

Understanding the renewables power purchase agreements market

Summary of the report prepared for
the European Commission and DG ENER

June 2026

Understanding the Renewables Power Purchase Agreements Market

Approach, scope and key objectives of the study for DG ENER



157
Survey
Responses



2\2
Stakeholder
Interviews



2
EU Workshops



10
Strategic Topics
Assessed

Comprehensive analysis

Covering current status, future outlook, innovative structures, barriers and enabling measures for PPAs in Europe

10 STRATEGIC ASSESSMENT AREAS

- 1 PPA SUPPLY AND DEMAND: TODAY AND 2030-2035 OUTLOOK**
- 2 CROSS-BORDER PPAs OUTLOOK**
- 3 DEMAND AGGREGATORS AND MULTI-BUYER PPAs**
- 4 HYBRID PPAs: WIND, SOLAR AND BESS**
- 5 NUCLEAR PPAs**
- 6 PPA MARKET TRANSPARENCY**
- 7 STANDARDIZATION AND TRADABILITY OF PPAs**
- 8 PPAs BEYOND ELECTRICITY (HEAT, HYDROGEN, BIOMETHANE)**
- 9 REGULATORY AND NON-REGULATORY BARRIERS TO PPAs**
- 10 BEST PRACTICES TO ADDRESS PPA BARRIERS**

STAKEHOLDER ENGAGEMENT

MARKET PARTICIPANTS

- Developers/Producers
- Off-takers
- Utilities
- Investors and funds
- Aggregators

SUPPORTING ENTITIES

- Advisors and Consultants
- Financial Institutions
- Legal Experts
- Think tanks and Academics

PUBLIC INSTITUTIONS

- EU Institutions and Agencies
- National Governments
- Regulators (NRAs)
- TSOs/DSOs

POLICY & REGULATORY REVIEW

- Electricity Market Design Reform
- Renewable Energy Directive (RED III)
- REMIT II and ACER Initiatives
- Guarantees of Origin Framework
- Clean Industrial Deal
- Draghi Report
- ETS II and Hydrogen/Gas Package
- Other relevant EU policies and national measures

EU PPA Market Maturity Map

Three tiers of PPA market development across Europe



GROUP 1 – MATURE PPA MARKETS

Countries with steadily growing PPA markets since 2020 (or earlier in the Nordics), high cumulated volumes, diverse structures and, in multiple cases, dedicated support schemes.



