

The Efficiency Power Plant Model

能效电厂模式

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Presentation Topics

报告主题

- What is an Efficiency Power Plant (EPP)?
 - 什么是能效电厂(EPP)?
- Key components of an EPP
 - 能效电厂的关键组成部分
- Models of EPP Implementation
 - 实施能效电厂的模式
- Role of ESCOs in EPPs
 - 能源服务公司在能效电厂中的作用

What is an Efficiency Power Plant?

什么是能效电厂？

The EPP Concept

能效电厂的概念

- An EPP is a carefully selected portfolio of energy efficiency projects that provides a specified quantity of load reduction over a particular time period, with a level of reliability similar to the output from a conventional power plant
 - This portfolio approach enables cost comparison with conventional electricity generation
 - The cost comparison allows energy efficiency resources to be integrated into power sector planning and financing
- 能效电厂 (efficiency power plant, 简称EPP) 是一系列精心挑选的能效项目组合, 通过实施能够在特定时间段减少一定量的负荷, 其可靠性和传统电厂类似, 以达到替代传统电厂的效果。
 - 通过节能项目组合途径, 我们可以比较能效电厂与传统发电的成本。
 - 成本比较使得能效资源能够被纳入电力行业的规划与融资。

Indicative Costs of an EPP

能效电厂的成本

- Preliminary analysis shows the average cost of an EPP in China is about 15 fen/kWh
 - This compares very favorably with the cost of new power supply which is about 40 fen/kWh
- 前期分析表明, 中国的能效电厂平均成本是**15**分/千瓦时
 - 与新电厂的**40**分/千瓦时相比, 能效电厂的成本是很有优势的

Key Components of an EPP

能效电厂的关键组成部分

EPP Components

能效电厂的组成部分

- A lead entity
 - 主导实体
- A source of funding
 - 资金来源
- Program delivery
 - 项目实施
- Performance measurement
 - 效果计量
- Loan repayment
 - 贷款偿还
- Government oversight
 - 政府监管

Lead Entity

主导实体

- The lead entity is a single, competent credit-worthy organisation, which may be a utility, a government agency, a “Super ESCO”, or other body that is responsible for identifying and evaluating energy efficiency options
 - The lead entity selects energy efficiency options and aggregates them into a single EPP of substantial size (on the order of 300 MW)
- 主导实体必须是单一、能力强、值得信赖的机构。可以是电网企业、政府机构、能源服务公司，也可以是其它有能力筛选和评估能效项目的机构。
 - 主导实体选择能效项目，并把它们合成为有一定规模的能效电厂（比如说大约300MW）。

Source of Funding

资金来源

- Investment capital to fund the energy efficiency programs is identified, and loans or other capital funding resources are obtained by the lead entity
 - 确保主导实体拥有投资能效项目的资金, 获得贷款或其他方面的资金

Program Delivery

项目实施

- The lead entity oversees the design and delivery of energy efficiency programs and manages the financial aspects of the EPP
 - 主导实体监督能效项目的设计与实施，并管理能效电厂的财务。
 - 在主导实体监督下，能效项目由能源服务公司，消费者，承包商以及其他相关方共同实施。
- The energy efficiency programs are delivered by a mix of ESCOs, customers, contractors, and others under the supervision of the lead entity

Performance Measurement

效果计量

- Actual energy savings performance is measured and verified by one or more responsible government agencies
 - 由一个或者多个政府机构来计量并验证实际产生的节能量。

Loan Repayment

贷款偿还

- The loan or other funding source is repaid by the lead entity over the life of the energy efficiency investment
 - 在能效项目投资生命周期中，由主导实体归还贷款或其他投资资金。

Government Oversight

政府监管

- The entire EPP process from beginning to end is subject to government oversight and approval
 - 能效电厂从开始到结束的所有流程都需要政府的监管和审批。

Models of EPP Implementation

能效电厂实施模式

Four Implementation Models

四种实施模式

- RAP has identified four basic models for implementing EPPs:
 - Model 1: Integration with power sector reform
 - Model 2: System benefit charge
 - Model 3: Government funding
 - Model 4: Funding by participating consumers
- RAP找出了四种基本的能效电厂实施模式:
 - 模式1: 作为电力行业改革的一部分
 - 模式2: 系统收益费
 - 模式3: 政府提供资金
 - 模式4: 由参与的用户投资

Model 1: Integration with Power Sector Reform

模式1：作为电力行业改革的一部分

- Grid companies are given the obligation to meet customer needs using the least-cost mix of conventional power plants (CPPs) and EPPs
 - Because EPPs are much less expensive than CPPs, this model results in substantially increased use of EPPs
 - Electricity pricing is reformed so the costs of both CPPs and EPPs are included in prices
 - This enables utilities to recover the costs of both CPPs and EPPs on an equal basis
- 电网公司有义务，利用最低成本的传统电厂与能效电厂的组合来满足消费者需求。
 - 因为能效电厂比传统电厂便宜许多，此模式将极大地增加能效电厂的运用。
 - 对定价进行改革，在电价中同时包括传统电厂与能效电厂的成本。
 - 如此一来，电网企业就可以平等对待传统电厂与能效电厂，回收两者的成本。

