STRATEGY PAPER
FOR IMPROVED TARGETING OF AGRICULTURE POWER SUBSIDY

A. Introduction

1. The power sector in Punjab faces several challenges, which merit urgent attention to achieve commercial viability in operations:

(i) Poor financial health of Punjab State Power Corporation Limited (PSPCL) as reflected in the balance sheet, on account of sustained financial losses in the past due to high employee costs, regulatory disallowances on account of employee cost and distribution losses, and rising interest cost due to its debt burden.

(ii) A significantly high percentage of PSPCL's cost coverage is on account of subsidy from the Government of Punjab (GOP) as agricultural consumers continue to receive free (i.e. fully subsidized) power. The tariff-based subsidy is not sufficient to cover the entire cost of supply because every unit sold to agriculture sector adds to the financial losses of utility.

(iii) The requirement of energy for agriculture consumption during peak period increases the financial woes as supplying to agriculture during daytime contributes to demand curve peak and results in procurement of expensive peak hour power.

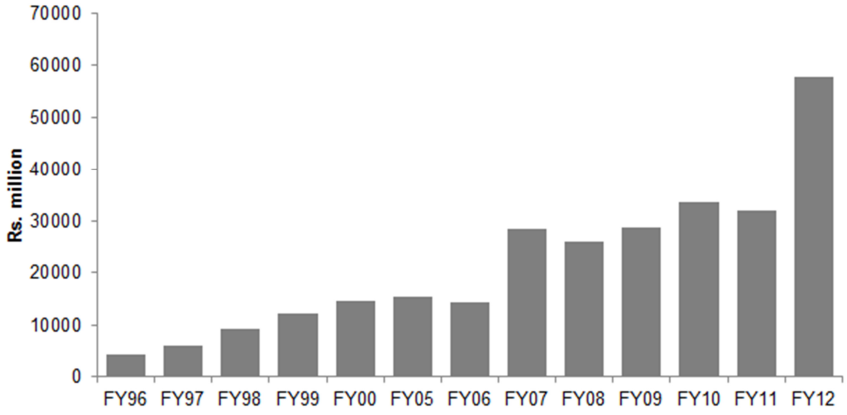
2. The above issues make it essential to have an in-depth look into the power subsidy support being extended by the state government to the various categories of consumer.

B. Power Sector Subsidy in Punjab

3. GOP provides revenue subsidies as tariff compensation to PSPCL for "price control" of retail tariffs levied on the subsidized category of agriculture and domestic consumers on account of their power consumption.

4. This subsidy given to the power sector has been increasing significantly and growing at a rate of 15%–20% per annum over the past 3–4 years (Figure 1).

Figure 1: Power Subsidy in Punjab
(Rs. million)



Source: Government of Punjab.

5. The current policy in place for providing subsidized power to the targeted category of consumers has been captured in the table below.

Subsidy target	Subsidy given on account of	Existing extent of subsidization
Agriculture consumers	Electricity consumed for operating tubewells for pumping ground water by farmers	Fully subsidized
	Meter rentals and service charges	
	Fuel cost adjustment charges levied by PSERC	
Scheduled caste domestic consumers (Load up to 1000W)	Electricity consumed by households	Partially subsidized—200 units/month/consumer
	Meter rentals and service charges	Fully subsidized
	Fuel cost adjustment charges levied by PSERC	Fully subsidized
Non-scheduled caste below poverty level domestic consumers (Load up to 1000W)	Electricity consumed by households	Partially subsidized—200 units/month/consumer
	Meter rentals and service charges	Fully subsidized
	Fuel cost adjustment charges levied by PSERC	Fully subsidized

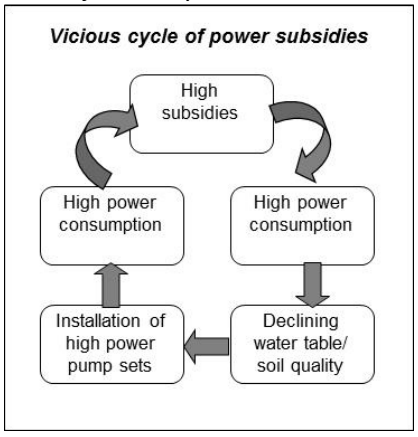
PSERC = Punjab State Electricity Regulatory Commission.
Source: Asian Development Bank.

