

**To:** Ariel Yepez, Energy (INE/ENE) Division Chief

**CC:** Juan Carlos Perez-Segnini (SGO/CME)

**From:** Javier Cuervo, Team Leader

**Subject:** Mexico. Strengthening of the Planning Capacity of SENER (ME-T1302).  
Approval of additional resources from the Japan Special Fund (JSF) to  
increase the operation ME-T1291

**Date:** 3/21/2016

**I. Background**

- 1.1 Mexico is in the midst of implementing a very ambitious energy reform that begun with the constitutional modifications approved in 2013 and continued with a set of energy laws enacted in 2014. This Mexican Energy Reform model, in which the state determines the energy and sustainability policy in the long term, is characterized by an open competitive production sector, competitive and efficient state enterprises, transparency and best practices in the management of energy resources, and social and environmental responsibility. The reform significantly changed the role and responsibilities of all government agencies including the Ministry of Energy (SENER). SENER is now responsible for (i) performing energy planning in the medium and long term; (ii) undertake actions to ensure adequate energy provision and access (iii) promote the expansion and modernization of the energy infrastructure; and (iv) coordinate the organizational structure of government agencies and institutions that are part of the sector and the regulation of the state owned energy companies.
- 1.2 To be able to fulfill the planning responsibilities, the Government of Mexico requested technical assistance from the Bank to create a decision center to perform prospective analysis of the energy sector integrating modeling and visual display. through the consolidation and implementation of a decision-making center for the energy sector. The center is both physical and virtual high-tech equipment for the handling and display of information, similar to a control center, which will be used by specialists for the prospective planning analysis of the energy sector. This will allow for the energy sector planning within the new legal and regulatory framework that the Energy Sector Reform imposes to the Ministry as the institution leading the energy sector as stipulated by the Electricity Industry Act, the Hydrocarbons Law, and the Internal Rules of the SENER.
- 1.3 Towards this objective the Bank sought to combine ordinary capital technical assistance with resources from the INFRAFUND and resources from the Japanese Special Fund (JSF). The INFRAFUND provides \$500,000 of technical

assistance and was approved in Nov 24 of 2015. As part of the approval process, it was also established that the technical assistance could be increased in an additional amount of \$250,000 with funds from the JSF.

## **II. Progress**

- 2.1 The total cost of this technical cooperation project is US\$950,000.00. As mentioned before, it was agreed by both the INFRAFUND and the JSF that this TC will be co-financed by these two sources of funds. The INFRAFUND part was processed under TC ME-T1291, provides \$500,000 of technical assistance and was approved in Nov 24 of 2015. As part of the approval process, it was also established that the technical assistance could be increased in an additional amount of \$250,000 with funds from the JSF (see footnote 4 of the approved TC document for ME-T1291), provided that, such amount is needed for purposes of complementing the activities identified in this operation, resources are available and the criteria provided by ORP/GCM and the Strategic Committee Minutes for this operation have been fulfilled. All these criteria are met. The process and approval of such increase will follow Bank's applicable policies and procedures, including the use of the Incremental Funding Appendix. The Government of Mexico will provide an additional amount of US\$75,000 that added to the original local counterpart of US\$125,000 will totalize US\$200,000.00 of local counterpart commitment that will come from the Sectorial Fund for Energy Sustainability and in-kind contribution.
- 2.2 Currently, the government of Mexico is reviewing the legal agreement for the execution of the INFRAFUND TC. When approved, the resources from the JSF will be amended to the legal agreement.

## **III. Objective of the Increase**

- 3.1 The objective of the increase is to finance the customized energy model to integrate it to the energy decision center complementing the basic energy model that is financed by the INFRAFUND.

## **IV. Justification of the Increase**

- 4.1 The increase is needed to fully provide SENER with the required capabilities to perform energy prospecting. With the resources approved from INFRAFUND, SENER would develop a basic energy model with visual display but with limited capabilities. The increase is necessary to customize the basic model and to implement a comprehensive Energy Sector Model for SENER. This includes creating a complementary modeling to the Basic Mexico's Energy Sector, installing a decision-maker center at SENER and developing the mathematical model to run in the center. The knowledge transfer that takes place in this phase will allow Mexico to create and fully develop a team of specialized technicians with the capacity to operate the Center and to continue developing additional models. In addition, this newly-trained personnel can also assist other

agencies/institutions/Secretaries to install and operate their own Centers should the Government of Mexico decides to do so.

