



White Certificates, on-bill financing

May, 2026

What do we know from White Certificates and on-bill financing

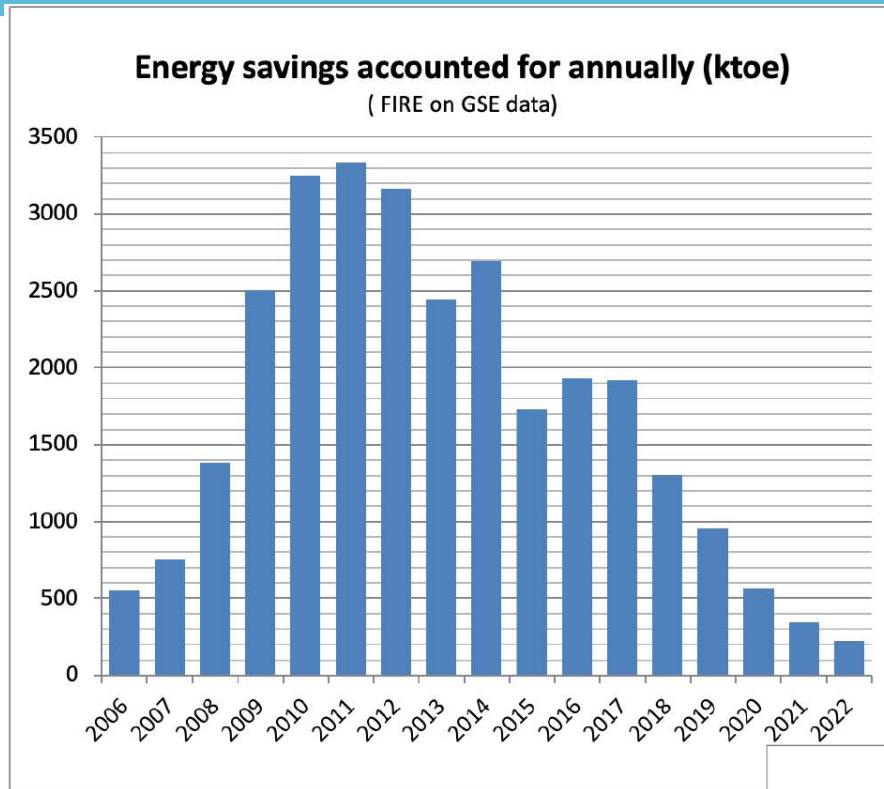
European Union

Country	Scheme Type	Main Features
France	White Certificates (CEE)	Large-scale national EEOS with tradable certificates and strong residential focus
Italy	White Certificates (TEE)	One of the oldest and largest schemes in Europe; tradable certificates linked to verified energy savings
Poland	White Certificates	Market-based trading through Polish Power Exchange
Spain	White Certificates (CAE)	Previously a contribution to the National Energy Efficiency Fund; white certificates implemented since January 2023
Bulgaria	EEOS with bilateral trading	Started in 2008, obligated parties (energy suppliers) may purchase savings from any third party, including energy service providers
Croatia	EEOS with bilateral trading	Started in 2019, OPs (energy suppliers) may purchase savings from any third party, including energy service providers
Cyprus	EEOS with bilateral trading	Started in 2023, OPs (energy suppliers) can trade energy savings bilaterally
Greece	EEOS with bilateral trading	Started in 2017, OPs include energy suppliers, and electricity and gas distributors
Hungary	EEOS with auctions	Started in 2021, since 2024 auctions are organised where OPs may buy energy savings from ESCOs or energy audit companies.
Ireland	EEOS with bilateral trading	Started in 2014, sub-targets for the residential sector and to tackle energy poverty
Luxembourg	EEOS with bilateral trading	Started in 2023, OPs (energy suppliers) can trade energy savings bilaterally
Slovenia	EEOS	Energy suppliers obligated to achieve savings
United Kingdom	ECO scheme (outside EU now)	Not certificate-based trading, but major obligation scheme with energy suppliers, focused on residential sector and energy poor households End of scheme announced in Nov.2025 (for an admin end in Dec. 2026)
Portugal	PPEC incentive mechanism	Competitive efficiency funding rather than certificate trading

Italy

- Introduced in 2005 as an Energy Efficiency Obligation (EEO) with tradable white certificates.
- Electricity and gas distributors have mandatory energy-saving targets.
- ESCOs and companies could generate certificates through efficiency projects.
- 1 White Certificate = 1 toe of primary energy saved.
- Scheme became one of Europe's largest market-based efficiency mechanisms.

Source: Di Santo, FIRE, 2023, ENSMOV Plus



- 2013: Only new projects eligible; limits on combining incentives.
- 2015: Short pay-back projects excluded.
- 2017–2018: Large fraud cases discovered.
- 2017: Shift to stricter metered savings and stronger M&V rules.
- 2018: Price cap introduced for tariff reimbursement.
- 2021: New targets and preparation for auction-based scheme.



To have an EEO with a price market can be useful to achieve high targets.

However, the elasticity of the supply shall be taken into account to avoid prices without control.

What to do if the supply is not capable to satisfy the demand?

