Technical Assistance Report

Project Number: 48017-001
Policy and Advisory Technical Assistance (PATA)
December 2014

People's Republic of China: Developing Innovative Financing Mechanism and Incentive Policies to Promote Demand-Side Management in the Electricity Sector

Asian Development Bank

CURRENCY EQUIVALENTS

(as of 7 November 2014)

Currency unit	–	yuan (CNY)
CNY1.00	=	$0.1637
$1.00	=	CNY6.1084

ABBREVIATIONS

ADB	–	Asian Development Bank
DSM	–	demand-side management
ESCO	–	energy service company
GW	–	gigawatt
NDRC	–	National Development and Reform Commission
PRC	–	People's Republic of China
TA	–	technical assistance

NOTE

In this report, "$" refers to US dollars.

Vice-President	S. Groff, Operations 2
Director General	A. Konishi, East Asia Department (EARD)
Director	A. Bhargava, Director Energy Division, EARD
Team leader	L. Lu, Economics Officer, People's Republic of China Resident Mission (PRCM), EARD
Team members	X. Fan, Operations Assistant, PRCM, EARD K. Ozoa, Senior Operations Assistant, EARD P. Perera, Principal Energy Specialist, EARD H. Xia, Project Analyst, PRCM, EARD

CONTENTS

		Page
POLICY AND ADVISORY TECHNICAL ASSISTANCE AT A GLANCE		
I.	INTRODUCTION	1
II.	ISSUES	1
III.	THE POLICY AND ADVISORY TECHNICAL ASSISTANCE	3
	A. Impact and Outcome	3
	B. Methodology and Key Activities	3
	C. Cost and Financing	3
	D. Implementation Arrangements	4
IV.	THE PRESIDENT'S DECISION	4
APPENDIXES		
1.	Design and Monitoring Framework	5
2.	Cost Estimates and Financing Plan	7
3.	Outline Terms of Reference for Consultants	8

POLICY AND ADVISORY TECHNICAL ASSISTANCE AT A GLANCE

1. Basic Data — **Project Number:** 48017-001

Project Name	Developing Innovative Financing Mechanism and Incentive Policies to Promote Demand Side Management in Electricity Sector	**Department /Division**	EARD/EAEN
Country	China, People's Republic of	**Executing Agency**	National Development and Reform Commission
Borrower	People's Republic of China		

2. Sector

	Sector	Subsector(s)	ADB Financing ($ million)
✓	Energy	Electricity transmission and distribution	0.10
		Energy efficiency and conservation	0.20
	Finance	Infrastructure finance and investment funds	0.10
		Total	**0.40**

3. Strategic Agenda

Strategic Agenda	Subcomponents
Inclusive economic growth (IEG)	Pillar 1: Economic opportunities, including jobs, created and expanded
Environmentally sustainable growth (ESG)	Eco-efficiency

Climate Change Information

Climate Change impact on the Project	High

4. Drivers of Change

Drivers of Change	Components
Governance and capacity development (GCD)	Client relations, network, and partnership development to partnership driver of change
Knowledge solutions (KNS)	Application and use of new knowledge solutions in key operational areas
	Pilot-testing innovation and learning
Partnerships (PAR)	Implementation
	Private Sector
Private sector development (PSD)	Promotion of private sector investment

Gender Equity and Mainstreaming

No gender elements (NGE)	✓

5. Poverty Targeting

Project directly targets poverty	No

Location Impact

Nation-wide	High

6. TA Category: B

7. Safeguard Categorization Not Applicable

8. Financing

Modality and Sources	Amount ($ million)
ADB	**0.40**
Sovereign Policy and advisory technical assistance: Technical Assistance Special Fund	0.40
Cofinancing	**0.00**
None	0.00
Counterpart	**0.00**
None	0.00
Total	**0.40**

9. Effective Development Cooperation

Use of country procurement systems	No
Use of country public financial management systems	No

Source: Asian Development Bank

I. INTRODUCTION

1. During the 2013 country programming mission, the Government of the People's Republic of China (PRC) requested Asian Development Bank (ADB) to provide technical assistance (TA) to the National Development and Reform Commission (NDRC) for Developing Innovative Financing Mechanism and Incentive Policies to Promote Demand-Side Management in the Electricity Sector.[1] The proposed TA was included in the country operations business plan, 2014–2016 for the PRC.[2] During the fact-finding mission in October 2014, agreement was reached with the government on the impact, outcome, outputs, and terms of reference for consultants, cost estimates, financing plan, and implementation arrangements.[3] The design and monitoring framework is in Appendix 1.

