

**CANEF: Support to Regulation, Technology Development,
and Sustainability of the Hydrocarbon Sector of Latin America and the Caribbean**

I. Basic Information for TC

▪ Country/Region:	Regional
▪ TC Name:	CANEF: Support to the Regulation, Technology Development, and Sustainability of the Hydrocarbon Sector of Latin America and the Caribbean
▪ TC Number:	RG-T2900
▪ Team Leader/Members:	Ramón Espinasa, Team Leader (INE/ENE); Carlos Bladimir Echeverría, alternate team leader (INE/ENE); Sergio Ballón, Carlos Sucre, Martin Walter, Estefania Marchán, Maria Vallenilla (INE/ENE); Lenin Balza (INE/INE), team members; Pilar Jimenez de Arechaga (LEG/LEG); attorney
▪ Indicate if: Operational Support, Client Support, or Research & Dissemination	Research and Dissemination
▪ If Operational Support TC, give number and name of Operation Supported by the TC:	N/A
▪ Date of TC Abstract authorization:	12 September 2016
▪ Beneficiary:	Countries in Latin America and the Caribbean that are borrowing members of the IDB
▪ Executing Agency:	Executed by IDB (INE/ENE)
▪ Donors providing funding:	Government of Canada, via the Canadian Facility for the Extractives Sector (CANEF)
▪ IDB Funding Requested:	US\$550,000
▪ Local counterpart funding, if any:	N/A
▪ Disbursement period (which includes Execution period):	30 months
▪ Required start date:	17 October 2016
▪ Types of consultants:	Firm and Individual Consultants
▪ Prepared by Unit:	INE/ENE
▪ Unit of Disbursement Responsibility:	INE/ENE
▪ TC Included in Country Strategy (y/n):	N
▪ TC included in CPD (y/n):	N
▪ Development Challenges and Cross-Cutting Themes (Institutional Strategy 2016-2019):	Climate Change & Environmental Sustainability; Institutional Capacity & the Rule of Law

II. Objectives and Justification of the TC

- 2.1 The objective of this project is to support the regulation, monitoring, and technology development of the hydrocarbon industry in Latin America and the Caribbean. The specific objectives of this project are: (i) to support the capacity of regulatory agencies and institutions of hydrocarbon extraction; (ii) identify and recommend available technologies that enhance resource extraction considering environmental vulnerabilities; (iii) identify innovative financial and operational mechanisms that reduce the environmental impact of hydrocarbon extraction; and (iv) monitor the regional hydrocarbon market in terms of economics, technology, regulatory, and environmental practices.
- 2.2 This project aligns with (i) the strategic objectives of IDB's Canadian Extractives Sector Facility (CANEF) by improving resource governance capacity at a country and regional

level and by enhancing the effectiveness of stakeholder engagement¹ and with (ii) the Development Challenges and Cross Cutting Themes of the IDB Updated Institutional Strategy (2016-2019) of Climate Change & Environmental Sustainability, by responding to climate change promoting practices that lessen carbon emissions; and Institutional Capacity & the Rule of Law, by supporting activities to strengthen institutions and foster improved social and environmental governance and sustainability.

- 2.3 The LAC region holds significant natural resource endowments and produces a substantial share of the global production of minerals and hydrocarbons. It is the world's leading source of metals and its second most important source of oil (EIA 2015, USGS 2014). Demand for the region's resources is projected to continue increasing in the future: in addition to traditional western trade partners, emerging markets are expected to ensure long-term demand for its resources (Espinasa et al. 2015). LAC resource-rich countries are key global destinations for extractives investment, which has contributed to the development of associated infrastructure and human capital, technology spill-overs, and upstream & downstream enterprise development.
- 2.4 Hydrocarbons are of paramount importance to the global and regional economy. Petroleum represents 41% of global energy consumption² and from hydrocarbons the world derives not only gasoline, diesel, and chemicals, but plastics, medicine, tires, clothing and shoes, irrigation systems and fertilizers, chairs and lamps.³ Hydrocarbons are daily consumption goods and one of the pillars of the modern economy. The IMF has estimated that if the drop in oil prices – ongoing since late 2014 – is passed through to domestic end-users, “global GDP would rise by roughly 1 percent in the first two years”.⁴ No other single energy source has a comparable impact on the global economy.
- 2.5 The LAC region plays a particularly key role in the market for this most important of energy sources. The region represents around 13% of global crude oil production and within it are the 8th, 11th, and 12th largest global producers (Venezuela, Mexico, and Brazil, respectively).⁵ Other large producers (Colombia, Argentina, Ecuador) rank 18th, 26th, and 27th globally. Moreover, around 20% of proven worldwide reserves lie in LAC, behind only the Middle East in terms of regional reserves levels.⁶ Venezuela – with 297 billion barrels – is the world's largest reserves holder, while Brazil – with 15 billion barrels – and Mexico with 10 billion barrels, have other large reservoirs in LAC. For the natural gas market, the region's importance is not as great as for crude oil, but it nonetheless has 4% of global reserves at 295 trillion cubic feet (with Venezuela holding the 8th largest reserves in the world at 196 trillion cubic feet, around 3% of the global total).⁷ As a whole, Latin America and the Caribbean represent around 6% of global natural gas production, with Mexico ranking 17th in the world and Trinidad &

