Guidelines for external communication: The low carbon standard certifies different types of emissions reductions: ex-post, ex-ante, indirect. It therefore gives specific communication guidelines to buyers, especially for the ex-ante and indirect certification.

Germany

MOORFUTURES

Date of foundation: 2011.

History and description: Federal states ('Länder') developed projects with the methodology developed by MoorFutures. The first project was conducted by the mecklenburg-vorpommern ministry of environment in 2011 and was then followed by Brandenburg (2012) and Schleswig-Holstein (2014). Further states are examining the possibility to implement the standard.

GOVERNANCE AND RESSOURCES

Public/private: Public.

Name of the institution in charge and affiliation: Federal states with the technical background of local universities in each of the three federal states.

Resources: (HR and budget): Not known.

PERIMETER

Sectors covered: Peatlands.

Methodologies: Conservation and rewetting peatlands inspired from Verra methodology. MoorFutures projects use the GEST approach.

NATIONAL CARBON MARKET

Certified Volume: 68 889 tCO_2e are certified.[2]

Price range: Between 40 €/tCO_2e and 87 €/tCO_2e.

Measures to stimulate demand: Not known.

CONNECTION WITH NATIONAL CLIMATE POLICIES

Objectives pursued by the scheme: MoorFutures projects are part of federal states strategies to reduce GHG emissions.

CERTIFICATION PROCESS

Brief description of certification process: Validation and **Verification:** first verification from 3 to 5 years after the start of the project, conducted by regional scientific institution. Then verification every 10 years.

Duration of the project: From 30 to 50 years.

Eligible VVB: Validation and verification are carried out 'in-house cross-validation' by the entities managing the MoorFutures schemes at regional level, which are:

- In Mecklenburg-Vorpommern: the University of Greifswald and the regional environmental ministry;
- In Brandenburg: the Eberswalde University and the regional environmental ministry;
- In Schleswig-Holstein: the University of Kiel.

Ex-ante/ex-post credit: Ex-ante credits.

Management of the risk of non-permanence: A fixed rate of 30% of estimated carbon units kept in a buffer fund.

Additionality (type of addionality): Economic additionality must be proven.

Co-benefits: Methodology include re-enabling ecosystem services of the peatland which include improved regional water, flood mitigation, evaporate cooling and increased mire-typical biodiversity.

EXTERNAL COMMUNICATION & OTHER

Management of double-claiming: In communication with the German Emission trading authority to discuss the post-2020 period, with the worst scenario becoming a 'mitigation certificate'.

Guidelines for external communication: No guidelines.

Other:

- One requisite is that the project is carried out in a property owned by a public person (local authorities, natural park, etc.).
- In 2012-2013 a study has been carried out to estimate the national demand and estimated that In Germany around 3.3 to 4.4 $MtCO_2e$ was retired from voluntary carbon markets and the total traded volume by national actors was around 30 $MtCO_2e$ fueled for 80% by companies (Ivleva et al. 2015).

Italy

CARBOMARK

Date of foundation: 2011-2013.

History and description: Carbomark was a project financed by the european funds with the objective of establishing of a voluntary carbon market in the regions of Veneto and Friuli Venezia Giulia.

GOVERNANCE AND RESSOURCES

Public/private: Public.

Name of the institution in charge and affiliation: Voluntary markets were supervised by 'kyoto observatories' located in regional authorities' premises.

Resources: Not known.

PERIMETER

Sectors covered:
- Forestry and land use change.

Methodologies:
- Sustainable forest management;
- Urban forestry;
- Wood products;
- Biochar.

NATIONAL CARBON MARKET

Certified Volume: Not known.

Price range: 3 € to 80 €.

Measures to stimulate demand: N/A.

CONNECTION WITH NATIONAL CLIMATE POLICIES

Objectives pursued by the scheme: Establishing at local scale a market voluntary carbon offsets within an environmental perspective where companies reduce their emissions in first place.

CERTIFICATION PROCESS

Brief description of certification process:
- Audits carried out by staff involved in the management of the market (meaning staff municipality) and external VVB.
- Different requirements are defined for the four methodologies (monitoring plans, audit of forest management plan or the production facility).

Duration of the project: From 30 years to 100 years.

Eligible VVB:

Ex-ante/ex-post credit: Ex-ante (for Sustainable Forest management and Urban Forestry) and ex-post credits (for wood products and Biochar) , depending of the methodology.