- 4.2 **DELIVERABLES:** I. this consists of the development of mathematical equations and programming of these equations, to represent some the complementary subsectors: 5. Petrochemicals processes, 6. CO<sub>2</sub> footprint, and 7. Public Finances; and II. Installation of the center, fully functional and in operation. This implies the design of the room, equipment purchase and installation, personnel training, knowledge transfer and supervision in order to assure a fully functional and operating center at SENER, in accordance to the identified and agreed specifications. In addition, this includes knowledge transfer and training SENER personnel to fully understand the processes related to building the Decision-Maker Center and developing the necessary capabilities for its operation. SENER will determine the place where the Energy Decision Center is going to be built.
- 4.3 The total amount of Bank's resources available for purposes of this TC will be US\$500,000.00 to be financed through the INFRAFUND. The Bank's financing may be increased up to an additional amount of US\$250,000.00 from the JSF provided that, such amount is needed for purposes of complementing the activities identified in this operation, resources are available and the criteria provided by ORP/GCM and the Strategic Committee Minutes for this operation have been fulfilled. The process and approval of such increase will follow Bank's applicable policies and procedures, including the use of the Incremental Funding Appendix.

## V. Budget

- 5.1 Based on the information provided above, and in light of the cost analysis carried out by the project team, the increase needed for covering the described activities is US\$ 250,000. The increase will be reflected in the TC budget as follows:

Components / Activities	IDB Contribution		Local counterpart contribution		Updated budget
	Original	Increase	Original	Increase	
	(IPF)	(JSF)			
Component 1: Modeling of the Energy Sector	342,000	197,500	0	0	539,500
Component 2: Visualization	87,500	13,500	125,000	72,500	298,500
Component 3: Capacity Building	64,000	36,000	0	0	100,000
Component 4: Audit, M&E	6,500	3,000	0	2,500	12,000
TOTAL	500,000	250,000	125,000	75,000	950,000

**VI. Recommendation**

- 6.1 In accordance with the Framework for Technical Cooperations (document GN-2469-2) and Resolution DE-044/08, the Division Chief has the authority to approve non-reimbursable technical cooperations up to an amount of US\$750,000. Therefore, taking into account that the total cost of the TC, including the increase proposed, does not exceed the amount of US\$750,000, it is recommended that the increase be approved by the Energy (INE/ENE) Division Chief.

