

**PROJECT INFORMATION DOCUMENT (PID)
APPRAISAL STAGE**

Report No.: PIDA3144

Project Name	MEXICO Sustainable Energy Technologies Development for Climate Change (P145618)
Region	LATIN AMERICA AND CARIBBEAN
Country	Mexico
Sector(s)	Other non-bank financial intermediaries (30%), General energy sector (70%)
Theme(s)	Other Financial Sector Development (30%), Climate change (70%)
Lending Instrument	Investment Project Financing
Project ID	P145618
GEF Focal Area	Climate change
Borrower(s)	Nacional Financiera S.N.C. I.B.D. (NAFIN), Secretaría de Hacienda y Crédito Público
Implementing Agency	Secretaría de Energía (Secretary of Energy - SENER)
Environmental Category	B-Partial Assessment
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Decision	

I. Project Context
Country Context

Prudent economic policies in Mexico over the past two decades have contributed to the progressive attainment of macroeconomic stability. After the 2008-2009 global financial crisis, Mexico's economy rebounded quickly, reaching an average growth rate of 4.4 percent between 2010 and 2012. Despite weathering these recent crises, Mexico's long-term economic growth has been somewhat below expectations, limiting a rise in average living standards and more rapid progress on poverty reduction. In Mexico in 2013, GNI per capita was approximately 39 percent of the level observed in high income OECD countries, the same proportion observed two decades ago, signaling a lack of progress in economic convergence. Over the past three decades annual GDP growth averaged 2.4 percent, and only 0.8 percent per capita. Moreover, Mexico has faced difficulties reducing poverty. The monetary (income) measure of poverty, for which long term trends are available in Mexico, shows that poverty has not changed significantly in the last decade, and has actually slightly increased from 50.0 percent in 2002 to 52.3 percent in 2012. Growth decomposition exercises point to insufficient average productivity growth as the main cause of the

less than satisfactory growth performance. An underdeveloped financial system, labor market rigidities, high informality, scarce skilled labor, regulatory barriers for doing business, and weak innovation and limited market competition in key input sectors such as telecommunications and energy are often cited as constraints to productivity growth.

To avoid becoming stuck in the ‘middle-income trap’, Mexico needs to shift its economic activity toward higher value-added activities by improving productivity through innovation and the adaptation of technology. Research has shown that a substantial share of differences in economic productivity over time and between countries are explained by technological progress or innovation broadly defined. Technological progress can occur by acquiring or adapting knowledge from abroad or by developing new knowledge domestically. Despite this, research has shown that Mexico has shown a preference for imported technology, which has limited technology diffusion and transfer in Mexico. Specifically, it was found that high technology industries do not invest significantly more in research and development than low-technology industries and as such do not contribute to the dissemination of knowledge and technology. Overall, Mexico has a low rate of productivity growth and Mexico’s science, technology, and innovation system lags behind that of other OECD countries; the ratio of Research and Development (R&D) expenditures to GDP is the second lowest in the OECD.

Implementation of an ambitious structural reform agenda introduced by the current administration has the potential to raise productivity and unleash growth in the medium term. One of the priority areas for innovation is clean energy. In recent years, the Government of Mexico (GoM) has made strong commitments to reduce its GHG emissions and increase the production of electricity from renewables. Mexico has established a ‘low-carbon’ development program based on the principles that it is in the interests of Mexico and the international community to reduce emissions and that doing so can spur economic growth, contribute to sustainable development, and provide other ancillary benefits such as stimulating the development of new technologies and improving productivity.

In order to achieve its productivity and climate change mitigation goals, Mexico needs to expand the development and commercialization of advanced clean energy (ACE) technologies. While Mexico has significant research capabilities and the potential to expand ACE technologies, enterprise activity in the sector is limited. Government intervention in this sector is particularly important due to two market failures: (a) the environmental costs of polluting technologies are not internalized, which reduces the demand for clean alternatives and (b) private investors are unable to determine the proper level of investment in new technologies due to a lack of awareness, uncertainty of risks and rewards, and the incentive to piggy-back on early adopters.

Public policy to support technology transfer has typically centered on two approaches. ‘Technology-push’ approaches include funding for human capital formation and basic and applied R&D; regulations to create a research- and innovation-conducive intellectual property rights (IPR) regime; the creation of appropriate incentives to commercialize technology; measures to deepen relationships between academia and the productive sector; and financing for prototype development and patent protection. ‘Demand-pull’ emphasizes the use of instruments to increase the demand for lower-emission technologies, such as taxes on polluting fuels or emissions, or more direct approaches such as renewable energy portfolio standards, adoption subsidies, or direct public sector investments.

Financing technology transfer is a particularly acute challenge in Mexico and worldwide. Pure (basic) research is globally recognized as a public good and is funded primarily by the public sector in most countries, while mature and commercial products and processes are typically funded by the private sector. However, both public and private financing for technology transfer is insufficient. The result is that many promising ideas are stranded in the ‘valley-of-death,’ that is, the period between when a new product is launched and when it becomes profitable. For the private sector, the risks of investing in firms at early stages are often too high. On the public sector side, government agencies are generally not well-equipped to evaluate new technologies or incentivized to invest in risk assets.

