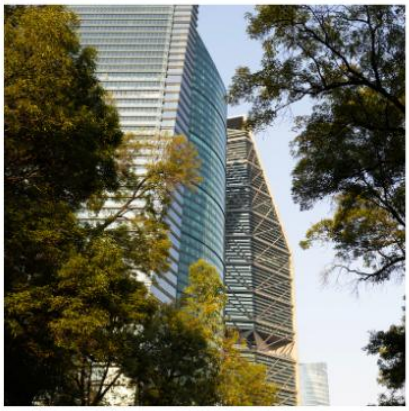
PROSPECT





Learning Handbook on White Certificates

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About the project

PROSPECT aims to strengthen the capacity of local and regional authorities (LRAs) across Europe to implement sustainable energy and climate actions by reducing reliance on public funding and increasing the use of innovative financing schemes (e.g., one-stop-shops, energy agencies, energy communities). The project offers a peer-to-peer Capacity Building Programme (CBP) tailored to the needs and time constraints of LRAs, available in multiple languages and structured in adaptable learning modules. Through large-scale outreach, including very small and remote LRAs, PROSPECT CUBE acts as an entry point to EU programmes and financing opportunities for authorities with limited experience in the field.

PROSPECT CUBE builds upon two successful Horizon 2020 initiatives: PROSPECT (2017–2020) and PROSPECT+ (2022–2025).

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List of abbreviations

Abbreviation	Description
ADEME	Agence de la Transition Écologique (French Agency for Ecological Transition)
AESS	Agenzia per l'Energia e lo Sviluppo Sostenibile
ARERA	Autorità di Regolazione per Energia Reti e Ambiente
AURA	Auvergne-Rhône-Alpes
AURA-EE	Auvergne-Rhône-Alpes Énergie Environnement
BACS	Building Automation and Control Systems
BAU	Business-as-Usual
CAE	Sistema de Certificados de Ahorro Energético
CAPEX	Capital Expenditure
CEE	Certificats d'Économies d'Énergie
CINEA	European Climate, Infrastructure and Environment Executive Agency
DSO	Distribution System Operator
DSM	Demand-Side Management
EE	Energy Efficiency
EED	Energy Efficiency Directive
EEO	Energy Efficiency Obligation
EEOS	Energy Efficiency Obligation Scheme
EEX	European Energy Exchange (Registry for French CEEs: Emmy)
EGE	Esperti in Gestione dell'Energia
EPC	Energy Performance Contracting
ESCO	Energy Service Company
EU	European Union
EU ETS	European Union Emissions Trading System
FC	Fiche de Calcul associée
FOS	Fiches d'Opérations Standardisées
GhG	Greenhouse Gas
GME	Gestore dei Mercati Energetici
GSE	Gestore dei Servizi Energetici
HVAC	Heating, Ventilation, and Air Conditioning
ISO	International standard for Energy Management Systems
kWh cumac	Kilowatt-hour "cumulated and discounted"
LRA	Local and Regional Authority
M&V	Measurement and Verification
MASE	Ministero dell'Ambiente e della Sicurezza Energetica
MBI	Market-Based Instrument
ORC	Organic Rankine Cycle

OTC	Over-the-counter (Bilateral trading outside of an exchange)
PNCEE	Pôle National des Certificats d'Économies d'Énergie
RRF	Recovery and Resilience Facility
RGE	Reconnu Garant de l'Environnement
ROI	Return of Investment
SECAP	Sustainable Energy and Climate Action Plan
SYTEC	Syndicat des Territoires de l'Est-Cantal
TEE	Titoli di Efficienza Energetica
TOE / toe	Ton of Oil Equivalent
TWh cumac	Terawatt-hour "cumulated and discounted"
UNI CEI 11352	Italian standard for requirements of ESCOs
US	United States
WC	White Certificate

1. Introduction

European and national governments have established ambitious objectives to improve energy efficiency (EE) and reduce greenhouse gas (GhG) emissions as part of the broader transition towards climate neutrality. In this context, energy efficiency obligation schemes (EEOS) have emerged as a key policy instrument to deliver measurable and cost-effective energy savings across multiple sectors. Among these, White Certificate schemes, also known as Energy Efficiency Certificates, represent one of the most developed and widely implemented market-based instruments (MBIs) in Europe, with France and Italy standing out as pioneering and mature examples.

Both countries have established long-standing national frameworks that combine binding energy-saving obligations, standardised methodologies, and tradable certificates, supported by robust legal, institutional, and monitoring structures. As a result, White Certificates have become a central pillar of national energy policy in the two countries, mobilising large volumes of investment and engaging a wide range of public and private actors.

For local and regional authorities (LRAs), in particular, given that a significant share of eligible EE actions is implemented at subnational level, these schemes - although typically designed and regulated at national level - can enhance the financial viability of climate and energy strategies by complementing existing funding resources. However, differences between national frameworks, administrative and verification requirements, and interactions with other financing and delivery models, including internal mechanisms, may introduce practical complexity, making it essential for LRAs to clearly understand when and how White Certificates can add value in practice.

This handbook responds to these challenges by providing practical, LRA-oriented guidance on White Certificate schemes, with a strong focus on France and Italy, where these instruments are legally embedded and widely applied in practice.

1.1. Purpose of this handbook

The purpose of this handbook is to support LRAs in understanding and strategically engaging with White Certificate schemes as part of their energy and climate action plans. Drawing on established policy practice in France and Italy, it aims to clarify the core principles and functioning of these schemes, the role LRAs can play within national obligation frameworks, and the conditions under which White Certificates can enhance the design and financing of local and regional strategies.

In this context, the handbook intends to help LRAs assess the relevance of White Certificates in their specific setting, understand the opportunities and constraints associated with their use, and consider how they may be combined with other financing and delivery mechanisms. It may therefore be conceived as a practical decision-support tool rather than a legal or technical manual, enabling well-informed and strategically aligned participation in these schemes.

1.2. Target audience

of EE measures within their territories, particularly in countries where White Certificate schemes are already in place. The main target audience includes:

- Elected representatives and senior decision-makers within LRAs, responsible for setting strategic priorities, endorsing investment approaches, and ensuring alignment with local energy and climate objectives.
- Technical, energy, and environmental departments, involved in the identification, design, and implementation of EE measures in public buildings, infrastructure, and services.
- Financial and procurement departments, responsible for budget planning, contracting arrangements, and the integration of White Certificates into broader financing strategies.
- Local energy agencies or internal coordination units, supporting project development, aggregation of measures, interaction with market actors, and monitoring of results.
- Public or semi-public entities linked to LRAs (e.g. municipal companies, housing providers, transport operators) that may act as implementers or beneficiaries of eligible measures.

The handbook may also be of interest to support organisations, consultants, and project developers working with LRAs in the fields of EE, innovative financing, and local climate action.

1.3. How to use this handbook

This handbook is structured to guide readers progressively from policy context to practical application. It does so by outlining the regulatory and institutional foundations of White Certificate schemes in France and Italy, and then examining their operational implications for local-level implementation.

Readers are encouraged to approach it according to their needs: those seeking a general understanding may follow the structure sequentially, while practitioners involved in project development or financing may focus directly on the sections addressing implementation pathways, stakeholder roles, and practical considerations. In this way, the handbook can serve both as an introductory resource and as a reference document during project planning and decision-making processes.

2. Understanding the White Certificates

White Certificate schemes are market-based policy instruments designed to deliver verified energy savings through a combination of regulatory obligations and tradable compliance units. Within this framework - typically implemented through an Energy Efficiency Obligation Scheme (EEOS) - specific actors, such as energy suppliers or distributors, are required to achieve quantified energy savings over a defined compliance period (Bertoldi & Rezessy, 2006, 2008).

Energy savings are calculated against predefined reference values and validated by a competent authority before being converted into certificates (Steuwer, 2013). These certificates can be used to demonstrate compliance or, where permitted, traded between market participants. Obligated parties may meet their targets by implementing energy efficiency measures directly, by contracting third parties such as Energy Service Companies (ESCOs), or by purchasing certificates, allowing flexibility in how savings targets are achieved (Crampes & Leautier, 2020; Togeby et al., 2007).

In Europe, White Certificate schemes have been implemented in different ways depending on national regulatory and market contexts, with the French Certificats d'Économies d'Énergie (CEE) and the Italian Titoli di Efficienza Energetica (TEE) frameworks representing two of the most established applications. Both rely on multiannual savings obligations, formal measurement and verification procedures (M&V), and dedicated electronic registries, and over successive compliance periods, they have evolved into central pillars of national EE policy (Steuwer, 2013).

Focus Box 1: White Certificates in practice

White Certificate schemes combine regulatory obligations with market flexibility.

Public authorities set binding energy savings targets for specific actors (e.g. energy suppliers or distributors). These actors must demonstrate that savings have been achieved.

Verified savings are converted into certificates, which can:

- be used directly to meet obligations, or
- be traded between market participants.

This creates a system where energy savings become a tradable asset, allowing obligated parties to choose the most cost-effective way to comply.

2.1. How they work in practice?

In operational terms, a White Certificate scheme follows a structured compliance cycle consisting of target setting, allocation of obligations, implementation of measures, verification of savings, certificate issuance, and compliance control. This cycle balances regulatory certainty with flexibility of delivery through multiple implementation pathways and, where applicable, trading mechanisms (Bertoldi & Rezessy, 2006, 2008; Crampes & Leautier, 2020; Steuwer, 2013; Togeby et al., 2007).