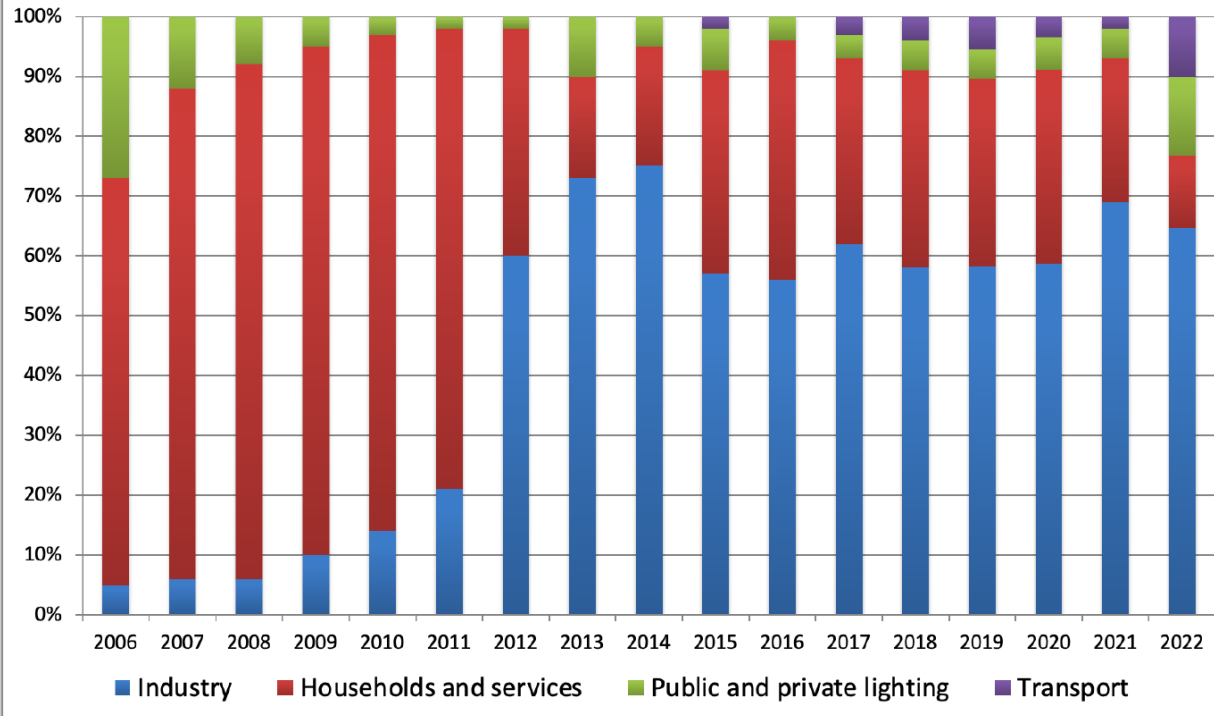
Structural adjustment measures can take time to produce results.



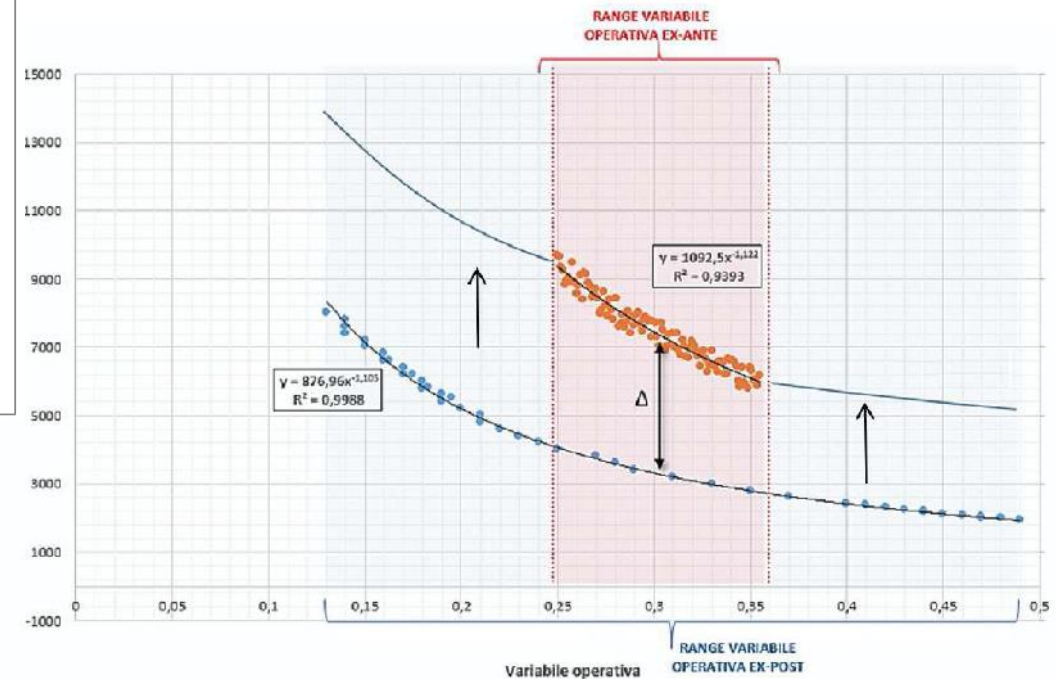
Italy

Breakdown of certificates among sectors (%)

(Source: FIRE on ARERA and GSE data; 2012 data refers only to Jan-May)



- The evaluation of ex-ante energy consumption is based on a year of measures implemented with hourly meters.
- There are also sectoral guidelines for baseline consumptions as references
- 2021 introduction of an auction scheme to generate additional savings to WhC
- Pay as bid auction, based on economic value per toe saved
- Costs covered under electricity and gas tariffs



France

France introduced the White Certificates scheme (CEE) in 2006.

Around 120 energy suppliers are obligated to deliver energy savings.