Sectoral and institutional Context

Over the past decade, Mexico has taken important steps to build its national innovation system and to support the creation of new technology-based firms. The strategy has been implemented by several government agencies including the National Science and Technology Council (Consejo Nacional de Ciencia y Tecnología [CONACyT]), the Secretary of Economy (Secretaría de Economía [SE]), the Secretary of Public Education (Secretaría de Educación Pública [SEP]), and NAFIN. The strategy has included investments throughout the innovation value chain, including in (a) human capital and education; (b) basic and applied R&D; (c) collaboration and connectivity between academia and the productive sector; (d) training, mentoring, and incubation services for technology start-ups; and (e) seed and venture capital. Although Mexico has made remarkable progress in developing its national innovation system, its innovation capacity lags behind other middle-income countries.

Nowhere is the innovation deficit more evident than in the energy sector, where the lack of technology and innovation capacity has been one of the reasons for declining oil and gas production and where nearly all clean energy technologies are developed abroad and imported. Given these challenges, Mexico is in the process of developing a national innovation strategy for the energy sector with SENER assuming a leading role. In terms of clean energy technologies, SENER currently channels public support for applied R&D through the Sustainable Energy Fund (Fondo Sectorial CONACYT-SENER de Sustentabilidad Energética [FSE]).

The FSE was created by the GoM in 2007 and is financed through a special royalty levied on petroleum and natural gas production in Mexico. At the end of 2012, the FSE had assets of US\$204 million. With its overall objective to promote the development of clean energy technologies in Mexico, the FSE is operated by SENER in collaboration with CONACyT. During the period 2009–2011, the FSE sought to achieve this objective by providing grants for applied research to higher education institutions and research centers that meet certain eligibility criteria. While SENER recognizes the importance of involving the private sector in the development of clean energy technologies, restrictions on the use of funds by private companies or individuals have prevented a broad private sector response to incentives offered by SENER. Private enterprises have been allowed to submit proposals to the FSE jointly with academic institutions, but they have not been able to receive grant proceeds from the FSE and must contribute at least 30 percent of the total project costs.

During the period 2009–2011, the FSE launched calls for proposals (convocatoria) to support applied research and technology development. A total of 48 proposals received funding, for a total of US\$28 million in support. The supply of qualified proposals to the FSE has been much lower

than available resources in the fund. In addition, while collaboration between academia and the private sector has been a stated goal of the FSE, only 6 of the 48 projects that were approved were collaborative. The restrictions within the FSE for funding the private sector may limit the ability of the public sector to stimulate greater private sector involvement in the energy sector in Mexico, which is an important policy objective of the GoM.

As a way of stimulating the clean energy industry in Mexico and utilizing the unused FSE resources, a call for proposals was launched in 2012 to set up the Mexican Centers of Energy Innovation (Centros Mexicanos de Innovación en Energía [CEMIEs]). CEMIEs are virtual collaboration centers which aim to coordinate R&D efforts by public and private entities related to clean energy technologies to accelerate their diffusion in Mexico. CEMIEs for geothermal, wind, and solar energy have been established, and new centers for biomass and tidal energy are also expected to be launched in the future.

To overcome its innovation deficit in the clean energy sector, Mexico must address both demand- and supply-side challenges. On the supply side, there is insufficient/inadequate human capital in science and technology (S&T) disciplines linked to clean energy; weak incentives and risk aversion among researchers to pursue entrepreneurship and commercialize their research; excessive public sector focus of the government's current innovation strategy for clean energy; under developed technical assistance (TA) services for S&T based entrepreneurs; and limited public/private financing for early-stage investment (prototyping and piloting). On the demand side, the market for ACE technologies has been constrained by the dominance of state-owned enterprises in both the electric power and hydrocarbons sectors and weak industry demand for innovations coming from Mexican research and academic institutions. Among the most important challenges for clean energy development that Mexico faces is the lack of academia-industry collaboration.

The Bank is seeking to advance the commercialization of clean energy technologies in Mexico through this proposed Project. The Bank brings global knowledge of clean energy markets and sector policies, experience with technology innovation programs globally and in Mexico, and a comparative advantage in designing and managing climate change funds. The proposed Project will contribute to overcoming barriers to ACE technology development by supporting a nationwide needs and capacity assessment and by piloting an ACE grant program to encourage private sector involvement and academia-industry collaboration in clean energy development. If successful, the latter program may enable SENER to work more closely with the private sector in the future on ACE technology innovation.

II. Proposed Development Objectives

The objectives of the Project are to improve the institutional capacity of ACE technology institutions (both public and private) in the territory of the recipient and to foster the commercialization of ACE technologies by providing financial incentives to the private sector, which together are expected to lead to GHG emissions reduction in the future.

