Coal Power Purchase Agreements (PPAs): Breaking Down the Basics

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Coal-fired power is the single largest source of carbon emissions in the world, and, if left unchecked, would consume two-thirds of the remaining budget for limiting warming to 1.5C. As more than 93% of global coal capacity is shielded from competition — and a significant portion of that sits under coal power purchase agreements (PPAs) — decarbonizing these contracts is critical to the stability of the climate and to the energy transition. In this brief, RMI will break down what coal PPAs are, how they are structured, and how they are developed.

What are PPAs?

PPAs are critical components of the global electricity sector. They are a widely used mechanism for procuring power by establishing a contract between a seller (or generator) and a buyer (an offtaker, often a utility) of power.

As power projects are capital intensive, successful projects need to attract competitive rates of financing to lower costs and ensure financial viability. The lower the risk investors see in a project, the cheaper the financing tends to be for that project. If well-structured, PPAs offer certainty for buyers as well as sellers, protecting them from volatility in energy prices by "locking in" the price buyers pay for electricity for decades to come. This kind of long-term certainty offers sellers a steady source of revenue and improves the chances of securing low-cost financing.

PPAs are and will remain critical to building out the clean power needed for decarbonizing the global power sector. However, by their very nature, when utilized for emissions intensive generation, these agreements lock in polluting assets like coal-fired power. They can (and do) prevent stakeholders from realizing the cost savings, job opportunities, earnings opportunities, and lower emissions possible from clean energy.

How are coal PPAs structured and who is involved?

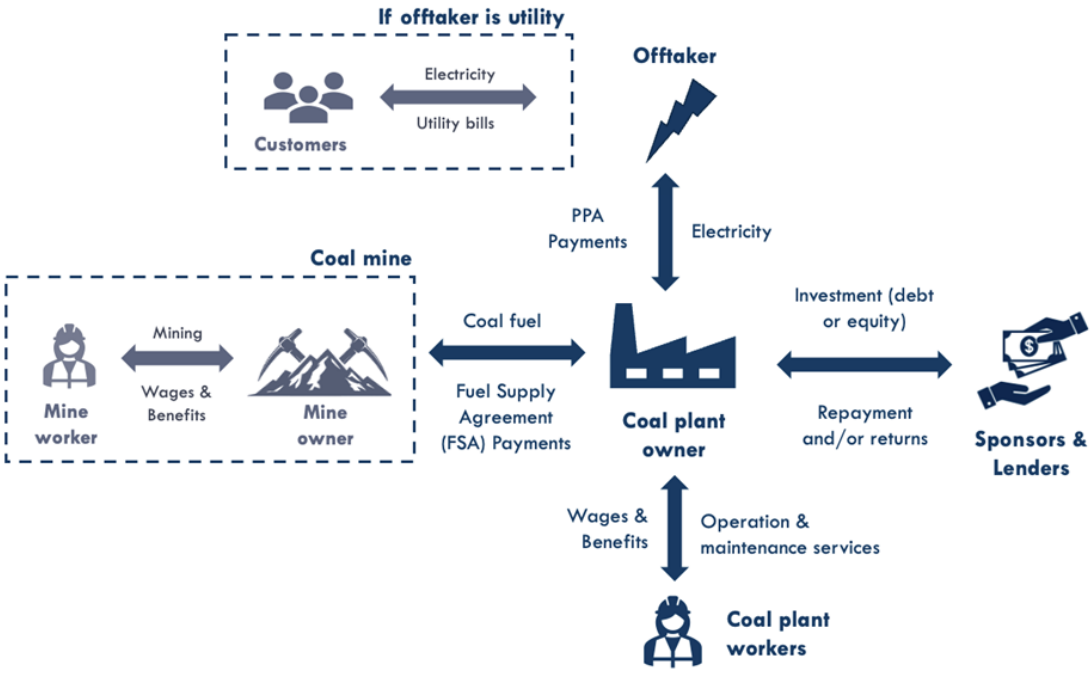
There are two broad categories of coal PPAs:

- Operating PPAs: These include coal plants currently operating and generating electricity.[i]
- Pipeline PPAs: These include coal plants in various stages of development, which are expected to generate power soon.

The range of stakeholders involved in operating PPAs is wide and involves parties upstream and downstream of the contract (illustrated in Exhibit 1).

[i] It is worth noting that the expiration of these PPAs does not guarantee that the coal plant itself will no longer be used, as these contracts are often renewed and tend to be shorter in duration than the life of the plants themselves.