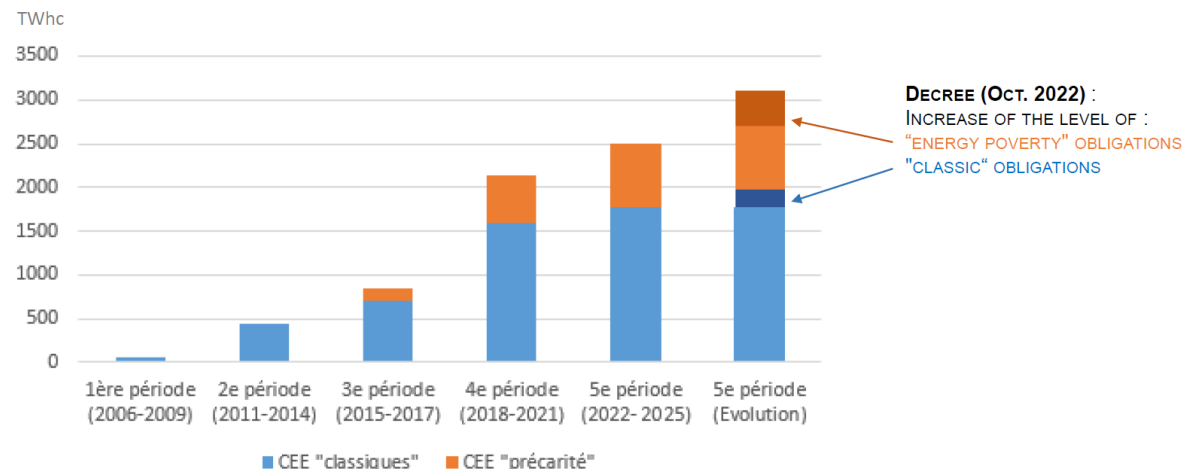
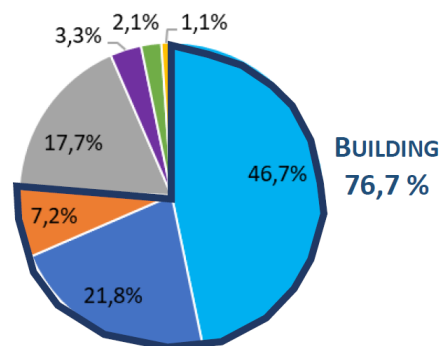
Certificates are mostly generated through standardized actions, and to a lesser extent specific projects and accompanying programs.

The scheme covers all end-use sectors (buildings, transport, industry, agriculture and networks).

Certificates are expressed in kWh cumac (lifetime cumulative discounted savings).

Source: French Ministry for Energy Transition – ENSMOV+ workshop 2023

- Bâtiment résidentiel précarité (BAR PR)
- Bâtiment résidentiel autre (BAR CL)
- Bâtiment tertiaire (BAT)
- Industrie (IND)
- Transport (TRA)
- Agriculture (AGRI)
- Réseaux (RES)



2006: Launch of the French White Certificates scheme.

2015–2021: Strong increase in obligations during P3 and P4.

2016: sub-target to tackle energy poverty

2019: Introduction of annual control plans and stronger M&V.

2022: 6,400 onsite controls and 380,000 questionnaires implemented.

P5 (2022–2025): Higher obligations and stronger focus on energy poverty.

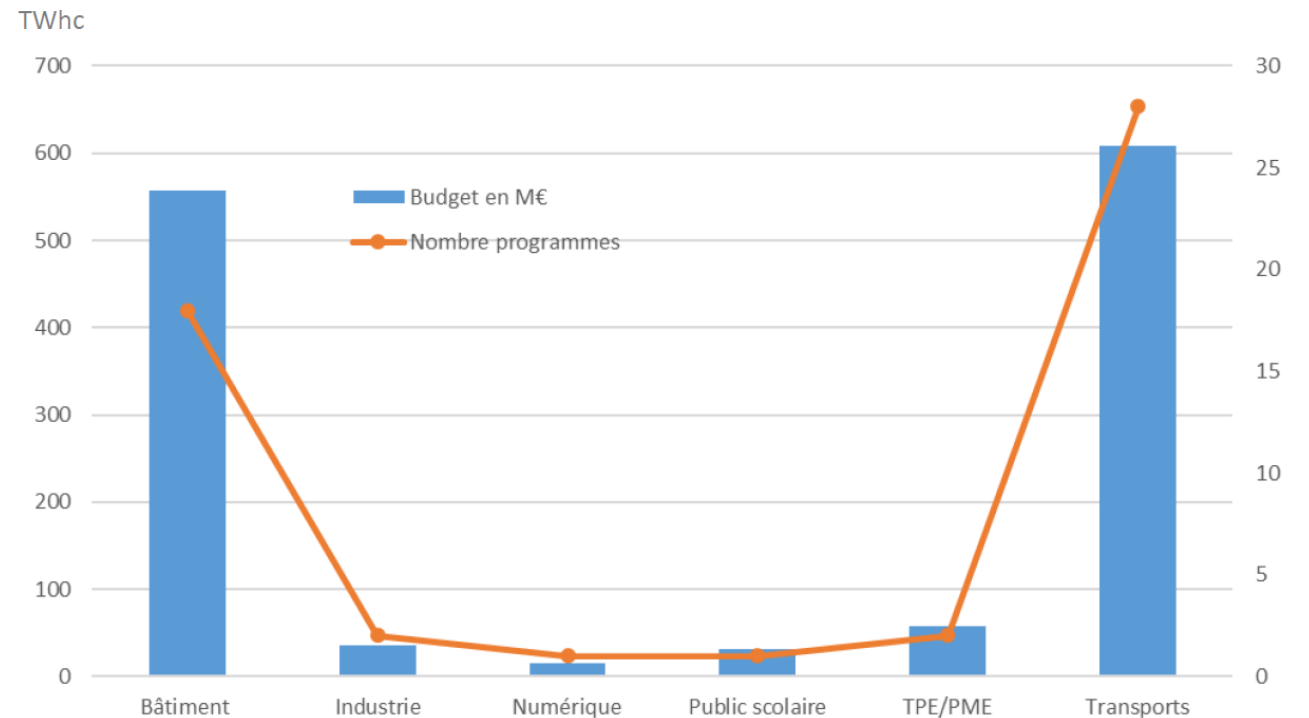
Catalogue expanded to 218 standardized actions across sectors.

