

### List of Knowledge Lessons

No.	Sub-Theme	Title
1	Institutional Framework	Confirmation of institutional framework and responsibility of implementing agency
2	Collaboration with Relevant Organizations	Common understanding and construction of a cooperative system among multiple stakeholders in the partner country
3	Project Design	Appropriate project design and monitoring
4	Legal Framework	Confirmation of legal framework on energy conservation, technical standards on electric power facilities
5	Smooth Implementation of Technical Cooperation	Smooth implementation of technical cooperation by contracted consultant team
6	Procurement of Equipment	Timely procurement of equipment for training and research
7	Effective Training	Provision of incentives to trainees of training program
8	Coordination of Schemes	Coordination between ODA loan, Grant aid, technical cooperation and training programs etc. (Continuous assistance)
9	Assistance to Rebuilding	Step by step assistance with clear priority to country under rebuilding
10	Input of Executing Agency	Timely implementation of input of the Executing Agency
11	Relationship with Outside Business	Consistency between preparation of up to downstream facilities in the grid
12	Smooth Implementation of the Project	Scheduling to avoid delay
13	Preliminary Analyses	Preliminary analyses—risk assessment and examination of alternatives
14	Smooth Implementation of Financial Assistance Projects	Prior written agreement on important matters in project implementation
15	Fuel Procurement	Secure stable supply of inexpensive fuel
16	Relationship with Private Investment	Risk hedge of private investment part and promotion of private investment

17	Projects in Rural Area	Effective rural electrification and small-scale decentralized sub-projects
18	Environmental and Social Considerations	Effective countermeasures for environmental and social consideration
19	Collaboration with Other Projects or Other Purposes	Consistency and synergy with related development projects including those other than energy

Knowledge Lessons Sheet										
Energy 1	Institutional Framework				Confirmation of institutional framework and responsibility of implementing agency					
Applicable Scheme(s)	T	P	G	L	Applicable Stage(s)	Form	Plan	Exec	Compl	After
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>				
Applicable Subsectors					All subsectors					
Lessons Learned										
Type(s)	<input type="radio"/>	Generic aspects of project management (cross-cutting among themes)								
		Specific to characteristics of the sector								
		Specific to characteristics of the country/region (incl. geographical ones)								
Key Words	Implementing Agency, Executing Agency, Counterpart (C/P)									
Applicable Cases					Summary/Background of the Issues					
All projects					Identification of appropriate implementing agency is the most critical issue for success of projects. JICA needs to identify established institution which is responsible to project with good governance and personnel & financial resources at project formulation stage.					
Risks and Considerations					Countermeasures (Approach)					
<p>1. There is possibility to delay commencement of technical cooperation project significantly, if the project needs to establish a new institution to implement the project, taking into consideration of post completion of the project, since establishment of a new institution may take time to reach agreement among stakeholders.</p> <p>2. There is possibility that technology transfer to implementing agency may not be implemented</p>					<p><u>Technical cooperation:</u></p> <p>1. JICA should identify government institution which is in charge of geothermal exploration such as Geological Agency of Ministry of Energy and Mineral Resources as implementing agency for technical cooperation project on geothermal exploration and resource potentials evaluation. JICA should identify government department of Ministry of Energy etc. which is in charge of geothermal development policy as implementing agency of technical cooperation project on geothermal development promotion policy (T20-1 Indonesia)</p> <p>2. JICA should identify appropriate government ministry/department, regulatory institution of utility or electric power company as implementing agency for technical cooperation on electric power project. In general, regulatory institution which has been established under power sector reform tends to have own revenues from licensing to power companies, good governance and personnel resources despite</p>					

<p>effectively, or transferred technology by the project may not be utilized continuously after completion of the project, because of lack of personnel and financial resources of implementing agency.</p> <p>3. Institutional framework and responsibility of regulatory institution may not be clearly defined in countries where power sector reform such as de-bundling of electric power sector were implemented. There is possibility that institutional framework in charge of power development planning and supervising the implementation of the plan may not be clear even after establishment of regulatory institution.</p> <p>4. Officers of implementing agency (mainly officers of energy &amp; power departments) may have limited understanding on operation and maintenance of power system and equipment even they have doctoral or master degree of engineering department of universities, because of</p>	<p>of short history. Government department which is in charge of energy and power policy including autonomous government agency such as rural electrification agency tends to be lack of personnel and financial resources. In most countries, electric power companies have good personnel resources. However financial situation and management of company are quite different by countries. In countries where power sector reform has been executed, power companies were de-bundled by sectors such as generation, transmission, distribution etc. Commonly, power generation sector has been privatized mainly among various sectors and various international and domestic private IPPs are actively involved. JICA needs to conduct preliminary study on de-bundling and privatization of power sector to identify appropriate implementing agency from various institutions in electric power sector, in case that power company is considered as implementing agency.</p> <p>3. JICA should identify institution in charge of power development planning and managing the plan. JICA conducts a sector survey to confirm institutional framework and its capacity, if JICA did not identify the implementing agency after de-bundling of power sector. In case that implementing agency does not have enough institutional framework and capacity to develop power development plan, JICA requests a condition that the implementing agency must improves its capacity prior to implementing the project.</p> <p>4. For energy conservation projects, implementing agencies are commonly government agencies which have legal power under Energy Conservation Law or energy conservation promoting institutions. In general, government department in charge of energy conservation policy has poor personnel and financial resources.</p> <p>5. For projects to enhance personnel resources on renewable energy and energy conservation, universities and other training institutions may be appropriate implementing agency.</p> <p>6. JICA should investigate the legal power, allocation of personnel resources (actual assignment of personnel resources) and key person's background and professional capacity and his/her</p>
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<p>lack of field experiences.</p> <p>5. Government officers including ministers of energy and/or power often may not know exactly current situation of power sector (For instance, challenges and progress of rural electrification).</p> <p>6. In case of ODA loan project, there is possibility of over capacity of executing agency to handle several projects simultaneously including addition of new project.</p> <p>7. There is possibility to delay project if executing agency is not familiar with JICA ODA procurement procedures.</p>	<p>commitment to the project of the implementing agency.</p> <p>7. Commitment of CEO of implementing agency (Minister, permanent secretary of ministry, director general or chairperson of regulatory institution, chancellor or vice chancellor of university. Full time executive is preferable than honorable executive.) is the most critical point of judgement criteria of technical cooperation project.</p> <p>8. In African countries, counterparts of implementing agency often do not acknowledge or understand their responsibility of the assignment. It is necessary to confirm their responsibility of the assignment as the counterparts of implementing agency at commencement of project. To analyze current situation and to share understanding on challenges to be solved with them may be effective way to acknowledge their responsibility.</p> <p><u>ODA Loan:</u></p> <p>1. JICA needs to provide suggestions on manageable number of contracts or adoption of full turnkey contract etc. to executing agency taking into account of its capability to manage ODA loan project. The capability of executing agency can be assessed by its experiences and number of its officers including number of full time officers in charge of the ODA loan project.</p> <p>2. Assignment of full time officer with wide range of decision making with establishment of project team, capacity development of executing agency's officer and employment of good consultant are effective measures to enhance executing agency's capacity to execute ODA loan projects.</p> <p>3. If executing agency is not familiar with ODA loan scheme, evaluation of its capability and assessment of its risks to manage project are desirable. (World Bank prepares a procurement assessment report for a new project during appraisal based on the country procurement assessment report, and the Bank assesses executing agencies' capabilities and risks related to procurement, and formulate a detailed project implementation plan based on the report.)</p>
<p><b>Expected Effects</b></p>	
<p>Technology transfer to implementing agency is effectively implemented.</p>	

Taking measures to supplement lack of capacity and experiences of executing agency (borrower of ODA loan) can reduce delay of project.

References of originated projects

No.	Country	Project Title	Key Words
T20-1	Indonesia	The Project for Capacity Building for Enhancement of the Geothermal Exploration Technologies	regular tasks, improvement of technical skill
T14-1	Cambodia	Capacity and Institutional Building of the Electric Sector	Improvement of installed equipment and capacity development of implementing agency's officers, Strong commitment of executives of implementing agencies
T15-2	Turkey	Project for Energy Efficiency Improvement of Power Plant in Turkey	strong ownership of implementing agency's executives and officers
T10-1	Iran	The Project on Energy Management Promotion in the Islamic Republic of Iran	educational institution, sustainability
T9-1	Thailand	The Practical Energy Management Training Center in the Kingdom of Thailand	build internal mechanism of implementing agency to grow autonomously
T13-1	Lao PDR	Lao Electric Power Technical Standard Promotion Project	organizational establishment, assumption for the project
T22-1	Pakistan	The Project for Improvement of Training Capacity on Grid System Operation and Maintenance	host country government, burden of the project cost
T24-1	India	Research Partnership for Application of Low Carbon Technology for Sustainable Development	networks, strong local partner
T25-1	Algeria	Sahara Solar Energy Research Center Project	lobby the chancellor and vice chancellor, strong top management,
L102	Bangladesh	Barge-Mounted Power Plant Rehabilitation Project	building the institutional capacity
L108	Philippine	Tongonan geothermal power plant construction project	division of procurement contract, over capacity of executing institution
L120	Brazil	State of Goias Rural Electrification Project	wide-ranging authority to make decisions, placement of a full time project manager
L166	Egypt	Zafarana Wind Power Plant Project	ODA loan procedures

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L168	Pakistan	Jamshoro Thermal Power Station Project	appropriate number of contracts
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Note [ **T**: Technical Cooperation, **P**: Technical Cooperation for Development Planning, **G**: Grant Aid, **L**: ODA Loan ]

<b>Knowledge Lessons Sheet</b>		
<b>Energy 2</b>	<b>Collaboration with Relevant Organizations</b>	<b>Common understanding and construction of a cooperative system among multiple stakeholders in the partner country</b>

Applicable Scheme(s)	T	P	G	L	Applicable Stage(s)	Form	Plan	Exec	Compl	After
			○	◎		○	○	○	○	○

Applicable Subsectors	All subsectors
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<b>Lessons Learned</b>	
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<b>Type(s)</b>	○	Generic aspects of project management (cross-cutting among themes)
		Specific to characteristics of the sector
		Specific to characteristics of the country/region (incl. geographical ones)
<b>Key Words</b>	Relevant organizations, Plural actors, Common understanding, External stakeholders, Coordination among stakeholders	

<b>Applicable Cases</b>	<b>Summary/Background of the Issues</b>
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<p>In case involvement or influence by the implementing organization and other multiple parties concerned or relevant parties in the partner country takes place (including the cases of an organizational change in the relevant parties such as takeover).</p>	<p>As the scale of the project grows and depending on the type of the project such as rural electrification, the number of stakeholders may increase. In order to complete the project, their cooperative system must function effectively.</p> <p>Therefore, it is very important to clarify the common understanding of each party concerned on the individual roles and responsibilities, and to make coordination for building cooperative relationships.</p>
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<b>Risks</b>	<b>Counter Measures</b>
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<p>Unless a common recognition is shared among multiple stakeholders, various troubles would arise, which will result in cost increase, delay, and a decline in business performance after the implementation of the project.</p> <p>The example of coordination: (1) that of water release between Electricity agencies and Water Resource</p>	<p>First, confirm all the stakeholders—from organizational and authorization aspects—at the project formation stage, recognize the dynamics in decision making between them (who is the actual decision maker), and assume how to make coordination.</p> <p>Subjects to be coordinated and clarified at the project planning stage are as follows:</p> <ul style="list-style-type: none"> <li>• Overall framework of decision making and O&amp;M and cooperation system; and</li> <li>• Roles and responsibilities of each relevant organization.</li> </ul> <p>Related cases and organizations other than the main Executing Agency include:</p>
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<p>Department, land acquisition for access road with forest agency for the case of hydro power generation;</p> <p>(2) coordination of cancelation of forest reserve with Forest Department for the case of geothermal power generation;</p> <p>(3) building transmission line under a canal;</p> <p>(4) change of governance under division and privatization of the related sectors;</p> <p>(5) coordination among many villages for the case of rural electrification; and</p> <p>(6) coordination between multiple contractors.</p>	<ul style="list-style-type: none"> <li>• Where nature conservation areas and/or national parks involves several municipalities, involvement of coordinating agencies and high-level officials is important from the early stage; and</li> <li>• In the case of regional development plan type, which involves multiple municipalities, strengthening cooperation and collaboration of multilayered organizations concerned—from Executing Agency to villages—is important.</li> </ul> <p>In addition to the cases where stakeholders are limited within JICA projects (i.e., cooperation of only internal parties is sufficient), there may be interaction with the outside of the project. Especially, in the latter case, it is important to judge the necessity of involvement of high class government officials and/or politicians in an early stage.</p> <p>In some cases, an organization specific to this purpose was set up for efficient coordination, such as:</p> <ul style="list-style-type: none"> <li>• Natural gas fired power plant construction project with external ones to produce and supply the gas as critical factor of the project (L183 India).</li> </ul> <p>It is important to reconfirm orbit correction and agreement items as common understanding among stakeholders, regularly or irregularly.</p> <p>Components of the project, of which the responsibility tends to be unclear, need to be adequately coordinated, such as boundaries of facilities with different finance sources.</p> <p>In some cases, the role of stakeholders involved in situation changes (e.g., the change of institutions and/or organizations, takeover, etc.) alters during or after the project, and follow-up of the adjustment process is important in such cases. An example to hand over the operation includes preparation and submission of PCR conforming to L/A regulations. In this case, JICA should receive it after reviewing its contents.</p>
<p><b>Expected Effects</b></p>	
<p>Cost increase and delays in projects are mitigated, making it less likely to adversely affect the performance of the project after implementation.</p>	