III. Project Description

Component Name

Component 1. Regional Needs Assessments (RNAs) (Funding: GEF US\$4.58 million; SENER US\$90 million)

Comments (optional)

The objectives of Component 1 are to (a) conduct RNAs to assess the capacity of academic and

research institutions, private enterprises, and subnational government entities across Mexico to develop and commercialize ACE technologies; (b) prepare the Clean Energy Regional Investment Plans (CERIPs) that aim to boost institutional capabilities to produce clean energy technologies in order to broaden the currently concentrated energy R&D market in Mexico; and (c) identify promising initiatives that can be considered for financial support by the ACE program (Component 2) or the FSE.

Component Name

Component 2. Incentives to the Private Sector for the Commercialization of ACE Technologies (Funding: GEF US\$11.50 million; Private sector enterprises US\$1.85 million)

Comments (optional)

Component 2.1. ACE Subgrants Program (Funding: GEF US\$10.50 million; private sector enterprises: US\$1.85 million). The ACE program will provide subgrants to private sector enterprises for (a) proof-of-concept stage development of ACE technologies and (b) collaborative clean energy commercialization (CCEC) targeting industry-academia collaboration for ACE technologies.

Component 2.2. Technical Assistance (Funding GEF: US\$1 million). Winning subproject proposals from Component 2.1 will receive 'on-boarding' TA as part of their overall grant package and as a condition of their award. The TA will cover topics such as business plans, intellectual property (IP) protection and monetization, marketing strategies, access to finance, and safeguards.

Component Name

Component 3. Project Management (Funding: GEF US\$0.80 million; SENER US\$2 million)

Comments (optional)

The proposed Project will use and strengthen the existing proposed project implementation unit, SENER-UREP, within SENER to coordinate and manage the proposed Project. The additional workload of the proposed project is expected to require the addition of four new team members: a procurement specialist, a financial management specialist, and two proposed Project managers, one for Component 1 and one for Component 2. Additional support for screening grant applications under Component 2 will be provided by SENER personnel or subcontractors. SENER has agreed to provide an equivalent of US\$2 million in cash or in-kind support for proposed Project management.

IV. Financing (in USD Million)

Total Project Cost:	16.88	Total Bank Financing:	0.00
Financing Gap:	0.00		
For Loans/Credits/Others			Amount
Borrower			0.00
Global Environment Facility (GEF)			16.88
Total			16.88

V. Implementation

Overall arrangements. The recipient of the grant will be the United Mexican States through its Secretary of Finance and Public Credit. The implementing agency for the proposed Project will be SENER, who will execute and oversee all three components of the proposed Project. SENER is currently implementing other World Bank projects and is highly experienced with Bank procedures. A POM which describes the rules and procedures governing the proposed Project has been prepared by SENER and is acceptable to the Bank as of October 14, 2014. NAFIN will be responsible for

financial management and the use of GEF grant resources by SENER.

Project Implementation Unit (PIU). Activities under the proposed Project will be managed by a project manager housed within the existing SENER-UREP which manages other Bank Group and GEF projects. The project manager will report directly to the Under-Secretary for Planning and the Energy Transition. New staff will be hired by the SENER-UREP to handle the additional workload created by the proposed Project, particularly in the areas of financial management and procurement. SENER will provide additional support to the SENER-UREP through subcontractors and SENER staff.

Flow of funds. Activities under Component 1 will mostly finance consultancies and workshops which will be paid directly from the Energy Transition Fund (Fondo para la Transición Energética y el Aprovechamiento Sustentable de la Energía [FOTEASE]) to beneficiaries. Component 2 will entail more complexity as the ACE program will imply financing of subprojects whose beneficiaries will be clean energy technology entrepreneurs. In both cases, beneficiaries will be paid from the FOTEASE within SENER, which will be reimbursed by NAFIN with GEF resources following the review and approval of statements of expenses.

Investment Committee (IC). The IC consists of five individuals: the General Director for Information and Energy Studies (DGIEE) at SENER, another SENER representative, and three outside experts with experience in early-stage risk investment, go-to-market strategy, and clean energy technologies. SENER will propose the membership of the IC to the Bank but reserves the right to make its own decisions on the composition. The IC will be responsible for evaluating and selecting subproject proposals to receive TA and grants under Component 2 based on criteria described in the POM. The IC will be in place before the call for proposals for the ACE Fund competition is announced and the selection of the IC will be a condition of disbursement for Component 2.

VI. Safeguard Policies (including public consultation)

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment OP/BP 4.01	x	
Natural Habitats OP/BP 4.04		x
Forests OP/BP 4.36		x
Pest Management OP 4.09		x
Physical Cultural Resources OP/BP 4.11		x
Indigenous Peoples OP/BP 4.10		x
Involuntary Resettlement OP/BP 4.12		x
Safety of Dams OP/BP 4.37		x
Projects on International Waterways OP/BP 7.50		x
Projects in Disputed Areas OP/BP 7.60		x

Comments (optional)

VII. Contact point

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