France

- Buildings dominate the scheme (76.7% of certificates in P4).
- Tertiary sector remains underrepresented despite large efficiency potential.
- High-impact renovations are still not profitable enough for many users.
- Administrative controls and monitoring costs are increasing.
- France shows that strong scaling-up of obligations can mobilize investment, but alignment between targets and incentives remains essential.

- White certificate scheme : ~ € 4 -5 billion/yr
- Certificate price : ~ 7 –9 €HT / MWh

Accompanying programmes mostly related to buildings and transportation (in 2018-2022)



UK

1994–2002

EESoP

Early supplier obligations for domestic efficiency.

2002–2008

EEC1 / EEC2

Energy-saving target; at least 50% in the Priority Group.

2008–2012

CERT

Carbon metric; larger national target; insulation became central.

2009–2012

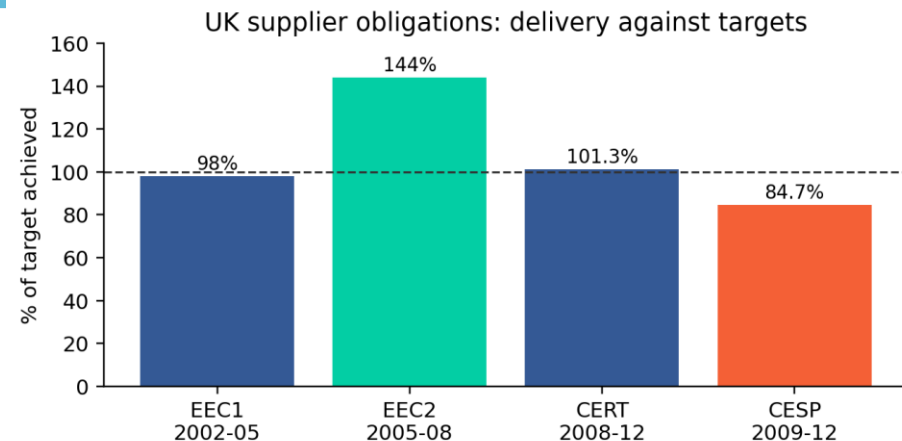
CESP

Area-based programme for low-income communities; whole-house incentives.

2013–2026

ECO

Fuel poverty and household bill reduction focus; later ECO3/ECO4 concentrated on low-income homes.



What could be traded

Early EEC allowed trading of completed energy savings and obligations, all approved by Ofgem.

What was missing

No formal certification of attained savings and no liquid exchange-traded instrument.

What happened instead

Suppliers contracted retailers, installers, landlords and local authorities to deliver measures directly.

UK

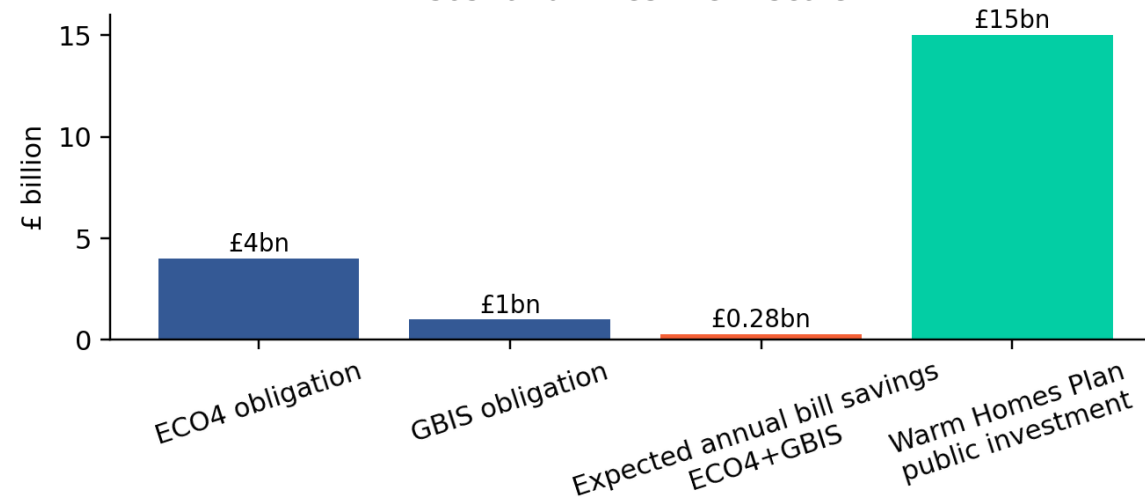
Define the instrument honestly: the UK was a supplier obligation with transfers, not a full certificate market.

Simple, standardised measures can scale quickly; deep renovation requires stronger local delivery and quality control.

Obligations funded through energy bills are politically vulnerable when energy prices rise.

Trading only adds value if there is a real market: clear ownership, certification, registry, liquidity and enough actors.