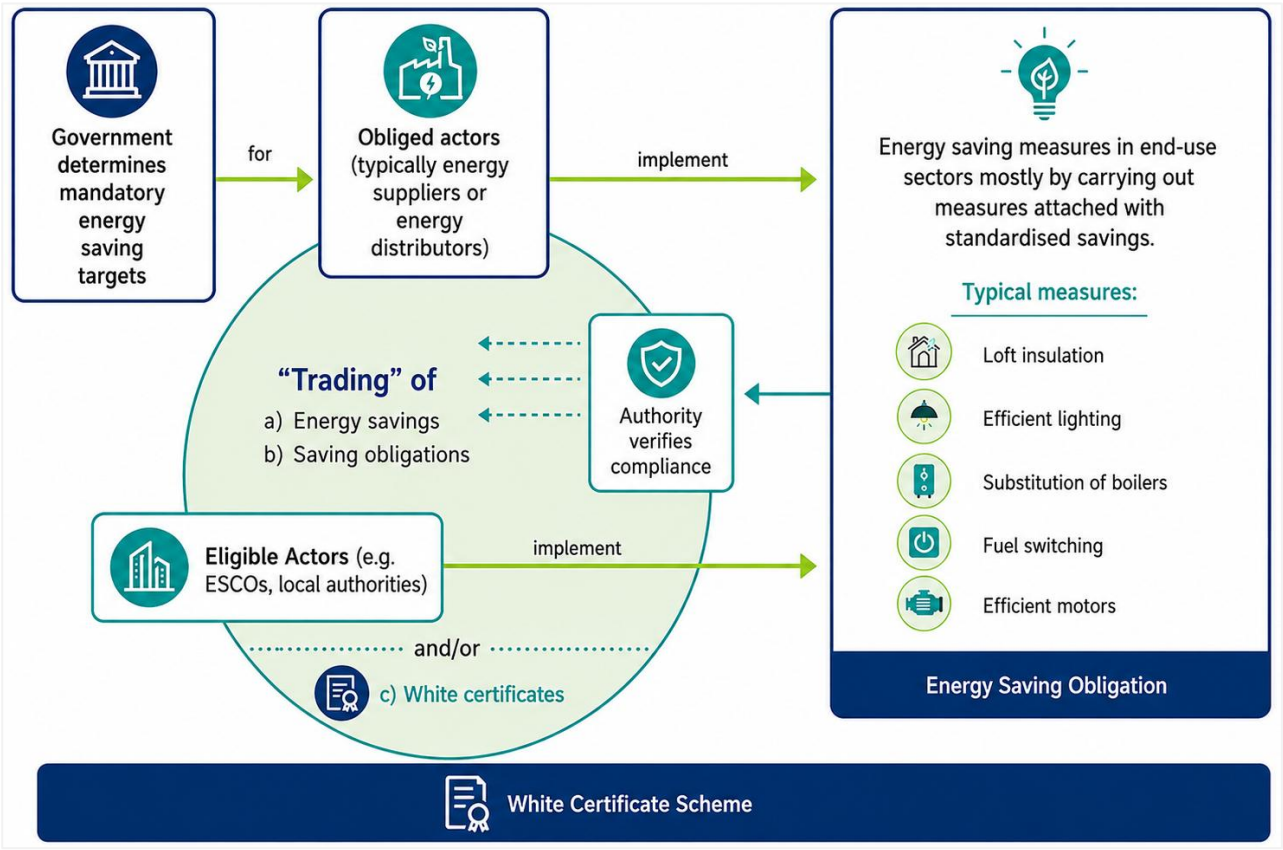


Figure 1. Operational structure of a White Certificate scheme (Source: Steuwer, 2013)

The process begins with the national authority establishing a cumulative savings target for a defined compliance period (often multiannual), typically covering sectors such as buildings, industry, transport, and public services. This target is then distributed among obligated parties - based on criteria such as energy sales volumes, number of customers, or market share - who are responsible for delivering the required savings through the implementation of eligible measures (Bertoldi & Rezessy, 2006, 2008).

To ensure compliance with scheme rules, the resulting savings are calculated using approved methodologies - either through standardised "deemed savings" values or project-based approaches - and are subsequently subject to measurement and verification (M&V) procedures. Once validated by the

competent authority, they are converted into certificates and recorded in a central electronic registry, such as the GME registry in Italy or the CEE registry in France (ALLICE, 2023; ENSMOV, 2019a).

Each certificate corresponds to a defined quantity of additional energy savings and may be retained and surrendered for compliance or transferred between market actors, depending on the national framework. At the end of the compliance period, obligated parties must submit a number of certificates equivalent to their assigned obligation. In cases of non-compliance, financial penalties apply, reinforcing accountability and safeguarding the achievement of savings targets (Crampes & Leautier, 2020).

Focus Box 2: How compliance is demonstrated

The effectiveness of a White Certificate scheme relies on a transparent compliance mechanism that links verified energy savings to the obligations assigned to participating entities.

- White Certificates represent verified and validated energy savings achieved through eligible energy efficiency measures.
- Certificates can be retained by obligated parties to demonstrate compliance or traded between market actors, depending on the national regulatory framework.
- At the end of the compliance period, obligated parties must surrender a sufficient number of certificates to meet their assigned energy savings target.
- Financial penalties apply when obligations are not fulfilled, providing a strong incentive for compliance and ensuring the integrity of the scheme.

Through this mechanism, White Certificate schemes combine flexibility in implementation with robust accountability, helping ensure that national energy efficiency targets are effectively achieved.

2.2. Arrangements and characteristics across national schemes

France and Italy have developed two of the longest-running White Certificates models in Europe. Both operate within binding national EEO frameworks, with their institutional configurations, methodological orientations and market dynamics reflect distinct regulatory traditions and energy market structures.

France has developed a large-scale, highly standardised and programme-driven system anchored in retail energy suppliers, whereas Italy has historically operated a more market-oriented and project-based scheme centred on energy distributors and active trading mechanisms.

A closer look at these two mature systems provides practical insight into how each scheme design shapes stakeholder roles, administrative complexity and implementation pathways for LRAs.

Table 1. Key differences between the French (CEE) and Italian (TEE) White Certificate schemes

Feature	France (CEE)	Italy (TEE)
Obligated parties	Energy suppliers (electricity, gas, heat, fuels)	Energy distributors (DSOs with >50,000 customers)
Sectoral scope	Multi-sectoral (residential, tertiary, industry, transport, agriculture, and infrastructure)	Multi-sectoral, with strong focus on industry (waste heat recovery/motors) and large tertiary projects
Methodological approach	Standardised “deemed savings” (ex-ante) via standardised technical/sectoral sheets	Project-based and metered savings (ex-post), requiring monitoring systems for most projects (meter installations).
Market organisation	Primarily obligation-driven, with limited reliance on trading	Market-oriented system with active trading (organised exchange and bilateral contracts)
Role of intemediaries	Important but often complementary (delegated parties, aggregators)	Central role (ESCOs and voluntary actors generate most certificates)
Technical authority	• Ministry • PNCEE (Pôle National des Certificats d’Économies d’Énergie) • ADEME (Agence de la Transition Écologique)	• GSE (Gestore dei Servizi Energetici) • ARERA (Autorità di Regolazione per Energia Reti e Ambiente)
Registry system	National registry (Emmy).	Centralised registry managed by GME (Gestore dei Mercati Energetici)
Social dimension	Explicit “energy poverty” (CEE Précarité) quota – representing 25% of the overall certificates	No dedicated energy poverty mandate within the TEE
Additionality	Incentive must demonstrate an “active and inciting” role before works begin	Strict technical and financial additionality beyond regulatory minimum standards

2.2.1. France - Certificats d'Économies d'Énergie (CEE)

The French White Certificate scheme, known as the Certificats d'Économies d'Énergie (CEE), was established by the 2005 Energy Policy Act (Loi n° 2005-781 or Loi POPE) and became operational in 2006. It was designed as a long-term instrument to complement regulatory standards and fiscal incentives in achieving national EE targets (ALLICE, 2023).

Since its launch, the scheme evolved through successive multiannual compliance periods, with progressively increasing energy savings targets reflecting the strengthened EU EE objectives. The transition to the 6th period (2026–2030) marks a significant escalation in ambition, with a total target of 5,250 TWh cuma[1] - representing an almost 30% increase compared to the previous period and aligning with the REPowerEU objectives (IEA, 2022; Ministère de la Transition Écologique et de la Cohésion des Territoires, 2025).

Over time, the CEE system has also expanded in scale, sectoral scope, and budgetary significance, becoming one of the largest White Certificate schemes in Europe. A notable development has been the increasing integration of social policy objectives, particularly through the "CEE Précarité" mandate (Energy Poverty mandate), which provides enhanced incentives for measures targeting energy-poor households to ensure a just energy transition. Introduced in 2016, these energy poverty certificates now represent approximately 25% of the overall scheme (ADEME, 2024).

2.2.1.1. Scheme architecture

The French CEE scheme operates as a supplier-based obligation model, codified in the National Energy Code and governed by ministerial decrees that ensure long-term regulatory predictability. The architecture is primarily "programme-driven" : the Ministry for Ecological Transition sets multiannual targets, while the National Registry (Emmy) manages certificate issuance, tracking and surrender[2] (ALLICE, 2023; Ministère de la Transition Écologique et de la Cohésion des Territoires, 2025).

At its technical core, the system relies on a standardised framework of over 200 Standardised Operation Sheets (Fiches d'Opérations Standardisées - FOS), which assign predefined lifetime savings values

[1] TWh cumac stands for "Terawatt-hour cumulated and discounted". Unlike annual saving metrics, this unit calculates the total energy savings achieved over the entire technical lifetime of an efficiency measure (cumulated) and applies a 4% annual discount rate to reflect the present value of future savings (discounted), as defined by the French Ministry of Ecological Transition (link).

[2] The PNCEE (Pôle National des Certificats d'Économies d'Énergie) acts as the specialised administrative body responsible for verifying and performing ex-post audits to prevent fraud (Cour des comptes, 2024). Its oversight is supported by the Emmy registry, which provides the digital infrastructure for the secure lifecycle management of certificates, ensuring full traceability and preventing double-counting within the market (EEX, 2025).

(expressed in TWh cumac) to eligible interventions. Each FOS is supported by an Associated Calculation Sheet (Fiche de Calcul associée - FC), providing the methodological justification for the predefined savings, while Explanatory Sheets (Fiches explicatives) group similar operations and offer technical guidance to ensure sectoral consistency.