Management of the risk of non-permanence: For the sustainable forest management, discount rate for a buffer pool are established for fire risk, abiotic disturbances and meteoric disturbances depending on the tree species. It varies from 0.05% to 14%.

Additionality (type of addionality and baseline): For sustainable forest management, carbon credits will be calculated **in comparison with practices in use at local or regional level.**

For wood products, a coefficient of use of woods per m^3 constructed was established to define the baseline. Any construction with higher content of woods would generate carbon credits.

For urban forestry, **legal additionality** is applied. Only trees planted beyond municipal, regional of national legal requirement can be accounted.

For Biochar, **financial additionality** is required.

Co-benefits: N/A.

EXTERNAL COMMUNICATION & OTHER

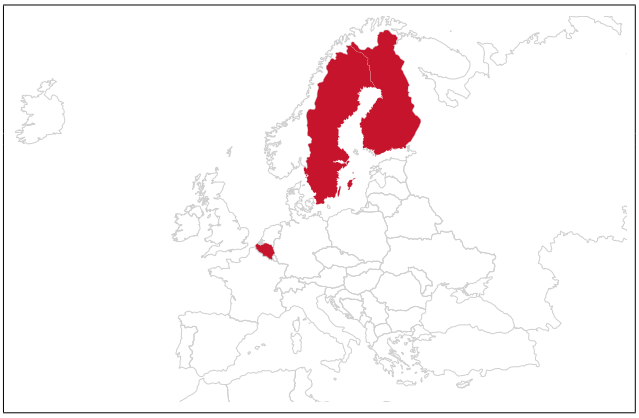
Management of double-claiming: N/A.

Guidelines for external communication: N/A.

Other: N/A.

Northern Europe

PURO.earth



Date of foundation: 2019.

History and description: Initiative of a consortium of 23 private and public companies from Norway and Finland to develop a voluntary scheme based on removal units. Project developers are from Norway, Belgium and Finland but buyers can be from anywhere else.

GOVERNANCE AND RESSOURCES

Public/private: Private.

Name of the institution in charge and affiliation: Developed and launched by Fortum, a finish electricity services company.

Resources: NK.

PERIMETER

Sectors covered:
- Building;
- Agriculture.

Methodologies:
- Biochar;
- Carbonated Building elements;
- Wooden building elements.

NATIONAL CARBON MARKET

Certified Volume: Not known.

Price range: Around 26 €/tCO_2e.

Measures to stimulate demand: A system of 'blind' auctions is set to put in contact sellers and buyers.

Currently, the volume of demand and supply is not disclosed but is approximately balanced with a 10% difference between each side.

CONNECTION WITH NATIONAL CLIMATE POLICIES

Objectives pursued by the scheme: Create a certification scheme on voluntary markets for CO_2 removals units.

CERTIFICATION PROCESS

Brief description of certification process: **Verification:** in-site visits of production facility to assess several parameters.

Duration of the project: At least 50 years.

Eligible VVB: DNV-GL is an international certification body and the only VVB accredited by Puro for the moment.

Ex-ante/ex-post credit: Ex-post for the first three auctions. Could use ex-ante credits for the next auctions. Even though credits are ex-post, a discount rate (2.5-5% for biochar methodology, 10% for wood building elements and specific rates for carbonated elements) is applied and will fuel a buffer pool against uncertain carbon estimation.

Management of the risk of non-permanence: Each methodology does ensure permanence of emissions removals for at least 60 years.

Additionality (type of addionality and baseline): No additionality but extended scope of the project to estimate the net carbon removals (include emissions of transport of raw material to production facility, emissions associated to raw material used).

Co-benefits: Not mentioned.

EXTERNAL COMMUNICATION & OTHER

Management of double-claiming: N/A.

Guidelines for external communication: No marketing o branding claims can be made by the end user on the fact that underlying product is a carbon sink (biochar, wooden product, carbonated elements for building).

Other: Several clarifications are to be made concerning this scheme:
- The three first auctions were experimental;
- There are no geographical restrictions for companies participating to the scheme on the supply or demand side;
- Hence if it started with European companies as supplier for carbon removals projects, it will probably extend to companies from Asia and north America. This scheme does not fit in national certification scheme category.