Cost and investment scale



1. Bill politics

ECO was funded through energy bills. In a cost-of-living crisis, removing ECO from bills was presented as immediate bill relief.

2. Delivery stress

GBIS was harder and more costly to deliver than expected; installation rates lagged and supply chains were constrained.

3. Quality and fraud

NAO found clear failures in scheme design, quality assurance and consumer protection, leading to poor-quality work and suspected fraud.

4. Target mismatch

The obligation worked well for standardised mass measures, but deep retrofit in vulnerable homes is harder to procure through supplier compliance.

5. New funding philosophy

Warm Homes shifts to public capital investment, loans and standards rather than only supplier-funded delivery.

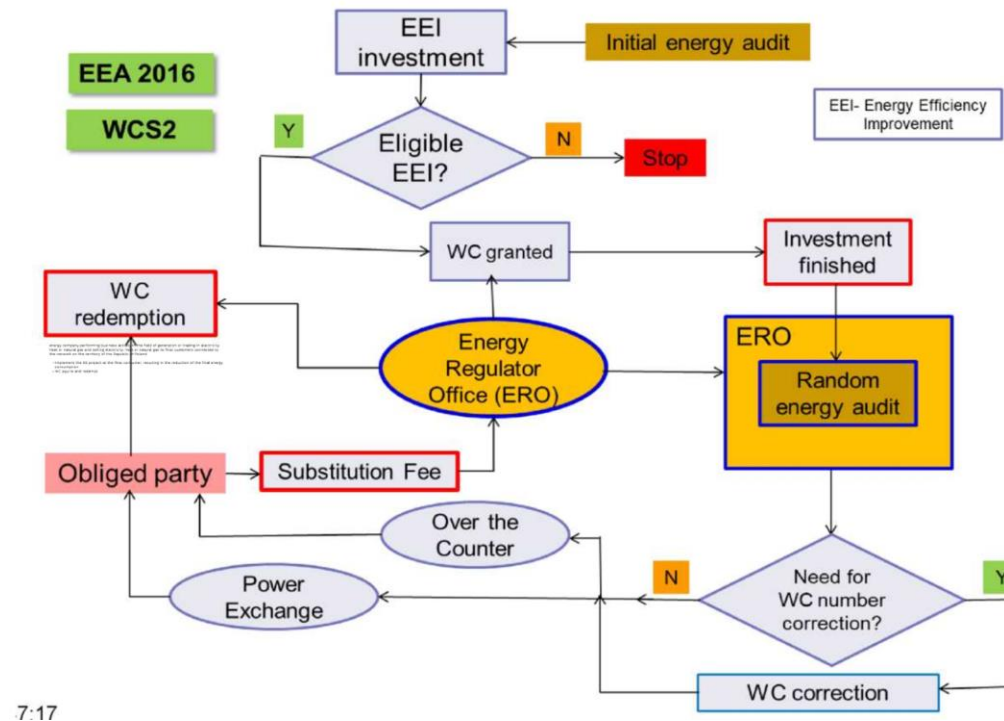
Lesson

Market instruments need strong QA, transparent costs and a delivery chain aligned with the depth of retrofit required.

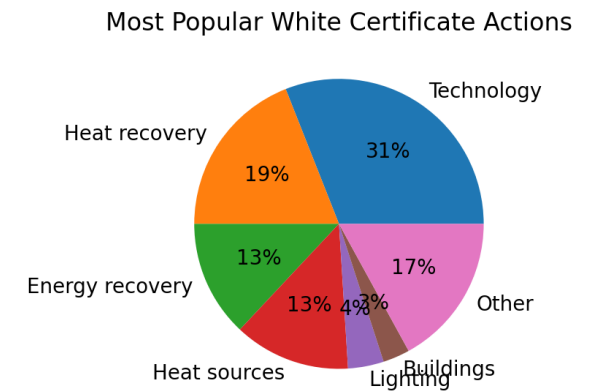
Poland

- Poland introduced the White Certificates system in 2011, operational from 2012.
- Obligated parties include electricity, gas, heat and fuel suppliers.
- The system became one of Poland's main energy-efficiency policy tools after 2020.
- Projects must deliver verified savings confirmed by energy audits.
- White certificates are traded through the Polish Power Exchange (TGE).

2011–2012: Launch of the White Certificates system.
 2016: New Energy Efficiency Act strengthened the framework.
 2018: Energy efficiency linked with air-quality policy.
 2019–2024: Introduction of Clean Air Programme and tax reliefs.
 2021 revision: stronger monitoring and verification procedures.
 Recent reforms focus on energy poverty and building renovation.



