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## The Single-Buyer Model

### A Dangerous Path toward Competitive Electricity Markets

**Many Asian, African, and Eastern European countries freeing up their electricity markets are preserving an artificial monopoly over the wholesale trading of electricity even after the vertically integrated national power company is unbundled. Evidence so far suggests that this “single-buyer” model has major disadvantages in developing countries: it invites corruption, weakens payment discipline, and imposes large contingent liabilities on the government. These disadvantages in most cases overshadow the higher short-term costs of a “bilateral contracts model” where generators contract with customers.**

#### Why so popular?

The single-buyer model first appeared in developing countries in the 1990s. To relieve capacity shortages while conserving scarce public resources, governments in several countries authorized private investors to construct power plants—independent power producers (IPPs)—to generate electricity and sell it to the national power company. IPPs sold their output through long-term power purchase agreements that included take-or-pay quotas or fixed capacity charges to protect investors from market risks. Some governments went further and split the national utility into generation, transmission, and distribution companies, intending ultimately to turn over generation and distribution facilities to the private sector. Most decided to keep strategically important transmission and dispatch facilities in state hands, however, and

awarded exclusive rights to the newly formed transmission and dispatch company—the single buyer—to purchase electricity from generators and sell it to distributors (figure 1).<sup>1</sup>

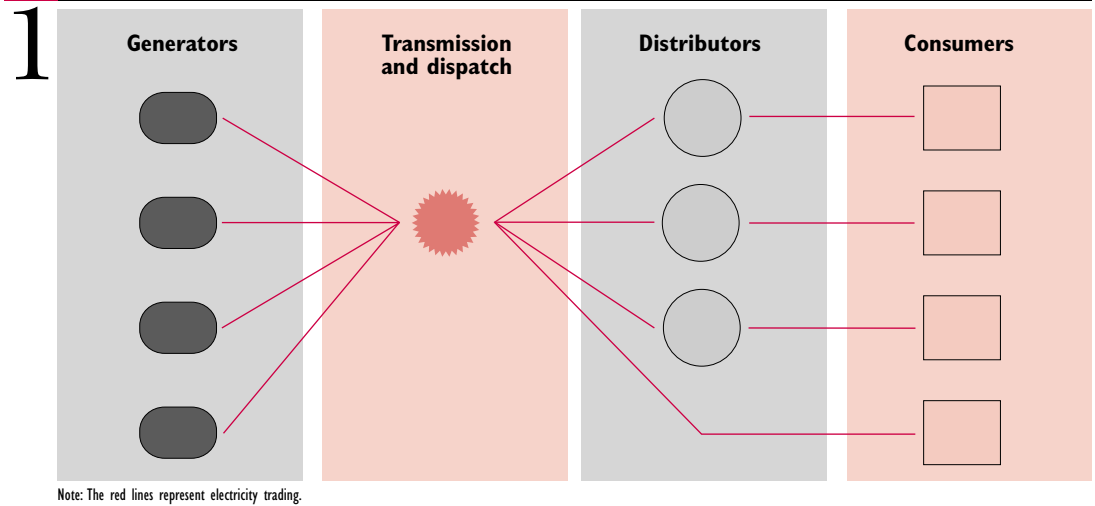
The legal separation of generation from transmission and distribution facilitates competition by allowing equal treatment of IPPs and the national utility's power plants. The simplest way to ensure equal treatment is to require all generators to sell their output to the transmission and dispatch entity, ruling out direct (bilateral) contracts with distributors, which may unfairly favor some plants over others.

The popularity of the single-buyer model is due to a number of technical, economic, and institutional factors:

- Electricity supply has to match demand second by second, requiring the balancing of differences between the planned and actual



Figure The single-buyer model for electricity trading



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output of individual generators and between the planned and actual loads of individual distributors. By giving the entity responsible for real-time dispatch the exclusive right to buy electricity from generators and sell it to distributors, the single-buyer model greatly facilitates this balancing.

- Network electricity flows follow the laws of physics with no regard for contractual arrangements—a major problem for market models with multiple buyers and sellers. The single-buyer model solves this problem without requiring a regime for third-party access to transmission, which can be costly and institutionally demanding to establish.
- The single-buyer model preserves a key role for the sector ministry in decisions on investments in generation capacity, and for the state-owned electricity company in the sector's day-to-day financial affairs—and thus tends to be favored by these influential players.
- The single-buyer model helps to maintain a unified wholesale electricity price, simplifying price regulation.
- The single-buyer model makes it possible to shield financiers of generation projects from market risk and retail-level regulatory risk, reducing financing costs or making the investment commercially bankable.
- The single-buyer model appeals to the populist instincts of politicians reluctant to support the state's complete withdrawal from wholesale electricity trading.

