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LEDs GP CASE STUDY: FINANCING ENERGY TRANSFORMATION AT THE SUB-NATIONAL LEVEL IN PERU

Lima's rapid fuel matrix switch from high sulfur content diesel to Compressed Natural Gas—mitigating risks, innovating financial structures, and pioneering ICTs to establish an enabling environment at the local level.



In less than 9 years, the COFIGAS programme has created partnerships that put more than 199,276 CNG vehicles in circulation. (156,676 vehicles converted from diesel or gasoline and 42,600 new CNG vehicles). In addition, in 3 years (2009-2011), financing was approved for the acquisition of 714 new CNG busses for public transportation.

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KEY TAKEAWAYS

Since 2006, the second tier National Development Bank of Peru - COFIDE has successfully mobilized international and national, private sector financial resources to reduce emissions and transform the transportation system at the subnational level. By working strictly through “Intermediary Financial Institutions” (IFIs) at the local level and directly addressing legal, political and operational risks, COFIDE through the COFIGAS programme has been able to drive a public-private effort to rapidly switch the energy matrix in the transportation sector from high sulphur content diesel to nationally sourced natural gas (NGV - “natural gas for vehicles”); while concurrently significantly improving inner-city public mass-transport services.

First, at the national scale, inter-ministerial collaboration created a regulatory base for the nascent natural gas industry; including supply, distribution and point of sale. This effort created a multi-disciplinary, public-private “enabling environment.” Then, to mitigate political risks and stabilize the industry across successive government administrations, the autonomous INFOGAS was founded to administer key information with advanced information and communications technology (ICT). The use of a novel ICT to “pay your loan at the pump,” minimized operational risks to creditors. Intergovernmental collaboration between subnational and national entities created partnerships that in just 9 years, has put more than 199,276 CNG (compressed natural gas) vehicles in circulation; 156,676 vehicles converted from diesel or gasoline and 42,600 new CNG vehicles.¹ This has produced significant GHG emission reductions and dramatically improved air quality. In addition, this pioneering effort has created more than 500 formal national companies and over 7,000 direct sustainable jobs.

Nevertheless, there is still a long way to go to further decarbonize the economy of Peru. Currently, the infrastructure gap in Peru is estimated at more than US\$48 billion—requiring an estimated US\$5 billion/yr of investments over the next 10 years. It is anticipated that 75% of this investment will need to come from the private sector (Paredes, 2013). Lessons and experience from the COFIGAS programme represent great promise and demonstrate that significant transformational change (as opposed to incremental change) for low carbon infrastructure at the local level is possible and that public-private sector collaboration has a crucial role to play in integrating subnational actions with national GHG mitigation objectives.

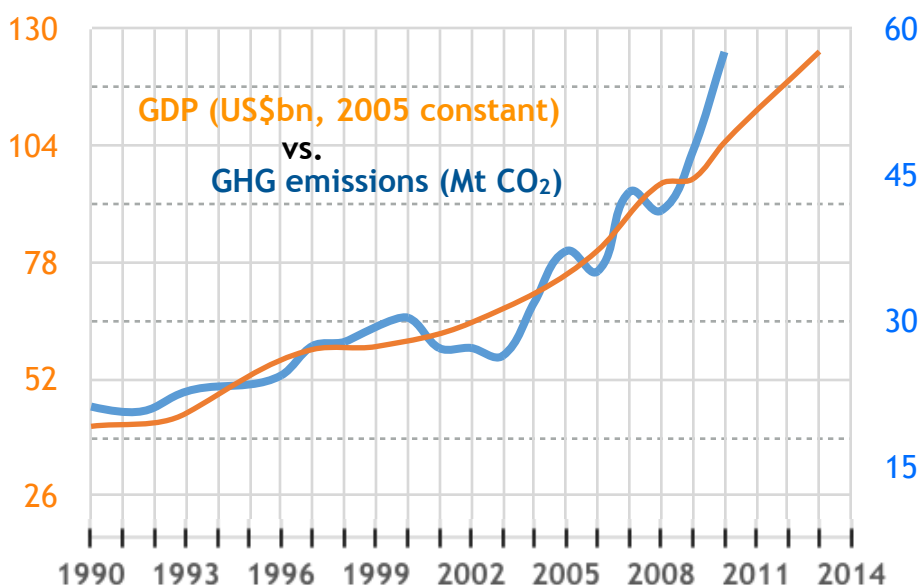
BACKGROUND

PERU

Between 1970 and 2013, the population of Peru grew from 13 million to over 30 million persons, consisting of 23 different ethnic groups. Since the early 90’s Peru has realized notable advances in programs of macroeconomic stabilization, structural reforms, restored relations with the international finance community and has expanded productive and social infrastructure. Nevertheless, the solid economic growth is correlated with a considerable intensification in carbon emissions. Per capita CO₂ emissions from the burning of fossil fuels surged from 0.972t in 1990 to 1.967t by 2010².