II. ISSUES

2. The PRC has experienced rapid economic growth, supported by energy-intensive industrialization, to become the largest electricity consumer in the world with an installed electricity generation capacity of more than 1,000 gigawatts (GW). The government has recognized the challenges presented by the rapid increase in the electricity and energy consumption and associated air pollution.[4] Since 2006, specific targets were set for energy intensity reduction and conservation of primary energy (i.e., coal, natural gas, and oil) and electricity.[5] In addition, energy-intensive industries are encouraged to phase out inefficient and obsolete industrial capacity and invest in more advanced industrial processes.

3. The electricity subsector accounts for about half of the PRC's coal consumption and is a major contributor to the country's greenhouse gas emissions and to local air pollution. The industry sector in the PRC accounts for 56% of total electricity consumption. Thus, electricity savings in the industry sector can play a major role in reducing the PRC's greenhouse gas emissions and urban air pollution. Despite improved energy intensity, energy consumption per unit of industrial output in the PRC exceeds that of other major economies such as the United States, Japan, and advanced European countries.

4. Despite large capacity additions, the PRC's electricity sector is struggling to meet the demand, especially during the summer months. Electricity shortages are frequently experienced in industrial centers in the Yangtze and Pearl river deltas (i.e., Guangdong, Jiangsu, and Zhejiang provinces) because of inadequate generation and transmission capacity. The peak-time electricity capacity shortage has been estimated to be 40 GW (i.e., approximately 4% of peak demand). The electricity shortages have resulted in the use of inefficient diesel power plants by industries, which are economically inefficient and causes local air pollution.

5. The PRC aims to increase the share of non-fossil fuel in the energy mix to 15% by 2020, which will require a significant increase in the use of wind, solar, and hydro power in electricity generation. Although the PRC has an installed wind and solar capacity in excess of 100 GW,

---

[1] The TA first appeared in the business opportunities section of ADB's website on 30 October 2014.
[2] ADB. 2014. *Country Operations Business Plan: People's Republic of China, 2014–2016.* Manila.
[3] Since the TA prioritized policy reform related to the DSM, it was changed from capacity development TA to policy and advisory TA.
[4] The energy and electricity sector in the PRC is heavily dependent on carbon and pollution-intensive coal, which provides more than two-thirds of its energy and about 80% of electricity.
[5] Energy intensity is defined as the energy consumption per unit of gross domestic product measured in constant currency. The energy intensity reached 1.276 tons of coal equivalent per CNY10,000 (tce/CNY10,000) in 2005 and 1.034 tce/CNY10,000 in 2010 and 0.736 tce/CNY10,000 in 2013.

their combined share in electricity generation is less than 3%. Moreover, wind and solar power plants suffer from curtailment due to inflexibility in the power system and transmission constraints.[6] While the government has partly addressed this through increased investments in the transmission network, greater flexibility in the power system is needed, including the ability to control electricity demand in real time in response to changes in the availability of renewable sources of electricity.

6. The government has initiated DSM programs aimed at electricity savings and peak demand reduction, which are supported through fiscal subsidies. In response, an energy service company (ESCO) industry has emerged to implement these projects in industrial and commercial installations using energy performance contracts.[7] Since ESCOs are small and medium-sized enterprises, they have limited access to debt financing, which is limiting their ability to target larger projects. The ongoing investment subsidies by the government are not sustainable in the long term and have not been successful to leverage commercial debt financing. Reforms of the existing subsidy mechanism are urgently needed to use the limited government subsidies to leverage and mobilize funds from other sources to scale-up DSM and electricity saving projects.

7. The government issued a new regulation in April 2011 to govern the DSM for electricity load management. Although the regulation encourages local governments to deploy economic incentives to solicit more flexible demand from large electricity consumers, the local governments have instead preferred to use administrative measures to control electricity demand. However, these measures are economically inefficient and have high economic cost as they interrupt the production schedules of industries. Innovative policy reforms providing appropriate price signals and other market-based economic incentives are urgently needed to encourage industry consumers to offer flexible electricity demand. This demand-side flexibility is crucial to balance the electricity demand and supply when faced with supply shortages or excess due to high renewable energy generation.