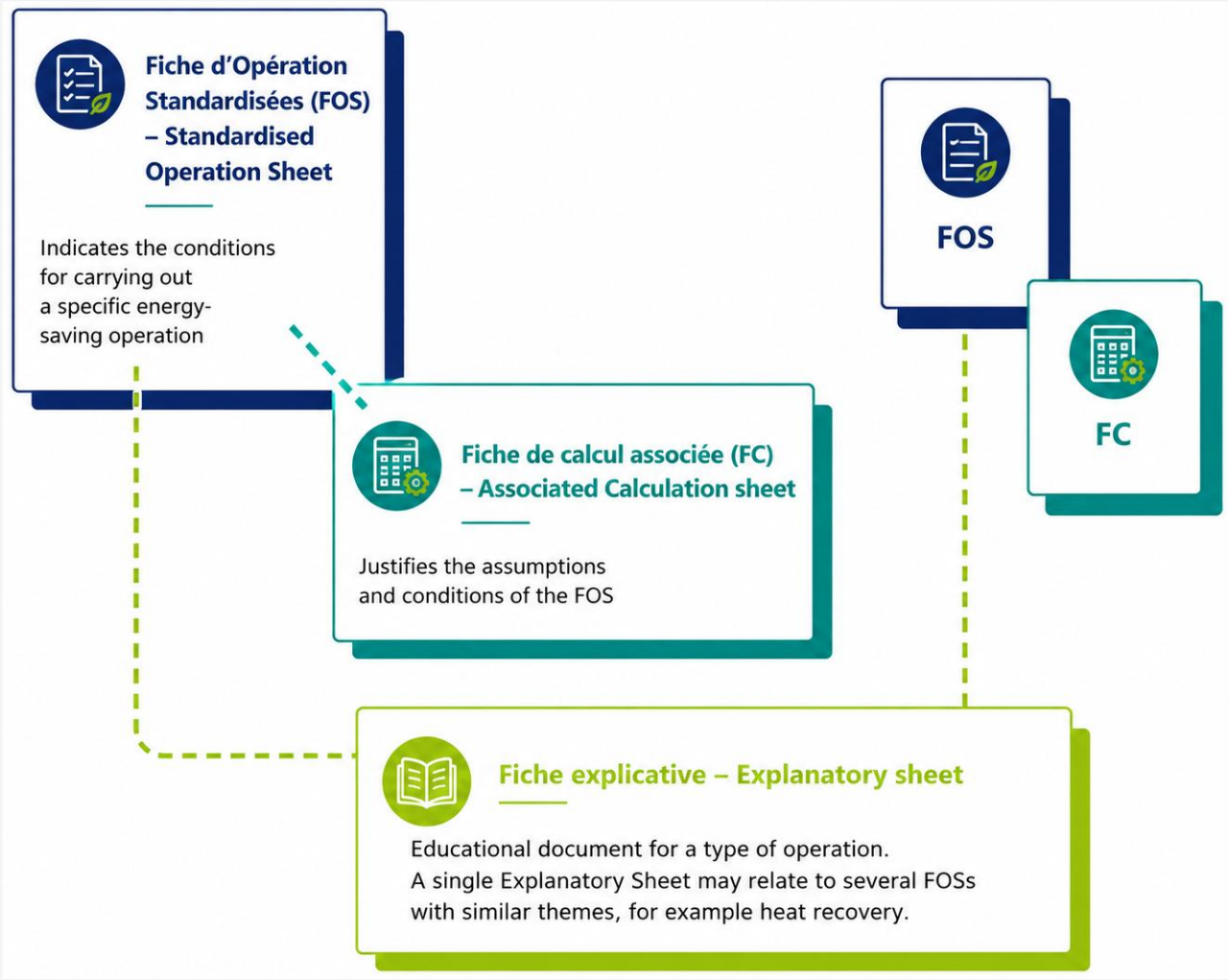


Figure 2. Standardised operations of the French White Certificate scheme
(Source: Adapted from Ministère de la Transition Écologique et de la Cohésion des Territoires, 2025)

This documentation hierarchy streamlines M&V while maintaining methodological robustness. To further accelerate priority decarbonisation actions, the architecture incorporates bonus mechanisms ("Coup de Pouce"), which increase the volume of certificates generated for targeted measures (ALLICE, 2023; Ministère de la Transition Écologique et de la Cohésion des Territoires, 2025).

2.2.1.2. Actors and market dynamics

The CEE scheme is structured around three main actor categories: (i) obliged parties, (ii) delegated entities, and (iii) beneficiaries.

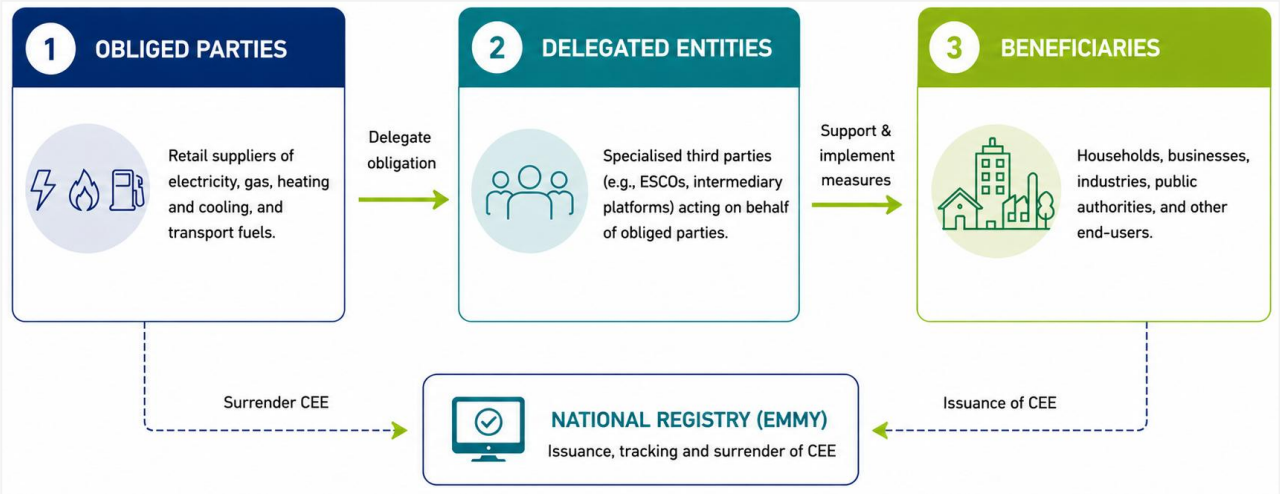


Figure 3. Actor categories in the French CEE scheme (Source: Author's own elaboration / AI-enhanced)

Obliged parties

Under the CEE framework, the obligation is placed on retail suppliers of electricity, gas, heating and cooling, and transport fuels - referred to as the obliges (Code de l'énergie, Art. L221-1, 2025). These actors are assigned cumulative savings quotas for each compliance period, calculated in proportion to their energy sales volumes.

Overall savings targets are bifurcated into two mandates: (i) the "Classic" obligation and (ii) the CEE Précarité mandate, which requires energy suppliers to direct part of their energy-saving efforts towards low-income households to address energy poverty (Ministère de la Transition Écologique et de la Cohésion des Territoires, 2025).

Obligated parties may comply through three principal pathways:

- direct implementation of eligible energy-saving measures for their own clients;
- financial incentives (subsidies or grants) provided to final consumers; or
- acquisition of certificates from third parties or eligible non-obligated actors, such as LRAs.

Failure to surrender the required volume of certificates results in a financial penalty per missing unit (currently set at €15/MWh cumac), which functions as a price ceiling for the certificate market (Code de l'énergie, Art. L222-2, 2025).

Delegated entities

Pursuant to Article L221-3 of the Code de l'énergie (2025), obliged parties may transfer all or part of their obligation to specialised third parties known as delegated parties (délégataires or mandataires), who are typically ESCOs or intermediary platforms that possess the technical expertise to aggregate a number of small-scale projects. Unlike LRAs, which are simply eligible to generate and sell certificates, delegated entities assume the legal liability for a specific quota on behalf of the obliged party they represent, thereby significantly improving market liquidity (EEX, 2025).

Beneficiaries

The beneficiaries of the scheme encompass a broad range of end-users across all energy-consuming sectors, including residential homeowners, industrial operators, commercial businesses, and LRAs. While these actors do not hold a direct savings obligation, they act as the primary implementers of EE measures, receiving financial support from obliged parties in exchange for the energy savings rights associated with their interventions (ADEME, 2024; Ministère de la Transition Écologique et de la Cohésion des Territoires, 2025). This arrangement shifts part of the compliance cost from end-users to energy suppliers, incentivising large-scale retrofitting investments across key areas (ALLICE, 2023).

2.2.1.3. Territorial strategies for local authorities in the CEE scheme

Within the French CEE framework, territorial strategies have transitioned from fragmented energy efficiency projects into comprehensive implementation models that reinforce local energy transition. Leveraging the scheme's adaptability, LRAs utilise the CEE mechanism not only for certificate acquisition but also to establish durable investment pipelines, foster stakeholder collaboration, and harmonise multi-sectoral renovation efforts across their jurisdictions (ADEME, 2024; ALLICE, 2023; ENSMOV, 2019b).

In practice, these territorial strategies typically focus on:

- Aggregation: Bundling various small-scale upgrades across municipal assets - including public buildings, street lighting, and utility infrastructure - to achieve the necessary certificate scale while minimising overhead and transaction complexities.
- Facilitation and coordination: Managing regional renovation schemes in conjunction with energy providers or third-party delegates, specifically targeting residential retrofits and initiatives focused on alleviating energy poverty under the CEE Précarité requirements.
- Strategic alignment: Integrating CEE revenues into broader local climate and energy roadmaps (such as SECAPs) and leveraging them alongside other funding streams like capital grants, Energy Performance Contracts (EPCs), or national financial incentives.

While administrative and regulatory requirements remain significant, these territorial approaches enable LRAs to move beyond a project-by-project logic toward a more scalable and programmatic model of climate action (Bertoldi & Rezessy, 2008; Crampes & Leautier, 2020).

2.2.1.4. Eligible sectors, measures and criteria

The CEE scheme is cross-sectoral, covering residential, tertiary, industrial, transport, agricultural, and infrastructure sectors (ADEME, 2024). The distribution of typical energy-saving measures across these sectors is summarised in the Table 2 below:

Table 2. Distribution of typical energy-saving measures across eligible sectors in the French CEE scheme

Sector	Typical eligible measures
Residential & Tertiary	Building envelope insulation, high-efficiency heat pumps, biomass boilers, LED lighting systems.
Industrial	High-efficiency electric motors, variable speed drives, industrial heat recovery systems.
Transport	Vehicle fleet renewal (electric/hybrid), eco-driving training, modal shift to rail or waterways.
Agriculture & Infrastructure	Greenhouse climate control, high-efficiency irrigation, optimised public lighting.

To qualify for certificates, each measure should comply with strict technical performance thresholds and quality standards to ensure real and additional energy savings (ALLICE, 2023; Ministère de la Transition Écologique et de la Cohésion des Territoires, 2025). These criteria are summarised in Table 3:

Table 3. Summary of technical and administrative eligibility criteria for energy-saving interventions.

Eligibility category	Requirements and standards
Technical performance	Measures should meet minimum efficiency thresholds, such as the specific thermal resistance for insulation (R value) or the Coefficient of Performance (COP) for heat pumps, as defined in the FOS.
Quality certification	For residential and tertiary works, installers should hold the Reconnu Garant de l'Environnement (RGE) label, a national certification for energy efficiency professionals.
Additionality	The financial incentive from the obliged party should be documented as a "triggering factor" (rôle actif et incitatif) before the start of the works.
Verification	High-impact measures (e.g., "Coup de Pouce" boosters) are subject to mandatory ex-post technical audits to verify compliance with the declared standards.

2.2.1.5. M&V and registry

The M&V framework of the CEE scheme is designed to ensure the reality and quality of energy savings while minimising administrative costs. Unlike metered savings models, the French system utilises an ex-ante calculation approach, where savings are deemed based on the technical parameters defined in the sectoral sheets (ADEME, 2024).

The integrity of the system is maintained through:

- The Emmy national registry: Operated by EEX, this electronic platform serves as the single source of truth for the issuance, transfer, and cancellation of certificates, preventing double-counting and ensuring full traceability of every kWh cumac (EEX - European Energy Exchange AG, 2025).
- Compliance audits: The PNCEE performs ex-post controls and site inspections (particularly for high-volume or "Coup de Pouce" measures) to verify that the works were actually performed according to the declared technical standards (Cour des comptes, 2024).