### What's the downside?

The single-buyer model can be seen as a transitional arrangement before the conditions for a competitive wholesale market are satisfied. But is it better to skip this stage by adopting a market model with multiple buyers immediately after unbundling? Evidence suggests that the answer is yes. The single-buyer model has major disadvantages, particularly in countries with weak or corrupt government and low payment discipline.

First, decisions about adding generation capacity are made by government officials who do not have to bear the financial consequences of their actions. In countries where investors found government assurances attractive (such as Hungary, Indonesia, Pakistan, and Thailand), there has been an upward bias in the generation capacity procured under both the single-buyer and the IPP models. The apparent reason: government officials found it difficult to resist powerful interest groups pushing for state-guaranteed capacity expansion.

Second, power purchase agreements create a contingent liability for the government, which is expected to step in if the state-owned transmission company (or, in the IPP model, the vertically integrated utility) is unable to honor its obligation to the generator. This expectation is often formalized in a guarantee agreement. Unless managed carefully, these implicit or explicit contingent liabilities can undermine the government's creditworthiness and, ultimately, macroeconomic stability. The cash-

based budgeting typically used in developing countries hides the fiscal exposure associated with guarantees, creating perverse incentives that distort the government's decisionmaking.

Third, the single-buyer model responds poorly when electricity demand falls short of projections (such as in a macroeconomic crisis). Ideally, electricity prices would fall, stimulating demand, and revenue losses would be allocated to private financiers, best equipped to manage market risks. Under the single-buyer model, however, wholesale electricity prices rise because take-or-pay quotas (or fixed capacity charges) must be spread over a shrinking volume of electricity purchases. When these high prices cannot be passed on to final consumers, taxpayers must bear the losses.

Fourth, the single-buyer model hampers the development of cross-border electricity trade by leaving it to the single buyer, a state-owned company without a strong profit motive. This can become a major disadvantage when neighboring countries adopt a less restrictive market model.

Fifth, the single-buyer model weakens the incentives for distributors to collect payments from customers. The state-owned single buyer is often reluctant to take politically unpopular action against a delinquent distributor, and its aggregation of cash proceeds from distributors allows it to spread the shortfall caused by a poorly performing distributor among all generators. When distributors see that paying and nonpaying distributors are treated alike, their motivation for cutting off nonpaying customers weakens.

Sixth, the single-buyer model makes it so easy for governments to intervene in the dispatch of generators and the allocation of cash proceeds among them that few are able to resist the temptation. In Poland and Ukraine, for example, pressure groups formed by coal miners have obtained special treatment for coal-fired power plants. In countries with high-level corruption an equally important concern is the temptation to divert cash to illegal purposes, such as funding political campaigns.

Finally, the single-buyer model increases the likelihood that, under pressure from vested interests, governments will indefinitely delay the next step toward fully liberalized electricity markets.

Some of these disadvantages disappear under a *mandatory competitive pool*, the most advanced form of the single-buyer model. The private sector makes decisions about new generation capacity, and the pool agreement and market rules replace power purchase agreements. Generators are not shielded from market risks by government guarantees, and wholesale prices respond quickly to changes in demand and supply. And it is relatively easy to allow generators and distributors in neighboring countries to sell into and purchase from the pool. But in many developing countries the electricity system may be too small for a pool to function competitively. Moreover, the lack of direct contracts between generators and distributors still undermines payment discipline,<sup>2</sup> and the temptation for governments to intervene in dispatch and cash allocation remains as strong as under the basic single-buyer model. The Ukraine experience with a mandatory pool—with the government intervening arbitrarily in the allocation of cash proceeds and generators unable to stop supplying electricity to delinquent distribution companies—shows that these disadvantages can have severe consequences.