8. The government encourages wider applications of DSM through provision of technical and policy support and prioritizes it as a means to achieve the total energy consumption cap by 2015. The government set up the DSM Pilot City Award Fund to provide financial support to the pilot cities. It launched a DSM pilot city program in 2011, under which four cities (i.e., Beijing, Foshan, Suzhou, and Tangshan) were selected for the design and implementation of a comprehensive program to reduce the peak demand and reduce electricity consumption in industrial facilities and commercial buildings. The pilot cities are encouraged to experiment with innovating policy mechanisms and market-based solutions to create experiences in DSM that could be replicated in other parts and regions of the PRC.

9. The proposed TA is a timely response to (i) conduct a comprehensive assessment of, and gather the lessons from, the first batch of DSM pilots; (ii) recommend an innovative financing mechanism to diversify DSM investments; (iii) enable the scaling up of DSM pilot cities and make it market-driven and self-sustainable and (iv) propose a market-driven mechanism to solicit demand response from large electricity consumers to optimize peak load

[6] Curtailment is the forced reduction of the output of renewable energy plants by the power system operator because of transmission constraints or surplus electricity generation due to the presence of inflexible thermal power plants. Wind power curtailment in the PRC is estimated to be 20% of the available generation.

[7] ESCOs are specialized entities with proprietary energy-saving technologies. They invest in energy-saving projects located at third-party installations (i.e., industrial and commercial) and share a portion of the monetary value of energy savings realized according to the provisions of the energy performance contract between the ESCO and the host company.

management. The TA is closely aligned with the Midterm Review of Strategy 2020 objectives of facilitating knowledge transfer in state-of-the-art technologies and market practices as well as ADB's country partnership strategy and energy sector strategy for the PRC, which seek to promote energy efficiency, resource conservation, and increased utilization of renewable energy.[8]

III. THE POLICY AND ADVISORY TECHNICAL ASSISTANCE

A. Impact and Outcome

10. The impact will be reduced peak demand and electricity consumption through DSM. The outcome will be the implementation of market-based policies and reforms to scale-up DSM financing implemented.

B. Methodology and Key Activities

11. The TA will (i) review and assess the ongoing programs, actions and policies in support of the DSM, (ii) conduct stakeholder consultations to obtain feedback on existing DSM incentive policies and DSM pilots in the PRC, (iii) review the relevance and applicability of international experience in DSM in advanced economies, and (iv) compare and contrast different financing tools and models to best leverage private resources to scale-up DSM investments by 2015 and beyond. The TA will also examine and propose a financing mechanism for scaling up DSM investments and propose a suitable institutional setup.

12. The TA will have three outputs:

(i) **Output 1**. The TA will review and assess existing policies to promote DSM, peak load management, and the performance of the DSM pilot city program. It will also compare and contrast DSM management and incentive policies in major economies and identify international practices applicable to the PRC. Initial findings will be presented in stakeholder workshops to obtain feedback and to further refine and improve the assessment report.

(ii) **Output 2**. The TA will identify the systematic barriers for ESCOs' financing for electricity-saving DSM projects and will propose financial products, including risk-sharing arrangements for leveraging commercial banks and the private sector investments for the DSM. It will also propose a suitable financing platform bringing together local governments, electricity utility companies, commercial banks, and other financing institutions. The institutional arrangement of such platform will also be elaborated.

(iii) **Output 3**. The TA will propose recommendations on market-based incentive policies to promote demand response such as payment of ancillary services provided by the grid operator. It will analyze how to promote DSM through demand response pricing and the role of demand response aggregators and the distributed energy storage system in the PRC. Recommendations on incentive policies, demand response strategy, and regulatory framework will be proposed.

[8] ADB. 2014. Midterm Review of Strategy 2020: *Meeting the Challenges of a Transforming Asia and Pacific*; ADB. 2012. *Country Partnership Strategy: People's Republic of China, 2011–2015*. Manila;

C. Cost and Financing

13. The TA is estimated to cost $550,000, of which 400,000, will be financed on a grant basis by ADB's Technical Assistance Special Fund (TASF-other sources). The government will provide counterpart support in the form of counterpart staff, relevant data and information, assistance in arranging meetings and field visits with government agencies, logistics support, and other in-kind contributions.

D. Implementation Arrangements

14. The TA will be implemented over 18 months, from 20 December 2014 to 30 June 2016. The Bureau of Economic Operations Adjustment of the NDRC will be the executing agency. The Power Division of the Bureau of Economic Operations Adjustment will be the implementing agency.