Focus Box 3: Critical compliance rule - The principle of additionality

Beyond technical specifications, eligibility is strictly linked to the principle of additionality.

This requires that the financial incentive provided by the obliged parties demonstrates a documented “triggering role” (rôle actif et incitatif) in the beneficiary’s decision to implement the measure. Importantly, this commitment must be formalised prior to the start of works, ensuring that the intervention would not have taken place in the absence of support under the scheme.

2.2.2. Italy - Titoli di Efficienza Energetica (TEE)

The Italian White Certificate scheme, officially known as Titoli di Efficienza Energetica (TEE), was established by the Decrees[3] adopted by the Ministry of Productive Activities in consultation with the Ministry of Environment and Land Protection on 20 July 2004 and became operational in 2005. Designed as a market-based instrument, it promotes end-use energy savings through mandatory obligations placed on electricity and gas distributors (DSOs) (GSE, 2025).

In line with the REPowerEU and the revised EED, Italy's updated National Energy and Climate Plan reinforces the role of TEE in achieving the 2030 milestones, with the scheme expected to contribute significantly to the national cumulative savings target of approximately 73,42 million tonnes of oil equivalent (Mtoe) for the 2021-2030 period (European Commission, 2024; MASE, 2024). To support this objective, successive strategic reforms were introduced[4] aimed at strengthening TEE's methodological rigour, transparency, and market stability (GSE, 2025).

As a result of this regulatory consolidation, the scheme's operational orientation progressively shifted towards industrial and complex tertiary sectors, prioritising high-impact, project-based interventions, while simpler residential measures are predominantly supported through different fiscal incentives such as tax deductions and the Conto Termico scheme[5] (ENEA , 2025).

2.2.2.1. Scheme architecture

Unlike the French system, which relies primarily on standardised calculation sheets, the Italian White Certificate scheme is characterised by a stronger emphasis on technical precision and project-based verification. In particular, the framework prioritises analytical and experimental methodologies requiring the installation of metering systems to measure actual energy consumption before (in the case of replacement of pre-existing systems, components, transport assets, etc) and after the implementation of a measure - an approach that ensures that each certificate corresponds to a verified and accurately quantified unit of energy savings, thereby reinforcing the technical credibility of the scheme (Di Santo & Biele, 2017; ENSMOV, 2019a).

[3] Ministerial Decree of 20 Jul. 2004 on electricity and Ministerial Decree of 20 Jul. 2004 on gas.
[4] Notably with the Ministerial Decree (Decreto Ministeriale) of 11 January 2017 (DM 11 Gennaio 2017), the Decree of 21 May 2021 (DM 21 Maggio 2021) and through a major structural overhaul introduced by the Decree of 21 July 2025 (DM 21 Luglio 2025).
[5] For example, the "Ecobonus" and the "Superbonus" tax deduction schemes, which collectively support residential energy efficiency renovations and deep building retrofits in Italy.

To support this structure, the Italian framework provides for a clear separation of institutional responsibilities across technical evaluation, market operation, and regulatory oversight, involving three principal actors:

- GSE (Gestore dei Servizi Energetici) acts as the central technical authority, responsible for the evaluation of energy-saving projects, the verification of results through M&V protocols, and the final issuance of TEEs (GSE, 2025).
- GME (Gestore dei Mercati Energetici) functions as the market operator, managing the electronic trading platform (Borsa TEE) where certificates are exchanged between obligated distributors and voluntary parties (e.g.ESCOs), ensuring price transparency and market liquidity (GME, 2026).
- ARERA (Regulatory Authority for Energy, Networks and Environment) provides regulatory oversight by defining the "tariff contribution", a compensation mechanism that partially reimburses obligated DSOs for the costs incurred in meeting their quotas, while also contributing to the setting multiannual national savings targets (ENEA, 2025).

The interaction as well as the flow of certificates between these actors is illustrated in Figure 4.

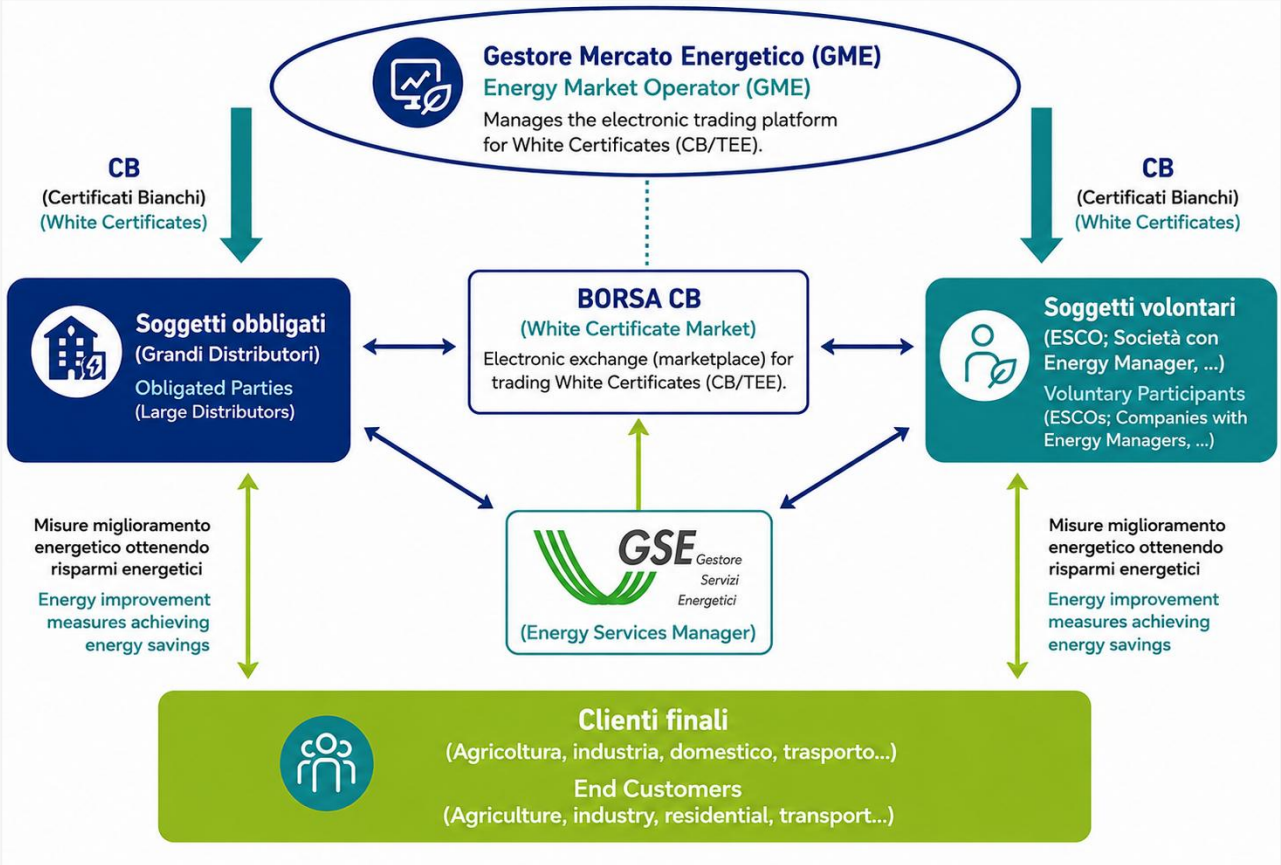


Figure 4. Institutional architecture and transaction flow of the Italian White Certificate scheme (TEE) (Source: Adapted from GSE, 2025)

2.2.2.2. Actors and market dynamics

At the operational level, the TEE framework functions through the interaction between regulated entities and competitive market actors, comprising (i) obliged parties, (ii) voluntary actors, and (iii) beneficiaries.

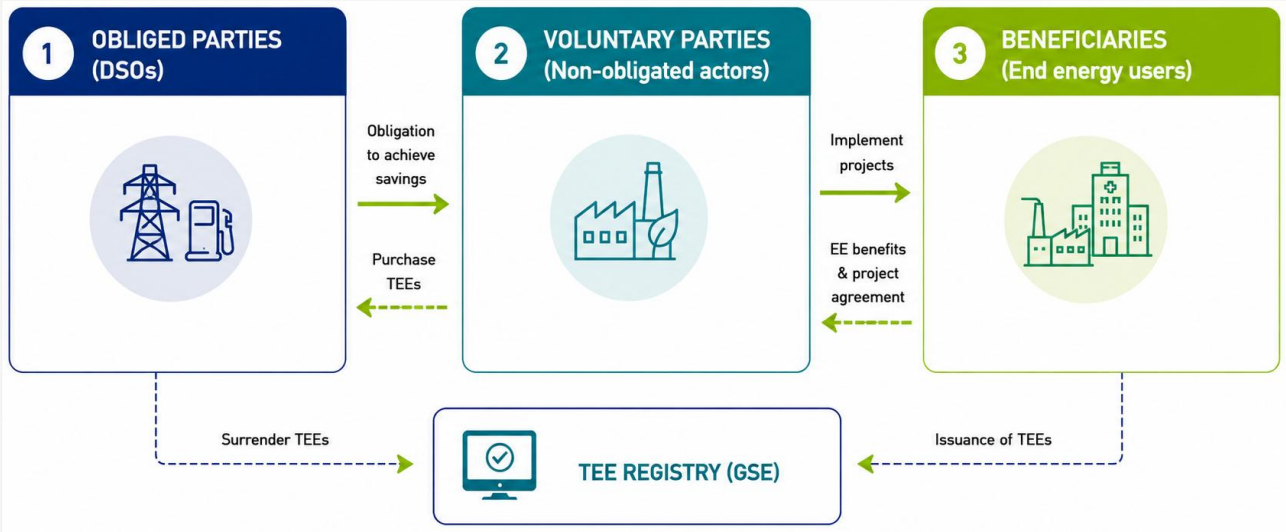


Figure 5. Actor categories in the Italian TEE scheme (Source: Author's own elaboration / AI-enhanced)

Obliged parties

Within the TEE , DSOs (with over 50,000 customers) carry the statutory energy savings obligation, acting as the primary regulated actors. Each year, ARERA notifies the Ministry and GSE of the share of obligations assigned to each obligated entity, expressed in terms of the number of Energy Efficiency Certificates (TEEs), proportionally calculated on the basis of the ratio between the volumes of electricity and natural gas distributed to final customers connected to the entity's network and the total volumes distributed at national level (GSE, 2025).

Compliance may be achieved through two principal channels:

- Direct implementation of EE projects within their own distribution networks or among end-users;
- Acquisition of certificates on the GME's regulated exchange platform or through bilateral over-the-counter (OTC) contracts from voluntary parties.