Component and Activities			Unit	Expenditure Category	Quantity		Costs		Infrastructure Fund	JSF Fund	Counterpart	TOTAL	
					Year 1	Unit Cost (USD)	Year 1						
Phase 1: Basic Model of Mexico's Energy Sector													
Component 1: Mathematical Model of the Exploration and Production Module										\$85,500		\$0	\$85,500
Interview with decision makers to determine objectives, inputs and outputs	Liaison	Consultants	1	\$4,000.00		\$4,000		\$4,000		\$0		\$4,000	
Building of the structure of the model	Technical Expert	Consultants	1	\$14,500.00		\$14,500		\$14,500		\$0		\$14,500	
Technical advice for mathematical programming	Technical Expert	ASU	1	\$7,500.00		\$7,500		\$7,500		\$0		\$7,500	
Technical advice on interaction between model and visualization	Technical Expert	ASU	1	\$10,000.00		\$10,000		\$10,000		\$0		\$10,000	
Computational Programming of the components of the model	Programmers	Consultants(1)/ASU(1)	2	\$16,000.00		\$32,000		\$32,000		\$0		\$32,000	
Scenario building	Programmers	Consultants	3	\$5,000.00		\$15,000		\$15,000		\$0		\$15,000	
Validation and feedback from SENER personnel	Liaison	Consultants	1	\$2,500.00		\$2,500		\$2,500		\$0		\$2,500	
Component 2: Mathematical Model of the Electricity Generation Module										\$85,500		\$0	\$85,500
Interview with decision makers to determine objectives, inputs and outputs	Liaison	Consultants	1	\$4,000.00		\$4,000		\$4,000		\$0		\$4,000	
Building of the structure of the model	Technical Expert	Consultants	1	\$14,500.00		\$14,500		\$14,500		\$0		\$14,500	
Technical advice for mathematical programming	Technical Expert	ASU	1	\$7,500.00		\$7,500		\$7,500		\$0		\$7,500	
Technical advice on interaction between model and visualization	Technical Expert	ASU	1	\$10,000.00		\$10,000		\$10,000		\$0		\$10,000	
Computational Programming of the components of the model	Programmers	Consultants(1)/ASU(1)	2	\$16,000.00		\$32,000		\$32,000		\$0		\$32,000	
Scenario building	Programmers	Consultants	3	\$5,000.00		\$15,000		\$15,000		\$0		\$15,000	
Validation and feedback from SENER personnel	Liaison	Consultants	1	\$2,500.00		\$2,500		\$2,500		\$0		\$2,500	
Component 3: Mathematical Model of the Refining Module										\$85,500		\$0	\$85,500
Interview with decision makers to determine objectives, inputs and outputs	Liaison	Consultants	1	\$4,000.00		\$4,000		\$4,000		\$0		\$4,000	
Building of the structure of the model	Technical Expert	Consultants	1	\$14,500.00		\$14,500		\$14,500		\$0		\$14,500	
Technical advice for mathematical programming	Technical Expert	ASU	1	\$7,500.00		\$7,500		\$7,500		\$0		\$7,500	
Technical advice on interaction between model and visualization	Technical Expert	ASU	1	\$10,000.00		\$10,000		\$10,000		\$0		\$10,000	
Computational Programming of the components of the model	Programmers	Consultants(1)/ASU(1)	2	\$16,000.00		\$32,000		\$32,000		\$0		\$32,000	
Scenario building	Programmers	Consultants	3	\$5,000.00		\$15,000		\$15,000		\$0		\$15,000	
Validation and feedback from SENER personnel	Liaison	Consultants	1	\$2,500.00		\$2,500		\$2,500		\$0		\$2,500	
Component 4: Mathematical Model of the National Energy Consumption Module										\$85,500		\$0	\$85,500
Interview with decision makers to determine objectives, inputs and outputs	Liaison	Consultants	1	\$4,000.00		\$4,000		\$4,000		\$0		\$4,000	
Building of the structure of the model	Technical Expert	Consultants	1	\$14,500.00		\$14,500		\$14,500		\$0		\$14,500	
Technical advice for mathematical programming	Technical Expert	ASU	1	\$7,500.00		\$7,500		\$7,500		\$0		\$7,500	
Technical advice on interaction between model and visualization	Technical Expert	ASU	1	\$10,000.00		\$10,000		\$10,000		\$0		\$10,000	
Computational Programming of the components of the model	Programmers	Consultants(1)/ASU(1)	2	\$16,000.00		\$32,000		\$32,000		\$0		\$32,000	
Scenario building	Programmers	Consultants	3	\$5,000.00		\$15,000		\$15,000		\$0		\$15,000	
Validation and feedback from SENER personnel	Liaison	Consultants	1	\$2,500.00		\$2,500		\$2,500		\$0		\$2,500	
Component 5: Design and Implementation of a visualization model in a Decision Center										\$87,500		\$0	\$87,500
Design of the visualization model	Technical Expert	ASU	1	\$4,000.00		\$4,000		\$4,000		\$0		\$4,000	
Programming of the visualization model	Programmers	Consultants	3	\$8,000.00		\$24,000		\$24,000		\$0		\$24,000	
Transfer of the mathematical model to visual image	Programmers	Consultants	3	\$10,000.00		\$30,000		\$30,000		\$0		\$30,000	
Design of the interactive sessions	Technical Expert	Consultants	1	\$16,000.00		\$16,000		\$16,000		\$0		\$16,000	
Session trials	Technical Expert	Consultants	1	\$5,000.00		\$5,000		\$5,000		\$0		\$5,000	
Validation and feedback from SENER personnel	Liaison	Consultants	1	\$2,500.00		\$2,500		\$2,500		\$0		\$2,500	
Rent of the ITESM Decision Theater	Decision Theater	Decision Theater	1	\$6,000.00		\$6,000		\$6,000		\$0		\$6,000	
Component 6: Training of SENER personnel in the operation and upgrading of the components 1 to 5										\$64,000		\$0	\$64,000
Workshop for SENER personnel component 1	Workshop	Workshop	5	\$3,000.00		\$15,000		\$15,000		\$0		\$15,000	
Workshop for SENER personnel component 2	Workshop	Workshop	5	\$3,000.00		\$15,000		\$15,000		\$0		\$15,000	
Workshop for SENER personnel component 3	Workshop	Workshop	5	\$3,000.00		\$15,000		\$15,000		\$0		\$15,000	
Workshop for SENER personnel component 4	Workshop	Workshop	5	\$3,000.00		\$15,000		\$15,000		\$0		\$15,000	
Technical Experts on project preparation	Consultants	Consultants	2	\$2,000.00		\$4,000		\$4,000		\$0		\$4,000	
Rent of the ITESM Decision Theater for workshops	Decision Theater	Decision Theater	5	\$2,000.00		\$10,000		\$10,000		\$0		\$10,000	
Audit, Evaluation and Project Management										\$6,500		\$0	\$6,500
Financial Audit	Audit	Firm	1	\$1,000.00		\$1,000		\$1,000		\$0		\$1,000	
Project Management	consultants	consultants	1	\$3,000.00		\$3,000		\$3,000		\$0		\$3,000	
Monitoring cost	Travel	Travel and Perdiem	3	\$600.00		\$1,800		\$1,800		\$0		\$1,800	
Office supplies	materials	Goods	2	\$350.00		\$700		\$700		\$0		\$700	
SUBTOTAL COST PHASE 1										\$500,000		\$0	\$500,000