6. In 2012–2013, the subsidy allocated for power consumption by agriculture consumers constituted approximately 87% of the total GOP power subsidy. With subsidy payouts by GOP increasing significantly and agriculture constituting the majority of the share, better targeting of power subsidy given to agriculture consumers becomes imperative.

C. Need for Improving Targeting of Agriculture Power Subsidy

7. The high levels of subsidy, especially to agriculture consumers which has always been 85%–90% of the total annual power subsidy, have had an adverse impact on the environment as well as on the state government's finances. Some of the major problems associated with the increasing power subsidy are:

(i) **Creating a vicious circle of agriculture subsidies.** Agricultural subsidies have been leading to wasteful and/or higher energy consumption, depletion of water tables, and the consequent need for more power to pump water from greater depths. This, in turn, leads to the installation of higher capacity pump sets, higher power consumption, and finally the requirement for increased subsidy to compensate for the increased consumption.



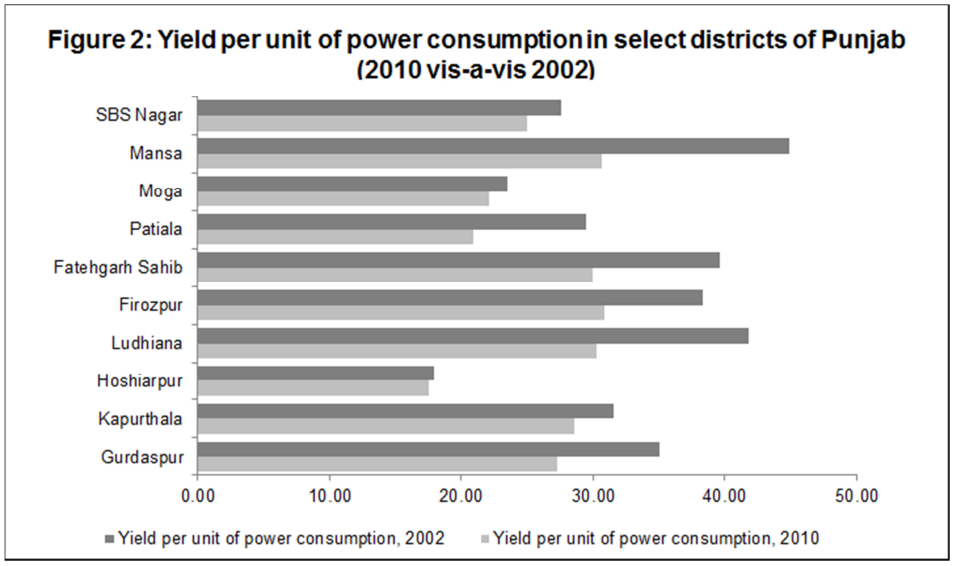
Source: Asian Development Bank.

(ii) **Depleting water table.** Increased pumping through tubewells has led to an average increase in the depth of water table in most of the districts over the past 10 years. Out of the 20 districts in the state, post-monsoon, the minimum depth of water table has increased in 15 districts and the maximum depth has increased in 14 districts.

Post-monsoon Water Table Depth (metres)	**2002**		**2012**	
Region	Min	Max	Min	Max
Northern	1.3	17.8	1.5	18.6
Central	5.8	13.8	4.5	34.4
Southern	10.3	24.9	20.8	24

Source: Government of Punjab.

(iii) **Agricultural yield and power consumption not related.** There has been an increase in the average per hectare power consumption (kwh/hectare) in 2010 as compared to 2002, but per hectare yield of food grains (kg/hectare) went down during the period across majority of districts. The primary issue with the current situation is that power required for irrigation is being given free and equally to all agriculture consumers without any targeting (Figure 2).