Provided the annual targets are met, ARERA recognises a tariff contribution (contributo tariffario) for each certificate surrendered, partially offsetting expenditures.

During the compliance year, obligated parties may fulfil less than 100% of their obligation, provided that at least 60% of the target is achieved and the remaining share is compensated within the following two years. Furthermore, within certain limits, it is possible to obtain from GSE the issuance of certificates not associated with actual energy efficiency interventions. Such certificates, issued at a fixed price of EUR 10

each, are not eligible for the tariff reimbursement contribution. They may also be subject to redemption upon the transfer to GSE of "ordinary" TEEs within the deadlines established by the applicable regulatory framework. In the event of non-compliance with the prescribed obligations, ARERA imposes penalties on the obligated entity for each missing certificate, without prejudice to the obligation to fulfil the outstanding compliance requirements.

Voluntary parties

Voluntary parties are non-obligated actors that implement eligible projects in order to generate and sell certificates. They constitute the competitive core of the mechanism with a central role in project origination and aggregation (GSE, 2025), and include:

- ESCOs certified under the UNI CEI 11352 standard,
- Firms operating under ISO 50001-certified Energy Management Systems or employing a certified Energy Management Expert (EGE).

In practice, voluntary actors have generated the majority of certificates in recent years, particularly within the industrial sector[6]. By aggregating distributed interventions or managing complex retrofit projects, they enable obligated distributors to achieve their regulatory compliance targets.(GSE, 2025).

Beneficiaries

Beneficiaries are the final energy users where EE measures are physically implemented, and include:

- Industrial facilities, which account for the largest share of savings per project;
- Commercial and tertiary entities (e.g. hospitals, hotels, retail chains);
- Public authorities undertaking building renovations or infrastructure upgrades (ENEA, 2025).

Although beneficiaries are not subject to specific obligations, except for ensuring the accuracy of the pre- and post-intervention energy performance data submitted to GSE , they receive the technical and often financial benefits of the energy upgrade (e.g., reduced bills or modernised assets). In exchange they transfer the associated environmental attributes (e.g., the certified energy savings) to the project developer or obligated distributor (ESCO or DSO). Where the intervention is implemented through an ESCO, the revenues generated from the sale of the certificates may be shared between the parties, or retained by one party only, in accordance with the contractual arrangements agreed in advance. This

[6] According to the Rapporto Annuale Certificati Bianchi 2025, most TEEs are generated by voluntary parties (mainly ESCOs), primarily in the industrial sector, excluding High-Efficiency Cogeneration (CAR).

arrangement aligns private investment incentives with national efficiency targets while mobilising capital toward high-impact interventions (IEA, 2023; Stede, 2016).

2.2.2.3. Territorial strategies for local authorities in the TEE scheme

Within the TEE framework, LRAs can catalyse the implementation of EE measures by acting as facilitators, aggregators of public assets, and strategic partners. Although the Italian TEE exhibits greater technical complexity and market orientation than the French CEE system, applied territorial approaches enable LRAs to navigate the mechanism effectively through collaboration with specialised market actors (Di Santo & Biele, 2017; ENEA, 2025; ENSMOV, 2019a; GSE, 2025; IEA, 2023b; Stede, 2016).

LRAs' strategies typically involve:

- Strategic ESCO partnerships: Collaborating with certified provides for technical design and rigorous M&V. Given the scheme's emphasis on metered data, ESCOs in particular can serve as essential intermediaries in managing complex administrative and technical compliance.
- Asset aggregation: Grouping interventions across municipal assets (e.g. buildings, lighting systems, and water or district energy networks) to consolidate savings volumes and enhance project bankability.
- Financing integration and public procurement: Combining TEEs with complementary funding instruments such as EPCs, and public procurement procedures, to optimise financial viability of municipal renovation and infrastructure projects. In this context, white certificate revenues act as an ancillary stream that de-risks infrastructure investments.
- Infrastructure modernisation: Leveraging the scheme to facilitate high-impact municipal infrastructure measures, such as public lighting upgrades, thermal systems and smart energy management, aligning technical retrofits with broader urban goals.

From 2020 onwards, however, the incentive scheme known as "Conto Termico", as an alternative to White Certificates (TEEs), became significantly more advantageous for financing the energy renovation of schools and public healthcare facilities owned by LRAs and, more broadly, for improving the energy performance of public building stock.

At present, TEEs are used by LRAs almost exclusively for the refurbishment of public lighting systems and the upgrading of public transport fleets. Conversely, an opportunity still only marginally exploited by LRAs concerns so-called "behavioural" measures, which have recently been admitted under the White Certificates scheme, such as smart working arrangements or the development of Home-to-Work Travel Plans, together with the subsequent measurement of the energy savings effectively achieved.

2.2.2.4. Eligible sectors, measures and criteria

Unlike more standardised systems such as the French CEE scheme, the Italian framework favours tailored interventions designed to deliver substantial and measurable energy savings. Although it applies across multiple end-use sectors its implementation is largely concentrated in energy-intensive activities, with eligible measures extending beyond industry to the tertiary, residential, transport, and infrastructure sectors, including public lighting and, more recently, also "behavioural" interventions. (GSE, 2025).

The main eligible measure categories are summarised in Table 4 below.

Table 4. Distribution of typical energy-saving measures across eligible sectors in the Italian TEE scheme

Sector	Typical eligible measures
Industrial	High-efficiency motors, waste heat recovery (e.g., Organic Rankine Cycle - ORC), compressed air system optimisation, steam production upgrades.
Tertiary & Residential	Building automation and control systems (BACS), high-efficiency HVAC for large facilities, heat pumps, biomass boilers (primarily large-scale).
Infrastructure & Lighting	Optimised public lighting (LED), water pumping system efficiency, smart grids.
Transport	Fleet conversion to alternative fuels (e.g. LNG and electric mobility), logistics optimisation, and shore-side electricity supply ("cold ironing") in ports.
Behavioural	Initiatives promoting modal shift in transport and the reduction of mobility demand

To be eligible for certificates, each measure must comply with rigorous technical and administrative standards, with a particular emphasis on verified additionality and metered performance (ENEA, 2025; GSE, 2025). These criteria are summarised in Table 5.

Table 5. Summary of technical and administrative eligibility criteria for energy-saving interventions in Italy

Eligibility category	Requirements and standards
Technical performance	Measures should exceed EU Ecodesign and national regulatory minimum standards ("beyond business-as-usual").
Metering and M&V	Most projects require dedicated metering to record baseline and post-intervention consumption for a defined monitoring period (typically ≥1 year). If the installed system or vehicle does not replace a pre-existing one, the baseline is defined as the energy consumption of an equivalent "business-as-usual" system or vehicle, corresponding to the standard market offering available at the date of project submission
Additionality and cumulation	Projects must demonstrate regulatory additionality, confirming that the investment is not mandated by law and that the incentive is not cumulated with other State aid schemes relating to the same intervention. The project must also comply with the limits established under EU State aid legislation.
Verification	GSE conducts ex-ante review of monitoring plans and ex-post inspections and audits to validate reported savings.

2.2.2.5. M&V and registry

The M&V framework of the Italian TEE scheme is designed to ensure the accuracy and credibility of certified energy savings. Unlike the French ex-ante calculation approach, the Italian system relies primarily on metered savings, requiring dedicated measurement of actual energy consumption before and after the intervention (ENSMOV, 2019a).

The integrity of the system is maintained through:

- The TEE electronic registry: Operated by GME, this centralised platform records the issuance, transfer, and retirement of certificates, ensuring full traceability and preventing double-counting within both organised and bilateral markets (GME, 2026).
- Monitoring and compliance audits: The GSE conducts ex-ante evaluations of monitoring plans and ex-post documentary reviews and on-site inspections to verify compliance with technical requirements and validate reported savings (ENEA, 2025).

Focus Box 4: Core design feature - Metered and verified savings

A defining characteristic of the Italian TEE scheme is its reliance on metered energy savings rather than deemed ex-ante calculations.

For most project-based and experimental interventions, dedicated metering systems should record actual energy consumption before and after implementation, and certificates are issued only on the basis of verified performance data, following ex-ante approval of the monitoring plan and ex-post validation by GSE.

This design ensures that each TEE corresponds to a real, measurable unit of energy saved, reinforcing the credibility and environmental integrity of the scheme.

2.2.3. Emerging White Certificate schemes in Europe: the case of Spain

Beyond France and Italy, several European countries are developing White Certificate-type mechanisms within their broader EE policy frameworks, reflecting the growing use of market-based instruments, to support national energy savings obligations under the revised EED. Among the emerging approaches, Spain represents one of the most notable recent developments.

The Spanish national White Certificate framework (Sistema de Certificados de Ahorro Energético - CAE) was formally established through Royal Decree 36/2023 and complements existing public support instruments by creating a market mechanism for certified energy savings across sectors such as buildings, industry, transport, and public infrastructure (Ministerio para la Transición Ecológica y el Reto Demográfico -MITECO, 2023). Similar to other European systems, it allows obligated actors to fulfil part of their savings obligations through certified savings generated by third parties. At the same time, it emphasises administrative simplification, digitalised procedures, compatibility with Recovery and Resilience Facility (RRF) funding schemes, and the participation of ESCOs and private project developers (EUROCROWD, 2026; IDAE, 2023).