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References of originated projects

No.	Country	Project Title	Key Words
L13-1,2	India	Teesta Canal Hydroelectric Project (I)(II)	general framework of O&M in advance
L23	Indonesia	Asahan No. 3 Hydroelectric Power Plant Construction Project	municipalities involvement, lengthening, Involvement of coordinating agency and high officials
L24	Indonesia	Kamojang Geothermal Power Plant Extension Project	protected forest area, Forest Agency, coordination
L29	Indonesia	Semarang Power Plant Rehabilitation and Gasification Project	early consultation incl. coordinating agency
L36	Indonesia	Multipurpose Dam Hydroelectric Power Plant Project	handoff and cooperation for shifting from project implementation to operation stage
L65	Thailand	Construction of 230kV Underground Transmission Line between Bangkapi and Chidlom Substation Project	establishment of the council of stakeholders for coordination
L75	China	Hubei Small-Sized Hydropower Project	coordination and mitigation by the central government in advance
L143-1,2	Jordan	Aqaba Thermal Power Plant Expansion Project (I) (II)	external conditions change incl. privatization of the sector
L149	Pakistan	500kV Multan - Guddu Substations Extension Project	adjustment of the border of transmission line and substation
L183	India	Faridabad Gas Based Power Station and Associated Transmission System Project	coordinative body among several executing organizations
L205-1,2	Morocco	Rural Electrification Project	executing agency for coordination among interested bodies with commune
L207	Thailand	Gas Separation Plant Project	initiative by the local government

Note [ **T**: Technical Cooperation, **P**: Technical Cooperation for Development Planning, **G**: Grant Aid, **L**: ODA Loan ]

Knowledge Lessons Sheet										
Energy 3		Project Design			Appropriate project design and monitoring					
Applicable Scheme(s)	T ⊙	P	G ○	L ○	Applicable Stage(s)	Form ○	Plan ○	Exec ○	Compl ○	After ○
Applicable Subsectors		All subsectors especially energy conservation project								
Lessons Learned										
Type(s)	○	Generic aspects of project management (cross-cutting among themes)								
		Specific to characteristics of the sector								
		Specific to characteristics of the country/region (incl. geographical ones)								
Key Words		Project plan, PDM (Project Design Matrix), Energy conservation								
Applicable Cases				Summary/Background of the Issues						
All projects (Especially technical cooperation)				Appropriate project design is important for successful project taking into account of exact situation in host country and implementing agency at project formulation phase. Project design needs to be flexibly and timely modified based on progress of the project.						
Risks and Considerations				Countermeasures (Approach)						
Although making quantitative goal of project is commonly requested as much as possible, it might be realistic to use qualitative goal for project especially energy conservation project which is difficult to acquire quantitative data to design goal of project in PDM.				<ol style="list-style-type: none"> <li>1. It is important to design goal and monitoring methodology of project which is suitable for technical cooperation project on energy conservation, taking into consideration of process that transferred output of the project are disseminated from implementing agency to company's and individual's activity gradually and then improvement of energy efficiency is realized. Note that to design goal and monitoring methodology of project is dependent on scope of project.</li> <li>2. It is very difficult to monitor trend of unit national energy consumption timely between commencement and completion of the project because of lack of macro energy statistics in developing country. Alternative indicator of overall goal of the project to unit energy consumption may be quantitative estimation of energy efficiency improvement in each sector and industry using database on change of a kind of quantitative indicator relevant to energy efficiency which is collected through project activities. Practically, quantifying result of follow up survey of trainees of training after completion of the training or energy audit of facilities as much as possible and estimating</li> </ol>						

	<p>degree of change of energy efficiency in each sector and industry based on the above mentioned quantified information as an indicator of the project. (T5 Turkey)</p> <ol style="list-style-type: none"><li>3. Evaluating effect of project by indicator which is designed in about half year later from commencement of the project, approved by JCC (Joint Coordination Committee) of the project and monitored through project period is a realistic solution in case that designing of quantitative indicator is not possible at planning stage of the project.</li><li>4. It is necessary to conduct baseline survey systematically at planning or commencement period of project to monitor achievement of effectiveness and impact of the project quantitatively and clearly. Designing realistic indicator with counterparts of implementing agency by conducting survey on current situation with them after commencement of the project is practical manner especially for capacity development project on operation and maintenance of power facilities in African countries where capacity development plan of implementing agency which are developed by other donor is not often executed in reality.</li><li>5. JICA needs to consider provision of explanation of possibility to amend PDM or PO (Plan of Operation) during project period to counterparts including executives of implementing agency at detailed planning survey of the project. Because there are implementing agencies which hesitate amendment of PDM or PO which is attached to R/D (Record of Discussions) with signature of executives of the agency though PDM and PO need to be amended flexibly through discussions at JCC of the project etc.</li><li>6. JICA officer in charge of project especially executed by contracted consultant team needs to monitor progress of the project compared with PDM often and carefully, taking into consideration of tendency that problem may not be presented by them timely, since the contract with them corresponds with PDM. JICA officer should consider to hire outside evaluator to reflect third party's opinion depending on the situation.</li></ol>
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### Expected Effects

Progress of project is able to be clearly monitored and thus input of experts and counterparts of implementing agency, budget allocation and schedule of project are modified timely based on the progress of the project and effectively to improve achievement of project's goal.

### References of originated projects

No.	Country	Project Title	Key Words
T5-1	Turkey	Project on Energy Conservation in the Republic of Turkey	technology transfer, change of behavior
T10-1	Iran	Project on Energy Management Promotion in Islamic Republic of Iran	trend of unit energy consumption, similarity, uniqueness, multifaceted views
T18-2	Sri Lanka	Project for Promoting on Energy Efficiency Improvement	designing realistic goal
T11-2	Philippine	Sustainability Improvement of Renewable Energy Development in Village Electrification in the Philippines	realistic goal and overall goal, designing measurable project indicator
T15-1	Turkey	Project for Energy Efficiency Improvement of Power Plant in Turkey	in half year after starting the project, measurable indicator
T17-1	Ghana	Project on Human Resource Development for disseminating PV systems	target group, scope, goal, the project term and the quantity of input
T8-1	China	Improvement of Environment Protection Technology for Metallurgical Combustion	to identify players of activity, designing indicator
T14-1	Cambodia	Project of Capacity and Institutional Building of the Electric power Sector	baseline study
T19-1	Vietnam	Electric Power Technical Standards Promotion Project	qualitative indicator, quantification of qualitative data
T23-1	Lao PDR	Project for the improvement of Power Sector Management (IPSM) in the Lao PDR	to examine appropriateness of PDM
Interview	Tanzania	Project for Capacity Development of Efficient Distribution and Transmission Systems	5 S "Kaizen", change of attitude to the project

Note [ **T**: Technical Cooperation, **P**: Technical Cooperation for Development Planning, **G**: Grant Aid, **L**: ODA Loan ]

<b>Knowledge Lessons Sheet</b>					
<b>Energy 4</b>	<b>Legal Framework</b>	<b>Confirmation of legal framework on energy conservation, technical standards on electric power facilities</b>			

Applicable Scheme(s)	T <input type="radio"/>	P	G	L	Applicable Stage(s)	Form <input type="radio"/>	Plan <input type="radio"/>	Exec <input type="radio"/>	Compl	After
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Applicable Subsectors	Not specified (esp., energy saving type)
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<b>Lessons Learned</b>	
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<b>Type(s)</b>	<input type="radio"/> Generic aspects of project management (cross-cutting among themes)
<input type="radio"/>	Specific to characteristics of the sector
<input type="radio"/>	Specific to characteristics of the country/region (incl. geographical ones)

<b>Key Words</b>	Energy conservation, Technical standards of power supply
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Applicable Cases	Summary/Background of the Issues
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<p>Technical cooperation projects on establishment of legal framework of energy conservation and technical standards on electric power supply and enhancement of executing the legal framework.</p>	<p>Simultaneous execution of various measures such as establishment of legal framework, capacity development of personnel resources and energy conservation investment promotion etc. is expected to multiply effects of technical cooperation project on energy conservation.</p> <p>Establishment of legal framework of technical standards on electric power supply including operation and maintenance of electric power facility secures compliance of the standards. Note that voluntary standards might be able to be disseminated as national standards without legalization of the standards.</p>
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Risks and Considerations	Countermeasures (Approach)
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<ol style="list-style-type: none"> <li>1. Energy conservation measures are not effectively executed without legal framework.</li> <li>2. It is difficult to decide exact project schedule since developing legal framework is dependent on political situation and coordination among stakeholders in host</li> </ol>	<ol style="list-style-type: none"> <li>1. JICA needs to confirm progress of establishment of legal framework on energy conservation and consider contents of technical cooperation project on energy conservation. Energy conservation measure is commonly implemented based on commercial value in country without legal framework.</li> <li>2. JICA needs to consider necessary amendment of scope and schedule of technical cooperation project flexibly to respond timely to progress of establishment of legal framework in case of technical cooperation project to assist establishment of legal framework.</li> <li>3. To provide technical cooperation project to respond to progress</li> </ol>
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<p>country.</p>	<p>of establishment of legal framework, JICA needs to consider timely provision of technical cooperation project on establishment of legal framework in step by step manner following progress of establishment of legal framework. JICA may cancel the following phase of technical cooperation project if establishment of legal framework is suspended.</p> <p>4. JICA should consider inclusion of establishment of legal framework of technical standards on electric power supply as an indicator of project as much as possible since further effective dissemination of the standards is expected once the standards become mandatory requirement by law.</p> <p>5. Legal documents need to be written in official language of host country of the project. Translation into official language by counterparts of implementing agency enables quick legalization and enhances ownership of implementing agency to the project.</p>
<p><b>Expected Effects</b></p>	
<p>Technical cooperation project integrated with establishment and execution of legal framework secures to penetrate output of the project.</p>	

References of originated projects

No.	Country	Project Title	Key Words
T18-2	Sri Lanka	Project for Promoting on Energy Efficiency Improvement	establishment of legal framework
T3-1	Argentina	Industrial Energy Conservation Project	local industries, energy conservation, enactment of legal framework
T12-1	Poland	Project on the Poland-Japan Energy Conservation Technology Centre	promotion of energy conservation, legal regulation, economic incentives
T5-2	Turkey	Technical Assistant Program to support the activities Turkish National Energy Co	establishment of legal framework, technical cooperation
T9-2	Thailand	Project on the Practical Energy Management Training Center in the Kingdom of Thailand	policy study
T19-1	Vietnam	Electric Power Technical Standards Promotion Project	legal documents, official national language
T7-1	Lao PDR	Project on Electric Power Technical Standard Establishment in Lao	standards, official national language

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		People's Democratic Republic	
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Note [ **T**: Technical Cooperation, **P**: Technical Cooperation for Development Planning, **G**: Grant Aid, **L**: ODA Loan ]



Knowledge Lessons Sheet		
<b>Energy 5</b>	<b>Smooth Implementation of Technical Cooperation</b>	<b>Smooth implementation of technical cooperation by contracted consultant team</b>

Applicable Scheme(s)	T	P	G	L	Applicable Stage(s)	Form	Plan	Exec	Compl	After
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Applicable Subsectors	All subsectors
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### Lessons Learned

<b>Type(s)</b>	○	Generic aspects of project management (cross-cutting among themes)
		Specific to characteristics of the sector
		Specific to characteristics of the country/region (incl. geographical ones)
<b>Key Words</b>	Consultant contract, Technical cooperation project by contracted consultant team, Long term expert	

Applicable Cases	Summary/Background of the Issues
Technical cooperation project which is conducted based on consultant contract	Provision of technical cooperation project in energy sector has been changed from assignment of long term full time experts to contracted consulting team. Technical cooperation by contracted consultant team contributes rationalization of increased and more complicated JICA works, but response to negative change of outside condition of project may be delayed and communication with implementing agency may not be sufficient compared with assignment of long term full time experts, since term of each assignment of contracted consultant team in host country is often not full time, commonly occasional and short during project period. To overcome this disadvantage of technical cooperation by contracted consultant team, the following measures should be considered.
Risks and Considerations	Countermeasures (Approach)
1. There is possibility that contracted consultant may not submit request of necessary amendment of contract to JICA, to avoid complicated contract amendment	1. In case of technical cooperation project by contracted consultant team, JICA should consider to extend term of each assignment in host country longer and to amend contract flexibly to enable consultant team to spend more time with counterparts of implementing agency and to respond quickly to change of project condition in host country by monitoring need for amendment of the contract in advance.