Note: Power consumption is in terms of Kwh/hectare, foodgrains yield is in kg/hectare.
Source: Government of Punjab.

D. Strategic Options for Improving Targeting of Power Subsidy for Agriculture Consumers

8. The objective of developing a strategy for improving targeting of power subsidy for agriculture is to define principles for rationalization and manage disbursement of annual power revenue subsidy provided to the utility on free power being provided to agriculture consumers.

9. The overriding principle underlying the strategic options is to contain and manage the revenue subsidies without any additional financial burden for existing levels of agricultural power consumption for the farmers. These principles are geared towards fostering conservation of energy and water.

E. Key Definitions

10. **Normative energy consumption (NEC).** The maximum quantum of energy allowed for a consumer category and/or class eligible for a specific revenue subsidy. It will be established on the basis of a detailed study of geographical region, rainfall, cropping patterns, irrigation requirements, water table depths, pump set sizes, etc.

11. **Normative supply hours (NSH).** Derived from the NEC, this indicates the maximum power supply allowed for a consumer category and/or class in hours, eligible for a specific revenue subsidy.

12. **Transition period (TP).** The time period given to agriculture consumers and the distribution utility for getting the tubewell connections metered.

13. **Zones.** Categorized on the basis of natural availability of ground water.

F. Assumptions

14. A petition for approval of this plan and any revision in the tariff categories and structure for agriculture consumers will be submitted to the Punjab State Electricity Regulatory Commission (PSERC) by PSPCL, and implemented subsequently only after its approval by the regulator.

15. NEC for agriculture consumers would be determined for the classified zones on the basis of the maximum energy required per brake horsepower (BHP) per month for irrigation in the particular zone.

16. The State of Punjab can be classified into separate agricultural zones with similar characteristics with respect to category of consumer, cropping pattern, water requirement, etc.

17. The NEC for zones with lower natural availability of water is assumed to be higher as compared to other zones.

18. The NSH for zones with lower natural availability of water is assumed to be higher as compared to other zones.

G. Strategic Options

1. Option I: Restricting power supply to agriculture consumers as per the NSH requirements of the zone

19. The challenges present in the implementation of Option I, for instance, the existing low levels of agriculture consumer metering, the large transition period required for achieving 100% consumer metering, levying a differential tariff on sub-categories of consumers, and issues associated with the monitoring of NEC of consumers, make the adoption of the policy challenging. A second option to overcome these challenges and which can be readily implemented may be explored.

20. In Option I, the state government will continue giving free power supply to farmers but only up to the extent required for irrigation in a particular region in terms of NSH on an average basis. The estimation of the NSH would, in essence, help cut-off any wasteful consumption of electricity as well as water.

21. Post the setting of the zone-wise NSH based on a study, supply restrictions can be

implemented on a group of consumers in the same zone. Zones with lower ground water pumping requirements can be given lesser power in terms of lesser number of supply hours as compared to dry zones with an average greater groundwater irrigation requirement. The deviation from the current practice of uniform free supply to all agriculture consumers is expected to help in a substantial reduction in the overall consumption of electricity by agriculture pump sets and, in turn, improve the targeting of subsidy in the state.

22. The NSH computed for all the zones would be determined on a monthly and a daily basis, factoring in the effect of seasonality. The important thing to note here is that no differentiation is to be made between metered and unmetered consumers under Option II.

23. **Benefits and challenges.** Although the plan has significant advantages, there are also a few challenges that need to be addressed for it to be successful as follows:

Benefits	Challenges
Fairly simple to implement, at present, as well some amount of differential power supply is practiced for some areas of the state.	Determination of normative energy consumption would pose a challenge as this would require a detailed study to be undertaken taking into consideration all associated factors like landholding, cropping patterns, etc. as the availability and integration of requisite data from various departments may pose huge challenge.
No disincentive offered to unmetered consumers and, therefore, this option might not face as much consumer resistance in Option II	In case of mixed cropping patterns (number of crops in a year and variety of crops used) and therefore varying water and energy requirements, an additional challenge may arise in the geographical categorization of zones.
In the event that the contribution of the Government of Punjab subsidy is reduced from 100% and a tariff is levied on consumers, the zones can act as a factor for setting differential tariff.	Owing to socio-political considerations, implementing different cut-off hours in different geographical areas becomes a challenge. The implementation veers to a uniform cut-off for the entire state at the higher cut-off limit.

