CAPACITY BUILDING OF CEYLON ELECTRICITY BOARD AS A WIND PARK DEVELOPER FOR PRIVATE SECTOR INVOLVEMENT IN WIND POWER GENERATION

A. Introduction

1. The power subsector is critical to the efficient development of the Sri Lankan economy. As with many countries, the power subsector in Sri Lanka is facing challenges in transitioning to a low-carbon future at a time of limited availability of public funds. To mobilize the required capital, the Government of Sri Lanka (the government) is promoting participation of the private sector in developing renewable energy generation.

2. Since wind power generation projects are expected to play an important role in meeting the government's renewable energy targets, the private sector is being invited to participate in developing wind power generation in Sri Lanka.

3. Investigations and studies have confirmed the existence of significant wind energy potential, such as the wind resource study report prepared by the National Renewable Energy Laboratory.[1] This study did not consider practical social and environmental constraints, nor the feasibility of exporting power to the national grid. Nevertheless, it estimated the wind power potential in Sri Lanka as approximately 24,000 megawatts (MW), distributed across an area of approximately 4,850 square kilometres (km^2) of land and lagoons (Table 1).

Table 1: NREL estimate of the Wind Potential in Sri Lanka (Classes 4 and above)

Wind Resource Utility Scale	Wind Class	Wind Potential at 50m W/m^2	Wind Speed at 50m m/s	Land area km^2	Lagoon Area km^2	Total Area km^2	Total Installed Capacity MW
Good	4	400-500	7.0-7.5	2341	664	3005	15,000
Excellent	5	500-600	7.5-8.0	788	41	829	4,150
Excellent	6	600-800	8.0-8.8	517	0	517	2,600
Excellent	7	>800	>8.8	501	0	501	2,500
Total				**4147**	**705**	**4852**	**24,250**

km^2 = square kilometers, m/s = meter per second, MW = megawatt, NREL = National Renewable Energy Laboratory, W/m^2 = watt per square meter.

4. There are numerous factors that constrain the harnessing of available wind power potential. Land related issues are critical, and often require extensive consideration of socio-economic and environmental consequences. Therefore, public sector facilitation of the necessary infrastructure and approvals, especially by the state-owned electricity utility, Ceylon Electricity Board (CEB), will catalyse private investments. As such, some form of a public-private partnership (PPP) is envisaged.

5. Establishing benchmarks for wind power development and streamlining the procurement of private investments is required to ensure the outcomes are favourable to the nation and fair to participants. With the assistance of its development partners, including the Asian Development Bank (ADB), the government is installing a framework to achieve these outcomes. Development of the 100 MW wind farm in Mannar Island as a CEB investment is the first step taken by CEB in establishing benchmarks. Apart from project investment, the private sector involvement has been broadened by developing the project on a turnkey basis, where up-front technical and commercial risks are substantially transferred to the private sector.

[1] A comprehensive study of the wind power potential in Sri Lanka was undertaken by the National Renewable Energy Laboratory of the United States Department of Energy in 2003 under a contract to the United States Agency for International Development.

6. In view of subsequent private sector investments to follow, priority is given to setting up procurement processes and procedures that encourage optimal project selection and competitive award of concessions. Hand-in-hand with the strengthening of the procurement framework is the need to develop the capacity of staff to ensure effective application and enforcement of the procedures. In recognition of this need, a program of capacity building was included within the scope of work of ADB TA 9085-SRI: Wind Power Generation Project.[2]

B. Objectives

7. The goal of the capacity building program was to give CEB staff the multi-disciplinary skills they need to undertake the implementation of wind power projects from identification and scoping through to operation and transfer. This includes:

(i) Selecting and preparing candidate wind power projects for the market;
(ii) Processing wind power concessions using systematic and transparent procurement procedures; and
(iii) Administering and regulating the implementation of the projects, ensuring that the obligations of all parties to the wind power transactions are properly discharged.

8. The aim of the training is to instil in the CEB team the legal, financial and technical expertise to negotiate arrangements that will minimize the project risks retained by government and its agencies and secure power purchase terms that maintain power system stability and keep electricity costs as low as possible.