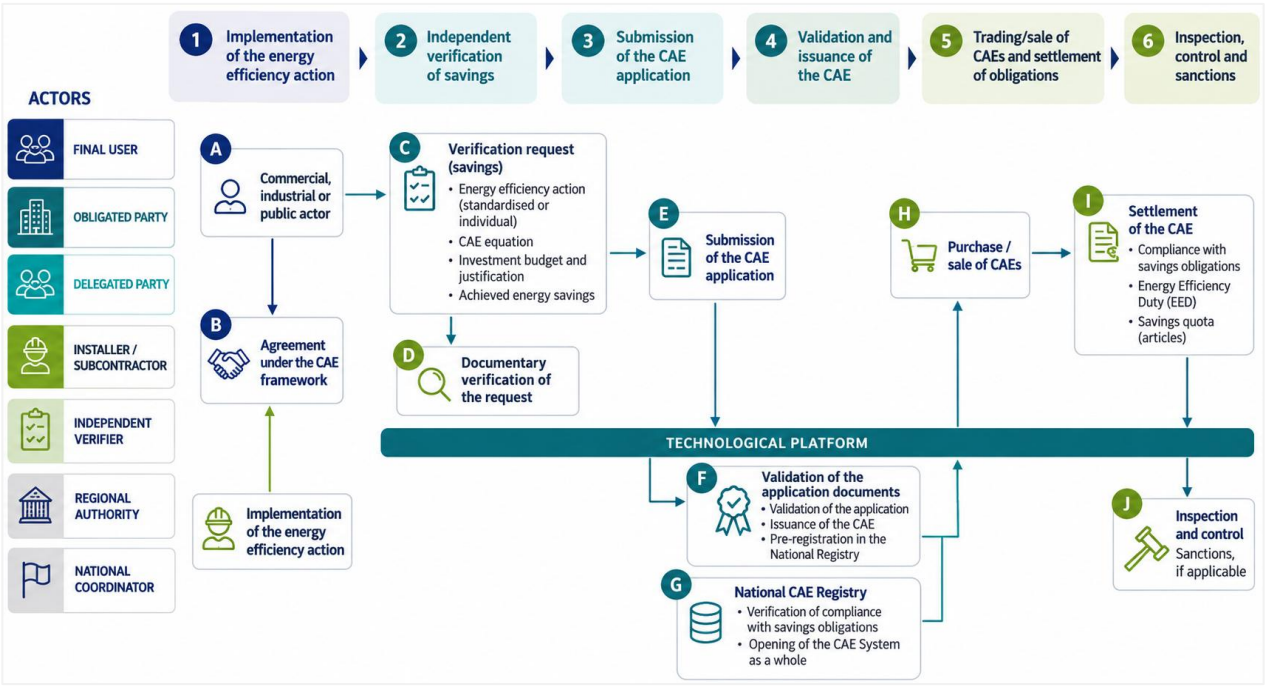


Figure 6. Operational process of the Spanish CAE (Source: Adapted from MMITECO, 2023)

A notable feature of the Spanish model is the involvement of regional authorities (*Gestores Autonómicos*) in the administrative and verification process, reflecting Spain's decentralised governance structure. For LRAs this feature illustrates how White Certificate mechanisms can support broader territorial energy transition strategies through the aggregation of municipal renovation projects and integration with EPCs or regional financing programmes.

3. Setting up a White Certificate project: A quick step-by-step guide

Although the specific rules of White Certificates schemes vary by country, the lifecycle of a project follows a common regulatory logic that combines legal clarity, institutional coordination, and technical credibility. Successful implementation, therefore, requires a structured yet adaptable framework that balances market functionality with robust savings verification.

At its core, the mechanism creates a market for a "virtual commodity" - energy savings - where demand is generated through a regulatory obligation. Unlike traditional commodities, certificates represent a "negawatt" (energy not consumed), making their credibility dependent on a sophisticated regulatory architecture that ensures each issued unit corresponds to a real, additional, and verifiable reduction in consumption [7] (IEA - International Energy Agency, 2023a). For LRAs the process is not just a technical renovation but a financial pathway to transform these "negawatts" into a tradable asset.

In practice, this follows a structured **"**application-to-settlement" roadmap that links investment planning, verification procedures, and certificate trading within a coherent operational sequence (DB Energy, 2026).

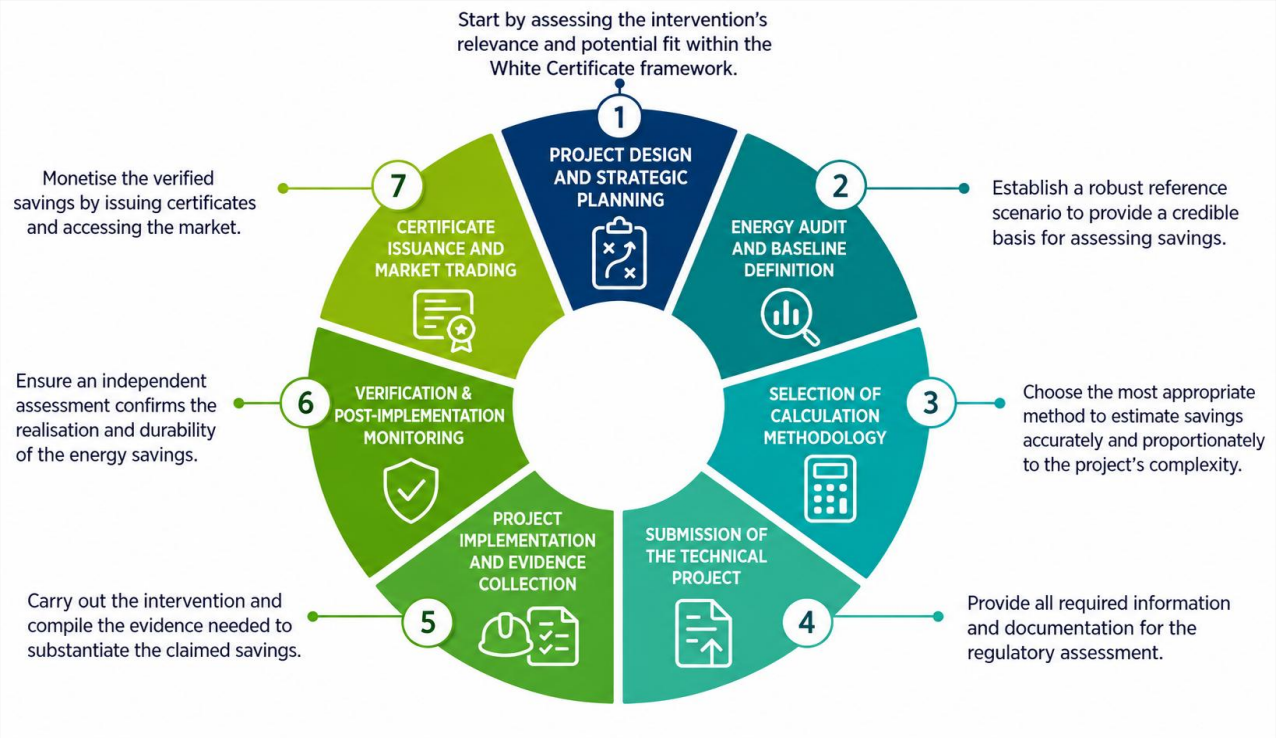


Figure 7. The White Certificate Application Lifecycle: From energy saving potential to market monetisation (Source: Author's own elaboration / AI-enhanced)

[7] The IEA Energy Efficiency 2023 report, Chapter 4 ("Policy and Implementation"), pp. 58–62, highlights that for EE to function as a reliable market resource - often referred to as "negawatts" - robust regulatory frameworks are required to ensure the additionality, measurability, and verification of energy savings.

3.1. Key steps from concept to implementation

The following steps outline a typical project lifecycle can be followed by LRAs, from the early design phase to certificate issuance and market trading. While the exact procedures may differ across national frameworks, the overall implementation logic remains broadly similar, providing authorities with a structured pathway for transforming verified energy savings into tradable assets and reinvestment opportunities.

Step 1 – Project design and strategic planning

Before any technical measurements are undertaken, LRAs should define the strategic scope of the intervention and evaluate its potential for the White Certificate market. This initial step typically involves the following key actions:

- Identification of target sectors with high energy-saving potential (e.g., street lighting, public buildings, water pumping stations).
- Definition of the investment model (e.g., municipal funding, EPC, or other financing mechanism).
- Conducting a preliminary cost-benefit analysis to estimate the expected revenue from the sale of certificates.
- Screening for compatibility with other funding sources to ensure the project does not receive other grants that are legally incompatible with White Certificates.

Common pitfalls to avoid:

- Ignoring additionality: Designing a project that only meets the minimum legal standards (e.g., basic building code compliance), which may result in ineligibility.
- Misalignment with national goals: Failing to align the project with the specific technology "fiches" or priorities set by the national authorities.
- Lack of internal coordination: Initiating project preparation without consulting procurement departments regarding the “early start” rules.

Step 2- Energy audit and baseline definition

This step establishes the "Business-as-Usual" (BAU) scenario against which future energy savings will be measured. Key actions required typically include:

- Appointing a certified energy auditor or utilising a specialised internal energy agency.
- Collecting 2-3 years of historical energy consumption data for the relevant infrastructure.
- Identifying and documenting all energy-consuming equipment or systems to be replaced or retrofitted.
- Defining the baseline consumption, adjusted for external variables such as climate data or occupancy hours.

Common pitfalls to avoid:

- Premature contract signature: Signing implementation contracts before the audit is finalised, violating the "incentive effect" rule.
- Inaccurate baseline: Using a non-representative baseline year (e.g., a year with abnormal building occupancy), which may lead to rejected savings claims.

Step 3 - Selection of calculation methodology

In this step the LRA determines how the expected energy savings ("negawatts") will be quantified, balancing administrative simplicity with technical precision. Key choices to consider typically involve the following:

- Using a standardised approach based on predefined "deemed savings" sheets for mass-market (common) measures (e.g., LED lighting) to avoid expensive metering.
- Applying a metered approach for complex or holistic renovations requiring a tailored M&V plan.
- Verifying the "lifetime factor" of the intervention to determine the total certificate volume generated over the project duration.

Common pitfalls to avoid:

- Over-complication: Applying a metered approach for simple projects, which may unnecessarily increase administrative and monitoring costs.
- Methodology Inconsistency: Using calculation methods that are not officially recognised by the national registry.

Step 4 - Submission of the technical project

This step involves the formal submission of the project to the national authority or relevant regulatory body. Key administrative actions typically include:

- Preparing the technical application folder, including the energy audit report and projected savings calculations.
- Formalising the “incentive effect” declaration, confirming that the anticipated White Certificate revenue influences the investment decision.
- Submitting all required documentation to the national regulator’s portal or electronic registry.

Common pitfalls to avoid:

- Incomplete documentation: Submitting applications with missing technical data or uncertified audits, leading to immediate administrative rejection.
- Timing errors: Filing the application after the project implementation has already begun.

Step 5 - Project implementation and evidence collection

During this step the LRA should ensure that the project implementation and documentation are aligned with the approved application. Key actions typically include:

- Implementing the EE measures as per the approved technical project specifications.
- Maintaining a complete evidence file with all purchase invoices and technical data sheets.
- Securing official certificates confirming the decommissioning and recycling for the replaced equipment.

Common pitfalls to avoid:

- Loss of traceability: Failing to document the technical specifications of the replaced equipment.
- Deviations from the approved specifications: Modifying technical components during installation without updating the original project documentation.

Step 6 - Verification and post-implementation monitoring

This step demonstrates that the projected energy savings have actually materialised post-investment. Key actions to consider typically include:

- Conducting an ex-post energy audit to verify the performance of the implemented measures.
- For metered projects, collecting energy data for the required verification period (often around one year for complex projects).
- Submitting the final performance report for validation by the national authority or regulator.

Common pitfalls to avoid:

- Monitoring gaps: Inadequate maintenance or loss of metered data, or incomplete datasets, which may reduce the final certificate count.
- Underestimated timeline: Failing to account for the time needed for data collection and verification before certificate issuance.

Step 7 - Certificate issuance and market trading

The final step converts verified savings into tradable certificates that can generate financial returns. Key actions typically include:

- Activating and managing the LRA's account within the national electronic registry.
- Monitoring the certificate markets or negotiating bilateral transactions with the obligated parties (energy suppliers or DSOs).
- Finalising certificate transactions and reinvesting revenues into further municipal energy-saving initiatives.