Exhibit 1: Structure of and stakeholders involved in operating coal PPAs.



As the exhibit above details, there is a complex web of relationships between the coal plant owner and other stakeholders:

- **RELATIONSHIP WITH OFFTAKER**: While coal PPA terms may vary widely, the basic relationship of the plant owner with the offtaker involves the latter making PPA payments to the former, for the supply of electricity. The shape of these payments (e.g., to what extent they are fixed regardless of the plant's generation or how they "pass on" changing coal fuel costs) varies by contract and market context.
- **RELATIONSHIP WITH FINANCIERS:** As mentioned previously, PPAs facilitate securing low-cost financing for power projects. The corresponding financiers can be private sector actors, investors from public or multi-lateral development institutions,[ii] or a combination of both — depending on the specific project, geography, or market context. These stakeholders — public and private — engage in power projects in two broad roles:
    - Project lenders — These are financial institutions (e.g., banks) that lend capital to projects in the form of debt and require repayment of that capital with interest. In case a project fails, lenders have the first right to recover their investments and as a result of this lower risk profile, debt is typically cheaper than equity. Specific clauses are often included in PPAs to increase the certainty of the project's future revenues and, thereby, attract project lenders.
    - Project sponsors — These investors provide capital in exchange for partial ownership of the project (i.e., through equity), analogous to the shareholders of a publicly traded company. While these investors have the right to share in the project's financial returns, they also bear more risk if the project fails, as they are last in line to recover their investments.
- **RELATIONSHIP WITH COAL MINE:** Coal plant owners usually contract with coal mines through Fuel Supply Agreements (FSAs), to ensure a stable supply and price of fuel for the power plant. Depending on

ii Public investors can include direct investments or indirect support by foreign governments into projects in other countries. Multi-lateral development institutions are institutions such as the World Bank, which are supported by the public funds of multiple countries, and aim to support economic development, climate mitigation, gender equality, and other outcomes.

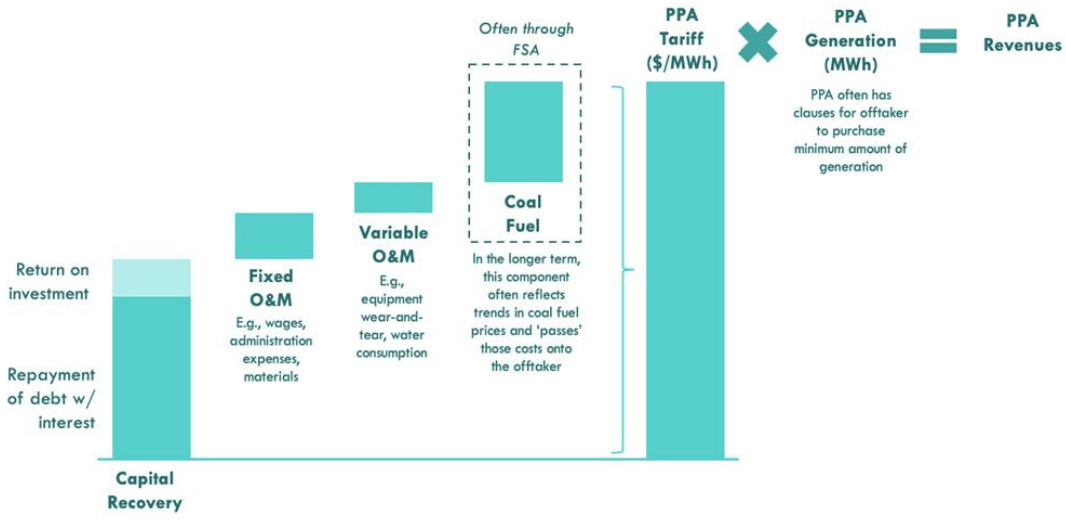
the specific market and the domestic coal resources available in-country, these contracts can vary in structure but often include minimum offtake clauses — wherein the coal plant owner must purchase and the coal mine must supply a minimum amount of coal over a period of time. Failure to comply often results in the responsible party incurring a penalty. A coal mine can have FSAs with multiple coal plants, or, in rarer cases, with just a single plant (i.e., a mine-mouth plant, more on that below).

- **RELATIONSHIP WITH WORKERS AND COMMUNITIES:** The coal plant owner has a direct relationship with the workers it employs at the plant and an indirect one with the workers at the mine(s) it purchases coal from. The relationship with mine workers is stronger for mine-mouth coal plants as these are joint partnerships where the plant and the mine are considered as one project, with the plant as the sole consumer of coal from the mine and the mine the sole supply of coal to the plant.