15. A total of 50 person-months (one international financing policy expert for 4 person-months and six national experts for 46 person-months) of consulting services will be provided. The international consultant will be recruited as an individual consultant, while a consulting firm will be recruited for national consultants through quality- and cost-based selection (with a quality–cost ratio of 90:10) following the simplified technical proposal, in accordance with ADB's Guidelines on the Use of Consultants (2013, as amended from time to time). Procurement of any equipment will be undertaken in accordance with ADB's Procurement Guidelines (2013, as amended from time to time). The proceeds of the TA will be disbursed in accordance with the *Technical Assistance Disbursement Handbook* (2010, as amended from time to time).

IV. THE PRESIDENT'S DECISION

16. The President, acting under the authority delegated by the Board, has approved the provision of technical assistance not exceeding the equivalent of $400,000 on a grant basis to the Government of the People's Republic of China for Developing Innovative Financing Mechanism and Incentive Policies to Promote Demand-Side Management in the Electricity Sector, and hereby reports this action to the Board.

DESIGN AND MONITORING FRAMEWORK

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
Impact Reduced peak demand and electricity consumption through DSM	Peak demand savings by DSM to increase 35.0 GW by 2020 compared to 2013. Electricity savings due to DSM projects increased by 40 TWh in 2020 compared to 2013.	NDRC yearly evaluation notice China Electricity Council yearly report NDRC yearly evaluation notice	**Assumptions** The financing mechanism for DSM pilot cities replicated in other cities Continued central and local government support for DSM policies and incentives **Risk** Difficulties in incorporating DSM in the absence of competitive wholesale electricity market
Outcome Implemented market-based policies and reforms to scale-up DSM financing	Total investments in DSM projects in pilot cities increase by CNY10 billion by 2016 compared to 2013. DSM pilot cities save at least 4%–6% power consumption due to DSM by 2016 (Baseline: DSM pilot cities' power demand was 56.6 GW in 2013 with zero power savings due to DSM)	Project implementation report NDRC yearly evaluation notice	**Assumptions** Industry consumers actively participate in the DSM program Proposed reforms and market-based incentives adopted by DSM pilot cities **Risk** Regulators fail to incentivize DSM investments or introduce market-based policies and reforms in pilot cities in a timely manner.
Outputs 1. Comprehensive assessment report of DSM pilot cities incorporating relevant international experience are prepared. 2. DSM financing platform including the description of financial products, the roles of governments, electricity utilities, investors, and technology providers are proposed. 3. Recommendations on market-based incentive policies to initiate demand response program	Comprehensive review of PRC's existing plans, programs, actions and policies in support of DSM and a desk assessment of international experiences. An assessment report prepared, discussed and submitted by September 2015. A suitable platform channel for ESCOs to apply for bank loan through EPC project receivables developed by December 2015. PPP model and accessible financing systems to establish DSM financing mechanism and institutional framework drafted by January 2016. Incentive measures to promote DSM investment drafted by February 2016.	Workshops and conferences Progress reports and consultants' reports Interviews and data collections with EMCA and professional ESCOs, domestic banks, guarantee agencies, and investment agencies Final report	**Assumptions** Relevant agencies such as electricity utilities, price bureaus, and large electricity consumers actively participate and provide timely inputs Executing and implementing agencies remain committed to the TA activities and provide timely guidance and support **Risks** Lack of interest from key stakeholders Stakeholders unwilling to participate in PPP Lack of policy support for the PPP mechanism and lack of innovation to engage private sector