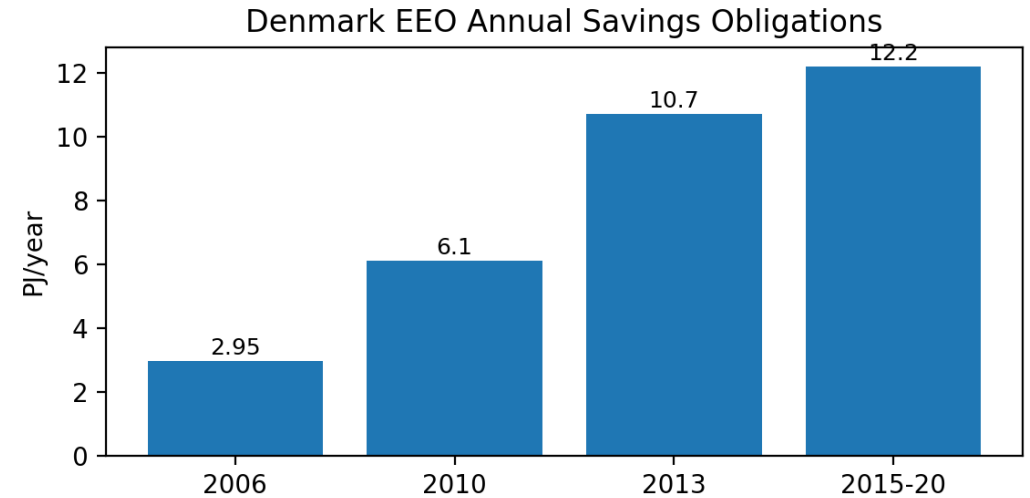
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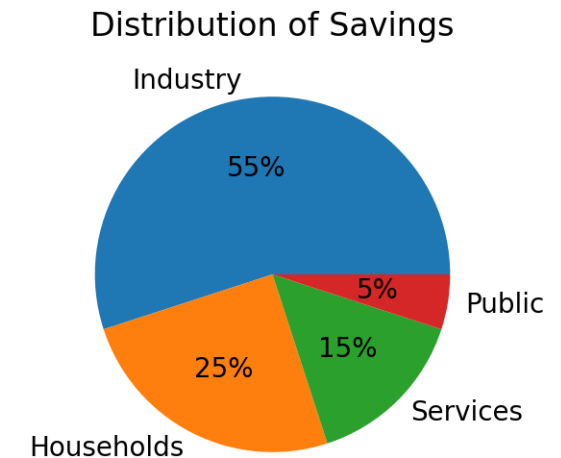
- About 70% of obligations are fulfilled through substitution fees rather than investments.
- Minimum 10 toe threshold excludes many small building projects.
- Audit and verification quality has been a major challenge.
- White certificates are most effective in industrial projects with large savings.
- Poland demonstrates that stable long-term schemes can create strong energy-efficiency markets, but monitoring and targeting remain weak.

Denmark

- Denmark introduced energy efficiency obligations in the mid-2000s.
- Obligations applied to electricity, gas, district heating and oil distributors.
- Companies could implement projects directly or purchase verified savings.
- Denmark used bilateral transfers rather than a large exchange-traded certificate market.
- The scheme became a central tool for EU Energy Efficiency Directive compliance.



- 2006: formal energy savings obligations introduced.
- 2010: obligations increased significantly.
- 2012: new Energy Savings Agreement negotiated.
- 2015–2020: annual obligations reached around 12.2 PJ/year.
- Savings increasingly shifted toward industry projects.



Denmark

- The scheme was praised for flexibility and low administrative costs.

- Standardized savings calculations reduced complexity.

- Negotiated targets between government and energy companies were a key feature.

- Denmark became a major European reference case for EEO design.

- Denmark's EEO was considered one of Europe's most cost-effective schemes.

- Administrative costs remained relatively low.

- Critics argued some savings may have been overestimated.

- Questions emerged regarding free-rider effects and additionality.

- Industrial projects dominated delivered savings.

- Denmark phased out the EEO system at the end of 2020.

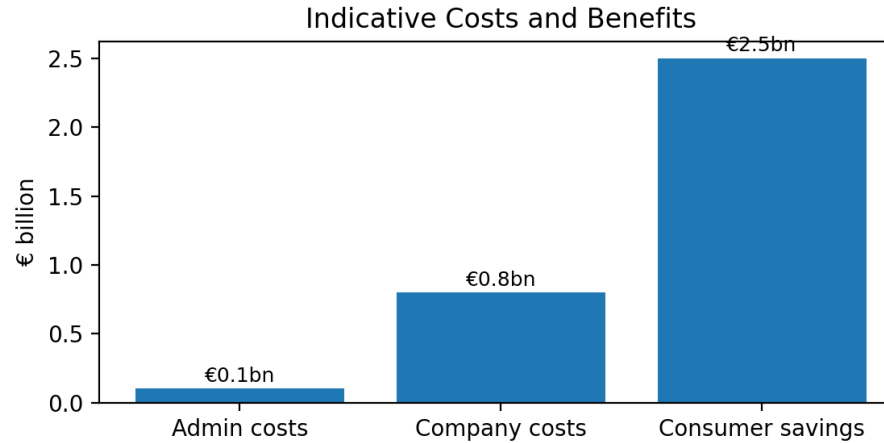
- Policymakers questioned the reliability and additionality of reported savings.

- The scheme increasingly focused on industry while household impacts were more limited.

- Denmark shifted toward broader climate policies and electrification strategies.

- Concerns also existed about accounting complexity and validation burdens.

- New climate agreements focused more on carbon neutrality and direct support measures.



On-bill financing

- On-bill financing allows households or companies to repay energy-efficiency investments directly through utility bills.
- Utilities, banks or public agencies finance upgrades such as insulation, heat pumps, lighting or appliances.
- Repayment is linked to the energy meter or customer account and often designed so energy savings offset repayments.
- Schemes have been used in the United States, United Kingdom, Germany, India and several EU countries.

Step 1

Customer applies for energy-efficiency upgrade through utility or approved provider.

Step 2

Utility or financial partner pays upfront installation cost.

Step 3

Repayment is added to monthly utility bill over several years.

Step 4

Energy savings reduce net bill increases and improve affordability.

On-bill financing problems and solutions

Consumer mistrust

Many households feared hidden costs, debt risks or uncertain savings.

Split incentives

Landlords often paid for upgrades while tenants benefited from lower bills.

Credit and default risk

Utilities worried about repayment performance and customer arrears.

Complex administration

Verification, billing integration and contractor management increased costs.