Phase 2: Customized Energy Sector Model for SENIR									
<b>Component 1: Mathematical Model of the Petrochemical Production Module</b>									
Interview with decision makers to determine objectives, inputs and outputs	Habison	Consultants	1	\$4,000.00	\$4,000		\$4,000	\$0	\$4,000
Building of the structure of the model	Technical Expert	Consultants	1	\$17,000.00	\$17,000		\$17,000	\$0	\$17,000
Technical advice for mathematical programming	Technical Expert	Consultants	1	\$3,000.00	\$3,000		\$3,000	\$0	\$3,000
Computational Programming of the components of the model	Programmers	Consultants	3	\$14,000.00	\$42,000		\$42,000	\$0	\$42,000
Scenario building	Programmers	Consultants	1	\$5,000.00	\$5,000		\$5,000	\$0	\$5,000
Validation and feedback from SENIR personnel	Habison	Consultants	1	\$2,500.00	\$2,500		\$2,500	\$0	\$2,500
<b>Component 2: Mathematical Model of the Environmental Impacts Module</b>									
Interview with decision makers to determine objectives, inputs and outputs	Habison	Consultants	1	\$4,000.00	\$4,000		\$4,000	\$0	\$4,000
Building of the structure of the model	Technical Expert	Consultants	1	\$17,000.00	\$17,000		\$17,000	\$0	\$17,000
Technical advice for mathematical programming	Technical Expert	Consultants	1	\$3,000.00	\$3,000		\$3,000	\$0	\$3,000
Computational Programming of the components of the model	Programmers	Consultants	2	\$14,000.00	\$28,000		\$28,000	\$0	\$28,000
Scenario building	Programmers	Consultants	2	\$5,000.00	\$10,000		\$10,000	\$0	\$10,000
Validation and feedback from SENIR personnel	Habison	Consultants	1	\$2,500.00	\$2,500		\$2,500	\$0	\$2,500
<b>Component 3: Mathematical Model of the National Economic Impacts Module</b>									
Interview with decision makers to determine objectives, inputs and outputs	Habison	Consultants	1	\$4,000.00	\$4,000		\$4,000	\$0	\$4,000
Building of the structure of the model	Technical Expert	Consultants	1	\$17,000.00	\$17,000		\$17,000	\$0	\$17,000
Technical advice for mathematical programming	Technical Expert	Consultants	1	\$3,000.00	\$3,000		\$3,000	\$0	\$3,000
Computational Programming of the components of the model	Programmers	Consultants	2	\$14,000.00	\$28,000		\$28,000	\$0	\$28,000
Scenario building	Programmers	Consultants	2	\$5,000.00	\$10,000		\$10,000	\$0	\$10,000
Validation and feedback from SENIR personnel	Habison	Consultants	1	\$2,500.00	\$2,500		\$2,500	\$0	\$2,500
<b>Component 4: Design and Implementation of a Visualization model in a Decision Center</b>									
Design of the visualization model	Technical Expert	Consultants	1	\$4,000.00	\$4,000		\$4,000	\$0	\$4,000
Programming of the visualization model	Programmers	Consultants	3	\$10,000.00	\$30,000		\$30,000	\$0	\$30,000
Transfer of the mathematical model to visual image	Programmers	Consultants	3	\$10,000.00	\$30,000		\$30,000	\$0	\$30,000
Design of the interactive sessions	Technical Expert	Consultants	1	\$16,000.00	\$16,000		\$16,000	\$0	\$16,000
Session trials	Technical Expert	Consultants	1	\$5,000.00	\$5,000		\$5,000	\$0	\$5,000
Validation and feedback from SENIR personnel	Habison	Consultants	1	\$2,500.00	\$2,500		\$2,500	\$0	\$2,500
Host of the HESM Decision Theater	Decision Theater	Decision Theater	1	\$4,500.00	\$4,500		\$4,500	\$0	\$4,500
<b>Component 5: Training of SENIR personnel in the operation and upgrading of the components 1 to 3</b>									
Work shop for SENIR personnel component 1	Workshop	Work Shop	1	\$1,000.00	\$9,000		\$9,000	\$0	\$9,000
Work shop for SENIR personnel component 2	Workshop	Work Shop	3	\$1,000.00	\$9,000		\$9,000	\$0	\$9,000
Work shop for SENIR personnel component 3	Workshop	Work Shop	1	\$1,000.00	\$9,000		\$9,000	\$0	\$9,000
Technical Experts on project preparation	Consultants	Consultants	2	\$1,500.00	\$3,000		\$3,000	\$0	\$3,000
Host of the HESM Decision Theater for workshops	Decision Theater	Decision Theater	3	\$2,000.00	\$6,000		\$6,000	\$0	\$6,000
<b>Component 6: Design and Implementation of a Decision Theater in SENIR</b>									
Design of the Decision Center	Technical Expert	Consultants	1	\$2,000.00	\$2,000		\$2,000	\$0	\$2,000
Acquisition of the equipment	Purchasing	Purchasing	1	\$85,000.00	\$85,000		\$85,000	\$0	\$85,000
Implementation of the Decision Theater in SENIR	Technical Expert	Consultants	1	\$45,000.00	\$45,000		\$45,000	\$0	\$45,000
Training of SENIR personnel to operate the Decision Theater	Technical Expert	Consultants	1	\$10,000.00	\$8,000		\$8,000	\$0	\$8,000
<b>Audit, Evaluation and Project Management</b>									
Financial Audit	Audit	From	1	\$1,000.00	\$1,000		\$1,000	\$0	\$1,000
Project Management	consultants	consultants	1	\$2,000.00	\$2,000		\$2,000	\$0	\$2,000
Monitoring cost	Travel	Travel and Perdiem	3	\$600.00	\$1,800		\$1,800	\$0	\$1,800
Office supplies	materials	Goods	2	\$400.00	\$800		\$800	\$0	\$800
<b>SUBTOTAL COST PHASE 2</b>							\$250,000	\$200,000	\$450,000
<b>TOTAL</b>						\$500,000	\$250,000	\$200,000	\$950,000