What are the components of a coal PPA tariff?

While PPA terms vary widely across plants, market contexts, and geographies, the broad components of coal PPA tariffs are similar. These tariffs generally incorporate recovery of — i) costs related to capital investment in the plant, ii) operations and maintenance (O&M) costs for running the plant and, iii) fuel costs, derived from the plant's contract with coal mines (Exhibit 2).

Exhibit 2: Illustrative chart detailing general components of a coal PPA tariff



What are the consequential terms in coal PPAs?

Some commonly found and consequential clauses in PPAs include:

- **"TAKE-OR-PAY" (TOP) CLAUSES:** These contract clauses require the offtaker to purchase and for the seller to supply a minimum amount of electric generation. Failure to comply would require the responsible party to pay a (often significant) penalty. Such clauses mitigate risks associated with insufficient demand or technical challenges with plant operations. They strengthen the certainty of future power plant revenues and help attract low-cost financing. However, they also incentivize the offtaker, the plant owner, the utility, and the grid operator to maximize the utilization of these plants.
- **TERMINATION CLAUSES:** These are defined fees in the contract aimed at providing guarantees to the

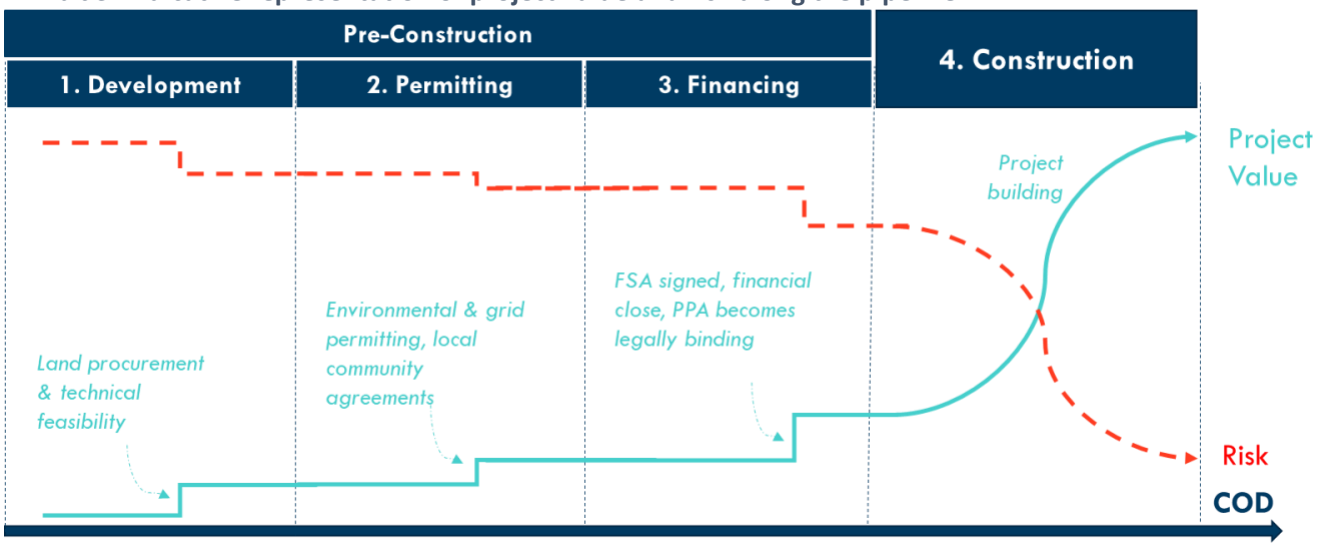
buyer and seller of the coal PPA, in case the parties have significant challenges in purchasing or supplying power (also known as counterparty risk), and the contract has to be terminated earlier than expected. The fee amounts are often substantial and could include compensations equaling the value of the entire coal plant, or all its future revenues, or of its outstanding repayment obligations.

- **COAL FUEL PRICE COMPONENT:** As fuel costs are a significant component of the total cost of coal power, and because coal prices can undergo major fluctuations in global markets (i.e., fuel price risk), the terms of this PPA component are consequential. Often, the value of this component may be structured to shift and track market trends in coal fuel prices, thereby shifting fuel price risk onto the offtaker.

How are coal PPAs developed?

Thus far, this brief has detailed how coal PPAs are structured and who they affect. However, it is also important to understand how they are developed, and to that end, we have broken down PPAs in the pipeline as belonging to one of four phases (see Exhibit 3 below).