Common pitfalls to avoid:

- Poor market timing: Selling certificates during a temporary price downturn due to insufficient market monitoring.
- Aggregation barriers: Small projects failing to reach sufficient scale without an intermediary aggregator.

3.2. Practical checklist – Key questions for successful set up

Following the presentation of the key set up steps, the checklist below supports LRAs in streamlining the launch of White Certificate projects, from readiness assessment to implementation oversight.

Phase 1 - Strategic planning and eligibility

☐ Strategic alignment: Is the project included in the LRA's SECAP or broader local energy strategy?

☐ Early start check: Has it been ensured that no binding implementation contracts have been signed and no legal commitment to the investment has been made before the official application date?

☐ Threshold check: Do the projected energy savings meet the minimum requirements defined by the national scheme?

Phase 2 - Technical preparation

☐ Audit quality: Is the baseline audit performed by a certified professional recognised by the regulator?

☐ Additionality: Does the project design exceed current requirements of applicable building codes, Ecodesign standards or other regulatory benchmarks?

☐ Documentation: Are the technical specifications and disposal or decommissioning proof of the existing inefficient equipment properly documented?

Phase 3 - Market and financial readiness

☐ Registry account: Is the LRA registered in the national certificate registry or trading platform?

☐ Double-funding check: Has it been verified that the project does not receive other public grants incompatible with White Certificate funding?

☐ Aggregation: If the project scale is limited, has the possibility of bundling it with other municipal or regional projects been explored to reach viable market volumes?

Phase 4 – Post-implementation and trading

☐ Evidence and documentation: Has a complete evidence file been compiled?

☐ Verification readiness: Have monitoring data and performance reports been prepared for submission to the competed authority?

☐ Market strategy: Has a strategy been defined for the sale or transfer of certificates?

☐ Revenue reinvestment: Has a plan been considered for reinvesting certificate revenues into further local energy or climate initiatives?

4. Case studies

This section presents selected case studies from France and Italy illustrating how White Certificate schemes have been applied in practice to support local and regional energy and climate actions. The examples demonstrate how the concepts outlined in this handbook can translate into concrete projects and financing mechanisms, offering practical insights for LRAs seeking to apply similar approaches.

4.1. The AURA-EE consortium approach (France)

GENERAL CONTEXT. In France, the technical and administrative complexity of the CEE scheme often creates high entry barriers for smaller municipalities. To bridge this gap, eight departmental energy syndicates in the Auvergne-Rhône-Alpes (AURA) region formed a collaborative consortium to centralise the management of White Certificate applications and provide specialised technical support, ensuring that local authorities can access funding that would otherwise be out of reach.

HOW THE PRACTICE WAS APPLIED. Initiated by the Auvergne-Rhône-Alpes Énergie Environnement (AURA-EE) the consortium was designed to reduce the administrative burden of preparing and submitting CEE files. By pooling technical resources and expertise, the participating syndicates support municipalities that lack the internal capacity to navigate the scheme's documentation and compliance requirements.

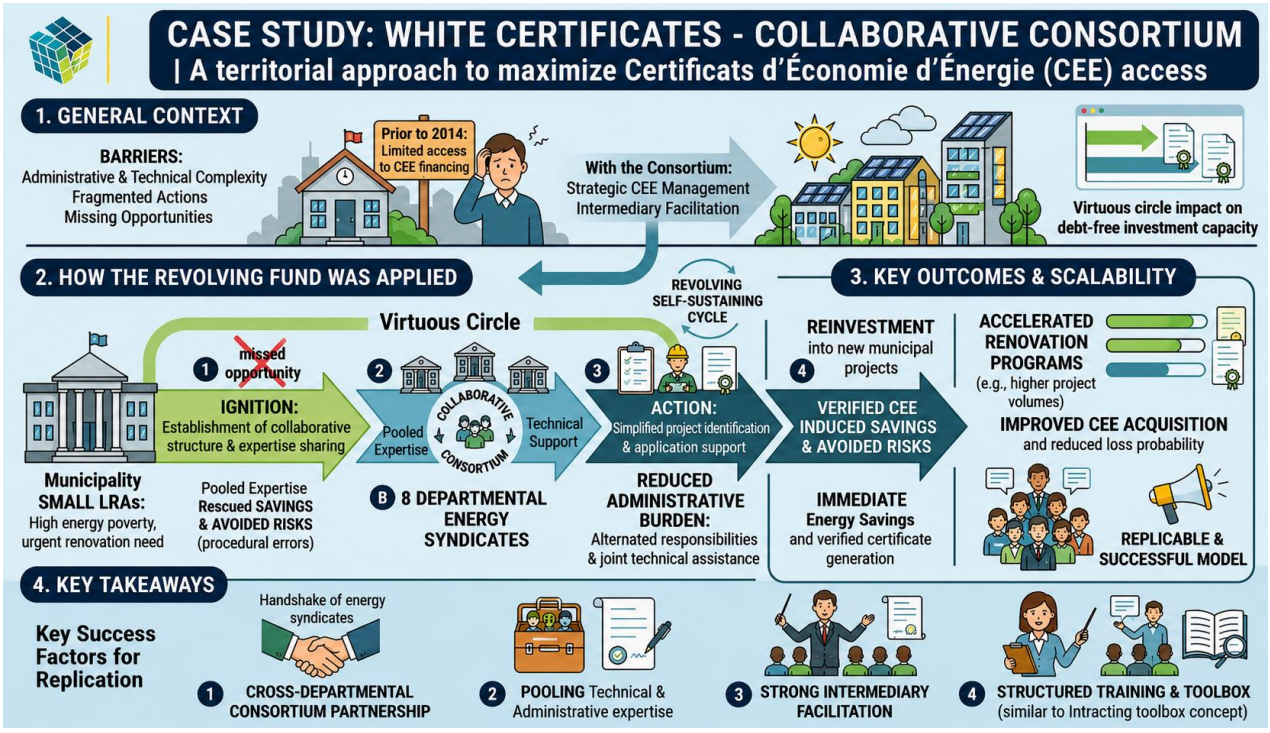


Figure 8. Collaborative consortium model for managing White Certificates in the Auvergne-Rhône-Alpes region (Source: Author's own elaboration / AI-enhanced)

Within this framework, the syndicates rotate administrative leadership while providing collective assistance in project identification and technical auditing. This shared governance ensures high-quality submissions and significantly lowers the risk of certificate forfeiture due to procedural errors or missed deadlines. Beyond simple administration, the consortium acts also as a powerful aggregator, bundling small-scale EE projects into larger volumes. This approach achieves economies of scale and strengthens municipalities' position when negotiating the sale of certificates to the obliged energy suppliers.

KEY TAKEAWAY. The AURA-EE experience proves that inter-municipal cooperation and pooled expertise are essential for making White Certificate schemes inclusive for smaller public entities. By lowering transaction costs and streamlining coordination, this consortium model offers a highly scalable and replicable blueprint for regional territories seeking to maximise EE financing through aggregation.

READ MORE ABOUT THIS PROJECT. For deeper insights on the home-to-work programme and how it was applied in Modena, find and download the case study factsheet on the PROSPECT Stories webpage.

For more information on the agency's broader role in sustainable energy and mobility management visit the official AURA-EE website.

ACCESS MORE PRACTICES FROM FRANCE. Proving that there is no "one-size-fits-all" approach, AURA-EE presents additional examples showing how local authorities - from rural syndicates to departmental councils - have adopted different approaches to monetise White Certificates and strengthen EE financing.

- Direct and diversified management (Ardèche): The department of Ardèche demonstrates a sophisticated mix, using "direct deposits" to bypass intermediary margins and increase financial returns by 15-20%, while using "invoice deductions" for smaller, standardised equipment upgrades. Watch here.
- The rural "third-party trust" model (SYTEC[8]): SYTEC, representing 88 rural communes, showcases how small territories can use a delegate to handle the complex trading of certificates while the syndicate acts as a "local enabler" to ensure small projects are not overlooked. Watch here.
- Professionalising local oversight (Aurillac): The city of Aurillac highlights the transition from full delegation to a more active model, where the city retains ownership of the certificates to ensure better transparency and higher financial yields. Watch here.

[8] Syndicat des Territoires de l'Est-Cantal

4.2. The Modena home-to-work mobility programme (Italy)

GENERAL CONTEXT. In Italy, White Certificates have expanded beyond industrial and building retrofits to include innovative transport and mobility measures. The municipality of Modena pioneered a home-to-work commute programme that successfully translated sustainable mobility behaviours into quantifiable energy savings, demonstrating how behavioural shifts can be monitored, verified, and integrated into the national TEE scheme.

HOW THE PRACTICE WAS APPLIED. The initiative - developed by the Agenzia per l'Energia e lo Sviluppo Sostenibile (AESS) - incentivised municipal employees to switch to low-energy transport modes for their daily commutes. A dedicated digital platform was deployed to track real-time movements, providing the rigorous data quantification necessary to meet the technical requirements of the TEE framework.

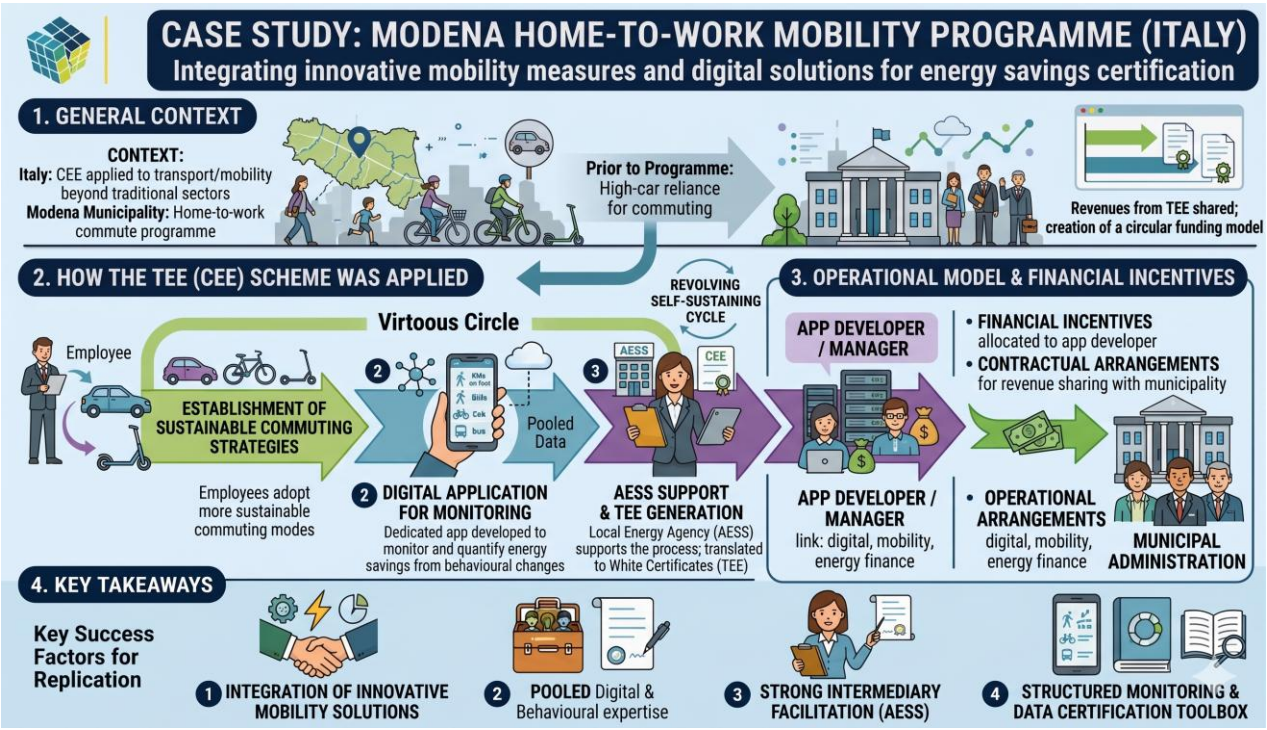


Figure 9. The Modena Home-to-Work mobility programme (Source: Author's own elaboration / AI-enhanced)