One distinctive feature of Peru’s population growth has been rapid urbanization. Between 1940 and 2013, the country’s

Peru CO₂e Emissions vs GDP



¹ <http://www.infogas.com.pe/images/pdf/estadisticas/12-2014/estadisticas-4.pdf>

² Carbon Dioxide Information Analysis Center, Environmental Sciences Division, Oak Ridge National Laboratory, Tennessee, United States.

population living in urban areas climbed from 35% to 78%. In that same timeframe, Metropolitan Lima's population rose from 645,000 to around 8.7 million—and today, more than half the population in the city is under the age of 29 years. Another example is metropolitan Arequipa, which grew from 112,000 to over 925,000 persons in the same period. In both cities, the rapid urbanization engendered a disorganized, dangerous³ and highly contaminating public transportation system—oversaturated by outdated taxis and busses which operated on high sulfur content diesel fuel.



In Lima there are an estimated 250,000 taxis, with a ratio of 27 taxis per 1,000 persons; while Arequipa has an estimated 39 taxis per 1,000 persons. And despite national legislation establishing limits of diesel fuel sulfur concentrations of 50 ppm by 2010, fuel available at the pumps has remained over 2,000 ppm. No refineries in Peru have the technology to produce 50 ppm sulfur diesel.⁴ As a result, the World Health Organization recently designated Lima the city with the worst air pollution in all of Latin America.⁵ In fact, a previous study⁶ published by the National Environmental Council of Peru (CONAM) established that the contaminated air in Metropolitan Lima was responsible for the death of 4,000 persons in the city each year.⁷

Directly related to short lived climate pollutants and the carbon intensification of the Peruvian economy, are the

significant direct and indirect impacts from rapid climate change. Accelerated glacial⁸ melt is one effect that is well documented, resulting in the rapid loss of sources of drinking water, irrigation for agriculture, as well as the loss of hydroelectric generation potential.

In fact, the largest tropical glacier in the world is Quelccaya, located just north of Arequipa. In the 1960s the glacier was retreating at a rate of 6 m per year. By 2007, this had increased to a retreat of 60 m per year. In 2009, the preeminent glaciologist Dr. Lonnie Thompson recorded it retreating at 46 cm per day. Dr. Thompson pointed out that, “you can sit next to the glacier and watch it retreat.”⁹ By drilling 2000 year old ice cores in Quelccaya, Dr. Thompson determined that the oxygen isotope ratio $^{18}\text{O}:^{16}\text{O}$ has risen abruptly in the last 50 years, indicating regional warming patterns.¹⁰

Despite the negative environmental, health, and economic impacts cascading from the over supply of vehicles and poor fuel quality, the complex situation was not resolved by national fuel quality legislation nor limits to protect air quality.

COFIDE

Established in 1971, COFIDE (Development Finance Corporation SA)¹¹ is a state owned (97.96%), national development bank of mixed economy with administrative, economic and financial autonomy. Day-to-day operations are managed by an autonomous board of directors, independent of the Government of Peru. Although COFIDE began its operations as a

³ Pedestrians comprise 78% of the road fatalities in Peru. Quistberg, D.A. et al; The Walking Environment in Lima, Peru and Pedestrian–Motor Vehicle Collisions: An Exploratory Analysis. Traffic Injury Prevention Volume 16, Issue 3, 3 April 2015, Pages 314-321

⁴ In 2014, the refinery in Talara announced plans to modernize equipment and produce diesel that complies with the 50ppm sulfur legislation.

⁵ http://www.who.int/phe/health_topics/outdoorair/databases/cities/en/

⁶ <http://elcomercio.pe/opinion/colaboradores/aire-limpio-salud-antonio-brack-egg-noticia-1710892>

⁷ CONAM was the official environmental authority of the National Government, prior to the foundation of the Ministry of the Environment (MINAM) in 2009.