¹ See [IDBDOCS#40708363](#) for the Project's CANEF Outcome Alignment Matrix.

² IDB Energy Database (2016); available at: <http://www.iadb.org/energydatabase> accessed 29 August 2016

³ U.S. Department of Energy, Office of Fossil Energy – “Common Products Made from Oil and Natural Gas” (2016); available at: <http://energy.gov/fe/downloads/common-products-made-oil-and-natural-gas>.

⁴ Husain, Aasim et al, “Global Implications of Lower Oil Prices” International Monetary Fund, July 2015. Available at: <https://www.imf.org>.

⁵ IEA World Energy Statistics; available at: <http://stats.oecd.org>.

⁶ U.S. Energy Information Administration (2016) <https://www.eia.gov>.

⁷ U.S. Department of Energy – Energy Information Administration, International Energy Statistics – Proved Reserves of Natural Gas (Trillion Cubic Feet). Available here: <https://www.eia.gov> (Accessed 30 August 2016).

Tobago right behind in 19th place with Venezuela, Brazil, and Bolivia also ranking as important producers on a global scale.

- 2.6 The hydrocarbon industry has been the backbone of economic development for Mexico, Brazil, Venezuela, Ecuador, Colombia, and Trinidad & Tobago for the better part of the past century and it continues to represent important sources of income and investment throughout the region.⁸ Given the significance of the hydrocarbon industry to the region, it is imperative that its activities are carried forward with particular attention to evolving modes of regulation, with care that their extraction is done in the most environmentally sustainable fashion possible, and with an emphasis on researching and developing technologies for the sustainable functioning of the industry to the benefit of the societies where they operate.
- 2.7 While Latin America has made progress in fostering independent and strong regulation of the hydrocarbon industry with several countries by adopting independent oversight models that foster improved performance and governance, these changes have proven insufficient to the ever evolving nature of the hydrocarbon industry particularly in dealing with technology adoption, environmental regulations, and other factors.
- 2.8 Another particularly important challenge to the hydrocarbon industry in the region is the development and access of new technologies that allow for improving the rate of recovery of hydrocarbon assets, which in Latin America averages between 10 and 15%. It is often prohibitive in terms of cost to introduce technology that allows for increasing the share of hydrocarbon resources extracted from a given basin. There have been uncoordinated efforts throughout the region towards developing and deploying enhanced recovery technology. It is important to support those efforts through exchanges of information and experiences. Aside from those challenges, the hydrocarbon industry in Latin American – particularly in Venezuela, Mexico, Brazil and Ecuador⁹ – continues to feature routing burning and venting of gasses associated with the production of crude oil, a practice that contributes to climate change and pollutes the environment.¹⁰ The practice often takes place due to the economics of using the flared gas for other purposes yet there are examples of innovative financial and operational arrangements that allow for the use of gas that would otherwise be flared for productive purposes such as electricity generation. The region has timidly started to implement such mechanisms.

III. Description of activities

- 3.1 **Component 1: Training and Dialogue Program for National Hydrocarbon Regulators** – This program will assist the national hydrocarbon regulatory bodies throughout Latin America (paying particular attention to those of the largest hydrocarbon producing countries: Argentina, Bolivia, Brazil, Colombia, Ecuador, Mexico, Peru, Trinidad & Tobago, and Venezuela) to remain up to date with latest industry practices in a variety of issues. Latin American hydrocarbon regulators have a high degree of heterogeneity in terms of experience, design, capacity, funding,

⁸ Walter, Martin. “Extractives Industry: The Basics” (2016). Inter-American Development Bank. Available at: <https://publications.iadb.org/bitstream/handle/11319/7372/>. Accessed 30 August 2016.

⁹ According to preliminary gas flaring data from the National Oceanic and Atmospheric Administration, Venezuela ranks 5th in the world in terms of the amount of gas flared; Mexico is 8th, Brazil 23rd and Ecuador 29th. Data available from the World Bank presentation “Gas Flaring: An Industry Practice Faces Increasing Global Attention.” 31 August 2016.