Model 2: System Benefit Charge

模式2：系统收益费

- EPP costs are recovered as a separate small uniform charge on all kilowatt-hour sales
- The grid company role is limited to collecting the funds needed to repay the EPP financing
 - 对所销售的所有电量单独收取不高且统一的费用，以此回收能效电厂成本。
 - 电网公司的角色仅限于收取资金，偿还能效电厂的融资。

Model 3: Government Funding

模式3:政府提供资金

- The government directly provides financing for the EPP energy efficiency programs
- Government funding can be sourced from existing revenue sources or from new taxes designed to encourage energy efficiency, such as energy or pollution taxes
 - 政府直接为能效电厂的能效项目提供资金
 - 政府资金的来源可以是现有的收入来源,也可以设置新的税种来鼓励提高能效,比如说能源税或污染税。

Model 4: Funding by Participating Consumers (1)

模式4：由参与用户投资 (1)

- Individual electricity customers (or ESCOs) propose energy efficiency projects
 - The lead entity assesses the projects for technical, economic, and financial viability
 - The projects that pass the assessment process are aggregated into an EPP, and loans for individual projects are approved
 - The project proposers (electricity customers or ESCOs) are responsible for repaying the loans
- 个体电力用户(或能源服务公司)建议能效项目。
 - 主导实体评估该项目的技术、经济、财务可行性。
 - 项目通过评估之后,就累积在一起构成能效电厂,单个项目的贷款获得批准。
 - 项目提出者(即电力用户或能源服务公司)负责偿还贷款。

Model 4: Funding by Participating Consumers (2)

模式4：由参与用户投资 (2)

- In our preferred version of Model 4, individual loans are made to the participants but, for purposes of risk management and loan repayment, the participants are treated as a group
 - Loan repayment is structured as an “Energy Saving Fee” (ESF) equal to the average cost per kilowatt-hour saved for the aggregated EPP
 - Each participant pays the same ESF for the kilowatt-hour savings estimated for its particular project
- 在模式4的改良版中，贷款可以发放给参与者，但是为便于风险管理与还贷，参与者被当做一个整体。
 - 以收取“节能费”的形式来归还贷款，节能费相当于能效电厂每节省一千瓦时电所需要的平均成本。
 - 每个参与者都为这个项目所节约的电量付出相等的节能费。

Role of ESCOs in EPPs

能源服务公司在能效电厂中扮演的角色

How EPPs Support ESCOs (1)

能效电厂如何支持能源服务公司（1）

- The bundling approach of the EPP model supports the development and operations of ESCOs in five ways:
 1. EPPs increase the general awareness of energy efficiency and in so doing support the expansion of current ESCO undertakings
 2. EPPs aggregate a large number of energy efficiency options making large-scale, low-cost external financing possible and reducing administrative and transaction costs
- 能效电厂模式的一揽子措施通过以下五个方面支持能源服务公司的发展与运营
 1. 能效电厂增强了公众的能效意识, 从而扩大了能源服务公司的影响。
 2. 能效电厂汇集了大量的能效措施, 这使得能源服务公司的大规模、低成本外部融资成为可能, 同时减少了它们的行政与交易成本。

How EPPs Support ESCOs (2)

能效电厂如何支持能源服务公司 (2)

3. EPPs shift the focus of lenders from the technical, economic, and credit worthiness of individual consumers to the credit worthiness of the lead entity and the aggregated group of projects
 4. Several aspects of EPPs, especially the Energy Saving Fee and utility on-bill collection, reduce transaction costs and collection risk
 5. Some marketing and customer acquisition activities may be undertaken by the lead entity rather than by ESCOs
3. 能效电厂转移了放款人关注的焦点, 使关注焦点从对个体消费者的技术、经济和可信度转移到主导实体和项目组合的可信度。
 4. 能效电厂的若干方面, 比如节能费和电网企业票据托收, 减少了能源服务公司交易成本和收费风险。
 5. 部分的营销工作和争取客户工作可以由主导实体代劳, 而不需要能源服务公司来做。

ESCO Roles in an EPP

能效电厂中能源服务公司的角色

- There are two possible roles for ESCOs in an EPP:
 1. ESCOs can be part of the way EPPs are delivered, acting essentially as delivery contractors
 2. EPPs can provide enhanced roles for ESCOs, eg working with the lead entity to identify and assess energy efficiency projects
- 能源服务公司在能效电厂中可能扮演的角色有两种
 1. 能源服务公司可以作为合同商来实施能效电厂，完成一部分节能量。
 2. 能源电厂可以赋予能源服务公司更重要的功能—例如协同主导实体筛选与评估能效项目。

About RAP

The Regulatory Assistance Project (RAP) is a global, non-profit team of experts that focuses on the long-term economic and environmental sustainability of the power and natural gas sectors. RAP has deep expertise in regulatory and market policies that:

- Promote economic efficiency
- Protect the environment
- Ensure system reliability
- Allocate system benefits fairly among all consumers

Learn more about RAP at www.raonline.org

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