Spain

REGISTRO HUELLA DE CARBONO

Date of foundation: 2014

History and description: The RHC is a public platform composed of three sections:
- One where organizations (private or public) calculate their carbon footprint and monitor their reduction;
- One where forestry projects sequestrating CO_2 are registered;
- One that is a public registry of organizations offsetting their carbon footprints.

GOVERNANCE AND RESSOURCES

Public/private: Public.

Name of the institution in charge and affiliation: Ministry of environment.

Resources: Two full time employees.

PERIMETER

Sectors covered:
- Forest and land-use change.

Methodologies:
- Afforestation/reforestation;
- Restoring forest areas degraded by fires.

NATIONAL CARBON MARKET

Certified Volume:
- 123 590 tCO_2e carbon units estimated representing 529 ha;
- Whose 19 159 tCO_2e have been verified;
- Whose 3 313 tCO_2e were retired.

Price range: At least 25 €/tCO_2e.

Measures to stimulate demand: N/A.

CONNECTION WITH NATIONAL CLIMATE POLICIES

Objectives pursued by the scheme:
- Promote calculation and reduction of the carbon footprint of organizations;
- Promote projects improving the national sink.

CERTIFICATION PROCESS

Brief description of certification process:
- **Validation:** once the different elements of project (estimated GHG sequestrated, project design document…) are approved by the ministry of environment, the project is uploaded in the public platform;
- **Verification:** every 5 years a report must be provided to the ministry of environment. If a buyer wants to retire its carbon units, a third party intervene to verified GHG emissions on an ex-post basis in order to confirm the volume of carbon sequestrated.

Duration of the project: Minimum of 30 years.

Eligible VVB: Any verification body meeting the requirements (GHG Protocol, PAS 2050, UNFCCC…).

Ex-ante/ex-post credit: Ex-ante credits in the limit of 20% claimable units. These units can be retired once the process of verification has been carried out.

Management of the risk of non-permanence: Buffer with a fixed rate of 10% of estimated carbon units.

Additionality (type of addionality and baseline): Not defined criteria mentioned.

Co-benefits: An indicative list of additional positive impacts is given by the environmental ministry (additional adaptation measures, location of the project in an ecological network Natura 2000 or in priority zone to be restored according to WWF, sustainable forest management certification (PEFC or FSC).

EXTERNAL COMMUNICATION & OTHER

Management of double-claiming: No official position from RHC on the matter. It did not represent a barrier for private actors to voluntarily invest in national projects sequestrating emissions.

Guidelines for external communication:

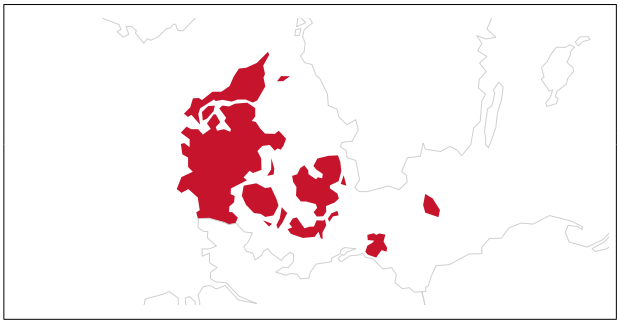
Three different public labels are granted by the environment ministry: one for calculating his carbon footprint and uploading in the public platform, one for reducing GHG emissions on a three years period, one for compensating part or all its own emissions with national forestry projects.

Each of the three public labels must be renew every year. A short notice explains how the three labels are related.

Other:
- Some companies choose to invest and develop themselves forestry projects that will be later certified by the scheme. These forestry projects registered do not sell carbon units since they will be retired by the company who invested in the projects.
- Another scheme co-exist with RHC and is called “Fundo de carbono”. It focuses on national projects developed in non ETS sectors and exclude projects sequestrating GHG emissions. These carbon units are bought, trough annual call for projects, by the state in order to comply with international targets assumed by Spain in reducing GHG emissions at a price defined at 9.7 €.

The Netherlands

GREEN DEAL



Date of foundation: In development since 2017.

History and description: The Netherlands Government, along with 17 market stakeholders created in May 2017 the legislative framework of the "Green Deal Pilot National Carbon Market" (GD), for voluntary compensation. The pilot period is supposed to last three years and plans to deliver carbon certificates to projects in non ETS sectors.

GOVERNANCE AND RESSOURCES

Public/private: Semi-Public. Stakeholders involved are public (central government) and private (NGO, research institute, carbon broker….). An institution that will be specifically in charge to manage the Green Deal should be created.