Design Summary	Performance Targets and Indicators with Baselines	Data Sources and Reporting Mechanisms	Assumptions and Risks
for peak load management are made.	Recommendations on policies and regulatory approaches to enable demand response strategy and pricing developed by February 2016.		
Activities with Milestones 1. **Prepare of comprehensive assessment report of DSM pilot cities incorporating relevant international experience** (April 2015–Sep 2015) 1.1 Review of the existing DSM programs, peak load management, and policies in the PRC by August 2015 1.2 Assessment of the effectiveness of the existing DSM Pilot City Program by September 2015 1.3 Review of the DSM programs, peak load management, and policy incentives in major economies such as the US and EU member countries, and applicable best practices by October 2015 2. **Propose financial products and roles of relevant government agencies and other stakeholders in the proposed DSM financing platform** (May 2015–March 2016) 2.1 Stakeholder interviews (government agencies, utility companies, technology providers, and investors) to investigate the financing requirements for national DSM project implementation by July 2015 2.2 Analyze how to design PPP model to mobilize private sector investments in DSM and propose institutional arrangements by December 2015 2.3 Analyze financing channels for ESCOs to apply for bank loan for DSM project and propose institutional arrangements by March 2016 3. **Propose recommendations on market-based incentive policies to initiate demand response program for peak load management** (April 2015–April 2016) 3.1 Analyze how to promote DSM through demand response pricing, demand response aggregators, and distributed energy storage system in the PRC by November 2015 3.2 Recommend incentive policies, demand response strategy, and regulatory framework to promote investments in DSM by project developers, utilities, and financiers by April 2016			**Inputs** **ADB: $400,000** Note: The government will provide counterpart support in the form of counterpart staff, office and housing accommodation, office supplies, secretarial assistance, domestic transportation, and other in-kind contributions.

ADB = Asian Development Bank, DSM = demand-side management, EMCA = Energy Saving Service Industry Committee of China Energy Conservation Association, EPC = energy performance contact, ESCO = energy saving company, EU = European Union, GW = gigawatt, NDRC = National Development and Reform Commission, PPP = public–private partnership, PRC = People's Republic of China, TA = technical assistance, TWh = terawatt-hour, US = United States.

Source: Asian Development Bank.

COST ESTIMATES AND FINANCING PLAN

($'000)

Item	Amount
Asian Development Bank[a]	
1. Consultants	
a. Remuneration and per diem	
i. International consultant	80.0
ii. National consultants	230.0
b. International and local travel	10.0
2. Training, seminars, and conferences[b]	20.0
3. Miscellaneous administration and support costs[c]	20.0
4. Contingencies	40.0
Total	**400.0**

Note: The technical assistance (TA) is estimated to cost $550,000, of which contributions from the Asian Development Bank are presented in the table above. The government will provide counterpart support in the form of counterpart staff, use of office space, office supplies, relevant data and information, domestic transportation, and other in-kind contributions. The value of government contribution is estimated to account for 27% of the total TA cost.

[a] Financed by the Asian Development Bank's Technical Assistance Special Fund (TASF-other sources).

[b] This item will be included as a provisional sum in the contract of the national consulting firm.

[c] This includes the translation costs associated with each deliverable of the TA, as well as report editing, printing, and dissemination.

Source: Asian Development Bank estimates.

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

1. The policy and advisory technical assistance (TA) will be implemented over 18 months, from 20 December 2014 to 30 June 2016. A combination of individual consultant and consulting firm will be recruited. The international consultant will be recruited as an individual consultant, and a consulting firm will be recruited for national consultants through quality- and cost-based selection (with a quality–cost ratio of 90:10) following the simplified technical proposal, in accordance with the Guidelines on the Use of Consultants (2013, as amended from time to time) of the Asian Development Bank (ADB).

2. The project will require about 50 person-months of international and national experts. The expected professional and academic qualifications of the experts are as follows:

(i) International demand-side management (DSM) and demand response policy expert and co-team leader is expected to have postgraduate qualifications in electrical engineering and energy policy with more than 10 years' research and professional experience in DSM policy. The expert is expected to have academic and professional publications in DSM policy formulation in advanced economies and in the People's Republic of China (PRC).

(ii) National DSM policy expert and team leader is expected to have postgraduate qualifications in electrical engineering and energy policy with more than 10 years' experience and possess extensive experience in DSM policy formulation in the PRC.

(iii) National DSM and demand response technical expert should have postgraduate qualification in electrical engineering with more than 10 years of experience in technical aspects of DSM project design including remote demand control and monitoring technologies and electricity dispatch procedures.

(iv) National financing policy expert should have postgraduate qualifications in economics and/or finance with more than 5 years experience in financing policy and incentive policies for technology promotion in the PRC.

(v) National financing institution expert should have postgraduate qualifications in economics and/or finance with more than 5 years' experience in PRC financing institutions, financial regulations, and financial products for energy efficiency and DSM financing.

(vi) National energy service company (ESCO) business expert should have postgraduate qualifications in engineering and/or business studies and have more than 5 years' experience working in the ESCO industry in the PRC.