<p>procedures.</p> <p>2. There is possibility that appropriate and quick response to sudden occurrence of negative factor to external condition of project may not be taken.</p> <p>3. Communication with implementing agency may not be sufficient.</p>	<p>2. JICA and contracted consultant team should monitor change of external condition of project and progress of project through joint coordination committee etc. and consider necessary drastic modification of project design and methodology of project implementation including change of scope of activities and assignment of experts if the condition is significantly changed from the condition at commencement of the project.</p> <p>3. Combination of assignment of long term full time expert on project coordination etc. and contracted consultant team should be considered if necessary to implement project smoothly. Clear demarcation of missions between long term full time expert and the contracted consultant team is mandatory requirement for this combination and JICA officers in charge of the project at the headquarter and host country office need to communicate with implementation agency, long term full time expert and the contracted consultant team frequently especially at the beginning of the project.</p> <p>4. Establishment of project management unit by permanent assignment of long term full-time supervisor and project coordinator to synchronize and harmonize activities of other experts dispatched by the contracted consultant team and counterparts in various fields of expertise could effectively contribute to the successful implementation of project. (T11-1 Philippines)</p> <p>5. JICA should evaluate methodology of technology transfer of consultants as experts of technical cooperation project before commencement of the project and provide necessary orientation on it to them since many energy sector consultants are mainly involved in technical cooperation for development planning, which mainly provides assistance to make development plans.</p> <p>6. JICA and contracted consultant team need to consider to use third country experts in Africa, because of continuous shortage of Japanese experts who will participate in technical cooperation project in Africa.</p>
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**Expected Effects**

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JICA can quickly respond to change of project conditions and communicate smoothly with implementing agency by using contracted consultant team for technical cooperation project with maximizing benefit of outsourcing of operation of project efficiently.

#### References of originated projects

No.	Country	Project Title	Key Words
T11-1	Philippine	Sustainability Improvement of Renewable Energy Development in Village Electrification in the Philippines	contracted consultant team, project management unit (PMU)
T26-1	Kenya	Establishment of Rural Electrification Model Using Renewable Energy	amendment of scope of project, amendment of way of dispatching experts
T18-1 T18-2	Sri Lanka	Project for Promoting on Energy Efficiency Improvement	each assignment, short term
T20-1	Indonesia	Capacity Building for Enhancement of the Geothermal Development	assignment of full time expert of project coordination
T23-1	Lao PDR	Project for Improvement of Power Sector Management	change of expert
T25-1	Algeria	Sahara Solar Energy Research Center (SSERC)	assignment of full time expert of project coordination

Note [ **T**: Technical Cooperation, **P**: Technical Cooperation for Development Planning, **G**: Grant Aid, **L**: ODA Loan ]

<b>Knowledge Lessons Sheet</b>					
<b>Energy 6</b>	<b>Procurement of Equipment</b>	<b>Timely procurement of equipment for training and research</b>			

Applicable Scheme(s)	T	P	G	L	Applicable Stage(s)	Form	Plan	Exec	Compl	After
	<input type="radio"/>					<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Applicable Subsectors	All subsectors
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<b>Lessons Learned</b>	
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<b>Type(s)</b>	<input type="radio"/> Generic aspects of project management (cross-cutting among themes)
	<input type="radio"/> Specific to characteristics of the sector
	<input type="radio"/> Specific to characteristics of the country/region (incl. geographical ones)
<b>Key Words</b>	Procurement of equipment, Training/research

Applicable Cases	Summary/Background of the Issues
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<p>Technical cooperation project which needs equipment for training and/or research activity.</p>	<p>Some technical cooperation projects require expensive equipment for training and/or research activity. Project to which equipment plays critical role (especially Science and Technology Research Partnership for Sustainable Development (SATREPS) projects, which is increasing in recent years, etc.) needs to consider the following measures to make timetable of the project and procurement plan of equipment.</p>
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Risks and Considerations	Countermeasures (Approach)
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<ol style="list-style-type: none"> <li>1. Risk of delay of total project period is high if procurement of equipment for training and/or research activity.</li> <li>2. Equipment may not be utilized after completion of project.</li> </ol>	<ol style="list-style-type: none"> <li>1. Specification of equipment, which needs to be procured for project, should be decided after decision of training plan and manner of utilization of training equipment. Supplier of equipment should be selected either in Japan/other country outside the host country or the host country of the project (including local agent of distributor of imported equipment), taking into consideration of capacity of operation and maintenance (O&amp;M) of equipment including capability of budget allocation for O&amp;M of implementing agency.</li> <li>2. It is desirable to procure very reliable training equipment, for example equipment which was often used for Japanese ODA projects, after investigating quality and specification of common training equipment in host country of project.</li> <li>3. Procurement in host country of project requires various works and procedures such as preparation of specifications, bidding</li> </ol>
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	<p>documents, bidding procedures, evaluation and selection of tender processes, import and custom clearance, installation, and inspection, etc. in order for assuring performance specified. It is necessary to make procurement plan taking into account of rules of local procurement in host country and necessary term of each procedures. (T12-1 Poland)</p> <p>4. Procurement in Japan takes time for various works and procedures such as preparation of specifications, bidding, overseas transportation (including marine insurance during overseas transportation), custom clearance, local transportation in the host country of project.(T22-1 Pakistan)</p> <p>5. When making timetable of project, JICA and contracted consultant need to select the most suitable procurement method for project and to decide appropriate timing of project's component which requires procured equipment, taking into account of commonly required time for procurement, to avoid significant delay of project period, because both procurement in Japan and in host country takes considerable time.</p> <p>6. Note that there is equipment which requires further fine tuning after installation by manufacturer as well as installer. Local distributor of spare part of equipment with which implementing agency can contact should be clearly identified to secure supply of spare part since there is possibility that its procurement in host country might be difficult for equipment procured in Japan or other country outside the host country. Also it is important to choose equipment which is easily operated and maintained by implementing agency to secure continuous utilization of equipment after completion of the project. (T24-1 India)</p> <p>7. Technology transfer and training on O&amp;M of equipment for implementing agency is mandatory required. JICA and contracted consultant need to consider if provision of additional guidance document on O&amp;M of the equipment as well as manufacture's manual is necessary for implementing agency, when they make bidding document</p>
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<b>Expected Effects</b>
Procurement plan taking into consideration of equipment procurement procedures and estimation of required term of procurement avoids unexpected delay of project period. Appropriate specification of

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equipment, guidance on O&M of equipment and securing supply of consumable material and spare part enable continuous utilization of equipment after completion of project.

References of originated projects

No.	Country	Project Title	Key Words
T2-2	Thailand	Project for Training in the Distribution Automation System	spare parts, term of supplier's warranty
T4-1	Vanuatu	Rural Electrification Project	immediate response, troubles
T3-1	Argentina	Industrial Energy Conservation Project	provided equipment, maintenance skill, technology transfer
T12-1	Poland	Project on the Poland-Japan Energy Conservation Technology Centre	building code, procedures
T22-1	Pakistan	Project for Improvement of Training Capacity on Grid System Operation and Maintenance	insurance to transportation
T24-1	India	Research Partnership for the Application of Low Carbon Technology for Sustainable Development	after sales service, commissioning test

Note [ **T**: Technical Cooperation, **P**: Technical Cooperation for Development Planning, **G**: Grant Aid, **L**: ODA Loan ]

<b>Knowledge Lessons Sheet</b>					
<b>Energy 7</b>	<b>Effective Training</b>	<b>Provision of incentives to trainees of training program</b>			

Applicable Scheme(s)	T	P	G	L	Applicable Stage(s)	Form	Plan	Exec	Compl	After
	⊙		○	○		○				

Applicable Subsectors	All subsectors
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<b>Lessons Learned</b>	
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<b>Type(s)</b>	○	Generic aspects of project management (cross-cutting among themes)
	○	Specific to characteristics of the sector
		Specific to characteristics of the country/region (incl. geographical ones)
<b>Key Words</b>		Training, Energy conservation, Renewable energy, Technical standards on electric power supply, Power generation, Transmission and distribution, Transformation, Rural electrification, Operation and maintenance (O&M)

<b>Applicable Cases</b>	<b>Summary/Background of the Issues</b>
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<p>Project which training is considered to be effective (Especially technical cooperation)</p>	<p>Technical cooperation project often includes training to enhance personnel capacity. Issuance of certificate of achievement based on achievement test improves motivation of trainees to participate in the training program as well as simple certificate of training participation, if possible.</p> <p>Financial assistant projects need to evaluate capacity of executing agency and effectiveness of technology transfer either by project level as a part of the project or sector wide technical cooperation project to identify the most effective scheme.</p> <p>Technology transfer on operation and maintenance (O&amp;M) of power plant, transmission and distribution equipment and transforming equipment etc. through financial assistant project is carried out by soft component of grant aid or engineering service and/or training during the project of ODA loan. The effective design of technology transfer affects performance of O&amp;M of the equipment after construction and commissioning.</p>
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<b>Risks and Considerations</b>	<b>Countermeasures (Approach)</b>
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<p>1. Issuance of achievement certificate without fair achievement test reduce value of the certificate and thus reduce motivation of</p>	<p>Establishment of incentives:</p> <p>1. It increases motivation of trainees to issue them certificate of achievement based on fair achievement test and clear evaluation criteria which is well designed and conducted by expert. Result</p>
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<p>participation in the training.</p> <p>2. There is possibility that performance of equipment is not fully demonstrated as designed and decreased significantly if effective training is not provided.</p>	<p>of achievement test can be used to evaluate degree of understanding of implementing agency on transferred technology and to monitor level of achievement of project's goal.</p> <p>2. Issuance of achievement certificate contributes to capacity enhancement of trainers of the training and increases sustainability of the training.</p> <p>3. Issuance of achievement certificate is applicable to certificate scheme of energy managers under a Law to Promote Energy Efficiency.</p> <p>Needs for training of financial assistant project:</p> <p>1. Capacity on O&amp;M of executing agency is evaluated in preliminary survey of project.</p> <p>2. It is necessary to provide training on O&amp;M to executing agency as a part of soft component of grant aid project or engineering service and/or training of the ODA loan project, if the executing agency does not have appropriate capacity to operate and maintain the equipment.</p>
<b>Expected Effects</b>	
<p>Issuance of certificate of achievement increases sustainability of training program and enables continuous provision of training.</p> <p>Equipment installed by financial assistance is operated and maintained properly.</p>	