Source: Asian Development Bank.

24. **Option I (a): Option I plus an added incentive to metered consumers for reducing consumption.** The principles for improving targeting of agriculture power subsidy remain the same as under Option I, except that the monthly actual consumption for metered agricultural consumers would be periodically grossed up and compared with the NEC. Metered consumers, with their total consumption below the NEC, may be given an incentive on account of the reduced consumption by these consumers. The incentive mechanism can again be designed in one of the following two ways:

(i) A cash subsidy can be given directly to the consumer equivalent to the amount of net units saved by him/her (after adjusting the charges on account of over consumption), or

(ii) The net units saved by the agriculture consumer can be adjusted against his/her domestic connection bill.

2. Option II: Free supply of power up to NEC and incentivizing metering

25. It is envisaged that by implementing demand side measures, managing and quantifying amount of free power to farmers in the state would help to contain wasteful consumption of electricity. The idea is to establish NEC for consumer categories and/or consumers on the basis of a detailed study of geographical terrain, rainfall, cropping patterns, irrigation requirements, water table depths, pump set sizes, etc.

26. The distribution utility of Punjab has separated the energy supply to agriculture and other rural consumers through feeder segregation. It now has control over energy supply to agriculture consumers. Metering at these feeders gives an estimate of agricultural consumption at an overall level but does not provide consumer level energy consumption information—metering being only 10% of the 1.1 million plus connections. It also has an effect on loss calculations at the distribution utility level.

27. The proposed measures to be undertaken in Option II are based on two principles as follows:

(i) **Principle 1: Establishing the NEC.** Determination of the NEC per BHP load of the tubewell pump set can be done through a detailed study based on the following possible parameters.

(a) **Categorization—geographical.** Based on the type of land categorized according to the natural availability of ground water (wet, dry, etc.). Agriculture consumers in zone(s) with relatively lower ground water level may be given greater relief on NEC, i.e. higher consumption per BHP load of the pump set may be allowed to such consumers.

(b) **Categorization—consumer.** The consumer can be categorized based on the pump set size (in horsepower). It is seen from various studies that the consumption factor varies with pump set size ratings. Agriculture consumers with lower rating motors may be allowed higher NEC.

A study by possibly Punjab Agricultural University (PAU) for a complete calendar year would help in arriving at the month-wise NEC.

(ii) **Principle 2: Incentivize metering.** All agriculture consumers across the classified zones shall be further categorized on the basis of status of metering of their connections. All unmetered consumers would be allowed to apply for getting themselves metered within a TP, say 2 years. Consumers who get themselves registered with the distribution utility for getting meters installed in their connections within the TP but are unable to get this done before the end of the period due to constraints at the distribution utility's end would continue to completely get free power until the distribution utility gets all such connections metered. Taking the above condition into consideration, the following tariff differentiation could be explored:

(a) **Metered consumers.** Free power up to NEC for all metered consumers. A suitable tariff for any consumption above the NEC would be applicable after the TP.

(b) **Unmetered consumers.** Post the transition period, say 2 years, all unmetered consumers would be levied a fixed rate per BHP per annum. They would be eligible for free power consumption up to NEC as and when they get metered.

28. For metered consumers, the NEC would be computed on the basis of monthly targets for NEC depending on the seasonal irrigation requirement. The agriculture consumers would be billed as per their billing cycles and consumers crossing their NEC for the billing cycle would be charged as per the approved tariffs for their category.

29. Post implementation of such a scheme, all agriculture consumers would be issued a bill containing details of the total amount due on account of electricity consumption for their connection either on a per unit basis for metered consumers,[1] or on a fixed rate basis for unmetered consumers.