¹⁰ The IDB is a signatory on the Zero Routing flaring by 2030. See <http://www.worldbank.org>.

regulatory independence, and legal incidence. This program will leverage this heterogeneity through: (A) a regular training program by a university recognized as a leader in its field over the course of several days with a well-defined curriculum – including topics such as model contracts, environmental management, investment incentives, transparency, social practices – for medium and high ranking regulators selected by the participating regulatory agency; and (B) a series of regular dialogue events tailored specifically for hydrocarbon regulators. Lessons learned, curricula, and reports from the dialogue events and on the training program will be made available as IDB publications and accessible via the online CANEF platform.

- 3.2 **Component 2: Improved Resource Recovery Research Program** – This component will carry out field research in various hydrocarbon producing countries of the region to determine and recommend resource recovery technologies that maximize the productivity of a given hydrocarbon province while ensuring environmental safeguards remain paramount and accounting for the geology and above-ground conditions of that given province. Hydrocarbon recovery factors (HRF) in the United States hover around 40%, meaning that about 60% of a field’s resources remain stranded below ground. HRFs in Latin America average between 10 to 15%, thus leaving behind between 80 and 85% of the resource. These low extraction rates are explained by a variety of factors and salient among these is technology availability and usage. The tasks carried out by this component will (A) determine the current state of application of hydrocarbon recovery technologies (including Enhanced Oil Recovery, EOR for short); (B) propose, for each country under analysis, techniques for enhanced recovery that are suitable to the environment, geology, and above ground conditions of that country and province; and (C) produce recommendations for the environmentally sustainable application of enhanced recovery technologies for fields in the selected countries, which should include countries described under component I. Technologies identified during the course of the study will be made available to the public in an online database following open data principles.
- 3.3 **Component 3: Support of reduced flaring and venting initiatives** – The main purpose of this component is to support an on-going IDB Group initiative to repurpose associated petroleum gas (APG) that would otherwise have been vented and/or flared in Ecuador for electricity generation and to evaluate similar opportunities elsewhere in the region to reduce the environmental impact of that resource’s extraction through lessened emissions and cleaner electricity generation. Flaring/venting waste energy, release contaminants, and are done due to the perceived high costs of alternative uses versus the low cost of venting and burning. However, given certain conditions, it is possible to use that APG for other purposes such as generating electricity. The IDB Group is financing a flaring reduction project in Ecuador through the IIC with state-owned company Petroamazonas, whereby APG is transported to an electricity generation facility powered by that APG. This component (A) supports the IIC operation in Ecuador, (B) expands the APG flaring reduction initiative in Ecuador, (C) scopes APG flaring reduction initiatives in two additional IDB member countries, paying particular attention to countries described under component I; (D) finances economic pre-feasibility analyses as required; and (E) coordinates with public and private sector actors to evaluate PPP structures to implement flaring reduction initiatives in the selected CANEF countries.
- 3.4 **Component 4: Hydrocarbon Market Monitoring and Research** – This component will produce regular research pieces and media – to be published by the IDB, external

publications, and/or academic journals as technical notes, policy briefs, articles, opinion pieces, monographs – on the region’s hydrocarbon market and political economy in order to provide policymakers, investors, and other stakeholders in the region and at the IDB with relevant and timely information on the landscape of the hydrocarbon industry. Beneficiary countries throughout the region have repeatedly expressed interest for informed opinions and perspectives from the IDB on the hydrocarbon market, as the Bank has a particular focus and expertise on the LAC regional market. Previous research on the hydrocarbon industry, carried out on an ad-hoc basis with little coordination or planning, includes evaluations of the impact of institutions on performance, the dynamics of the oil market, and the new model for oil pricing.¹¹ This internal and external demand for research and opinion has been particularly clear since the decline in the price of crude oil began in the last quarter of 2014 as hydrocarbon producing countries in the region faced significantly lower revenue streams and hydrocarbon importing countries attempt to make gains from lower energy prices.

Indicative Budget*

Component	Output	IDB (CANEF) Funding, US\$
Component 1: Training and Dialogue Program for National Hydrocarbon Regulators	Training Program	60,000
	Dialogue Events	60,000
Component 2: Improved Resource Recovery Research Program	Field research and report	30,000
	Database Production	30,000
	Publication	20,000
Component 3: Support of reduced flaring and venting initiatives	Pre-feasibility analysis	100,000
	Support to ongoing operation	75,000
	Scoping of new opportunities	100,000
Component 4: Hydrocarbon Market Monitoring and Research	Research Data and Reports	15,000
	Publication	10,000
	Travel & Incidentals	50,000
Total		550,000

* Financed by and under the CANEF Facility (RG-X1262).