References of originated projects

No.	Country	Project Title	Key Words
T13-1	Lao PDR	Assistance for Promotion of Lao Electric Power Technical Standard	conducting achievement test, issuing certificate of achievement
G12	Cambodia	Project for Expansion of Electricity Supply Facilities in Siem Reap	sustainability
G11	Cambodia	Project for the Rural Electrification on Micro-Hydropower in Remote Province of Mondul Kiri	operation of power plant, institutional framework to maintain and manage
G32	Mongolia	Project for Rehabilitation of Power Plants of Sum Centers(Phase 4)	soft component, technical assistance

Note [ **T**: Technical Cooperation, **P**: Technical Cooperation for Development Planning, **G**: Grant Aid, **L**: ODA Loan ]



<b>Knowledge Lessons Sheet</b>					
<b>Energy 8</b>	<b>Coordination of Schemes</b>	<b>Coordination between ODA loan, Grant aid, technical cooperation and training programs etc. (Continuous assistance)</b>			

Applicable Scheme(s)	T	P	G	L	Applicable Stage(s)	Form	Plan	Exec	Compl	After
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Applicable Subsectors	All subsectors
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<b>Lessons Learned</b>	
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<b>Type(s)</b>	<input type="radio"/>	Generic aspects of project management (cross-cutting among themes)
		Specific to characteristics of the sector
		Specific to characteristics of the country/region (incl. geographical ones)

<b>Key Words</b>	Operation and maintenance (O&M), Volunteers
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Applicable Cases	Summary/Background of the Issues
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<p>Projects which need technology transfer on equipment and its O&amp;M in institutional level.</p> <p>Projects which continuous technology transfer on energy and renewable energy etc. is effective.</p>	<p>Each scheme can include both hard (equipment) and soft (technology) components. However, provision of soft component of grant aid is mainly focused on operation and maintenance (O&amp;M) of the granted equipment and basically its technology transfer to executing agency is not considered. On the other hand, technical cooperation is able to provide institutional scale capacity development but provision of training equipment is limited to equipment which is necessary for technology transfer, taking into consideration of purpose of the corporation scheme. Therefore it is necessary to formulate and to manage project with consideration of possible coordination with other scheme, since coordination with schemes is effective to understand advantages and limitation of each schemes and to provide assistances which can complement needs for project.</p>
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Risks and Considerations	Countermeasures (Approach)
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<p>1. Advance planning of coordination between assistant schemes is effective to provide assistance. However sometimes, continuous assistance may not be possible or effective</p>	<p>1. Following provision of technology transfer on O&amp;M as soft component of grant aid project or training on O&amp;M of equipment by its supplier as a part of ODA loan, technical cooperation project to transfer the technology to nation-wide power sector is implemented. It is also effective to coordinate with dispatching volunteer or training program in Japan. JICA needs to select the most effective combination of assistant scheme for technology transfer taking into account of each country situation. Note that</p>
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<p>because of change of project situation.</p> <p>2. There is a risk to cause high cost of coordinating schemes when coordination with other scheme is recognized as effective measure during implementing project.</p>	<p>to reflect the change of situation flexibly, need assessment is necessary before provision of further assistance by other assistant scheme.</p> <p>2. It is effective to assist development of master plan by technical cooperation for development planning and to provide technical cooperation project or financial assistance project based on the development plan or policy recommendation of the master plan. Projects should be flexibly formulated such as partially simultaneous implementation of master plan study with other assistance project taking into consideration of most effective timing of each assistant project.</p> <p>3. Assignment of coordinator to government ministry/agency which supervise sector (individual expert) who has knowledge and experience of various JICA assistant schemes as well as expertise and experiences of the sector is effective to coordinate schemes smoothly.</p>
<b>Expected Effects</b>	
<p>Institutional and commercial scale capacity development of overall sector is realized following technology transfer of individual equipment. Developing upper level plan such as sectoral master plan etc. helps to provide effective, comprehensive and continuous assistant.</p>	

References of originated projects

No.	Country	Project Title	Key Words
T22-1	Pakistan	The Project for Improvement of Training Capacity on Grid System Operation and Maintenance	transmission and transformation facility, grant, technical cooperation
G13	Cambodia	The Project for the Rural Electrification on Micro-Hydropower in Remote Province of Mondul Kiri	small hydro power, grant aid, technical cooperation
P7	Indonesia	Master Plan Study for Geothermal Power Development in the Republic of Indonesia	master plan, technical cooperation, ODA loan, private investment
L40-1 ,2	Ecuador	Transmission (Phase D) Project and Sub-Transmission (Phase B-2) Project	remote area, rural electrification, social infrastructure
L99	Bangladesh	Gas turbine power plant construction project	assistance to power sector reform
L102	Bangladesh	Barge-Mounted Power Plant Rehabilitation Project	building the institutional capacity of the executing agency
L142-	Mongolia	The Rehabilitation Project for the 4th Thermal	assistance of provision of

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1,2		Power Plant in Ulaanbaatar	equipment, technical assistance
L203	Vietnam	Rural Infrastructure Development and Living Standard Improvement Project (III)	framework, institutional, technical assistance

Note [ **T**: Technical Cooperation, **P**: Technical Cooperation for Development Planning, **G**: Grant Aid, **L**: ODA Loan ]

<b>Knowledge Lessons Sheet</b>					
<b>Energy 9</b>	<b>Assistance to Rebuilding</b>	<b>Step by step assistance with clear priority to country under rebuilding</b>			

Applicable Scheme(s)	T	P	G	L	Applicable Stage(s)	Form	Plan	Exec	Compl	After
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>			<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	

Applicable Subsectors	All sub-sectors
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<b>Lessons Learned</b>	
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<b>Type(s)</b>		Generic aspects of project management (cross-cutting among themes)
		Specific to characteristics of the sector
	<input type="radio"/>	Specific to characteristics of the country/region (incl. geographical ones)
<b>Key Words</b>	Power plant, Transmission and distribution facilities, Capacity of implementing agency, Enhancement of personnel resources	

<b>Applicable Cases</b>	<b>Summary/Background of the Issues</b>
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<p>Countries under rebuilding from internal war and large scale natural disaster</p>	<p>It is very common that power plants and transmission and distribution (T&amp;D) facilities are not operational because of destruction or aging of those facilities and customers who need electricity use own generators in countries under rebuilding from internal war and large scale natural disaster. Also in these countries, lack of operators of power plants and T&amp;D facilities and loss of fundamental information such as drawings of facilities (such as "as built drawings" including underground cables) and land ownership documents are very common.</p> <p>To provide assistance to these countries, it is necessary to provide continuous assistances in step by step manner with clear priority at each stage such as emergent rehabilitation, short and medium term rebuilding, since there are abundant needs for power sector rebuilding.</p>
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<b>Risks and Considerations</b>	<b>Countermeasures (Approach)</b>
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<p>1. It takes time to collect information to understand the urgent needs of assistance because of weak capacity of implementing agency, lack of information and data on electric power facilities,</p>	<p>1. It is essential to make need and priority of rebuilding clear and to collect information on other donor's assistant plan at project formulation stage. It is effective to conduct a survey to understand current situation roughly in about one month, to make and implement a plan of urgent assistance and to provide further assistant based on evaluation of the effect of the urgent assistance.</p>
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<p>electricity demand, customers etc.</p> <p>2. Many donors participate in rebuilding of power sectors. However donor coordination may not be workable because of lack of capacity of implementing agency.</p> <p>3. In these countries, implementing project may be disturbed sometimes by security reasons. Suspension or cancelation of the project may be happened if safety is not secured.</p>	<p>2. JICA should make assistant plan such as targeted regional area, targeted sector and organization which is not duplicated and would rather multiply effect with other donor's assistance. The plan should be designed to be amended easily to respond to change of situation or occurrence of more urgent need for assistance as much as possible.</p> <p>3. JICA should provide assistance in step by step manner and develop implementing agency's capacity continuously, taking into account of acceptability of assistance of implementing agency.</p> <p>4. It is important to train operators of equipment and to prepare relevant manuals and materials as well as rebuilding of equipment.</p> <p>5. Assignment of full time advisory expert (individual expert) is effective to provide long term and continuous assistance and to coordinate JICA's various assistant schemes. Note that appropriate expert may not be available because of security reason and remote geographical location from Japan especially in African countries.</p>
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### Expected Effects

The assistance to countries under rebuilding contributes to solve urgent and long term needs of power sector rebuilding.

### References of originated projects

No.	Country	Project Title	Key Words
T21-1	Sierra Leone	Project for Capacity Development for Maintaining Power Supply Facilities	electric power supply facilities, enhancement of capacity on operation and maintenance, grant aid
G16	Sierra Leone	Project for Urgent Improvement of Electric power Supply System in Freetown	operation and maintenance
G36	Timor-Leste	Project for Rehabilitation of Power Supply in Dili	electric power plant, operation and maintenance, technology transfer, electric power development planning
G37	Timor-Leste	Project for Rehabilitation of Power Distribution Network in Dili	long term, assistant on skills and technology
G12	Cambodia	Project for Expansion of Electricity	process between request by host

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		Supply Facilities in Siem Reap	country to implementation, prompt provision
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Note [ **T**: Technical Cooperation, **P**: Technical Cooperation for Development Planning, **G**: Grant Aid, **L**: ODA Loan ]

<b>Knowledge Lessons Sheet</b>					
<b>Energy 10</b>	<b>Input of Executing Agency</b>	<b>Timely implementation of input of Executing Agency</b>			

Applicable Scheme(s)	T	P	G	L	Applicable Stage(s)	Form	Plan	Exec	Compl	After
			○	○		○	○	○	○	○

Applicable Subsectors	All sub-sectors
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<b>Lessons Learned</b>	
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<b>Type(s)</b>	○	Generic aspects of project management (cross-cutting among themes)
		Specific to characteristics of the sector
		Specific to characteristics of the country/region (incl. geographical ones)
<b>Key Words</b>		Implementing Agency's input, Tax exemption, Total period of project

Applicable Cases	Summary/Background of the Issues
All financial assistance projects	There are many ODA grant and ODA loan projects which delay of input of executing agencies and taxation related works such as tax exemption cause delay of total project period. It is necessary to confirm progress of executing agency's input such as budgeting and procurement of necessary equipment and materials and tax exemption at each stage of preparatory study (basic concept study), signing of exchange of note (E/N), and detailed design etc.
Risks and Considerations	Countermeasures (Approach)
Realization of effect of project may be delayed because of delay of construction work by executing agency, budget allocation of executing agency and tax exemption for ODA grant and ODA loan project.	<ol style="list-style-type: none"> <li>1. It is effective to implement project efficiently that appropriate burden sharing between both JICA and executing agency taking into consideration of principles of ODA grant and ODA loan schemes and executing agency's financial and executing capability. (G8 Ghana)</li> <li>2. Coordination of total schedule between Japanese input and executing agency's input, taking into consideration of total schedule of project including input of executing agency, contributes to shorten total project period. For example, executing agency executes appurtenant work of the project such as movement of existing electricity pole before the commencement of the project etc. Note that executing agency's budget allocation often may not be approved without Japanese official commitment of financial assistance to the project. Especially in case of Grant Aid project, Japanese government</li> </ol>

	<p>cannot commit provision of the Grant Aid before signing of E/N officially and thus coordination between both parties may be delayed. This problem is not solved for long time. It is necessary to make timetable of total project period taking into account of timing of executing agency's decision of budget allocation. (G23 Tanzania)</p> <p>3. JICA should explain well about input of executing agency and tax exemption at stages of project formulation and project planning and mention those in minutes clearly. Following those actions, JICA should identify needs for those measures at preliminary study, coordinate with total schedule and arrange those measures.</p>
<b>Expected Effects</b>	
<p>Timely input of executing agency reduces delay of project period as minimum as possible. Completion and commissioning of project may be faster than original schedule and thus effect of project will be increased. (Energy 12: Smooth implementation of project)</p>	

References of originated projects

No.	Country	Project Title	Key Words
G8	Ghana	Project for Rural Electrification (Phase 1 and Phase 2)	end user, installation of customer's electricity meter, service wire
G13	Tanzania	Project for Reinforcement of Transmission and Distribution Facilities in Oyster Bay Substation (Phase I and II)	to shorten total project period
G23	Tanzania	Project for Power Supply Expansion in Dar es Salaam (Phase 2)	budget allocation, compensation for land acquisition
G16	Sierra Leone	Project for Urgent Improvement of Electric Power Supply System in Freetown	communication among relevant parties, procurement and installation of power feeder
G17	Suriname	Project for Expansion of Transmission and Distribution Grid for the Districts Commewijne and Saramacca	input of implementing agency, complete explanation