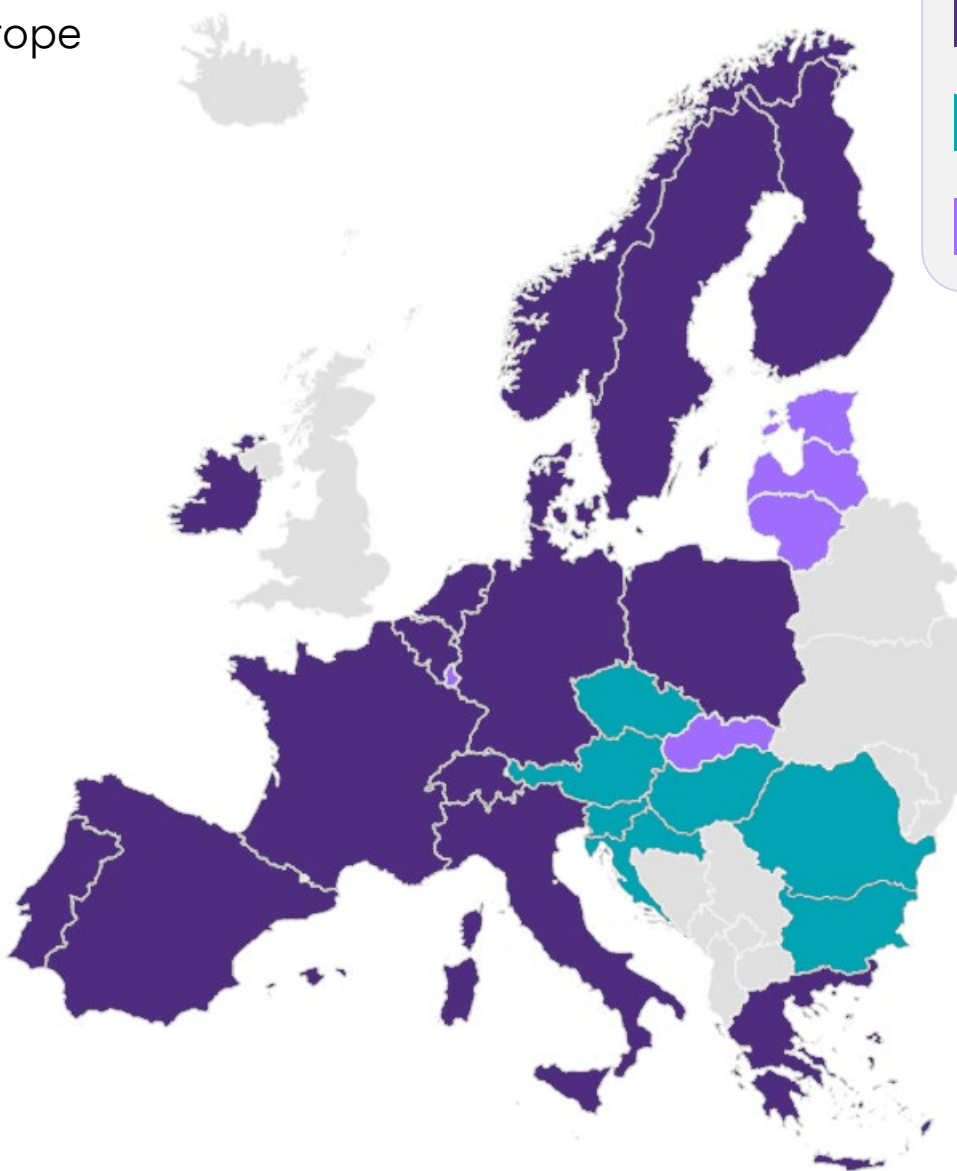
GROUP 2 – EMERGING PPA MARKETS

Growing markets, predominantly in Central and Eastern Europe, which have emerged over the last 3 years, with restricted cumulated PPA volumes.



GROUP 3 – NASCENT PPA MARKETS

Eastern countries, which as of 2025 have registered limited PPA activity, if any, facing high regulatory, market or technical challenges and barriers.



- Group 1**
Mature PPA Markets
- Group 2**
Emerging PPA Markets
- Group 3**
Nascent PPA Markets



EU PPA Market Outlook 2030-2035

Europe is entering a demand-constraint phase of PPA market development

1. MARKET GROWTH

- Greenfield PPA supply reached 350-500 TWh by 2030
- Supply nearly doubles by 2035
- Demand grows significantly but at a slower pace

RES deployment outpaces PPA demand growth

2. SUPPLY-DEMAND GAP

- EU wide gap reaches ~150-200 TWh in 2030
- Gap widens further by 2035
- Strongest oversupply observed in:

Spain

Germany

Italy

Greece

Demand activation becomes the critical challenge

3. MARKET CONCENTRATION

- 2030-2035 market dominated by:

Germany

Spain

Italy

France

~65% of EU PPA supply in 2035

Majority of PPA demand

Four markets drive the European PPA landscape

4. POLICY IMPLICATIONS

- Future market growth requires:

Higher corporate PPA uptake

Utility PPA expansion

Removal of market barriers

Improved bankability & credit support

Integration of PPAs with public support schemes

EU PPA MARKET OUTLOOK BY MARKET TYPE

2030

- OVERSUPPLIED MARKETS**
(Gap > 10 % of electricity demand)
- BALANCED MARKETS**
(10% > Gap > 5 % of electricity demand)
- UNDERSUPPLIED MARKETS**
(Gap < 5 % of electricity demand)

2035

EU PPA MARKET OUTLOOK

	PPA SUPPLY		PPA DEMAND		PPA GAP
2030	350-500 TWh	-	200-300 TWh	=	150-200 TWh
2035	650-900 TWh	-	250-500 TWh	=	~400 TWh

Key Barriers to PPA Development in Europe

Market dynamics and non-regulatory barriers are the greatest impediments to PPA growth

EXECUTIVE TAKEAWAYS



1. MARKET CONDITIONS DRIVE THE CHALLENGE

Most important deterrents identified are market dynamics or non-regulatory in nature



2. PRICE UNCERTAINTY UNDERMINES BANKABILITY

Low or volatile market prices, RES price cannibalization and limited hedging opportunities reduce PPA credibility and long-term value.



3. STRUCTURAL AND TECHNICAL CONSTRAINTS PERSIST

Grid capacity limitations, flexibility integration and low electrification levels restrict both supply and demand for PPAs.



4. REGULATORY AND POLICY GAPS REMAIN

Inconsistent frameworks for RES access, green attributes, curtailment and public buyer participation create frictions.



5. BUYER READINESS IS A KEY LIMITING FACTOR

Off-taker creditworthiness, demand fragmentation and lack of standardization or expertise are major obstacles for corporates and SMEs.