C. Need for Private Sector Involvement in Wind Power Development

9. The rationale for encouraging private financing of public infrastructure generally includes the following:

(i) Development of infrastructure is constrained by the limited availability of capital. Accessing private capital markets for public infrastructure eases this problem;
(ii) Management expertise and efficiency is enhanced by the involvement of private companies through the injection of a commercial focus, application of financial rigour, and exposure to modern international practices;
(iii) Competition in the provision of infrastructure services puts downward pressure on prices;
(iv) Private sector involvement is also said to hasten reforms through the adoption of new ideas, technologies and innovations; and
(v) Private participation in infrastructure promotes greater responsiveness to consumers.

10. While the extent to which these objectives have been met can be debated, it is self-evident that many projects would not have been implemented, were it not for private investment, simply because of the scarcity of public funds.

11. Investors find some infrastructure sectors are more appealing than others. Arguably, the provision of electricity hold greater appeal because of the commercial features of the industries. Power generation projects can be packaged with risk or reward characteristics that appeal to the market. Particularly, wind and solar projects lend themselves to private participation due to the size, low risk and long-term nature of the investments.

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[2] ADB. 2016. *Technical Assistance to the Democratic Socialist Republic of Sri Lanka for Preparing the Wind Power Generation Project*. Manila (TA 9085-SRI), approved on 18 March 2016 for $2,000,000 to be financed on a grant basis by the Clean Energy Fund (financing partners: the governments of Australia, Norway, Spain, Sweden, and the United Kingdom) under the Clean Energy Financing Partnership Facility and to be administered by ADB.

12. This cannot be said of public infrastructure for other sectors such as education, health, law and justice, defence, etc. To free-up public resources for these less attractive services, the wind and solar projects should be offered to investors wherever public and private interests can be reconciled.

D. Legal, Regulatory and Institutional Framework

13. PPP projects generally stand to benefit both the public and private parties to a transaction, but their development is more likely to result in a fair distribution of benefits and risks if a clear legal and regulatory framework exists to direct and control project formation and implementation.

14. The Procurement Guidelines, 2006 and the accompanying manual issued by the National Procurement Agency of Sri Lanka set out procedures to be followed in public procurement. However, these documents were drafted principally with Goods and Works contracts in mind and modifications are needed to adapt them to the requirements of PPP procurement. Nonetheless, the principles of competition, transparency, efficiency and equal opportunity that underpin these guidelines should be to the extent practicable also apply to models for awarding PPP contracts.

15. PPP policy in Sri Lanka is evolving and an effective enabling environment is still in its early stages of development. Procurement of PPPs are currently governed by the *Guidelines on Private Sector Infrastructure Projects (Build-Own- Operate, Build-Operate-Transfer, and Build-Own-Operate-Transfer Projects)*, Part II, 1998, the *Guidelines on Government Tender Procedure* (revised in 1997) and various circulars and guidelines. Consequently, transactions for privately-financed power projects tend to be formed by negotiation of project-specific agreements. A bidding process may precede negotiations but outcomes are largely determined in the negotiation phase. This only emphasizes the necessity for CEB staff to possess the skills to properly prepare wind power projects before offering them to the market, and to be able to evaluate developers' proposals and negotiate balanced agreements.

16. The capacity building program will also equip CEB staff to play a part in the continual improvement of the PPP enabling environment. As the legal, regulatory and institutional framework develops and evolves, clarity and certainty in the implementing procedures will improve, giving CEB and other government agencies a firmer foundation on which to base their procurement activities. It will also provide developers of wind power projects with assurances that their interests are protected, resulting in lower tariffs.

17. Institutional developments have been made to support the implementation of the PPP guidelines and encourage PPP activity. Although the impact of centralized institutions has been minimal, units established within some line ministries and departments, including CEB, have successfully promoted a number of PPP projects. Institutional arrangements for the promotion of private wind power projects will also be considered in the capacity building program.

E. Different Business Models for Private Sector Involvement in Wind Power Development and the Roadmap

18. Three main business models can be considered for adoption to get private sector investments in wind power development:

(i) Conventional PPP where the project is developed by a joint venture between a public organisation and a private sector company. Both parties provide project equity and bear commercial risks throughout the duration of the project;
(ii) Project or the initial part of it (including land acquisition, permits, environmental approvals, common infrastructure, etc.) developed by the public sector (such

as CEB) and thereafter transferred to a private sector company selected through a bidding process; and

(iii) Full scale private development model under which the project will be owned and operated by private entities. The developer generally assumes all the development responsibilities including permits and approvals.