Name of the institution in charge and affiliation: 17 stakeholders implicated in working group and the research center JIN Climate Sustainability ensure the secretariat.

Resources: Funding from the government, financial and human resources contribution from stakeholders involved.

PERIMETER

Sectors covered:
- Forestry and land-use change;
- Renewable energy;
- The standard has an objective of covering all emission sources in the countries not covered by policies (with instruments and targets).

Methodologies:
- Peatland Management;
- Riothermia to substitute natural gas in heating public building (In development).

NATIONAL CARBON MARKET

Certified Volume: N/A.

Price range: N/A.

Measures to stimulate demand: N/A.

CONNECTION WITH NATIONAL CLIMATE POLICIES

Objectives pursued by the scheme: Not linked to a particular national objective yet, but the general objectives are:
- Lower the cost of GHG reduction and target GHG abatement in non-EU-ETS sectors.
- Create access to certification for smaller scale projects.
- Create options for visible local compensation.

CERTIFICATION PROCESS

Brief description of certification process:
- **Validation:** a proposition (not yet validated) is made to instruct projects through a committee of experts.
- **Verification:** a report realized by a VVB has to be presented every 5. Monitoring wells can be used to collect data (installed for the project or already installed by national monitoring service).

Duration of the project: At least 10 years if the peatland has an agricultural purpose or at least 50 years if the peatlands has an environmental purpose.

Eligible VVB: No VVB designed yet.

Ex-ante/ex-post credit: Ex-ante credits can be issued every five years, after methodology examination by Green Deal stakeholder and if it is demonstrated that funding is needed at the start of the project. a fixed rate of 15% of estimated carbon units is applied until verification is carried out.

Management of the risk of non-permanence: N/A.

Additionality (type of addionality and baseline): Legal additionality, nonetheless, there are no legal obligations for the moment concerning peatlands management.

For the peatland methodology, the baseline will be re-assessed every 15 years, ensuring further additionality and conservative evaluation.

Co-benefits: Co-benefits: mentioned as improving biodiversity and water benefits.

EXTERNAL COMMUNICATION & OTHER

Management of double-claiming: Double counting is not considered an issue for voluntary carbon market in Netherlands at the moment.

Guidelines for external communication: N/A.

The United Kingdom (1/2)

WOODLAND CARBON CODE (WCC)

Date of foundation: 2011

History and description: The Forestry Commission of the UK Government launched the Woodland Carbon Code in 2011. The WCC is a standard specific to carbon sequestration in woodland creation projects.

GOVERNANCE AND RESSOURCES

Public/private: Public with top-down dynamic.

Name of the institution in charge and affiliation: Managed by the UK Forestry Commission until March 2019, the WCC is now managed by Scottish Forestry on behalf of all the forestry authorities in the UK. Validations and verifications are carried out independently by two bodies, both accredited under the UK Accreditation Service. The carbon registry for the WCC is run by Markit.

Resources: (HR and budget): 2 full time jobs + registry costs of £42,000 per year, offset by fees at validation (0.6 £/tCO_2e) and verification stage (0.6 £/tCO_2e).

PERIMETER

Sectors covered:
- Afforestation;
- Considering potential extension to agriculture (agroforestry and hedgegrows).

Methodologies:
- Afforestation.

NATIONAL CARBON MARKET

Certified Volume:
- 187 projects are validated, due to sequester 3.4 $MtCO_2$ Of which 1.09 MtC02e are verified;
- Around 60% of the PIU are sold up-front.

Price range: From 5 £ to 15 £

Measures to stimulate demand:
- Launch in 2019 of the Woodland Carbon Guarantee funds for the next 30 years with a budget of £50M;
- In 2019, clarification in guidelines for companies reporting emissions.

CONNECTION WITH NATIONAL CLIMATE POLICIES

- ***Objectives pursued by the scheme:*** Supports afforestation targets in England, Scotland and Wales, set out in policy documents including the UK Clean Growth Strategy (2017), the 25 Year Environment Plan (2018) and the Scotland Climate Change Plan (2018).
- Provide a rigorous methodological framework to estimate and monitor CO_2 removals from afforestation receiving funding from private actors.

CERTIFICATION PROCESS

Brief description of certification process:
- **Registration:** Draft Project design documents uploaded in Markit;
- **Validation:** Project design documents validated by VVB;
- **Verification:** Assessment of the carbon sequestrated at 5 years and then every 10 years.