## Strengthening the capacity planner SENER Decision Making Center for Energy Sector

ME-T1302

### CERTIFICATION

I hereby certify that this operation was approved for financing under the **Japan Special Fund (JSF)** through a communication dated **December 9, 2015** and signed by **Michiko Tamashiro**. Also, I certify that resources from said fund are available for up to **US\$250,000** in order to finance the activities described and budgeted in this document. This certification reserves resource for the referenced project for a period of **four (4) calendar months** counted from the date of eligibility from the funding source. If the project is not approved by the IDB within that period, the reserve of resources will be cancelled, except in the case a new certification is granted. The commitment and disbursement of these resources shall be made only by the Bank in US dollars. The same currency shall be used to stipulate the remuneration and payments to consultants, except in the case of local consultants working in their own borrowing member country who shall have their remuneration defined and paid in the currency of such country. No resources of the Fund shall be made available to cover amounts greater than the amount certified herein above for the implementation of this operation. Amounts greater than the certified amount may arise from commitments on contracts denominated in a currency other than the Fund currency, resulting in currency exchange rate differences, i.e. represent a risk that will not be absorbed by the Fund.

Original Signed

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Sonia M. Rivera

Chief

Grants and Co-Financing Management Unit

ORP/GCM

03/22/2016

\_\_\_\_\_  
Date

Approved:

Original Signed

\_\_\_\_\_  
Rigoberto Ariel Yépez

Division Chief

Energy Division

INE/ENE

03/22/2016

\_\_\_\_\_  
Date