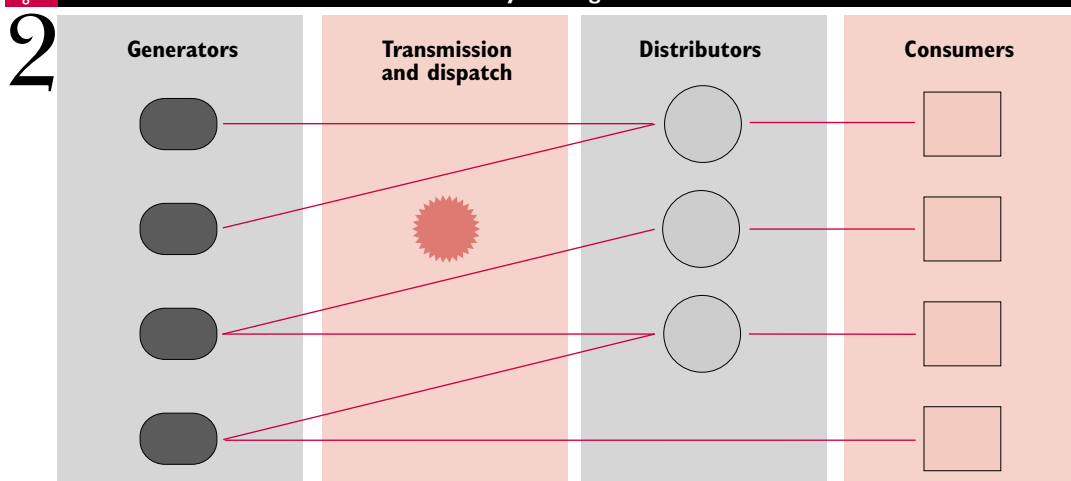
### Is there a better way?

Allowing generators to sell electricity directly to distributors and large consumers eliminates most of the disadvantages of the single-buyer model (figure 2). Generators that fail to get paid by their contractual partners can reduce their output and look for more reliable buyers. The ability of the government to intervene in the payment chain from consumers to generators is greatly diminished. Decisions about constructing new capacity—and the associated market risk—can be left to private investors.<sup>3</sup>

But this bilateral contracts model also poses difficult challenges that must be tackled up front:

- The electricity production and consumption of sellers and buyers seldom match the contracted amounts. A *balancing mechanism* needs to be created that the system operator can rely on to maintain equilibrium in real time.<sup>4</sup>
- Unless market participants receive the correct signals and incentives relating to the externalities created by their power flows, even a well-informed system operator will be

Figure 2 The bilateral contracts model for electricity trading



Note: The red lines represent electricity trading. The transmission and dispatch entity may have contracts with market players, but these are not for the trading of electricity. An example is a contract with generators for ancillary services (such as frequency control, spinning reserve, and cold reserve).

## viewpoint

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unable to implement the agreed transactions. This requires development of a *transmission access and pricing regime* that reflects capacity constraints and loss factors in the high-voltage network.

- Even with state-of-the-art technology and signaling mechanisms, parties entering into bilateral contracts sometimes forgo trades beneficial to the system. And in most developing countries, given their institutional and technical constraints, direct contracting between generators and distributors is likely to often lead to *suboptimal dispatch schedules*, particularly just after the new market model is introduced.
- The lack of a unified wholesale market price means that the electricity price for small consumers depends on the power purchase contracts signed by their distributors. To protect the interests of these consumers, the regulator needs to spell out *procurement rules* or other criteria that distributors must meet before they can pass through electricity purchase costs to captive consumers.

The short-term costs of developing solutions to these challenges are worth the investment, given the compelling long-term benefits of the bilateral contracts model: reduced likelihood of government interference, incentives to improve payment collection, market-driven decisions on new capacity, and better opportunities for cross-border electricity trade.

### Notes

1. In theory, transmission and dispatch can be separated from the wholesale electricity trading monopoly. In practice, developing countries opting for the single-buyer model kept these functions together to reduce transactions costs.

2. Generators and distributors may enter into “contracts for differences” to hedge the risks from volatile pool prices. But these contracts do not reduce payment risks.

3. Investors may still ask for government assurances on regulatory and market regimes, including the nature of government control over wholesale and retail prices and the rules of access to the transmission network. In contrast with the contingent liabilities from government-backed power purchase agreements, these partial risk guarantees limit the government’s exposure to risks fully under its control and leave the market risk with the private sector.

4. A net or residual pool may be an effective solution to the balancing problem in some countries. The option to trade outside the pool through “bilateral physical contracts” (as opposed to “contracts for differences”) differentiates this pool from the mandatory pool.

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