(vii) National electricity policy expert should have postgraduate qualifications in electrical engineering and/or energy policy and should have more than 5 years' experience in electricity policy, regulation, and electricity subsector institutional reforms in the PRC.

3. The number of person-months required from each expert under each output is summarized in the following table:

Summary of Consulting Services Requirement

Name of Position - International	Person-months	Name of Position - National	Person-months
Output 1			
DSM and demand response policy expert and co-team leader[a]	1	DSM policy expert and team leader	4
		DSM and demand response technical expert	4
		Financing policy expert	3
Subtotal	**1**	**Subtotal**	**11**
Output 2			
		DSM policy expert and team leader	4
		Financing policy expert	4
		Finance institution expert	6
		ESCO business expert	6
		Subtotal	**20**
Output 3			
DSM and demand response policy expert and co-team leader[a]	3	DSM policy expert and team leader	4
		Financing policy expert	2
		Electricity policy expert	5
		DSM and demand response technical expert	4
Subtotal	**3**	**Subtotal**	**15**
Total	**4**	**Total**	**46**

DSM = demand side management, ESCO = energy service company.
[a] = recruited as invidivual.
Source: Bureau of Economic Operations Adjustment of the NDRC.

A. Consulting Requirement and Scope of Work

4. **Output 1: Preparing comprehensive assessment report of DSM pilot cities incorporating relevant international experience.** This task will be undertaken by a team of consultants consisting of (i) a DSM and demand response policy expert (international, 1 person-month), (ii) a DSM policy expert and team leader (national, 4 person-months), (iii) a DSM and demand response technical expert (national, 4 person-months), and (iv) a financing policy expert (national, 3 person-months). The key deliverables are the following reports: (i) a review of the existing DSM programs, peak load management, and policy incentives in the major economies; and (ii) a review of the existing DSM programs, peak load management, and policy incentives in the PRC. The major tasks to be undertaken by the experts include the following:

(i) Assess the performance and progress of DSM pilot cities, including Beijing, Foshang, Suzhou, and Tangshan, and some other cities to realize electricity saving and peak load reduction.

(ii) Evaluate the effectiveness of different models adopted by these cities in utilizing the central government DSM Award Fund and leveraging private sector investments to promote investments in DSM.

(iii) Evaluate the government incentive schemes to support the implementation of energy efficiency power plant, peak load optimization, and demand response programs in the PRC.

(iv) Analyze DSM programs, peak load management, and incentive policies in major economies and distill applicable international practices.
(v) Conduct the technical evaluation of the DSM pilot city program in terms of suitability of technologies adopted for achieving energy savings, peak load reduction, monitoring, and verification of energy saving achieved and peak load reduction, remote monitoring, and control technologies adopted.
(vi) Review the DSM programs initiated in other major economies and draw useful lessons that are applicable to the PRC in improving its DSM programs in terms of mobilizing financing, providing incentives to large industry consumers to participate, and soliciting demand response.
(vii) Recommend a broad plan to improve the prevailing incentive policy regime to a broad-based market-driven DSM program that includes both electricity saving and peak load reduction.

5. **Output 2: Designing DSM financing platform including the description of financial products the roles of governments, electricity utilities, investors, and technology providers.** This task will be undertaken by a team of consultants consisting of (i) a DSM policy expert and team leader (national, 4 person-months), (ii) a financing policy expert (national, 4 person-months), (iii) a finance institution expert (national, 6 person-months), and (iv) an ESCO business expert (national, 6 person-months). The key deliverables are submission of the following reports: (i) the financing mechanism and application scheme for promoting DSM in the PRC, and (ii) institutional arrangements for establishing the DSM financing mechanism and organizing workshops on financing requirements for DSM and public–private partnership models. The specific tasks to be undertaken by the experts include the following:

(i) Review financing mechanisms for DSM pilot cities in utilizing the government DSM Award Fund to attract private sector capital to support professional ESCOs to implement DSM projects.
(ii) Review incentive policies and financing mechanisms for supporting ESCOs to mobilize financing for implementing DSM projects in different provinces.
(iii) Review specific financing mechanisms for supporting DSM investments and mobilizing commercial bank financing for DSM projects.
(iv) Review the extent to which DSM projects implemented by ESCOs using the energy performance contract model has been supported under different financial instruments available in the PRC market.
(v) Assess the existing financing mechanisms for DSM investments undertaken by host companies and ESCO companies in DSM pilot cities and other provinces implementing DSM programs. Review the performance of these DSM programs in terms of achieving electricity savings and peak load reduction.
(vi) Review the role of local governments and electricity utilities in implementing and mobilizing financing for DSM programs and make recommendations on how the local governments and electricity utilities can effectively partner to implement DSM programs.
(vii) Identify the constraints on and barriers to mobilizing adequate financing for DSM investments.
(viii) Propose innovative financing products that can leverage government funds and mobilize additional financing from commercial banks, host companies, and private equity funds for investment in DSM projects.
(ix) Propose institutional arrangements for establishing the DSM financing platform with clearly defined roles for the National Development and Reform Commission, provincial and local governments, electricity utilities, commercial banks, leasing

companies, guarantee companies, ESCOs, and third-party monitoring and verification agencies.

6. **Output 3: Proposing recommendations on market-based incentive policies to initiate the demand response program for peak load management.** This task will be undertaken by a team of consultants consisting of (i) a DSM and demand response policy expert (international, 3 person-months), (ii) a DSM policy expert and team leader (national, 4 person-months), (iii) a financing policy expert (national, 2 person-months), (iv) an electricity policy expert (national, 5 person-months), and (v) a DSM and demand response technical expert (national, 4 person-months). The key deliverables are (i) submission of a report on recommendations on market-based incentive policies to initiate the demand response program for peak load management, and (ii) organizing workshops on incentive policies for DSM policies and regulations. The key tasks to be undertaken by the experts include the following:

(i) Research international demand response programs, technologies, and regulations; draw lessons that are relevant to the PRC; and analyze how to promote DSM, especially demand response based on price signals from dispatch centers combined with distributed energy storage in the PRC.
(ii) Review the existing electricity market structure in the PRC, dispatch regimes, and the electricity regulatory policies that are relevant to the introduction of a demand response program in the PRC.
(iii) Assess the economic benefits that can be derived from a demand response program in the PRC in terms of avoided investments in new generation capacity, increased absorption of renewable energy, spinning reserves, and other ancillary services to improve the reliability of grid operation.
(iv) Assess the performance of interruptible load tariffs and orderly electricity demand management programs implemented in different parts of the PRC and draw useful lessons for introduction of a market-driven demand response program in the PRC.
(v) Identify the regulatory and technical barriers to the introduction of a market-driven demand response program in the PRC.
(vi) Propose strategies to overcome these barriers for the purpose of introducing a demand response program in the context of the existing electricity market structure in the PRC.
(vii) Propose a plan for introducing a demand response program in the PRC with clearly defined preconditions to be achieved before the introduction of the program.
(viii) Identify the role of local governments, electricity utility companies, demand aggregators, ESCOs, monitoring and verification agencies, and large industry consumers in implementing the demand response program.

B. Reporting Requirements

7. The key deliverables for each output are a set of subreports. For output 1, the subreports are (i) a review of the existing DSM programs, peak load management, and policy incentives in the major economies; and (ii) a review of the existing DSM programs, peak load management, and policy incentives in the PRC. For output 2, the subreports include (i) the financing mechanism and application scheme for promoting DSM in the PRC; and (ii) institutional arrangements for establishing the DSM financing mechanism. For output 3, a subreport on incentive policies and regulatory framework for initiating a demand response strategy and regulatory framework will be produced. The final report will be produced in the form of a synthesis report consolidating the key findings of the three outputs.

8. The consultants will submit (i) an inception report within 1 month after signing the consulting contract; (ii) the output 1 report within 6 months after commencement of consulting services; (iii) reports for outputs 2 and 3 within 9 months after commencement of the consulting services; (iv) the draft final report within 2 months of receiving ADB and executing agency comments on output 1, 2, and 3 reports; and (iv) a final report within 1 month after receiving feedback from executing and implementing agencies and ADB on the draft final report.

9. All TA deliverables and the three progress reports will be written in English. The national consultants will be responsible for translating documents into Chinese. Three copies of each TA deliverable will be submitted to ADB in English and 10 copies will be submitted to the executing and implementing agencies—five in English and five in Chinese. The deliverables and progress reports should address the terms of reference with details appropriate to that stage of the TA. The consultants will present key findings in workshops and seminars. Officials from the Bureau of Economic Operations Adjustment of the National Development and Reform Commission, Ministry of Finance, Energy Saving Service Industry Committee, and DSM pilot city governments will be invited to the workshops.