Note [ **T**: Technical Cooperation, **P**: Technical Cooperation for Development Planning, **G**: Grant Aid, **L**: ODA Loan ]



Knowledge Lessons Sheet		
<b>Energy 11</b>	<b>Relationship with Outside Business</b>	<b>Consistency between preparation of up to downstream facilities in the grid</b>

Applicable Scheme(s)	T	P	G	L	Applicable Stage(s)	Form	Plan	Exec	Compl	After
		○	◎	◎		○				

Applicable Subsectors	All subsectors
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Lessons Learned	
<b>Type(s)</b>	Generic aspects of project management (cross-cutting among themes)
	○ Specific to characteristics of the sector
	Specific to characteristics of the country/region (incl. geographical ones)
<b>Key Words</b>	Master plan, Rural electrification, Generation capacity, Transmission, Transformation, Distribution, Fuels

Applicable Cases	Summary/Background of the Issues
All financial assistance projects	<p>Since electric power is supplied by several stages of fuel procurement and a network of power generation, transmission, conversion and distribution, it is necessary to formulate a project in consideration of the supply-demand balance of the facilities constituting the network.</p> <p>Therefore, it is preferable to conduct a master plan study of the entire power sector first, to clarify the long-term power supply and demand forecast of the country, facility planning, and to investigate risks on fuel supply, and then to finance individual facilities.</p> <p>From that point of view, it is getting more important to include the aspects of climate change mitigation—especially, development of Nationally Determined Contribution (NDC) as the future target and planning of GHG emissions every 5 years required by the Paris Agreement—and renewable energy development.</p> <p>Therefore, future scenarios setting considering economic, environmental, and energy security and simulation of hourly demand-supply balance are required.</p> <p>On the other hand, another rural electrification projects, even if not overlapping to JICA's project, caused voltage drop of JICA project areas. This was due to the concentration of power flow to some specific transmission line and resulted the increase of loss of transmission lines, and degradation of the power supplied, as</p>

	<p>observed in the Ghana project (G8 Ghana). In order to prevent such a situation, it is important for C/P to fully understand the master plans formulated from long-term perspectives, and to utilize it as a sector plan for their country).</p>
Risks	Counter Measures
<p>In the countries and regions where the power generation capacity is insufficient, even if the power development plan including the transmission and distribution network of the relevant country is thoroughly confirmed at the prior investigation stage, the following risks are considered:</p> <ul style="list-style-type: none"> <li>• Even if the rural electrification project is implemented by extending the grid, sufficient power supply will not be carried out due to delays in power development; and</li> <li>• Electric power supply does not improve even if power generation capacity is strengthened due to delays in extension of the grid.</li> </ul> <p>Other points include:</p> <ul style="list-style-type: none"> <li>• Development of the Master plan—with simulations—is necessary, which includes GHG and renewables targets</li> </ul>	<p><u>Preliminary grasp of consistency of the whole power grid (country or region):</u></p> <ol style="list-style-type: none"> <li>1. Prior to financial cooperation for the improvement of transmission and distribution networks in countries or regions where power generation capacity is insufficient absolutely, JICA needs to confirm the future prospects including the progress of power development and funding and to determine whether to provide grant/loan.  In countries where the power generation heavily depends on IPPs, there is a possibility that uncertainty may increase, so it is necessary to sufficiently confirm the connection plan to the power plant concerned.</li> <li>2. In the power plant and substation construction projects, JICA should confirm the construction schedule of the transmission lines connecting these facilities and support construction as necessary.</li> <li>3. In the project to construct substations and high-voltage transmission lines, JICA should confirm the status of the distribution network.</li> <li>4. WASP IV, which has been widely used as a power development optimization program, has the merit that even a technician who does not know the power supply and demand operation can obtain a result. However, in the electric power system where the development of nuclear power generation and coal-fired power is restricted from political and environmental aspects, and the potential of renewable power is abundant to be promoted for the development, WASP IV cannot correctly simulate supply and demand operation since it calculates only its monthly balance. Based on these, it is important to simulate the future supply and demand balance on an hourly basis and compare and evaluate it, since renewable energies (hydro, PV</li> </ol>

<p>considering economical and energy security aspects.</p> <ul style="list-style-type: none"> <li>• In general, power is often recognized as a political resource (for voting, and the only large governmental resources), therefore, in some cases, technically and socially consistent development is difficult.</li> <li>• Rural electrification has a very political meaning in developing countries, so in some cases even the power company may not be notified at the planning stage of the electrification project.</li> <li>• Since China's support projects are formed in a short period of time, there is a possibility that the information is not available at the project formulation stage.</li> </ul>	<p>and wind) heavily fluctuates seasonally, monthly, daily and hourly.</p> <p><u>Considerations in rural electrification projects:</u></p> <ol style="list-style-type: none"> <li>1. At the project formulation stage, it is necessary to investigate rural electrification projects of other donor agencies, as well as to coordinates the intentions of how to proceed with electric power companies for rural electrification. If necessary, JICA should consider broadening the coverage area at the preparation survey stage, creating various scenarios for rural electrification, and sharing the transmission and distribution network plan that does not cause a voltage drop due to insufficient power generation capacity with the electric power company.</li> <li>2. JICA should prepare the rural electrification master plan by extension of the electric grid network and promote electrification systematically under the long-term rural electrification plan. In doing so, JICA should also consider possibility of introducing renewable energy, etc., and let C/P sufficiently recognize the risks of introducing renewable energy in advance in terms of stable operation of the power system.</li> </ol>
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**Expected Effects**

It is possible to eliminate cases that may have limited effect.

For rural electrification, it is possible to reduce transmission and distribution loss as well as to maintain and improve power quality.

References of originated projects

No.	Country	Project Title	Key Words
G25, G26	Nigeria	Grant Aid for Rural Electrification – Phase II, III	absolute shortage of power, request for the power development planning and financial support

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G29	Nepal	Project for the Construction of New Kawasoti Substation	construction of substation, scheduling of construction of transmission line connected
G9	Ghana	The Project for Electrification of Lower Volta Area	substation with high voltage transmission line, distribution lines
G2	Indonesia	The Project for Rehabilitation of Gresik Steam Power Plant Units 3 and 4	forecast of fuel supply, dual fuel of gas and oil
G8	Ghana	Grant Aid for Rural Electrification – Phase I, II	rural electrification, voltage drop, China's influence
L48	Kenya	Mombasa Diesel Generating Power Plant Project	strengthening power sector's operational management
L76-1,2,3	China	Hubei Ezhou Thermal Power Plants Construction Projects (Phase I, II, and III)	affected by other power development plans, precise demand analysis of the grid
L117 1,2	Philippines	Extra High Voltage Transmission Line Project Stage I, II	close cooperation between grid and power development plans, review of the assumptions
L169, L170	Indonesia	Java-Bali Transmission Line/Substation Development Project (East Java) (I & II)	insufficiency of expansion of supply facilities other than the increased medium voltage ones, worsening of financial status

Note [ **T**: Technical Cooperation, **P**: Technical Cooperation for Development Planning, **G**: Grant Aid, **L**: ODA Loan ]

Knowledge Lessons Sheet					
<b>Energy 12</b>	<b>Smooth Implementation of the Project</b>			<b>Scheduling to avoid delay</b>	

Applicable Scheme(s)	T	P	G	L	Applicable Stage(s)	Form	Plan	Exec	Compl	After
			○	◎		○	○	○		

Applicable Subsectors	All subsectors
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Lessons Learned	
<b>Type(s)</b>	<input type="radio"/> Generic aspects of project management (cross-cutting among themes)
	<input type="radio"/> Specific to characteristics of the sector
	<input type="radio"/> Specific to characteristics of the country/region (incl. geographical ones)
<b>Key Words</b>	Preliminary analyses, Profitability, Natural conditions, Barrier analyses, Financial situation, Technology selection, Risk analyses

Applicable Cases	Summary/Background of the Issues
All financial assistance projects	There are several patterns where delay occurs in financial cooperation projects. It is effective to take countermeasures in advance assuming the possibilities.

Risks	Counter Measures
In many cases, a delay in the completion of the project has been reported, and it appears in the form of a change of the original plan.	<p>In order to minimize the delay of the schedule, it is necessary to pay attention to the following points (please note that there is no comprehension):</p> <ol style="list-style-type: none"> <li>1. Analyze and evaluate the possibility of situations where various delays occur in preliminary analyses as much as possible.</li> <li>2. Make sure of the implementation capability (for budget, personnel, implementation capability, etc.) of the Executing Agency.</li> <li>3. Establish a dedicated project team within the Executing Agency (streamlining communication by unifying the Executing Agency's focal points).</li> <li>4. Establish a realistic project implementation schedule that fully takes into account the possibilities of future plan changes (i.e., even if there is a request from the Executing Agency side, the schedule should not be set excessively tight).</li> </ol>

	<ol style="list-style-type: none"><li>5. Regular information sharing among stakeholders through the establishment of councils etc. and close and appropriate coordination are important (in many cases, it is impossible for the Executing Agency alone to deal with land acquisition, as shown later, and coordination between ministries and agencies becomes essential).</li><li>6. Appointment of experienced external consultants (as the Executing Agency's advisors or information collection at JICA side. Appointment aimed at initial response etc. when trouble occurs is effective).</li><li>7. In some cases, e.g., DSM project to promote energy efficient appliances (L70 Thailand), it may be necessary to flexibly ask for changes in the project scope itself.</li><li>8. For multiple projects as a set, it is necessary to pay attention to overall design and progress management. For example, for a set of transmission line and power plant construction projects, we should consider stepwise implementation, as necessary, for synchronizing their completion (see Lesson Energy 11 "Relationship with Outside Business").</li><li>9. For power transmission and distribution projects involving the construction of many substations, it is important to preliminarily select candidate sites for projects. Especially for land acquisition in island countries, etc., it is essential to collect prior information such as confirmation of rights relationships to avoid troubles.</li><li>10. Setting conditions for bidding that make it impossible for contractors to accept the order beyond its capacity by setting screening conditions based on contractor's rating and performance provisions in that country and/or its PQ (pre-qualification), etc.</li><li>11. When the project forms a part of a large-scale industrial development or regional development plan, there are cases where it is necessary to flexibly review and change the contents and scale of the plan due to external factors.</li><li>12. Consideration of the period required for land acquisition (generally takes time). For example, in the case of transmission lines, etc., consider options such as adopting a detour route.</li></ol>
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	<p>Investigation of options is also indispensable from the viewpoint of environmental and social consideration, such as by avoiding or minimizing involuntary resettlement etc.</p> <p>13. In the case of construction at an existing site, we need to consider the period of removal work of existing structures.</p> <p>14. We need to consider the period required for various types of compensation negotiations (generally takes time).</p> <p>15. We need to consider the period required for approval. We can refer to the period required by the past cases.</p>
<b>Expected Effects</b>	
<p>The risk of plan delay can be minimized by assuming various cases in advance and considering information collection and countermeasures (see Energy 2 "Collaboration with Relevant Organizations", 10 "Input of Executing Agency" and 13 "Preliminary Analysis" lessons).</p>	

References of originated projects

No.	Country	Project Title	Key Words
L6-1,2	India	Anpara Power Transmission System Project	a set of power plant and transmission line, both progress and approval period were considered
L7	India	Ujjani Hydroelectric Project	delay due to geological conditions
L64	Thailand	PEA Transmission System and Substation Development Project (Seventh Stage, Phase II)	plan changes due to power demand situation
L70	Thailand	Promotion of Electricity Energy Efficiency Project	DSM type, scope change during implementation
L71	Thailand	Distribution System Reliability Improvement Project	approval process with lessons from past cases
L96	Pakistan	Secondary Transmission Lines and Grid Stations Project	appointing consultant, sharing recognition
L98	Paraguay	Asuncion Power Transmission and Distribution Network Improvement Project	opposition of residents caused plan change
L134	Malaysia	Port Dickson Power Station Rehabilitation Project	construction at an existing site, period of removal work needed
L151	Thailand	Transmission System and Substation Development Project (Sixth Stage, Phase I)	pre-selection of many sub-station candidate sites

