BULGARIA POWER SECTOR: MAKING THE TRANSITION TO FINANCIAL RECOVERY AND MARKET LIBERALIZATION

CONTRACT FOR DIFFERENCE

THE WORLD BANK

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Agenda

Contract for Difference (CfD) overview

CfD calibration

The Security Fund and the role of CfD for Suppliers
Contract for Difference

CfD overview
Contract For Differences (CfD), is a financial contract between two parties that reduces exposure to volatile energy prices. At a pre-agreed frequency, the CfD seller will pay (receive) to (from) the CFD buyer the difference between the contracted price (strike) and the actual market price.

*Source: World Bank, based on IBEX Day-Ahead Market*
Contract For Difference (CfDs) as a financial tool

- Contracts For Difference (CfDs) is a very efficient tool to integrate and transition generators in an open market.

- A very flexible tool that allows all generators with contractual or legal obligation to be discussed individually and be included in the framework:
  - Substitute to Feed-in-Tariffs (FiTs) for renewables
    - e.g. Wind, Solar, Hydro, Biomass
  - Contracted Generators
    - e.g. District Heating
  - Independent Power Producers (IPPs)
    - Partial substitute to Power Purchase Agreements
Bulgarian Electricity Market Overview

**Regulated market**
- Public supplier (NEK)
- Obligatory purchases under PPA
- Obligatory purchases under FPA
- Other GE (MV)
- Wind
- Photovoltaic
- Biomass
- HPP <10MW
- Co-Generation
- Industrial Plants
- TPP ME 1 AES-SC
- TPP ME 3 Contour
- TPP ME 3 Contour Global

**Energy Mix 2015**
- NPP Kozloduy
- HPP (NEK) >10MW
- TPP ME 2
- TPP Bobov Dol
- TPP Russe
- TPP Maritsa 3
- HPP >10MW
- Co-Generation
- TPP ME 1 AES-SC
- TPP ME 3 Contour
- TPP ME 3 Contour Global

**Generation**
- Autoproducers
- RES
- 23.9%
- TPP ME 3 Contour Global
- 17.5%
- TPP ME 1 AES-SC
- 8.6%
- HPP (NEK)
- 8.6%
- Co-Generation
- 10.3%
- TPP ME 2
- 8.0%
- NPP Kozloduy
- 6.5%
- Electricity Supply Companies (CEZ, EVN, Energo Pro)
- Supplier of Last Resort (NEK)

**Free Market**
- Direct Sales
- Sales after Quota Obligations
- Residual Sales (Para 100 Energy Act)

**Bilateral Contracts**
- Trader
- Clients (LV, MV & HV)
- Clients (LV, MV & HV)
- Clients (LV, MV & HV)
- Clients (LV, MV & HV)

**Day Ahead (DAM)**
- Launch expected December of 2015

**TSO (ISO)**
- Export
- HV Grid
- MV Grid

**Electricity Distribution Companies**
- HV Grid
- MV Grid
- LV Grid

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*The Energy Mix for 2015 is based on reported figures for H1 2015 and figures for H2 2015 according to the new regulatory decision for the regulatory period August 2015 – June 2016.*
CfD’s key design parameters

1. **Counterparty**
   - A centralized counterparty for all CfD contracts
     (a decentralized market is basically a forward market)
     ➢ Security Fund

2. **Strike Price**
   - Consistent with existing contractual arrangements/regulatory framework

3. **Reference Price**
   - Electricity price indexes representing market equilibrium level and dispatch/load profiles
     ➢ The reference will be indexes based on **IBEX day-ahead market** prices

4. **Volume**
   - Usually based on a fixed quantity of electricity, volume could vary with years
   - Consistent with actual and expected dispatch
CfD’s key design parameters

5. Maturity
   • The duration of CfD contract, consistent with existing contractual arrangements
   • Could as well be different from existing agreements maturity, with the aim to organize a transition to a decentralized market

6. Settlement
   • Financial vs physical settlement
   • Objective is to minimize arbitrage opportunities
   • Should make sure that CfD doesn’t impact DAM market price (e.g. bid at marginal cost, final deliveries penalties)

➢ Impact on Market structure and looking forward
   • Regulatory framework and arbitrage e.g. IBEX
   • Regulated versus Free market
Contract for Difference

CfD calibration
Example: RES producing more than the NSG

Select appropriate strike price and contract volume to try to make generators financially indifferent between FiT and CfD

Analyses here are based on sector level, however contracts need to be negotiated with each specific producer

- **Strike price** equal to Feed-in-Tariff
- **Volume** equals to **Net Specific Generation**
- Basis risk if generator’s sales price not equal to CFD reference price
- A combination of a baseload and a peak-load reference can bring weighted reference price as closely to generator’s sales price as possible
Example: RES producing less than the NSG

Select appropriate strike price and contract volume to try to make generators financially indifferent between FiT and CfD.

Analyses here are based on sector level, however contracts need to be negotiated with each specific producer.

- **Strike price** equal to Feed-in-Tariff
- **Volume** equals to **Expected Dispatch**
- Basis risk if generator’s sales price not equal to CFD reference price
- A combination of a baseload and a peak-load reference can bring weighted reference price as closely to generator’s sales price as possible

**Dispatch Profile Example**

![Dispatch Profile Example](image-url)

% of installed capacity

Undispatched Capacity

Year


Net Specific Generation
How to better adapt the dispatch profile of different generators?

Dispatch profile differs by generator types

- IPP, Hydro, Biomass, DH: mostly baseload
- Solar: during day time, usually coincides with peak in demand
- Wind: more difficult to predict, peak in production usually coincides with lower demand

*Based on dispatch model output*
How to better fit the seasonality of the load profile?

- Load profile is not constant
- Price is set hourly on the DAM

- Basis risk
- Several CfDs, with different reference prices, can better replicate various load profiles
  - Base v.s. Peak
  - Winter v.s. Summer
  - Weekday v.s. Weekend
Contract for Difference

The Security Fund and the role of CfD for Suppliers
The role of the Security Fund and the importance of risk management:
- Open exposure to electricity prices
- Assessing the risks of the financial position: budgeting, cash-flow analysis, sensitivity/scenario analysis
- Hedging solutions for the Security Fund e.g. CfDs with Suppliers
Cash-flow Analysis for the Security Fund

Simulation of cash-flows using historical IBEX and dispatch model prices
Security Fund – How to manage market risk?

✓ With CFD strike and volumes agreed ex-ante, frequency of settlement has no impact on the exposure

✓ Security Fund has an open exposure to electricity price

✓ Security Fund cash flows can be budgeted based on expected price of electricity

✓ Security Fund actual cash flows can be significantly different from budgeted amounts

➢ Need for the security fund to either:
  1. Have access to liquidity and/or capital to face required payments
  2. Have the capability to transfer market risk to a third party
CfD for Suppliers – Regulated Market and Free market

- CfD can be used as an effective hedging tool for suppliers

**In a regulated market**, suppliers sell electricity at regulated price, while the cost of electricity is subject to market fluctuations

- CfD Volume based on projected demand on regulated market
- CfD Strike based on Expected Regulated Price (TBD)

**In free market**, suppliers can utilize CfD to partially hedge electricity cost and provide fixed price contract to end users

- Volume based on free negotiation with suppliers, or imposed by regulators (vesting contract)
- Strike price is decided by Suppliers themselves (based on their expectation of future electricity price)