COMPREHENSIVE BARRIER FRAMEWORK

MARKET DYNAMICS AND PRE-EXISTING CONDITIONS

- 1 Market prices
- 2 Forward market liquidity
- 3 Lack of long-term cross-border hedging opportunities
- 4 Stationary electrification level
- 5 Market interventions and regulatory instability
- 6 Flexibility resources' market integration
- 7 International competitiveness
- 8 Impact of public support schemes (e.g. Contracts for Difference) for RE

REGULATORY BARRIERS

	Complexity/Impact	
1 RES development framework and access	●	●
2 Sustainability goals of off-takers and treatment of GOs	●	●
3 Accounting treatment of PPAs	●	●
4 RES curtailment frameworks	●	●
5 RES development restrictions	●	●
6 Barriers to public buyers	●	●
7 Barriers to direct contracting between generators and off-takers	●	●

NON-REGULATORY BARRIERS

	Complexity/Impact	
1 Credit worthiness of off-takers	●	●
2 Demand fragmentation	●	●
3 Transmission and distribution grid capacity	●	●
4 PPA market transparency	●	●
5 Standardization of PPA contracts	●	●
6 Technical knowledge of off-takers	●	●
7 Administrative costs	●	●

Complexity /Impact: ● High ● Medium ● Low

The Evolution of PPAs in Europe

Diversifying technologies, structures and solutions to accelerate the energy transition

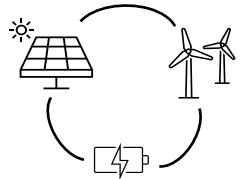


KEY TAKEAWAY

PPAs are no longer limited to corporate electricity procurement. The market is evolving through new technologies, innovative structures and enablers that make long-term renewable energy contracts more accessible, bankable and tailored to diverse needs.

1. HYBRID PPAs

Combining RES and Storage to reduce shaping risk



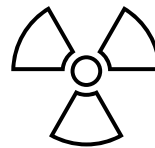
2. CROSS-BORDER PPAs

Accessing the best renewable resources across Europe



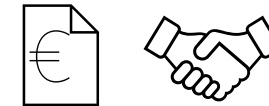
3. NUCLEAR PPAs

Supporting new nuclear development



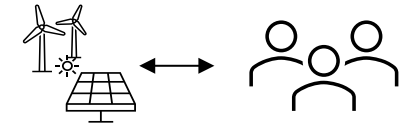
4. RES SUPPORT SCHEMES & PPAs

Combining PPAs with CfDs to enable the energy transition



5. MULTI-BUYER PPAs

Unlocking demand at scale



6. PPA STANDARDIZATION

Reducing complexity and reducing efficiency



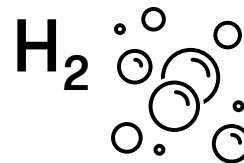
7. PPA MARKET PLATFORMS

Digital solutions for a more liquid and transparent market



8. HYDROGEN PURCHASE AGREEMENTS

Enabling demand for renewable hydrogen



9. BIOMETHANE PURCHASE AGREEMENTS

Scaling renewable gas markets



10. HEAT PURCHASE AGREEMENTS

Decarbonizing heating and industrial heat



Hybrid PPAs: The Next Evolution of Corporate Renewable Procurement

Combining renewables and storage can significantly improve PPA bankability and delivery profiles

WHY HYBRID PPAs ARE GAINING MOMENTUM



1. RISING SHAPING COSTS

- Growing RES penetration
- Increasing cannibalization
- More frequent negative prices
- Higher profile risk for off-takers



2. DECLINING STORAGE COSTS

- Utility-scale BESS costs expected to decrease by 2035
- Improved economics for collocated RES+BESS projects



3. BETTER MATCHING OF SUPPLY AND DEMAND

- ✓ Reduce shaping costs
- ✓ Improve delivery certainty
- ✓ Reduce curtailment exposure
- ✓ Increase RES dispatch
- ✓ Support clean energy strategies

HYBRID PPA VALUE CREATION FRAMEWORK

HIGH
VALUE

LOW
VALUE

LOW COMPLEXITY

HIGH COMPLEXITY

1. SHAPED PPAs: Baseload/FHP Delivery

- Seller guarantees a predefined delivery profile
- Highest firming and risk transfer

2. BLENDED RES + BESS: Premium Structure

- Pay-as-Produced with option to shape delivery
- Buyer decides charge/discharge schedule

3. RES PPA + BESS: Separate Contracts

- Two different contracts: generation and storage
- Lowest complexity

CONTRACTUAL MODELS

Hybrid PPAs can take different contractual forms depending on the level of firming, flexibility and risk allocation between buyer and seller.

TYPICAL OFFTAKERS



Utilities with strict mandates.



Corporates seeking hourly matched green energy

KEY BENEFITS OF HYBRID PPAs



REDUCED
SHAPING RISK



IMPROVED
CAPTURE
PRICES



LOWER
CURTAILMENT
EXPOSURE



BETTER
ALIGNMENT
WITH DEMAND



ENHANCED
BANKABILITY

KEY CHALLENGES TO OVERCOME



CONTRACTUAL
COMPLEXITY



STORAGE
REVENUE
ALLOCATION



GO TREATMENT
FOR STORED
ELECTRICITY



ANCILLARY
SERVICE
INTERACTION



VALUATION
UNCERTAINTY

Accelerating PPA Market Development in Europe

A holistic approach is required to unlock supply, stimulate demand and reduce market barriers





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