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L158	Egypt	El-Salam Canal Pumping Station Project	consideration of phased procurement
L163	Egypt	Cairo-Alexandria Transmission System Project	negotiation for compensation
L172	India	Indian Tamil Nadu State Micro Hydropower Stations Construction Project	dedicated project team
L192	Rao PDR	Greater Mekong Power Network Development Project (Lao PDR)	progress of related projects, confirmation of reality of planning
L204	India	Rural Electrification Project	confirmation of contractor's capacity
L207	Thailand	Gas Separation Plant Project	plan change as needed (even scaling down)

Note [ **T**: Technical Cooperation, **P**: Technical Cooperation for Development Planning, **G**: Grant Aid, **L**: ODA Loan ]



<b>Knowledge Lessons Sheet</b>					
<b>Energy 13</b>	<b>Preliminary Analyses</b>	<b>Preliminary analyses—risk assessment and examination of alternatives</b>			

Applicable Scheme(s)	T <input type="radio"/>	P <input type="checkbox"/>	G <input checked="" type="radio"/>	L <input checked="" type="radio"/>	Applicable Stage(s)	Form <input type="radio"/>	Plan <input type="radio"/>	Exec <input type="checkbox"/>	Compl <input type="checkbox"/>	After <input type="checkbox"/>
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Applicable Subsectors	All subsectors
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<b>Lessons Learned</b>	
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Type(s)	<input type="radio"/> Generic aspects of project management (cross-cutting among themes)
	<input type="radio"/> Specific to characteristics of the sector
	<input type="radio"/> Specific to characteristics of the country/region (incl. geographical ones)

Key Words	Preliminary analyses, Profitability, Natural conditions, Barrier analyses, Financial condition, Technology selection, Risk assessment
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Applicable Cases	Summary/Background of the Issues
All projects (especially, financial assistance)	<p>It is of utmost importance to conduct risk analysis and assessment adequately. In order to reduce the variation in the evaluation criteria by the consultant, it is desirable to specify the analysis and evaluation items clearly in the contents of the preliminary study. After grasping the characteristics of the project, it is necessary to conduct the analysis and, in some cases, to study alternatives.</p> <p>Although it is difficult, in reality, to review and evaluate all the concerns and to take countermeasures in advance, we can extract the points to consider from the experience of many financial cooperation projects so far.</p>

Risks	Counter Measures
<p>If the preliminary analysis is inadequate (i.e., required items are missing, points are shifting, and/or analysis level is too shallow), problems may emerge in various ways at a later stage.</p> <p>In reality, there is a large distribution in the consultant's ability in risk analysis and evaluation.</p>	<p>Major items of risk assessment:</p> <ol style="list-style-type: none"> <li>1. Political stability;</li> <li>2. Possibility of natural disasters;</li> <li>3. Possibility of human disaster;</li> <li>4. Natural and social environment;</li> </ol> <ul style="list-style-type: none"> <li>• Technological aspects: Important for hydro (high-precision geological analysis), wind (wind resources) and geothermal (geothermal resources) power plants. Cooling water influences thermal power plant's efficiency. Reservoir is essential for underground energy</li> </ul>

<p>There were several cases where the quality of geological analysis of hydroelectric power construction project was insufficient and large design change was forced.</p>	<p>resource development projects.</p> <ul style="list-style-type: none"><li>– Appropriateness of technology selection, design, assumption and simulation.</li><li>– It is desirable to conduct technical evaluation by experts on the geological survey plan and results of hydroelectric spots.</li></ul> <ul style="list-style-type: none"><li>• Environmental aspects: In addition to the environmental impacts, careful design of mitigation measures for forced resettlement is necessary. Investigation of impacts on residents' lives and possible alternatives are required.</li></ul> <p>5. Ability of the execution agency;</p> <ul style="list-style-type: none"><li>• ODA experience of the Executing Agency.</li><li>• Presence of full-time staff and competent consultants.</li><li>• The number of projects handled simultaneously.</li></ul> <p>6. Economic and financial viability;</p> <ul style="list-style-type: none"><li>• Cost/benefit analysis (including scrutiny of effects by electricity liberalization and fuel price. Scenario and sensitivity analysis are effective). Prospects of external situation and its preconditions:<ul style="list-style-type: none"><li>– Electricity demand and economic growth,</li><li>– Fuel supply and procurement.</li></ul></li><li>• Project scope and financial situation of the Executing Agency:<ul style="list-style-type: none"><li>– Profit excluding subsidies,</li><li>– Currency risk,</li><li>– Taxation method,</li><li>– Internal control organization of asset management,</li><li>– Reliability of accounting data, and</li><li>– Possibility and method of future privatization, etc.</li></ul></li></ul> <p>7. Other assessments of risks and alternatives;</p> <ul style="list-style-type: none"><li>• Assessment of site-specific constraints,</li><li>• Investigation of approvals and licenses,</li></ul>
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	<ul style="list-style-type: none"> <li>• Survey analysis on the impact of existing projects,</li> <li>• Possibility analysis of interaction between applications for multi-purpose project,</li> <li>• Investigation on the impact of other projects and synergy development,</li> <li>• Confirmation of certainty of remaining part of partial investment or loan project.</li> </ul>
<b>Expected Effects</b>	
Minimizing the risk of problems occurring during and after the project.	

References of originated projects

No.	Country	Project Title	Key Words
L7	India	Ujjani Hydroelectric Project	delay due to geological conditions
L11-1,2,3	India	Srisaïlam Left Bank Power Station Project (1)-(3)	impact analysis of lower pond surface change, alternative option
L18	India	Eastern Gandak Canal Hydroelectric Project	capacity of drainage, simulation
L21-1,2	India	Shimhadri and Vizag Transmission System Project (1) (2)	project in a restricted area
L31	Indonesia	Priok Steam Power Plant Unit 3 & 4 Rehabilitation Project	precise demand forecast
L37	Indonesia	Equipment Supply for Scattered. Diesel Power Plants Project	optimal power development plan for outer islands
L107	Philippines	Tiwi Geothermal Power Plant Complex Rehabilitation Project	balance of underground geothermal reservoir
L108	Philippines	Tongonan Geothermal Power Plant Construction Project	splitting order, over-capacity of the executing agency
L110	Philippines	Mak-Ban Geothermal Power Plant Complex Rehabilitation Project	confusion of the term of the steam supply plan, sector privatization impact
L119	Philippines	Northern Negros Geothermal Project	shortage of steam flow, currency crisis impacts
L182	Costa Rica	Pirris Hydroelectric Power Development Project	more in-depth geological investigation needed
See the sheets of Energy Lessons 1 and 2.			

Note [ **T**: Technical Cooperation, **P**: Technical Cooperation for Development Planning, **G**: Grant Aid, **L**: ODA Loan ]

Knowledge Lessons Sheet		
<b>Energy 14</b>	<b>Smooth Implementation of Financial Assistance Projects</b>	<b>Prior written agreement on important matters in project implementation</b>

Applicable Scheme(s)	T ○	P	G ◎	L ◎	Applicable Stage(s)	Form	Plan ○	Exec	Compl	After
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Applicable Subsectors	All subsectors
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Lessons Learned	
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<b>Type(s)</b>	○	Generic aspects of project management (cross-cutting among themes)
	○	Specific to characteristics of the sector
		Specific to characteristics of the country/region (incl. geographical ones)

<b>Key Words</b>	Preliminary analyses, Profitability, Natural conditions, Barrier analyses, Financial condition, Technology selection, Risk assessment
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Applicable Cases	Summary/Background of the Issues
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<p>In case there are elements that should be clarified before implementation, i.e., concerned elements that they would not be implemented reliably by the host country at the project implementation stage or post-completion stage.</p>	<p>The elements to be clarified beforehand includes the elements as follows: Construction/procurement plan; Monitoring methodology after project completion; Maintenance plan of equipment including future equipment update; Operation instruction at the time of delivery and technical guidance (soft component for grant projects); Additional measures for performance degradation after completion (e.g., declined operating rate); Financial situation of the Executing Agency (esp., securing operation and maintenance budget); How to deal with changes in external factors.</p> <p>By leaving these agreements in written form, we can reduce the risks not to be implemented as expected.</p>
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Risks	Counter Measures
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<p>There is a risk that the subject, to be beared and supposed to be done by the host country, will fall into a situation not implemented as expected.</p>	<p>The followings are examples to be included in the Loan Agreement or other agreements as the conditions.</p> <p><u>Project implementation stage:</u></p> <ol style="list-style-type: none"> <li>1. Sufficient consultation with the Executing Agency on the procurement implementation plan at the appraisal stage and agreement in writing are required (JICA's Standard Bidding Document is useful for general equipment).</li> <li>2. Appointing external consultant.</li> </ol>
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	<p><u>After project completion:</u></p> <ol style="list-style-type: none"> <li>3. Monitoring. <ul style="list-style-type: none"> <li>• Definitions, calculation formulae and target values of key O&amp;M indicators.</li> <li>• Monitoring data acquisition/recording system (For hydropower projects, prediction of rainfall is required in addition to the reservoir water quantity data).</li> <li>• Mandatory reporting of implementation status.</li> <li>• Financial situation of the Executing Agency.</li> </ul> </li> <li>4. Manualization and scheduling of training, etc.</li> <li>5. Periodic total inspection (For large hydropower, it is necessary with high frequency).</li> <li>6. Additional measures when performance is degraded (e.g., when there is a deviation from the expected results, such as a decrease in the operating rate of the power plant).</li> <li>7. Main equipment/member update plan, beyond the term of the Loan Agreement.</li> <li>8. When external conditions change (e.g., privatization after completion), the agreement between the Government and the Executing Agency is necessary concerning related change (e.g., on information sharing system).</li> </ol> <p>Although it is a somewhat different point of view, problems may arise in response to the maintenance of Japanese machinery and materials. Therefore, in addition to remotely monitoring the usage situation from Japan, it is desirable for JICA to prepare, in advance, a system that can respond to specific needs.</p>
<b>Expected Effects</b>	
<p>By discussing and documenting as an agreement for necessary items and elements in advance, it is expected to avoid unnecessary disputes and maintain performance during or after the project implementation.</p>	

References of originated projects

No.	Country	Project Title	Key Words
L8	India	Umiam Hydro Power Station	consideration of renewal of major

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		Renovation Project	equipment and parts
L73	China	Gansu Small-sized Hydropower Project	definitions and formulae of the indicators
L90	Nepal	Kali Gandaki 'A' Hydroelectric Project	mandating high-frequency periodic total inspection
L96	Pakistan	Secondary Transmission Lines and Grid Stations Project	appointing an external consultant, common recognition
L143-1,2	Jordan	Aqaba Thermal Power Plant Expansion Project (I) (II)	changes in external conditions such as privatization
L157	India	Umiam Stage 2 Hydro Power Station R&M Project	goal setting for operational indicators, future forecast
L165	Sri Lanka	Colombo City Electricity Distribution Development Project	procurement implementation plan, insufficient consultation

Note [ **T**: Technical Cooperation, **P**: Technical Cooperation for Development Planning, **G**: Grant Aid, **L**: ODA Loan ]

Knowledge Lessons Sheet										
Energy 15	Fuel Procurement				Secure stable supply of inexpensive fuel					
Applicable Scheme(s)	T	P	G	L	Applicable Stage(s)	Form	Plan	Exec	Compl	After
			○	◎		○	○			○
Applicable Subsectors		All subsectors								
Lessons Learned										
Type(s)		Generic aspects of project management (cross-cutting among themes)								
	○	Specific to characteristics of the sector								
		Specific to characteristics of the country/region (incl. geographical ones)								
Key Words	Fuel procurement, Unpredictability, Hedging risks									
Applicable Cases					Summary/Background of the Issues					
Energy supply facilities projects and geothermal power generation that require fuel and raw materials (esp., oil, gas and biomass).					<p>Fuel procurement at a stable and low cost is an extremely important factor in determining whether to implement the project in energy supply facilities such as power plants that require fuel.</p> <p>It is also important to prepare for unforeseen circumstances concerning fuel procurement at the stage of project formulation and planning, even if there is no particular problem.</p> <p>For geothermal power generation, various risk assessments that take geothermal resources or steam supplied from the outside as fuel, are necessary.</p>					
Risks					Counter Measures					
<p>There is a risk that the facility cannot operate as expected unless sufficient supply of fuel (at a price within a range that makes profitability) is made, including unforeseen circumstances.</p> <p>Problem could occur in the following situations:</p> <ol style="list-style-type: none"> <li>Spike in fuel price (international price for fossil fuels and domestic/local price for biomass)</li> </ol>					<p>As countermeasures, there may be the followings:</p> <ol style="list-style-type: none"> <li>Carefully analyze risk analysis of fuel supply as much as possible. If uncertainty still cannot be eliminated, JICA may consider design changes to dual fuel type that can use multiple fuels as well as the possibility not to adopt the project.</li> <li>In anticipation of unforeseen circumstances, take risk measures such as concluding a long-term contract on fuel supply as a prerequisite for implementing the main project, or as a condition for bid/contract consent in the project implementation.</li> <li>Encourage the Executing Agency to undertake cross-sectoral and comprehensive risk analysis.</li> </ol>					