⁸ Peru hosts 70% of the world's tropical glaciers

⁹ Thompson, L. (2009) “Retreating Glaciers Erase Records of Climate History.” Science News, Feb. 14, 2009.

¹⁰ <http://bprc.osu.edu/lcecore/Thompsonetal-climatic-change-2003.pdf>

¹¹ <http://www.cofide.com.pe>

“first floor” development bank, in 1992 COFIDE committed to exclusively operate as a “second floor” development bank—channeling resources only through domestic financial institutions supervised by the Banking Superintendent (*Superintendencia de Banca, Seguros y AFP* (SBS)). This mode of operation allows COFIDE to complement, rather than compete, with the work of the financial private sector.

The National Government's participation in COFIDE is through the National Fund for Financing Commercial Activity of the State (FONAFE- *Fondo Nacional de Financiamiento de la Actividad Empresarial del Estado*) under the Ministry of Economy and Finance. Additionally, 1.02% of COFIDE is owned by the CAF Development Bank of Latin America (CAF- *Corporación Andina de Fomento*), and the final 1.02% is offered as Class “B” stocks.

PROGRAMME IMPLEMENTATION

BACKGROUND

The goal of the transformational change to less contaminating transportation fuels was supported by the Camisea Gas project, one of the largest energy infrastructure projects in Latin America—estimated to contain 13.4 trillion ft³ of Natural Gas (NG) and 482 million barrels of liquid natural gas (LNG). This extraction operation is located near the Urubamba River in central Peru, near the Nagua-Nanti Reserve and Manu National Park, and then piped 700 km to Lima.

The Camisea gas fields were first identified by the Government of Peru with Royal Dutch Shell¹² in 1981. In 1994 Shell and Petroperú¹³ began to develop the fields in a consortium with Mobil¹⁴. But this effort was cancelled in 1998 due to insurmountable political risks. In 1999, under the Commission for the Promotion of Private Investment, a promotional effort was launched with the strategy to develop the Camisea project as an “independent modules, segmented business.” Two international tenders were organized to concession the processing and transport of liquids and gas from the Camisea fields to the coast, and then its distribution in Lima and Callao. In 2000, contracts were signed for the development of the projects with an international consortium, which now includes Pluspetrol¹⁵, Hunt Oil Company¹⁶, SK Corporation¹⁷, Repsol YPF¹⁸, Tecpetrol¹⁹ and Sonatrach²⁰. Cálidda²¹ (Peruvian Natural Gas Distributor of Lima and Callao) was awarded the 30 year concession contract to design, construct and operate the NG distribution system in the department of Lima and province of Callao.²²

The transformation of the transportation energy matrix to CNG²³ began by first creating a regulatory base for the nascent industry. This was under the administration of President Toledo, beginning in 2004. With a collaborative approach, a working group comprised of several ministries was charged with the design and implementation of a regulatory framework to incentivize and scale-up the use of NG in the country. It was determined that the Ministry of Energy and Mines (MINEM) would regulate the “Gasocentros” (CNG filling stations), the Ministry of Transport and Communications (MTC)

¹²Anglo-Dutch multinational headquartered in the Netherlands and incorporated in the United Kingdom.

¹³ Peruvian state-owned petroleum company.

¹⁴ American oil company, merged with Exxon in 1999 to form ExxonMobil.

¹⁵ Private multinational company, based in Algeria and Tunisia, expanded to Peru in 1996.

¹⁶ Private company headquartered in Dallas, Texas.

¹⁷ South Korean conglomerate

¹⁸ Private company based in Madrid, Spain. In 1999, purchased 97.81% of YPF, an Argentine oil and gas company.

¹⁹ A division of Techint, an Italian conglomerate multinational founded in Milan, Italy.

²⁰ Algerian government-owned company

²¹ owned by the Colombian firms EEB and Promigas. EEB (Empresa de Energía de Bogotá) is a corporation headquartered in Colombia. Promigas is a Colombian company controlled by the multinational Ashmore Energy International (AEI)

²²The concession of CALIDDA to distribute NG in Lima is exclusive until 2016, and in a “shared market form” through 2034.

²³ The term used in Peru, GNV (*Gas Natural Vehicular* or Natural Gas for Vehicles) specifically refers to Compressed Natural Gas (CNG).

would regulate the certification and CNG conversion workshops, and the Ministry of Production (PRODUCE) would regulate the importation of CNG cylinders and pressure regulators.