19. However, a combination of options (ii) and (iii) is proposed as a strategy to encourage private investments due to reduced development risks and consequently have a beneficial tariff impact.

20. It is proposed for CEB to develop a project pipeline for wind power in compliance with the long-term generation expansion plan and studies done to assess the wind power integration capacity of the network. The steps involved in developing the pipeline are:

(i) Carrying out wind resource and land use surveys of identified areas with high wind potential. Currently the Mannar and Jaffna districts are earmarked for immediate development due to the favourable wind resource;
(ii) Consultation with other agencies and nongovernment organizations (NGOs) to identify conflicting interests such as environmental sensitivities, other economic uses, social issues, etc.; and
(iii) Prepare a plan for wind power development, identifying the specific areas and the timeline. Along with the plan, a common development policy shall be published and practiced creating investor confidence in the system and preparing them for a streamlined process.

21. The following upstream activities can also be undertaken by CEB consequent to the experience gained and the capacity built in developing the 100 MW wind power project in Mannar:

(i) Securing energy resource permits;
(ii) Land acquisition;
(iii) Resource, environmental, and social studies;
(iv) Obtaining basic consents and clearances;
(v) Creation of access infrastructure such as roads and jetties; and
(vi) Identification and development of transmission infrastructure such as high voltage transmission lines, collector substations, control centres, ancillary services including reactors and spinning reserve.

22. With the preparation of the wind power development plan and performing some of the above listed upstream development activities, CEB can initiate the procurement process for prioritised projects under build-own-operate (BOO) development model, which has historically attracted sufficient competition among the private sector resulting in the desired economic efficiency of the process.

F. Procurement Options

23. Utilities frequently use competitive solicitations or bilateral negotiation to facilitate the development of renewable energy projects. These procurement models are generally slow and involves high transaction costs. Other models can be used to overcome some of these problems.

24. Competitive solicitation: Competitive solicitations are structured to mobilize competition between project sponsors with the objective of obtaining least-cost tariff offers that comply with specified technical and system requirements. Competitive solicitations can be structured (i.e., defined location, capacity, technology, generation characteristics, etc.) or

unstructured (i.e., a general solicitation for capacity or energy, leaving the choice of location, size, technology, etc. to the developer).

25. Advantages of competitive solicitation can be identified as:

(i) If the implementation framework for privately financed wind power projects is mature and the solicitation is properly conducted with well-balanced project agreements and streamlined bidding procedures, a competitive solicitation should result in least-price tariff offers;
(ii) Under the competitive solicitation model, requests for proposal (RFPs) are written to implement utility planning processes. Projects are scoped and individually negotiated, with a high level of scrutiny and analysis being applied to each transaction. This results in an optimal augmentation of the system that is in harmony with the least cost generation expansion plan in terms of its timing, size, location and generation characteristics (peak or baseload, dispatchability, ancillary services, etc.). Furthermore, the individual attention given to each transaction ensures technical viability and bankability, thus reducing the incidence of a project failing to reach financial close or complying with power purchase agreement (PPA) terms.

26. Disadvantages of the competitive solicitation are:

(i) The process of prequalifying bidders, preparing RFPs, evaluating bids, negotiating PPAs and arranging finance can be a complex, time-consuming, costly and uncertain process for sponsors and power purchasers alike. The use of streamlined bidding procedures and model documents can reduce the effort and risk to some degree;
(ii) Transaction costs of competitive solicitations are high and must be recovered by sponsors. These costs will be built into the tariff offer and this may negate in part any price advantage gained through the competitive bidding process; and
(iii) The rigour and costs associated with the competitive solicitation approach may deter smaller, less-established sponsors. This suggests that competitive bidding is more likely to be advantageous for larger MW capacity solicitations, but less effective for small sites. The corollary is that smaller sponsors, NGOs and cooperative entities may be disadvantaged, and small, distributed wind generators will be overlooked because of their higher cost profiles.