30. **Benefits and challenges of implementation.** Although the plan has significant advantages, there are also a few challenges that need to be tackled with for Option I to be successful.

Benefits	Challenges
Accurate energy accounting would help optimize the subsidy given on the account of power sale to agriculture consumers.	Determination of normative energy consumption (NEC) would pose a challenge as this would require a detailed study to be undertaken taking into consideration all associated factors like landholding, cropping patterns, etc. as the availability and integration of requisite data from various departments may pose huge challenge.
Accurate estimation of transmission and distribution losses of the utility would help rationalize power purchase costs.	The metering of more than one million connections would require a significant amount of time on account of procurement and installation of meters. Therefore, sufficient transition period would be needed to be given to the consumers.
Metering of connections would also enable the state to curb any wasteful energy consumption by imposing restrictions as per the NEC for each consumer.	Introduction of even a minimal tariff on the existing free power supply may attract resistance from the farmers.
Metering of connections may bring in consumer participation in demand side management as, at the moment, the consumer is absolutely unaware of the quantum of energy consumed by him for operating tubewells.	Levying a penalty in the form of a fixed rate on unmetered connections may prove to be challenging.
The incentive given to metered consumers would invoke consumer participation for undertaking metering of individual connections.	The plan might result in possible misreporting of consumer information on account of normative energy requirement, actual consumption, conversion to metered connection, etc.
The differentiated tariff structure would provide relief to consumers with greater NEC and with weaker socioeconomic background.	A robust monitoring mechanism needs to be put in place in order to keep the misreporting of information in check.

Source: Asian Development Bank.

31. **Option II (a): Option II plus further incentives for consumption under NEC.** A variant of Option II can also be explored in which an added incentive is given to metered consumers on account of energy saved by them.

32. The principles for improving targeting of agriculture power subsidy remain the same as under Option I, except that the monthly actual consumption would be periodically grossed up and compared with the NEC. Metered consumers, with their total consumption below the NEC, may be given an added incentive on account of the reduced consumption by the consumers. The incentive mechanism can be designed in one of the following two ways:

(i) A cash subsidy can be given directly to the consumer equivalent to the amount of net units saved by him/her (after adjusting the charges on account of over consumption), or

[1] This will also enable the possibility of power trading across metered farmers in the future.

(ii) The net units saved by the agriculture consumer can be adjusted against his/her domestic connection bill.

H. Roadmap for Improving Targeting of Power Subsidy

33. **Awareness building.** Post-selection of one of the options, a public awareness and communication campaign must be undertaken by GOP. This is one of the most important aspects of the scheme as the consumer's buy-in is of utmost importance to the scheme's success. Any resistance from the consumer can easily be avoided if he/she is made fully aware of the benefits what the new scheme can offer him/her. This campaign is proposed to be undertaken in three rounds:

(i) **Round I.** The objective of the first round of the awareness campaign, to be undertaken at the inception stage of the plan, would be to sensitize farmers about the increasing subsidy burden of the state government and the adverse effect it has on the environment. This round of the campaign would primarily stress on spreading the importance of conserving water and energy, and, in essence, the importance of managing the state government subsidy through an improved targeting strategy. Any savings in subsidy made on this account would be ploughed back for the development of the state and status of socioeconomically weaker sections of the society. Various options for achieving this can be publicized, highlighting expected benefits to the consumer, the environment, and the state government.

(ii) **Round II.** Once the strategic option is selected, a second round of campaign must be carried out. This, however, should be done prior to filing the petition with PSERC. This round would emphasize on making the public aware of the specific benefits that they can reap from the proposed scheme (including the incentives being planned). It would highlight the fact that any measure being undertaken by the state government in this regard would not, in any case, adversely impact the agriculture production or net earning capacity of any farmer. This will prepare the consumers for the upcoming tariff order based on the selection through better information sharing.