INFOGAS

Next, in order to mitigate political risks and stabilize the industry across election cycles and successive government administrations, the autonomous entity INFOGAS²⁴ was established by Presidential Decree in 2005. INFOGAS was created to administrate, utilizing ICTs, the “Control System for CNG Fueling,” which involves all the information generated by the participants throughout the CNG commercial chain in Peru; including the vehicle owners, the suppliers of converted and new CNG vehicles, CNG filling stations (*Gasocentros*), intermediate financial institutions (IFIs) and other agents involved.

INFOGAS is overseen by a “Supervisory Committee” comprised of delegates from MINEM, MTC and PRODUCE. This committee designated COFIDE as the Administrator of INFOGAS for a period of 10 years. As such, COFIDE was directly responsible for the design of the administration strategy and control system that was to be implemented.

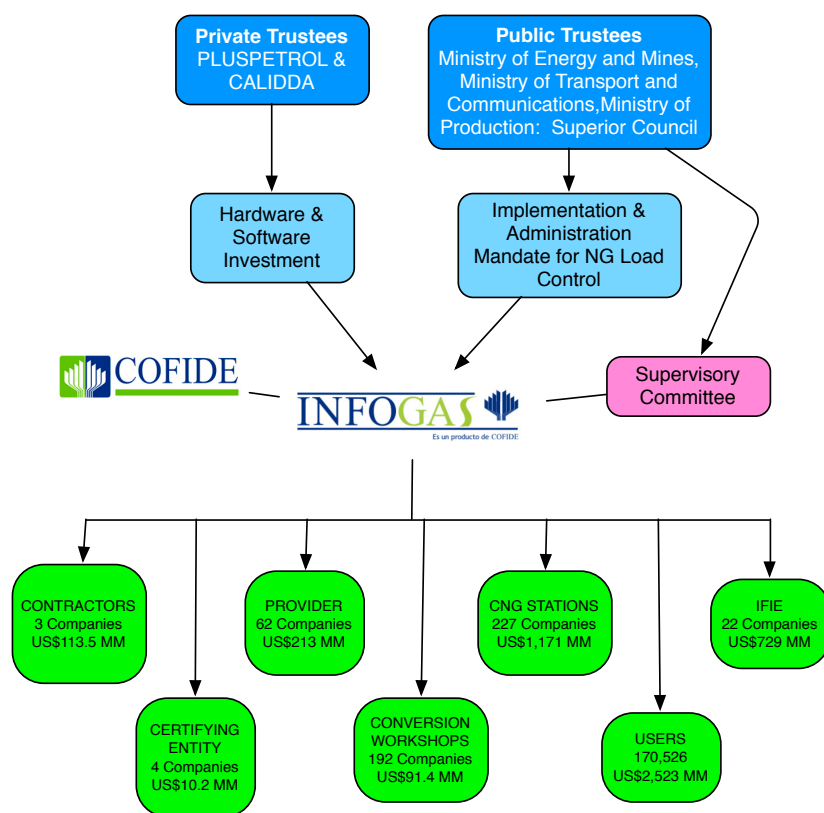
COFIGAS

COFIDE understood the tremendous opportunity that INFOGAS and ICTs enabled. With the regulatory base established and the political and operational risks addressed, COFIDE could accurately estimate the magnitude of the savings generated by the widespread uptake of CNG in the market of Metropolitan Lima. To enable this opportunity, COFIDE created and resourced the COFIGAS programme (Programme for Financing the Conversion of Natural Gas).

The goal of COFIGAS was to actively promote the transformation of the public and private transportation system in Metropolitan Lima to CNG by financing potential users, via structured financial products. In 2005, COFIDE commenced the design of the COFIGAS program with 3 components. The first, was to provide financial resources that enabled integrated financing for the conversion of diesel and gasoline engines to run on CNG. Second, was to finance the purchase of new CNG vehicles and third, was to make strategic structural investments via standardized financial products in the CNG commercial sector.