27. For smaller renewable energy concessions, the use of a feed-in-tariff (FIT) has enjoyed success. In Sri Lanka, FITs were in operation until recently for wind, solar, hydro and biomass based power generation projects. Under this approach, the sponsor can enter into a non-negotiable long-term contract that generally offers grid access and take-or-pay terms at published energy prices.

28. FITs take a number of different forms. The determination of FITs requires extensive analysis by regulators. Under some FIT policies payments are set based on estimated generation costs of representative projects. Generally, FIT values are periodically reviewed and adjusted every one to four years.

29. Positive features of FITs can be listed as follows:

(i) The FIT approach provides a more streamlined path to a power purchase commitment. It provides sponsors with long-term purchase obligations, transparent prices, and standardized contracts. This reduces investment risk and transaction costs. This encourages wider participation and broader development;

(ii) The effort involved in administering a wind power development program is less under a FIT approach. Effort is involved in setting FIT rates and adjusting them periodically, but the use of a published tariff and non-negotiable standardized agreements reduces the processing time of each transaction. Sponsors also benefit from savings in time and effort;

(iii) The FIT approach can increase market access for a number of participants and encourage traditionally risk-averse investors to invest in wind power projects. By providing standard contract terms at defined payment levels, FITs can be seen as a way to attract a broader range of developers; and

(iv) In this context, a FIT approach improves market access for new entrants. It is well-suited to driving an ongoing program of development in small to mid-scale wind power projects. It provides a consistent and streamlined implementation framework which can encourage an expansion of the wind energy market.

30. The negative aspects of FITs are:

(i) FIT prices are usually set to attract offers up to a total MW capacity cap. The value of the FIT is therefore determined for the marginal project and is competitive for that project, but for all others it is not a least-cost price;

(ii) The FIT prices are set administratively and it can be challenging to adjust them to market fluctuations and keep prices relevant over time. This can lead to over-payment. This issue becomes more significant the larger the project;

(iii) FITs might promote projects that are sub-optimal from a power system perspective as they are not individually tailored to fit the power system expansion plan and do not provide the desired mix of generation capacity in the areas where generation is needed most.

31. Sri Lanka made use of renewable energy FITs to very good effect in achieving its renewable energy targets up to year 2015. However, with the realization of the prevalence of sufficient market competition for renewable energy development, it is now practiced as a policy to procure renewable energy only through competitive solicitation. A competitive bid for two 10 MW wind farms in Jaffna district attracted considerable interest both from the local and international investors, yielding a substantially low tariff for wind power compared with the FIT offered previously. The positive outcome of this competitive bidding process is likely to direct any future wind power solicitations also through competitive processes.

G. Capacity Building Workshop on Procurement of Private Sector Wind Power Projects

32. In addition to the support received during the designing of the overall bid process and preparation of bidding documents, CEB will be provided with support to develop their capacity to undertake competitive solicitation of wind power under the PPP development model, focusing on an independent power producer (IPP) BOO project structure. A workshop will be conducted for relevant divisions of CEB specifically covering the commercial aspects of PPP projects and the associated legal and contractual requirements. The need for additional capacity building arises due to the absence of pure IPP elements in the turnkey model used in the 100 MW Mannar Wind Power Generation Project.

33. The outline of the capacity building workshop schedule to be conducted for CEB under ADB's TA 9085-SRI: Wind Power Generation Project (footnote 2) is as follows. The program is structured to improve the knowledge and understanding of CEB staff in the preparation, selection and implementation of wind projects with private sector investments. It is also intended to provide an opportunity for the many unresolved issues involved in implementation of wind power projects to be discussed by participants.

34. The workshop is to extend over a three-day period and will include tutorial and discussion sessions to reinforce the material provided in the classroom sessions. Proposed modules are outlined below.

(i) PPP Models

a) Models for involving the private sector in wind power projects (e.g., service contracts, management contracts, leases, build-operate-transfer, build-own-operate-transfer, BOO, concessions); and
b) Phases of the PPP project cycle: identification, selection, feasibility study, procurement, construction, operation and, as applicable, transfer.