(iii) **Round III.** The third round is proposed to be initiated once PSERC issues its order on the guidelines for rolling out the proposed option. This would be undertaken to educate farmers on the actual modalities of the approved scheme and the various routes through which they can benefit. This round would be done on a continued basis and after the completion of the first year of the scheme, and would showcase the actual benefits gained by farmers and the state. A feedback mechanism from the farmers should be introduced to incorporate any recommendations to improve the impact of the scheme and increase its acceptability to the consumer.

34. A proposed roadmap for rolling out the plan, including undertaking the public awareness campaign, for achieving an improved targeting of subsidy for agriculture consumers can be as mentioned below.

Activity No.	Proposed Activity	Proposed Timeframe for completing the activity
1	Approval of the strategy paper to improve targeting of power subsidy in Punjab	By August 2013
2	Design a public awareness and communication campaign targeted at sensitizing the agriculture consumers	By August 2013
3	Complete the first round of public awareness and	By March/April 2015

Activity No.	Proposed Activity	Proposed Timeframe for completing the activity
	communication campaign targeted at sensitizing the agriculture consumers	
4	Completion of field surveys and studies for determining normative energy consumption	By November 2015
5	Selecting and notifying one of the four available options for improving the targeting of power subsidy	By January/February 2016
6	Undertake the second round of the public awareness and communication campaign on the selected option	Before filing the tariff petition and during the hearing for ensuing year 2016–2017
7	File petition to Punjab State Electricity Regulatory Commission (PSERC) for implementation of the selected option	Along with the tariff petition for ensuing year 2016–2017
8	Based on PSERC order, issue guidelines and detailed plan for rolling out the proposed option	Post-PSERC order
9	Undertake the third round of the public awareness and communication campaign highlighting the benefits being achieved	On a continued basis

Source: Asian Development Bank.

OPTIONS AT A GLANCE

<table>
<tr><td colspan="2">Objective: Improving targeting of power subsidy given to agriculture consumers on the basis of normative energy consumption (NEC) determined depending on their agriculture zone (differentiated on depth to water table) and the average HP rating of the tubewell pump set. This objective can be achieved through one of the four options.</td></tr>
<tr><td>Option I: Restricting power supply to agriculture consumers as per the normative supply hours (NSH) requirements of the zone</td><td>Option II: Free Supply of Power up to ‘normative energy consumption’ and incentivising metering</td></tr>
<tr><td>Based on the NEC, the NSH would be derived for the category of zone and pump set size. Free power supply to farmers will be continued but only up to the extent required for irrigation in a particular region in terms of NSH on an average basis. Following this, supply restrictions can be implemented on a group of consumers in the same zone based on the NSH. Zones with lower ground water pumping requirements can be given lesser power in terms of lesser number of supply hours as compared to dry zones with an average greater groundwater irrigation requirement.

NSH for all the zones would be determined on a monthly and a daily basis, factoring in the effect of seasonality. The important thing to note here is that no differentiation is to be made between metered and unmetered consumers under Option I.</td><td>All unmetered consumers would be allowed to apply for getting themselves metered within a transition period (TP), say 2 years. Post this TP, the following tariff structure would be applicable:

1. Metered consumers. Free power up to NEC (including for consumers with a pending metering request). A suitable approved tariff for any consumption above the NEC would be applicable after the transition period.

2. Unmetered consumers. A fixed approved rate per brake horsepower (BHP) per annum would be levied. They would be eligible for free power consumption up to NEC as and when they get metered.

NEC would be computed on the basis of monthly targets depending on the seasonal irrigation requirement.</td></tr>
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<tr><td>Variant of Option I except that the monthly actual consumption would be periodically grossed up and compared with the NEC for offering an incentive to metered consumers with their total consumption below the NEC. The incentive mechanism can be either one of the following:

1. A cash subsidy given directly to the consumer equivalent to the amount of net units saved by him/her (after adjusting the charges on account of over consumption); or

2. Adjustment of equivalent net units saved against his/her domestic connection bill.</td><td>Variant of Option II except that the monthly actual consumption would be periodically grossed up and compared with the NEC for offering an added incentive to metered consumers with their total consumption below the NEC. The incentive mechanism can be either one of the following:

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