Duration of the project: Up to 100 years.

Eligible VVB: Accredited by the UK accreditation service: Organic Farmers and Growers and the Soil Association.

Ex-ante/ex-post credit: Ex-ante credits named 'Pending Issued Units' (PIU). Converted to 'Woodland Carbon Units' (WCU) after verification. A 20% reduction is applied to cover for modelling error, and a further fixed rate of 20% of claimable units are placed in a shared buffer. WCUs can be claimed once the process of verification has been carried out.

Management of the risk of non-permanence: Buffer with a fixed rate of 20% of carbon units, plus provisions in legislation for afforestation as a permanent change in land-use.

Additionality (type of addionality and baseline): Legal and contribution of carbon finance are mandatory + either financial additionality or barrier additionality must be proven (could be social, legal, …).

Co-benefits: Woodland Benefits Tool to assess the project outcomes for Wildlife/Community/Water/Economy.

EXTERNAL COMMUNICATION & OTHER

Management of double-claiming:

Concerning double-claiming: Units are only accounted for in one national inventory within the international emissions reporting process. Clear communication on the fact that WCC units contribute to the national reduction target, and that the WCC is a domestic scheme.

Concerning double-monetization: in the pre-2020 period there could be a risk if UK decided to sell spare AAUs or RMUs, but this is highly unlikely given the Government's challenging CO_2 emissions targets.

Guidelines for external communication:

Documents establishing general guidelines for Woodland Carbon Units:
- A buyer's guide to 'Woodland Carbon Unit' (Woodland Carbon Code, 2017);
- Environmental reporting guidelines: including Streamlined Energy and Carbon Reporting requirements (UK government, 2019).

Other: Private consulting services and project developers play a key role in promoting the WCC know to companies. A list of project developers and carbon retailer is available on the WCC website. Group certification are allowed in order to reduce cost from administration and travels.

The United Kingdom (2/2)

PEATLAND CODE

PEATLAND CODE

Date of foundation: 2015.

History and description:

- 2009: A peatland program is established as a partnership of environmental organizations, land managers, public bodies and scientist;
- 2015: the voluntary standard is launched;
- 2018: the first project is validated.

GOVERNANCE AND RESSOURCES

Public/private: Semi-public.

Name of the institution in charge and affiliation: IUCN United Kingdom manage the peatland program in collaboration with several English public institutions involved (regional environmental agencies, DEFRA, etc.).

Resources: A fee must be paid during the year.

PERIMETER

Sectors covered: Peatlands.

Methodologies: Restoration of peatlands.

NATIONAL CARBON MARKET

Certified Volume: One projects if validated and eight are waiting validation, representing in total 780 ha.

The project validated present an estimated abatement potential of 6848 tCO_2e.

Price range: Not known.

Measures to stimulate demand: Not known.

CONNECTION WITH NATIONAL CLIMATE POLICIES

Objectives pursued by the scheme: Restore 2 million hectares of peatlands by 2040 (UK peatland strategy, 2018).

CERTIFICATION PROCESS

Brief description of certification process:

- **Validation:** Project design documents and estimated GHG are assessed the site is visited by VVB, before the implementation of the restoration plan.
- **Verification:** During year 1, year 5 and then every 10 years.

Duration of the project: Minimum of 30 years.

Eligible VVB: VVB appointed by the peatland code executive board of organizations having at least ISO 14065. Organic farmers & growers.

Ex-ante/ex-post credit: Ex-ante credits, with a fixed rate of 10% of claimable units going to a precision buffer. These units can be claimed once the process of verification has been carried out.

Management of the risk of non-permanence: Buffer with a fixed rate of 15% of estimated carbon units.

Additionality (type of addionality and baseline): Legal and economic additionality are mandatory + either financial additionality or barrier additionality must be proven (could be social, legal …).

Co-benefits: Water and biodiversity benefits mentioned.

EXTERNAL COMMUNICATION & OTHER

Management of double-claiming: Peatlands are not accounted in national inventories, so there is no risk of double counting.

Guidelines for external communication:

Documents establishing general guidelines for Peatland units:

- A buyers' guide to the Peatland Code (Peatland Code, 2017).
- Environmental reporting guidelines: including Streamlined Energy and Carbon Reporting requirements (UK government, 2019).

Other: Group certification are allowed in order to reduce cost from administration and travels.

I4CE
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