<p>and steam of geothermal)</p> <p>2. Procurement becomes practically difficult from political instability etc. of the fuel supplier country (esp., for oil).</p> <p>3. Decrease in priority of fuel supply to the facility due to changes in domestic political situation.</p> <p>4. Relative price decline of competitive fuels or electricity (e.g., impact of shale gas/oil).</p> <p>5. Geothermal resources and steam supply are less than anticipated</p>	<p>4. Timely intervention from the Executing Agency to the central government (i.e., promotion of cross-sectoral coordination). Please note that due to the influence of shale oil and gas, the market for crude oil and natural gas will behave differently than before.</p> <p>5. Thorough examination of technical assessment of geothermal resource by various evaluation tests including test drilling or evaluate reliability of steam supply plan.</p>
<b>Expected Effects</b>	
<p>It contributes to minimize the possibility and/or its impact where the power station would become a stranded cost facility, i.e., becoming a useless asset which cannot be operated fully as expected.</p>	

References of originated projects

No.	Country	Project Title	Key Words
L15	India	Basin Bridge Gas Turbine Project	price of naphtha, converting the fuel to LNG
L46	Ghana	Power Plant Barge Project	forecasting fuel supply, prompt best course of action
L107	Philippines	Tiwi Geothermal Power Plant Complex Rehabilitation Project	balance of underground geothermal reservoir
L110	Philippines	Mak-Ban Geothermal Power Plant Complex Rehabilitation Project	confusion of the term of the steam supply plan, sector privatization impact
L119	Philippines	Northern Negros Geothermal Project	shortage of steam flow, currency crisis impacts
L136	Myanmar	Gas-Turbine Power Generation	LA conditioning of natural gas supply



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		Project (Rangoon)	plan
L147-1,2	Myanmar	Integrated Liquefied Petroleum Gas Project (Phase I–Part 2) (Phase II)	scrutiny of information on reserves
L173	India	Chandrapur Thermal Power Station Expansion Project	petroleum product price control lost
L188	Indonesia	Muara Karang Gas Power Plant Project	gas supply delay, cross-divisional and comprehensive risk analysis within the executing agency, appeal to the central government
L189	Indonesia	Muara Tawar Gas Fired Power Plant Extension Project	ditto.

Note [ **T**: Technical Cooperation, **P**: Technical Cooperation for Development Planning, **G**: Grant Aid, **L**: ODA Loan ]

Knowledge Lessons Sheet		
<b>Energy 16</b>	<b>Relationship with Private Investment</b>	<b>Risk hedge of private investment part and promotion of private investment</b>

Applicable Scheme(s)	T	P	G	L	Applicable Stage(s)	Form	Plan	Exec	Compl	After
				⊙		○	○			○

Applicable Subsectors	All subsectors
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**Lessons Learned**

<b>Type(s)</b>	<input type="radio"/>	Generic aspects of project management (cross-cutting among themes)
	<input type="radio"/>	Specific to characteristics of the sector
	<input type="radio"/>	Specific to characteristics of the country/region (incl. geographical ones)

<b>Key Words</b>	Private investment, IPP, Currency crisis, Risk hedge
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Applicable Cases	Summary/Background of the Issues
<p>Projects with high degree of dependence on private investment in it.</p> <p>Or projects under circumstances where policies to promote private investment, such as IPP promotion measures of the power generation sector, are (or will be) taken.</p>	<p>In the case of loan assistance project, there are cases where JICA project are positioned among the whole set of projects involving private investment. In addition, there are cases where JICA projects are in the trend of privatization and liberalization of the power and/or its generation sector.</p> <p>Private investment projects are likely to be affected by external factors. In general, it is very difficult for the ODA loan project to change the original plan. Therefore, it is necessary to consider, in advance, about the possibility that this will affect the JICA project. In the case where IPP promotion policy is implemented in the power sector, uncertainty of power development is large and it is becoming difficult to formulate a reliable power supply development plan. There are cases where JICA cannot catch up with the situation change and it is not easy to handle this issue.</p> <p>Conversely, it is desirable to formulate the JICA project to lead to demonstration and investment environment improvement and promote private investment.</p>
Risks	Counter Measures
<p>In the event of a currency crisis, the entire project may be affected by the influence of the private investment part of</p>	<p>For projects highly dependent on private investment, policy and/or Executing Agencies that can compensate for risks are needed to minimize the adverse effects of the currency crisis and others on private investment.</p>

<p>the project, which may make the whole project difficult to continue or be forced to change the contents of JICA projects</p> <p>In countries that adopt policies to rely heavily on IPP in the power generation sector, the medium- and long-term power supply and demand plan tends to be influenced by external factors. In such cases, the possibility that the position and role of ODA projects may become different from the initial assumption increases.</p>	<p>For power plant projects in IPP promoting countries, it is necessary to confirm with the partner country government regarding mid- and long-term electricity supply and demand plans and latest trends sufficiently.</p> <p>In regard to these points, it is essential to undertake scenario analyses, in advance, for mid- and long-term power demand, competitive conditions as a private enterprise, cost/benefit analysis, financial situation and fuel procurement risk analysis (see lesson 15), and Executing Agency's risk compensation ability etc. The experiences of electricity liberalization in other countries could be an important input for this analyses.</p> <p>Without degrading the quality of the development planning study, it needs to be done quickly so that it can respond to changes in the external situation. From the development planning /master plan stage, it is also important to make preparations that can be concretely projected at later stage.</p> <p>On the other hand, in addition to the uncertainty of the private sector, there is a possibility of adding a bias such as political decisions (such as too-much reliance on renewable energy or exclusion of coal-fired power, which may be questionable in reality).</p> <p>In the case of ODA loan, since ex-post evaluation is carried out in all projects, it is necessary to request the report of the monitoring result of the periodical operation after the completion of the project for grasp of the progress.</p>
<b>Expected Effects</b>	
<p>Even if the external situation greatly differs from the assumption, such as the occurrence of an unexpected situation, it is possible to minimize the influence by a part of private investment, with relatively large uncertainty, on the whole of the project.</p> <p>We cannot discuss pros and cons of the policy and its method of liberalization of the power sector which is the upper policy. However, by sharing and discussing analytical information with the counterpart government and/or the Executing Agency regarding the potential which would happen in the future, we can cope with accurate and prompt response to the situation.</p>	

References of originated projects

No.	Country	Project Title	Key Words
L5-1,2,3	India	Assam Gas Turbine Power Station	project profitability getting more

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		&. Transmission Line Construction Project (I) (II) (III)	important by the impact of sector liberalization
L110	Philippines	Mak-Ban Geothermal Power Plant Complex Rehabilitation Project	confusion of the term of the steam supply plan, sector privatization impact
L111	Philippines	Metro Iligan Regional Infrastructure Development Project	regional development project, dependent on private investment
L121	Vietnam	Power Sector Loan	financial plan considering competitive conditions
L127-1,2,3,4	Vietnam	Phu My Thermal Power Plant Project (1)–(4)	sharing facilities with other power plant, promotion effect of private investment
L135	Malaysia	Port Dickson Power Station Rehabilitation Project (2)	IPP promotion country, mid-/long-term power demand
L143-1,2	Jordan	Aqaba Thermal Power Plant Expansion Project (I) (II)	external factor change, e.g., privatization of the sector
L169, L170	Indonesia	Java-Bali Transmission Line/Substation Development Project (East Java) (I & II)	financial situation deteriorated by the currency crisis, insufficient expansion for another level
L178	Vietnam	Hanoi Urban Infrastructure Development Project	support of industrial zone infrastructure stimulating private sector, flexible readjustment

Note [ **T**: Technical Cooperation, **P**: Technical Cooperation for Development Planning, **G**: Grant Aid, **L**: ODA Loan ]

Knowledge Lessons Sheet										
Energy 17	Projects in Rural Area				Effective rural electrification and small-scale decentralized sub-projects					
Applicable Scheme(s)	T	P	G	L	Applicable Stage(s)	Form	Plan	Exec	Compl	After
			⊙	⊙		○	○	○	○	○
Applicable Subsectors		All subsectors								
Lessons Learned										
Type(s)	<input type="radio"/>	Generic aspects of project management (cross-cutting among themes)								
	<input type="radio"/>	Specific to characteristics of the sector								
		Specific to characteristics of the country/region (incl. geographical ones)								
Key Words	Rural electrification, Small-scaled decentralized sub-projects, Ownership, Dynamic overall management									
Applicable Cases				Summary/Background of the Issues						
Rural electrification project. Project consisting of many small-scale decentralized sub-projects.				For projects where residents' participation is indispensable, it is necessary to emphasize endogenous self-reliance, ownership building, and business. For this reason, various considerations are required that are not in the case of installation and operation of single power facility for ordinary power ministry and electric power companies.  Also, in a project consisting of many small-scale distributed sub-projects such as rural electrification, we need to consider how to utilize lessons of former sub-projects to those at later stages.						
Risks				Counter Measures						
There is a possibility that residents' participation and ownership in the project implementation process may not be fostered.  If it consists of many sub-projects and the timely overall supervision is inadequate, there is a possibility that the experiences of individual preceding sub-projects will not be utilized, the same				<u>Points of endogenous self-reliance and ownership building:</u> <ol style="list-style-type: none"> <li>Residents' participation in the project implementation process is an indispensable for endogenous self-reliance and ownership building. For that purpose, close outreach-type communication with residents by the Executing Agency staff is effective. Various coordination by the Executing Agency are also indispensable.</li> <li>It is effective to utilize a bottom-up plan formulation method according to the local needs, in case local governments are responsible for sub-projects.</li> <li>In the case of rural electrification, the various conditions of its effect should be clarified by resident participation type</li> </ol>						

<p>failure will be repeated, and good practices will not be shared.</p>	<p>investigation method etc. and reflected in the preliminary selection process of the target villages.</p> <ol style="list-style-type: none"><li>4. Secretariat should keep the continuity of the project, such as taking over to the local government, etc.</li><li>5. It is also important to coordinate who and how to cover the electrification costs (e.g., equal share of beneficiaries plus remainder by the Executing Agency).</li><li>6. Technically, the prepaid method is one of the effective tools for charge collection.</li></ol> <p>Points on business:</p> <ol style="list-style-type: none"><li>1. Proper supply capacity planning.</li><li>2. Strategic partnership collaboration for discovery of potential new industry.</li><li>3. Monitoring of the Executing Agency's financial situation and power service quality, etc.</li><li>4. Economic incentive for facility operation and maintenance managers.</li></ol> <p><u>Points of management of small scale distributed project:</u></p> <ol style="list-style-type: none"><li>1. It is effective for the Executing Agency to give incentives to the lower executing agencies according to progress and efficiency.</li><li>2. Likewise, it is important to clarify key indicators such as the amount of the deficit and distribution loss rate, and set the target values.</li><li>3. Project management as a whole—cross-sectoral horizontal management + central (vertical) management of each regional subproject situation—and management of individual subprojects are necessary.</li><li>4. There is a time lag in implementing multiple sub-projects. During the project period, O&amp;M and effectiveness management (ex-post monitoring) starts, which should play as the feedback to successive sub-projects and the project as a whole, and adjust them accordingly. For this purpose, the Executing Agency should determine key operation and effect indicators and start monitoring in advance, including baseline survey at</li></ol>
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	<p>an early stage.</p> <p>5. It is necessary to clarify the role sharing and responsibility relationship between the central and regional business management organizations, ensure that each individual business management institution conducts monitoring in rural areas, and the Executing Agency constructs a system centrally managing them with PDCA-cyclic processes as the integrated management headquarter.</p>
<b>Expected Effects</b>	
<p>In small-scale distributed sub-projects such as rural electrification, individual subprojects will be implemented with clear ownership based on proactive participation as rural initiatives.</p> <p>As the integrated system of the sub-projects, the experiences of sub-projects implemented earlier can be fed back to the whole through the PDCA cyclic approach, which makes the project more effective (see experience in L212).</p>	