Weak demand

Many customers preferred grants instead of loans or financing mechanisms.

Energy-price volatility

Savings estimates became less reliable during periods of fluctuating energy prices.

- Combining on-bill financing with grants or subsidies reduced customer risk.
- Public guarantees lowered financing costs and reduced default concerns.
- Strong accreditation and quality assurance systems improved trust.
- Simplified digital billing and repayment systems reduced administrative burden.
- Consumer protection rules limited repayment amounts relative to expected savings.

UK Green Deal / Pay-as-you-save

- Launched in 2013 to finance insulation, boilers and retrofits through electricity bills.
- Around 14 million homes were considered eligible.
- Interest rates reached around 7–10%, much higher than expected by households.
- By 2015 only about 15,000 Green Deal finance plans had been signed.
- Average financed investment per household: ~£7,000–£10,000.
- The programme was effectively cancelled in 2015 due to weak uptake and low consumer trust.

The 'Golden Rule' required expected bill savings to exceed repayments.

- Problems: high interest rates, low consumer trust and complex administration.
- Result: very low uptake and programme effectively closed in 2015.
- Lesson: financing alone is insufficient without grants, trust and simple delivery.

United States – Midwest Energy

- Midwest Energy developed one of the best-known tariff-based on-bill financing schemes in the US.
- Customers financed insulation, HVAC systems and efficient heating through utility bills.
- Typical project size: US\$2,000–US\$7,000 per home.
- Repayment obligations were attached to the meter, not the occupant.
- Repayment rates exceeded 95%, supported by utility billing collection.
- The programme demonstrated strong participation among rural and low-income households.

Some schemes attached repayment obligations to the meter instead of the customer.

- Utilities used disconnection risk to achieve very high repayment rates.
- Public guarantees and low-interest financing improved participation.
- Utility-led delivery proved effective for low-income and rural households.

Germany KfW and Utility blended financing

- Germany combined concessional KfW loans, grants and utility repayment models.
- KfW energy-efficiency programmes mobilised more than €400 billion in investments since 2006.
- Subsidised loans often reduced interest rates below 2–3%.
- Deep retrofit projects commonly exceeded €30,000–€80,000 per dwelling.
- Public guarantees and grants significantly improved uptake.
- One-stop-shops simplified financing, audits and contractor management.

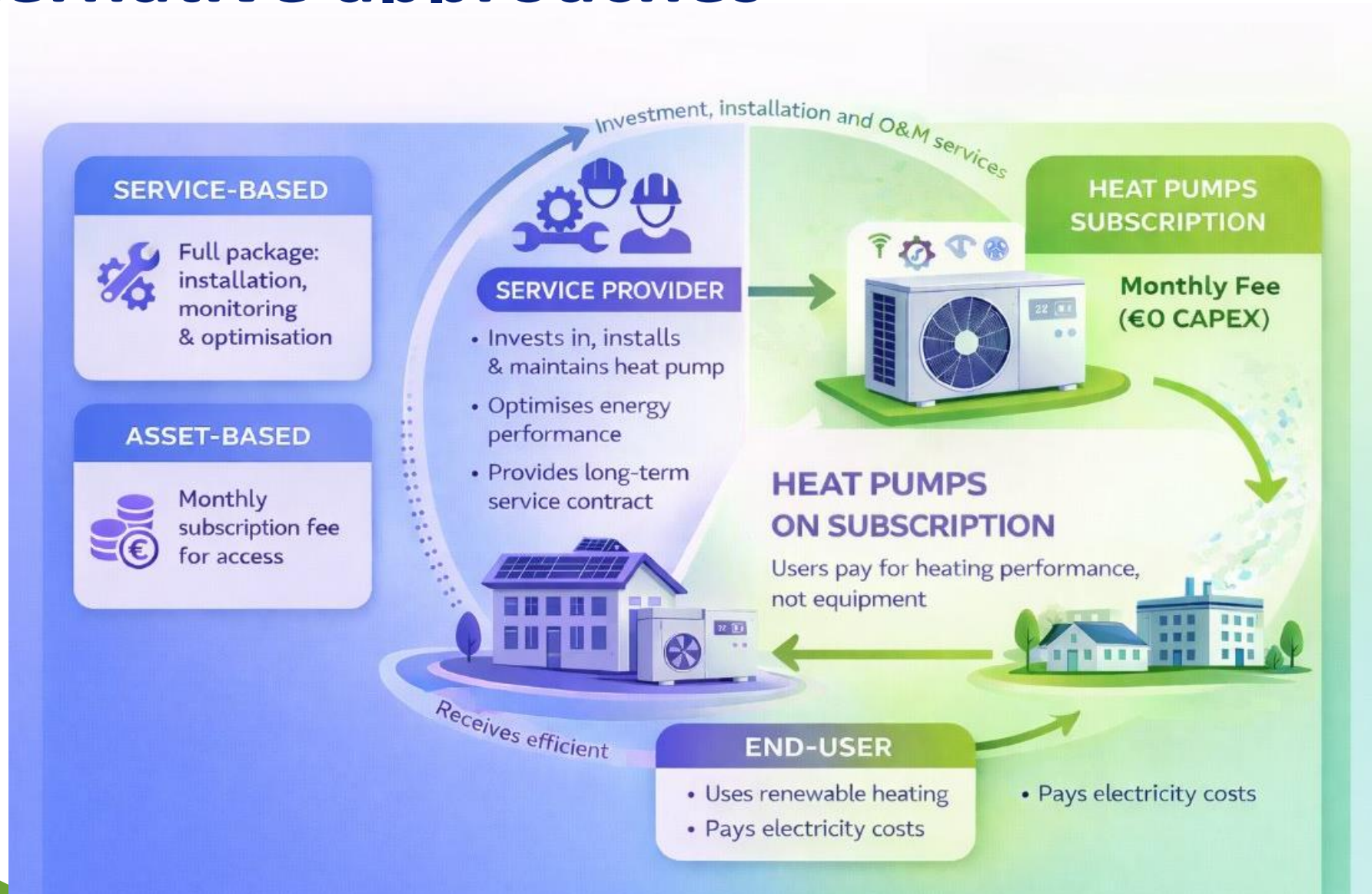
Distribution companies partnered with ESCOs and public banks.