Exhibit 3: Indicative representation of project value and risk along the pipeline.



Project value — the total value of the project's future revenues — gradually increases as a coal PPA moves along the pipeline, until it begins operating at its commercial operational date (COD) and becomes an operational PPA. This is because the likelihood of it realizing those future revenues increases the further along the development pipeline it is. Conversely, the further along the PPA is, the more resources (time, money, and labor) and wider set of stakeholders it has committed, lowering the inherent risk in the project, and making the coal project more challenging to decarbonize.

The four stages of the PPA pipeline are:

- **DEVELOPMENT:** At this stage the project has been awarded to the developer, either bilaterally or through competitive mechanisms like auctions. During this stage, the developer i) performs initial studies to procure the plant site and define the plant's technical capabilities, and ii) secures the land rights for the project are secured.
- **PERMITTING:** Local community agreements and environmental studies are the primary milestones of this phase. Permits to operate the plant are obtained, which mitigate risks associated with regulatory and political pushback.
- **FINANCING:** During this phase, key contracts are signed to grant the certainties required by lenders,

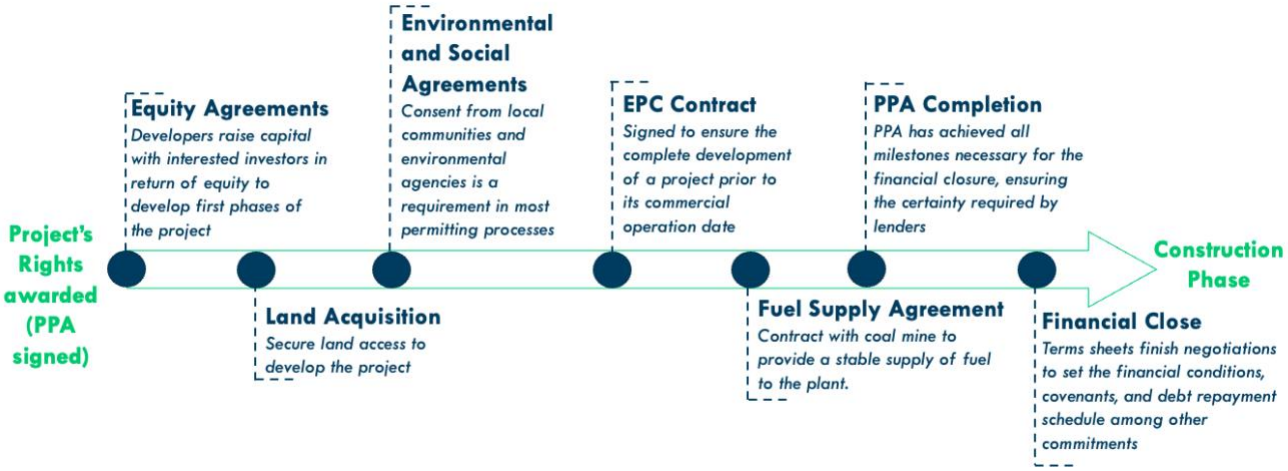
including — i) FSAs between the coal plant and coal mine and, ii) Contracts to undertake the construction of the power plant itself. After associated contracts are executed, all of the PPA's clauses become legally binding and the project is said to have reached "financial close" (i.e., the financing for the project has been secured and only its actual buildout remains).

- **CONSTRUCTION:** This phase is the most capital-intensive stage among the four, and by this stage, key financial, regulatory, and political risks have been mitigated.

What sub-agreements facilitate a coal PPA's execution?

Within the coal PPA contracting process, there are several smaller contracts that need to be negotiated and signed. These are related to different aspects of the power supply chain that, when combined, support the whole PPA. Exhibit 4 below lays out an illustrative timeline of the various contracts and the purposes they serve. One of the differentiators of coal PPAs versus other PPAs is that the former relies on FSAs.

Exhibit 4: General agreements and contracts signed along the coal PPA pipeline.



Engineering, procurement, and construction (EPC) contracts — which are a staple of most infrastructure projects — are key to the success of the construction phase, and thoughtfully procuring the right contractor can significantly reduce the risk of the project not being completed.

Given their importance to the energy transition, understanding coal PPAs is the first step toward decarbonizing them. In the coming weeks, RMI will be sharing a report that outlines how to decarbonize operating coal PPAs. It will examine, in detail, how that transition can be scaled in the country's power sector and across geographies.