References of originated projects

No.	Country	Project Title	Key Words
L33	Indonesia	Rural Electrification Project (2)	proper cost sharing and tariff setting (raise), consideration for poor
L103	Bangladesh	Rural Electrification Project (Phase 5-B)	improvement of profitability
L104	Bangladesh	Rural Electrification Project (Phase 4-C)	incentivizing rural electrification associations, clarification of deficit and target setting
L106	Philippines	NEA/VECO Rural Electrification Project	target setting on distribution loss rate of each electrification association
L129-1,2	Peru	Electric Frontier Expansion Project (1) (2)	activities to strengthen profitability
L141	Morocco	Rural Electrification Project	participation of beneficiary to the implementation processes
L192	Rao PDR	Greater Mekong Power Network Development Project (Lao PDR)	progress confirmation for each power plant
L193	Philippines	Metro Manila and the Rural Electrification Project	residents' participation type, facilitate endogenous self-reliance
L197	Peru	Social Sector Development Project in Sierra Area	method for residents' participation, permanency of the secretariat
L204	India	Rural Electrification Project	collaboration with existing support

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			scheme
L205-1,2	Morocco	Rural Electrification Project	execution agency for coordination among stakeholders with commune, introduction of pre-paid card system
L209	Pakistan	Rural Electrification Project	survey method with residents' participation, synergy with lifestyle project, reasonable plan (if lack of capacity of the executing agency)
L212	Vietnam	Small-Scale Pro Poor Infrastructure Development Project	integrated management of small and decentralized sub-projects

Note [ **T**: Technical Cooperation, **P**: Technical Cooperation for Development Planning, **G**: Grant Aid, **L**: ODA Loan ]



Knowledge Lessons Sheet					
<b>Energy 18</b>	<b>Environmental and Social Considerations</b>		<b>Effective countermeasures for environmental and social consideration</b>		

Applicable Scheme(s)	T	P	G	L	Applicable Stage(s)	Form	Plan	Exec	Compl	After
			○	◎		○	○	○	○	○

Applicable Subsectors	All subsectors
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Lessons Learned	
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<b>Type(s)</b>	○	Generic aspects of project management (cross-cutting among themes)
	○	Specific to characteristics of the sector
	○	Specific to characteristics of the country/region (incl. geographical ones)

<b>Key Words</b>	Environmental and social considerations, Baseline survey, Stakeholders, Information sharing, Social consideration program
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Applicable Cases	Summary/Background of the Issues
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Projects where environmental and social considerations are important (hydro, thermal, wind, geothermal power, etc.)	Environmental and social considerations at JICA are subjects to be dealt with sufficiently and carefully, with the revisions of the "Guidelines for Environmental and Social Considerations" in 2004 and 2010. For environmental social consideration, it is necessary to comply with the latest version of JICA guidelines. By confirming the environmental laws and regulations of the country concerned, we need to check which of EIA (Environmental Impact Assessment) or IEE (Initial Environment Evaluation) is required. At the same time, it is necessary to take action based on the basic policy (1.4) described in the JICA guidelines "to support and confirm appropriate environmental and social consideration by partner countries".
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Risks	Counter Measures
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In some cases, not only delays but also implementation of the project will become difficult.	<p>The following countermeasures are important:</p> <ol style="list-style-type: none"> <li>Sufficient baseline survey at the initial stage for grasping impact (If some survey items are insufficient, it won't be able to monitor and demonstrate the impact of the project implementation recognized as the gap of records between before and after the project implementation). <ul style="list-style-type: none"> <li>It is desired that stakeholders, including the Executing Agency and JICA, independently conduct detailed survey and analysis on water rights, etc.</li> </ul> </li> </ol>
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	<ul style="list-style-type: none"> <li>• It is desirable to consult with the Credit Risk Analysis and Environmental Review Department—of which the section responsible for environmental and social considerations—beforehand so that the procedure inside JICA does not fall behind.</li> </ul> <ol style="list-style-type: none"> <li>2. Dialogue with stakeholders and establishment of the council or task force for information sharing involving stakeholders.</li> <li>3. Compensation procedure based on the Guidelines.</li> <li>4. Respond promptly to complaints.</li> <li>5. Appropriate implementation of "land acquisition, involuntary resettlement relocation" integrated with various social consideration programs (livelihood support, welfare, regional environmental protection activities, etc.) and its continuous follow-up.             <ul style="list-style-type: none"> <li>• It is also effective to implement measures to reconstruct living. For example, it includes relocation mediation with vocational training in areas where employment can be expected such as industrial parks; and setting up a shared aquaculture pond in the case of hydropower.</li> </ul> </li> <li>6. The importance includes local governments' understanding on environmental and social considerations and on-site response.</li> <li>7. Afforestation activities are also effective as environmental preservation activities.</li> <li>8. If necessary, it can be considered to make necessary items out of environmental and social considerations as a condition for financial cooperation, e.g., mandatory monitoring and reporting of the environmental situations.</li> <li>9. In the case of the facility augmentation project, we should keep in mind that it is necessary to review the environmental and social impacts of the entire facility including the existing facilities.</li> </ol>
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**Expected Effects**

At the same time, it will lead to new employment and creation of cash income opportunities while minimizing the negative impacts of involuntary resettlement and other related project delays.

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References of originated projects

No.	Country	Project Title	Key Words
L10-1,2,3,4	India	Simhadri Thermal Power Station Project (1)–(4)	compensation procedure under stakeholder involvement, social consideration program, good practice
L14-1,2,3,4	India	Bakreswar Thermal Power Project (1)–(4)	social economic support / welfare activities, baseline survey
L17	India	Western Yamuna Canal Hydroelectric Project	insufficient water right problem solving, detailed survey analysis by stakeholders is necessary
L27-1,2,3	Indonesia	Sipansihaporas H.P.P. Project (1)–(3)	forest and environment conservation activities, formation and maintenance of a good relationship
L28-1,2,3	Indonesia	Transmission Line Construction Project in Java-Bali (1)–(3)	acquisition of large-scale land, preliminary survey, interview
L35-1,2,3	Indonesia	Renun Hydroelectric Power & Associated Transmission Line Project (1)–(3)	agreement on water demand priority and flow monitoring, afforestation activities
L49-1,2	Kenya	Sondu/Miriu Hydropower Project (1), (2)	establishment of a meeting body to hear requests and discontent
L55	Sri Lanka	Kelanitissa Combined Cycle Power Plant Project	mandatory implementation and reporting of environmental monitoring at the time of L/A concluding
L74	China	Hunan Yuanshui River Basin Hydropower Development Project	job training, mediation for migration to industrial areas
L7 1–5	China	Project of Construction of Hydroelectric Power Plant in Wuqiangxi (I)–(V)	continuing follow-up of residents' living conditions
L98	Paraguay	Asuncion Power Transmission and Distribution Network Improvement Project	residents' opposition and plan change
L116	Philippines	Calaca Coal-Fired Thermal Power Plant No. 1 Unit. Environmental Improvement Project	medical mission, respond promptly to complaints
L124-1,2,3,4	Vietnam	Ham Thuan – Da Mi Hydropower Project (1)–(4)	land inventory, establishment of forest problem task force, procedure

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			speeding up
L144	Rao PDR	Nam Leuk Hydroelectric Power Plant Construction Project	aquaculture pond, increase alternative livelihood means
L162-1,2	Philippines	Calaca II Coal-fired Thermal Power Plant Project, and Calaca II Coal-fired Thermal Power Plant Project Additional Financing	even in expansion, operational status and environmental social impact assessment including existing facilities are necessary
L167	Sri Lanka	Samanalawewa Hydroelectric Power Project	living reconstruction consideration such as vocational training
L191-1,2,3	Thailand	Mae Kuang Irrigated Agriculture Development (1)–(3)	baseline survey, monitoring, feedback, living support measures

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<b>Knowledge Lessons Sheet</b>		
<b>Energy 19</b>	<b>Collaboration with Other Projects or Other Purposes</b>	<b>Consistency and synergy with related development projects including those other than energy</b>

Applicable Scheme(s)	T	P	G	L	Applicable Stage(s)	Form	Plan	Exec	Compl	After
	<input type="radio"/>		<input type="radio"/>	<input checked="" type="radio"/>		<input type="radio"/>	<input type="radio"/>			

Applicable Subsectors	All subsectors
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<b>Lessons Learned</b>	
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<b>Type(s)</b>	<input type="radio"/>	Generic aspects of project management (cross-cutting among themes)
	<input type="radio"/>	Specific to characteristics of the sector
		Specific to characteristics of the country/region (incl. geographical ones)
<b>Key Words</b>	Multi-purpose, Other project, Other scheme, Interaction, Synergy	

<b>Applicable Cases</b>	<b>Summary/Background of the Issues</b>
<p>A case with a project whose main purpose is energy is also expected to be effective for other purposes.</p> <p>For multipurpose compound type projects including energy.</p> <p>When there is a related existing support in that sector or in that area.</p>	<p>Projects, classified in the energy field, may be required to pursue compatibility and synergistic effects with development objectives other than energy in the scope of the project or in relation to external development projects.</p> <p>Where there are existing support projects (including other schemes / projects of other donors), original projects/programs of the recipient country in the support sector (or in the support area), and/or a plan for the future, the relevant project design— anticipating collaboration and supplementary role with them at the time of planning—could prevent plan changes due to the influence of other projects and make it possible to achieve higher project effect in cooperation with and supplementing them additionally.</p>
<b>Risks</b>	<b>Counter Measures</b>
<p>There are risks that unexpected plan changes will occur, if there are other schemes or other projects that are deeply related (other donor support, host country's own projects, etc.), information sharing or collaboration is not</p>	<p>There are various cases. The following are examples:</p> <ul style="list-style-type: none"> <li>• For hydropower plant projects, if the road construction is necessary or when the reservoir can be used as an agricultural water pond, the development effect of the project as a whole will be strengthened by appropriate designing considering these multi-objectives.</li> <li>• Where targeted energy projects is a part of a large-scale industrial development or regional development plan, it may be</li> </ul>

<p>attempted.</p>	<p>necessary to flexibly review and plan changes on the content and scale of the plan based on external circumstances. Ownership of the partner country government is important in that case. In addition, responding to the demand of public services by the urban residents accompanied by the area development and industrialization, the role of local governments is important. It is necessary to secure and organize their resources (L207 Thailand).</p> <ul style="list-style-type: none"> <li>• Sufficient risk hedging of private investment part can minimize the risk of damaging the effect of ODA project.</li> </ul>
<b>Expected Effects</b>	
<p>Synergy effects can be maximized by integrating beyond sectors and schemes with other objectives and other projects.</p>	

References of originated projects

No.	Country	Project Title	Key Words
L90	Nepal	Kali Gandaki 'A' Hydroelectric Project	aspects of road construction project
L111	Philippines	Metro Iligan Regional Infrastructure Development Project	regional development project, highly dependent on private investment
L156	Hungary	Environmental Improvement Project in the Varpalota Region (Municipality Utilities Project)	regional development project by coalition of multi-local governments, coordination with regional development plan
L178	Vietnam	Hanoi Urban Infrastructure Development Project	support of industrial zone infrastructure stimulating private sector, flexible readjustment
L197	Peru	Social Sector Development Project in Sierra Area	Sub-project of an economic infrastructure project
L203	Vietnam	Rural Infrastructure Development and Living Standard Improve (I) (II)	simplified executing scheme by two organizations, bottom-up type planning method
L204	India	Rural Electrification Project	collaboration with existing supporting scheme
L207	Thailand	Gas Separation Plant Project	a part of waterfront development plan

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