(ii) PPP Enabling Environment in Sri Lanka

a) PPP policy in Sri Lanka;
b) Legal and regulatory framework;
c) Institutional functions and responsible agencies; and
d) Institutional structuring options – centralized and decentralized models.

(iii) PPP Procurement Procedures

a) Procurement principles: Government Procurement Manual, procedures of the multilateral development banks, United Nation Commission for Trade Law (UNCITRAL) Model Law and Guidance on Public Procurement (2011), Organization for Economic Co-operation and Development Procurement Regulations; and
b) Adaptation of PPP procurement principles for wind power projects.

(iv) Identification and Preparation of Bankable Wind Power Projects

a) Wind power project pipeline – project identification and selection criteria;
b) Resource investigations and wind measurements;
c) Pre-feasibility and feasibility studies: demand forecast, consistency with CEB generation expansion plan, optimal sizing of a wind farm, interconnection studies, economic and financial evaluation, and levelized cost of energy;
d) Environmental and social impact analyses;
e) Infrastructure and power grid development; and
f) Project permits, licences and consents.

(v) PPP Risk Identification and Analysis

a) Risk analysis matrices;
b) Risk-adjusted public sector cost estimates; and
c) Allocation of risks between the parties.

(vi) Financing of PPP Wind Power Projects

a) Financing options for PPP wind power projects;
b) Limited-recourse project finance;
c) Typical financing plan – bankability requirements, constraints to project financing and strategies to overcome them;
d) Debt instruments; and
e) Credit enhancement options, project development funds and viability gap funding.

(vii) The Financial Model

a) Description and role of the financial model;
b) Input and summary sheets;
c) Funding sheet;
d) Profit and loss sheet, balance sheet and cash flow sheet;
e) Calculation of performance ratios; and
f) Reserve accounts and payment waterfall.

(viii) Procurement for PPP Wind Power Projects

a) PPP tendering – comparison with traditional public procurement;
b) PPP procurement procedures: single stage and two-stage, one and two envelopes, best and final offer;
c) Prequalification of developers for wind power projects;
d) Requests for proposals;

e) Information disclosure to bidders;
f) Evaluation of proposals – evaluation criteria, marking systems and reference wind conditions;
g) Contract negotiations and contract award; and
h) Lender due diligence process and financial close.

(ix) Project Agreements

a) Concession terms and agreements;
b) Power purchase agreements for wind projects;
c) Land usage rights;
d) Security documents; and
e) Engineering, procurement and construction contracts.

(x) Performance Monitoring during Construction and Operation

a) Project performance monitoring during construction and operational phases;
b) Project management units – project monitoring and contract administration;
c) Refinancing – financial restructuring of PPP projects; and
d) Dispute resolution under PPP project agreements.

35. Workshops are also planned to build the capacity of CEB engineers through specialized training in wind farm design software used in the feasibility studies of prospective sites, wind energy fundamentals, and wind farm operations and maintenance. These courses will be provided through internationally accredited training bodies.

H. Preparation of Master Bidding Documents and Draft Contract Agreements

36. In the process of developing the bid documents for the 100 MW Mannar Wind Power Generation Project, the technical requirements and the desired features of wind farms connected to the Sri Lankan power system have been identified and documented. As a turnkey project, the performance requirements of sub-systems were also included. However, future private sector engagements on the PPP basis, most likely as IPP BOO projects, can be treated with more flexibility on technical performance; hence less detail in the bidding documents.

37. Relevant technical sections of the developed bidding documents can be used as master documents in the procurement of future private sector wind projects along with the contract agreements appropriately specifying the commercial aspects of the adopted PPP projects.

38. Currently, due to regulatory requirements, CEB is considering PPP projects, which clearly decouple CEB responsibilities from those of the overall project, aligning the business model more towards an IPP. Thus, the design, development and procurement of future projects have significant similarities with the previous private sector wind projects developed in Sri Lanka.

Taking into consideration the existing contract agreements used by CEB to procure renewable energy from the private sector and the need for wind power specific agreements covering salient issues, such as variability of the resource, a power purchase agreement is drafted to allow CEB to use it in the future private sector wind projects. This draft agreement will also form part of the master bidding document in the procurement of PPP projects as detailed above.