AESS acted as "ESCO-style" enabler, managing the complex administrative and technical process of obtaining White Certificates. By aggregating the verified energy savings generated by individual behavioural changes, they reached the minimum thresholds required for certification that would otherwise be inaccessible to single entities.

The operational model used a revenue-sharing structure defined by private contracts. Financial incentives from the certificates were allocated to the technology provider and the municipal administration. This

created a self-sustaining financial loop where digital innovation, mobility management, and energy efficiency financing were directly linked.

KEY TAKEAWAY. The Modena case proves that White Certificate mechanisms can effectively support non-traditional, behavioural EE measures through robust digital monitoring. In addition, it underscores the vital role of local energy agencies as aggregators and technical intermediaries. Their expertise is essential for navigating the certification process, making mobility-based carbon reduction a bankable asset for public administrations.

READ MORE ABOUT THIS PROJECT. For deeper insights on the home-to-work programme and how it was applied in Modena, find and download the case study factsheet on the PROSPECT Stories webpage.

For further information on the agency's broader role in sustainable energy and mobility management, visit the official AESS website.

The PROSPECT initiative supports LRAs in understanding and applying innovative financing schemes by providing practical guidance alongside an EU-wide repository of success Stories.

5. Critical conditions influencing White Certificates

The effectiveness of White Certificate schemes depends on a combination of regulatory, market and technical conditions. For LRAs, understanding these factors is essential when assessing whether the mechanism can effectively support the implementation of local energy and climate objectives, as defined in their SECAPs or SECAP-related strategies.

This section outlines the main drivers, constraints and risk dimensions that may influence the performance of a scheme, and the strategic approaches that can support LRAs' successful engagement.

5.1. Drivers and success factors

Several factors can enhance the effectiveness of White Certificate schemes and facilitate participation by LRAs. These include among others:

- Regulatory stability - Long-term and predictable regulatory frameworks, including multiannual compliance periods such as those applied in France and Italy, provide the certainty needed for investment planning and enable LRAs to integrate certificate revenues into medium-term project strategies.
- Market liquidity - A sufficient number of active participants, including obligated parties, ESCOs and project aggregators, supports a stable supply of certificates and reduces the risk of excessive price fluctuations.
- Technical simplification - Standardised calculation methodologies - such as predefined "deemed savings" sheets - reduce administrative complexity and facilitate participation in smaller-scale interventions commonly undertaken by LRAs.

5.2. Barriers and limitations

Despite their potential benefits, White Certificate schemes may also present challenges, particularly for smaller LRAs with limited technical capacity. Key barriers and limitations may include:

- Transaction costs - Complex measurement and verification (M&V) procedures and project documentation requirements may create administrative burdens, especially for smaller projects.
- Information gaps - Potential beneficiaries may lack awareness of the opportunities offered by the scheme, requiring additional outreach efforts by LRAs, energy agencies or obligated parties.
- Preference for low-cost measures - Market actors may prioritise easily achievable energy savings rather than more ambitious renovation projects that deliver deeper long-term emission reductions.

5.3. Key risk dimensions

White Certificate schemes may also be exposed to risks that affect market performance and investor confidence. These may include:

- Price volatility - Fluctuations in certificate supply and demand can lead to price instability, potentially weakening the long-term investment signal for public projects.
- Fraud and non-compliance - The risk of inaccurate or overstated savings requires robust monitoring, verification procedures and transparent registry systems.
- Free-rider effects - In some cases, incentives may support measures that would have been implemented anyway due to existing regulations, reducing the additional impact of the scheme.

5.4. Synthesis of critical conditions affecting White Certificates.

Table 6 below synthesises the critical conditions influencing the effectiveness of White Certificates, highlighting practical considerations relevant for LRAs when assessing their potential use.

Table 6. Summary of critical conditions influencing internal contracting schemes

Dimension	Key drivers & enabling factors	Common barriers or risks	Mitigation measures & practices
Regulatory framework	Stable regulations and multiannual compliance periods provide investment certainty and enable long-term planning.	Frequent policy changes or unclear regulatory guidance may reduce investor confidence and discourage participation.	Monitor regulatory updates, align projects with national scheme rules and integrate certificate revenues into mid-term planning.
Market functioning	Active participation of obligated parties, ESCOs and intermediaries supports market liquidity and price stability.	Limited participation may cause certificate price volatility and uncertain revenues.	Engage experienced intermediaries or aggregators and monitor certificate market conditions.
Methodological simplicity	Standardised methodologies reduce administrative complexity and facilitate participation in smaller-scale projects.	Complex M&V requirements or project-specific calculations can increase administrative costs and technical barriers.	Prioritise projects that qualify under standardised methodologies and seek technical support when project-based approaches are required.
Project scale and aggregation	Larger projects or aggregated portfolios generate higher certificate volumes and improve financial viability.	Small municipal projects may fall below minimum savings thresholds required for certificate generation.	Bundle multiple interventions across eligible sectors to reach viable project scale.
Information and technical capacity	Access to technical expertise and guidance increases scheme participation.	Limited awareness or technical capacity may discourage LRAs from engaging with the scheme.	Collaborate with local energy agencies, ESCOs or one-stop-shops for project preparation and support.

6. Summary of key takeaways

WHAT ARE WHITE CERTIFICATES SCHEMES ABOUT? White Certificate schemes are market-based policy instruments designed to deliver verified energy savings within national EEO frameworks. Under these schemes, obligated parties are required to achieve quantified energy-saving targets over defined compliance periods. Once achieved, they are converted into tradable certificates (representing a "negawatt" or energy not consumed) that can be used for compliance or exchanged between market actors.

Across Europe, two common implementation approaches coexist:

- standardised methodologies that are generally better suited to small-scale and replicable municipal projects; and
- project-based approaches that are more appropriate for complex or high-impact interventions requiring detailed monitoring and verification.

For LRAs both can be particularly valuable especially when multiple projects are aggregated across public assets or combined with complementary financing mechanisms such as grants, EPCs, or regional funding schemes.

HOW ARE WHITE CERTIFICATE SCHEMES STRUCTURED IN PRACTICE? White Certificate schemes combine regulatory obligations with flexible implementation pathways. National authorities define cumulative savings targets and allocate obligations to specific market actors, such as energy suppliers or distributors. These actors may comply by implementing eligible measures directly, financing third-party projects, or purchasing certificates from other participants.

At their core, White Certificate schemes generally involve multiple stakeholders, including obligated parties, ESCOs, aggregators, and national regulatory bodies responsible for verification, registry management, and compliance control. For LRAs, participation often depends on aggregation mechanisms, partnerships with intermediaries, and the integration of White Certificates into broader local energy and climate strategies.

WHAT ARE THE MAIN WHITE CERTIFICATE APPROACHES AND APPLICATIONS ACROSS SECTORS? Across Europe, White Certificate schemes support a wide range of interventions in sectors such as buildings, industry, transport, public lighting, water infrastructure, and municipal services. Common applications include building renovation, HVAC upgrades, efficient lighting systems, industrial process optimisation, sustainable mobility initiatives, and public infrastructure modernisation.

The two most mature models are represented by the French CEE and the Italian TEE schemes, which reflect different regulatory traditions and market structures.

- The French supplier-based model (CEE) places obligations on retail energy suppliers and relies heavily on standardised methodologies and large-scale programmes, making it particularly suitable for residential interventions and small-scale municipal aggregation.
- The Italian distributor-based model (TEE) places obligations on DSOs with more than 50,000 customers and relies more strongly on project-based methodologies, metered savings, and active certificate trading, favouring industrial-scale and complex infrastructure projects.

Beyond these systems, several European countries are progressively developing White Certificate-type mechanisms. Among them, Spain has recently introduced the CAE framework, which combines certified savings obligations with simplified administrative procedures and stronger integration with RRF funding schemes.

WHO SHOULD USE WHITE CERTIFICATES? White Certificate schemes can be highly relevant for LRAs that implement or coordinate EE interventions within their territories, helping improve the financial viability of the investments and mobilise cooperation with private market actors.

Potential users may include:

- LRAs and municipal departments implementing renovation programmes for public buildings, street lighting systems or municipal infrastructure.
- public utilities or municipal companies responsible for energy infrastructure or local services, such as water pumping stations or local district heating systems,
- energy agencies and project aggregators or other specialised bodies supporting local project development, technical coordination, and the bundling of small-scale interventions, and
- ESCOs and project developers, partnering with LRAs to implement EE measures and manage complex M&V procedures.

WHEN ARE WHITE CERTIFICATES MORE EFFECTIVE? White Certificates can be most effective when they are integrated into broader local energy and climate strategies, such as SECAPs, and when projects generate measurable and verifiable energy savings.

For LRAs, the mechanism tends to be particular impactful when:

- projects are targeted at sectors with clear, high-volume energy-saving potential.
- interventions involve technologies with recognised calculation methodologies, including building insulation, HVAC upgrades, high-efficiency motors or LED lighting systems;
- multiple measures can be aggregated across different municipal assets or departments, enabling larger certificate volumes and significantly lower per-unit transaction costs;
- active cooperation with obligated parties, ESCOs or project aggregators facilitates smoother project development and ensures compliance with national technical requirements;
- certificate revenues can be used as a complementary financing source alongside grants, internal funds or EPCs.

Under these conditions, White Certificates can improve project bankability, attract external expertise and investment, and support the long-term implementation of local decarbonisation strategies.

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