- Strong public guarantees reduced financing risks for utilities and banks.
- Blended finance models increased scalability compared to pure on-bill loans.

Key lessons

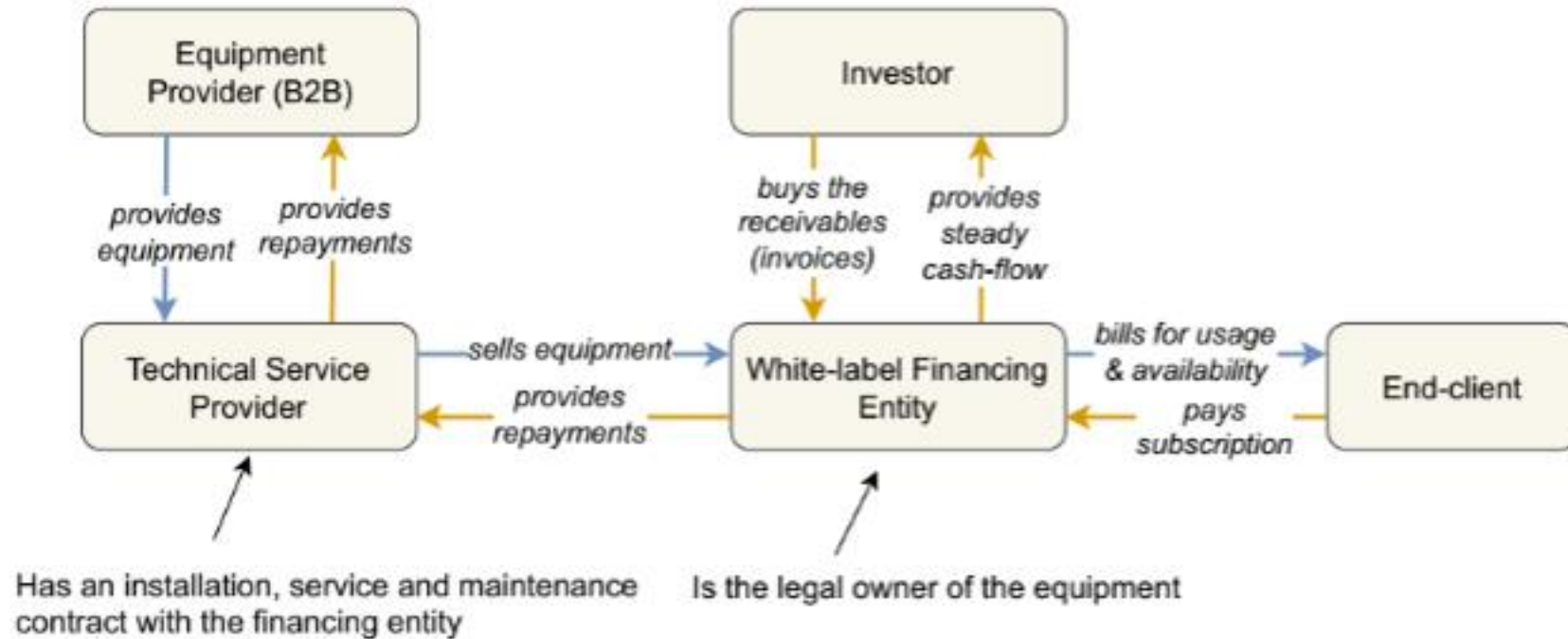
- High interest rates can destroy participation even in large national schemes (UK Green Deal).
- Utility repayment systems can achieve repayment rates above 90–95% (US examples).
- Large-scale public guarantees and subsidies dramatically increase investment mobilisation (Germany).
- Successful schemes combine financing, technical assistance and consumer protection.

Alternative approaches






Off-Balance-Sheet (OBS)

HP-SUBSCRIBE will propose Off-Balance-Sheet (OBS) contracting as a way to structure the business collaborations that are needed for the HPoS.






HPoS in practice: From Concept to Reality




Market Reality

-  Policy & Price Signals
-  Incentives vary by country
-  Electricity vs gas imbalance

Business Model

-  Multi-party contracts
-  ESCO | Landlord | Tenant | Financier
-  Revenue stacking required

Project Level

-  Building-specific design
-  Not plug & play
-  Skills & installation quality matter

Revenue € →

Predictability  →

Portfolio  →

Bankability





HPoS is NOT just a technology – it's a coordinated service + finance ecosystem

Tenant Moves Out: Who Pays?

Potential Risk allocation in HPOS model





Building Based



-  Contract → Landlord
-  Cost via service charges
-  New tenant continues
-  Stable / bankable






Tenant Based



-  Contract → Tenant
-  Tenant leaves → risk
-  Payment gap
- Mitigation ↔ Transfer contract
-  Guarantees

Hybrid model



-  +  Shared roles
-  Provider ensures performance
-  Cost partly embedded
-  Balanced model

 **Key Principle: Link the contract to the building, not the tenant**



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Thank you!