¹¹ For examples of previous research on the hydrocarbon industry produced by the IDB see the following:
 Espinasa (2016), available at: <https://publications.iadb.org/handle/11319/7446>.
 Balza & Espinasa (2015), available at: <https://publications.iadb.org/handle/11319/6759>.
 Casas-Alatriste & Espinasa (2015), available at: <https://publications.iadb.org/handle/11319/6886>.
 Espinasa & Sucre (2015), available at: <https://publications.iadb.org/handle/11319/6987>.
 Gallego, Jaramillo & Patiño (2015), available at: <https://publications.iadb.org/handle/11319/7265>.
 Espinasa & Sucre (2014), available at: <https://publications.iadb.org/handle/11319/6728>.

Indicative Results Matrix

Sub component	Output	Component	Unit of measurement	Baseline	End of Project Target	2016	2017	2018	2019	Method of Verification
Outcome statement: Improve resource governance capacity at a country and regional level for the hydrocarbon industry										
Component I: Training and Dialogue Program for National Hydrocarbon Regulators										
I.A	Regular training program with well-defined curriculum for national hydrocarbon regulators	I	Training Sessions	0	24	0	8	8	8	Minutes of the training sessions with participants list and available on IDBDOCS
I.B	Regular dialogue events tailored for hydrocarbon regulators	I	Report	0	2	0	2	0		Consultancy reports approved by IDB available online
Component II: Improved Resource Recovery Research Program										
II	Database on current and possible application of enhanced hydrocarbon recovery by country	II	Database	0	1	0	1	0	0	Consultancy report approved by IDB and accessible project files with database available on IDBDOCS
II	Published report on enhanced hydrocarbon recovery technologies for the region with country chapters with application recommendations	II	Report	0	1	0	1	0	0	Consultancy report approved by IDB available online
Component III: Support of reduced flaring and venting initiatives										
III.A III.B	Support the execution of the IDB Group gas flaring reduction project	III	Biannual Report	0	6	0	2	2	2	Consultancy reports approved by IDB and available on IDBDOCS
III.C	Scope opportunities for intervention in the reduction of flared or vented gas via private-sector interventions and report per opportunity identified on project profile and potential for IDB participation and mode of participation in project preparation, design, finance, and/or execution	III	Project Opportunity Reports	0	2		1	1	0	Consultancy reports approved by IDB on each identified opportunity
III.D III.E	Determine the economic viability of identified projects to reduce flared or vented gas through pre-feasibility analysis carried out for a reduced APG flaring/venting project in one country	III	Pre-feasibility Analyses	0	2		0	1	1	Consultancy report approved by IDB and available on IDBDOCS
Component IV: Hydrocarbon Market Monitoring and Research										
IV	Regular research pieces and media on the region's hydrocarbon market and political economy	IV	Technical Notes Policy Briefs Blog Posts Monographs	0	9	0	3	3	3	Reports published and available under publications.iadb.org

IV. Executing agency and execution structure

- 4.1 The Bank will act as the executing agency due to its ability to leverage its extensive network of internal and external subject-matter experts and well-established relationships with involved stakeholders. The IDB, at its Washington DC headquarters, is responsible for the supervision and implementation of CANEF resources as a Project Specific Grant (PSG) contribution. The Bank will include a progress and final report of the results of the operation in its annual report to the donor.
- 4.2 The Bank will contract individual consultants, consulting firms and non-consulting services in accordance with Bank’s current procurement policies and procedures.¹²

V. Major issues

- 5.1 The main risk for the implementation of the TC is that the level of participation in the training and dialogue events outlined above on the part of the target audience of hydrocarbon industry regulators. To address this risk, the component will be executed through a neutral, well-regarded institution with strong ties to the industry and past experience in these activities.

VI. Exceptions to Bank policy

- 6.1 None apply.

VII. Environmental and Social Strategy

- 7.1 According to the ESG toolkit, the classification of this project is “C”, no environmental or social risk are expected. See [Safeguard Policy Filter Report \(SPF\)](#) and [Safeguard Screening Form \(SSF\)](#).

Required Annexes

- Annex I: [Terms of Reference](#)
- Annex II: [Procurement Plan](#)

Approved by:	Original Signed _____ Ariel Yépez-García Division Chief, INE/ENE	October 24, 2016 _____ Date
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¹² Contractual and staff travel will be allowed for project execution purposes, as per the provisions of the Amended & Restated Cooperation Framework Agreement between the IDB and Canada (§4.1.7.), reinstated in §5 of the Administration Agreement with Canada for the CANEF Facility. These contributions may not supplement the budget of a Bank Department or Division for routine or customary activities.