In essence, through the COFIGAS programme and the use of ICTs, COFIDE was able to create “standardized financial products” to finance vehicle purchases and conversions (including cars, busses and moto-taxis), filling stations, CNG conversion workshops, new CNG vehicle vendors, certification entities, and bus rapid transit (BRT) operations. But in order to implement this transformational financing at the subnational level, all the credit lines that COFIDE administrated were channeled to the beneficiaries through subnational Intermediate Financial Institutions (IFI)—such as municipal or rural banks, lending agencies, small business developers (*entidad de desarrollo de la pequeña y micro empresa* - EDPYMES), cooperatives and, financial leasing agencies. The IFI’s that were specialized in micro-finance,

Programme Architecture



²⁴ <http://www.infogas.com.pe>

COFIDE termed IFIEs (*Institución Financiera Intermediaria Especializada en la microfinanza*). IFI's had the responsibility for receiving, qualifying, approving, distributing and recuperating the loans that were approved. For example, parties that were interested in financing the purchase of a CNG vehicle or to open a conversion workshop, could approach the local IFI of their choice. This meant that each particular IFI established their definitive loan conditions as well as the corresponding credit evaluations. In all cases of vehicle conversions and new new car/bus purchases, the loan would also finance the vehicles' insurance, taxes, certification and access to the automated INFOGAS information system.

When the COFIGAS programme was initially launched in 2006, COFIDE channeled the first tranche of financial resources through the “*Caja de Lima Metropolitana*” “(the savings bank of Metropolitan Lima)²⁵. Later, as the profitability and low risk nature of the mechanism was demonstrated, additional local IFIEs quickly became involved.

ICT - SMART CHARGING

A key part of the INFOGAS system was the integrated ICT based “smart charging” system, inspired by an established NGV programme in Colombia. This Colombian programme loaned money to consumers of NG and then embedded the loan repayments into the price of the actual NG. This was possible because the price of NG plus interest for the loan, was more economical than the fuel being replaced.

In the case of Peru, importantly, all *Gasocentros* are required by national legislation to be connected to the INFOGAS system of automated accounting. Currently, the system in the Metropolitan Lima is comprised of more than 220 stations. In each CNG vehicle, whether new or converted, there is a telecommunications “chip” located near the recharge port. When the recharging hose is inserted into the vehicle, specific information is collected from the vehicle being refueled. If the recharging system does not recognize the vehicle's chip, the CNG recharging hose does not unlock. Once the refueling is complete, the information is automatically registered by INFOGAS and includes; the amount of CNG recharged (in Peruvian Soles), and the corresponding % of payment that must go towards the vehicle's financing with taxes. At the end of the day, when the *Gasocentro* closes its registers, the station pays out the consolidated total, sending to COFIDE the corresponding amount for the financing for each CNG vehicle that refueled that day. From there, COFIDE closes out their accounts and distributes the money to the local IFIs in accordance with the particular IFI clients' loan obligation that refueled that day.



The first CNG taxis in Lima in 2006 were financed through the “Caja de Lima Metropolitana.”



If the CNG (GNV) pump does not recognize the vehicle's ICT “smart charging” chip, the hose will not unlock.

In effect, from the perspective of the car owner—a taxi driver for instance, the system provides a convenient and seamless way to “pay your loan at the pump.” For the IFIs that made the loans, the INFOGAS system minimized the operational risk and therefore drove a strong flow of credit for the purchase of CNG taxis, busses and private vehicles, as well as diesel conversions.

With respect to the loan percentage paid when refueling, each IFI applies their own model depending on the vehicles' intended use. For example, taxis that operate more kilometers per day and hence realize more refueling have a smaller payment percentage applied. Meanwhile, private vehicles that travel less, pay a higher percentage due to less frequent recharging.

²⁵ Also, for the first cases, the disbursements were made under customized credit lines with amounts based on a timeline of loans to the IFI's final clients.

Mr. David Mendoza, Chief of Transportation loans at the *Caja Metropolitana de Lima* (Lima's Municipal Bank), points out the importance of a system that allows the user to feel that they are apart of the modernization process, and that they are directly participating in the transformation of the city of Lima. For this reason the *Caja Metropolitana de Lima* has been working closely with the Municipality of Lima to support the 2013 regulation obligating the use of CNG by all taxis in Metropolitan Lima.

Summary of Financial Conditions

- The commissions and interest rate of the IFIs are established by COFIDE.
- The commissions and interest rate of the final loan recipient is negotiated between the IFI and the final loan recipient, based on an estimation of the recipient's ability to repay. Can not exceed 7 years.
- The currency can be either Peruvian Soles (S/.) or U.S. Dollars (US\$).
- There is no limit on the maximum loan size, only limitted to the availability of resources from COFIDE.
- Financing up to 100% of the investment required.
- The repayment of the principal and interest is on a monthly basis, except when COFIDE and the IFIs agree to another type of loan. The IFI and the recipient agree to an amortization schedule.
- The IFI can make a partial or total prepayment of the loan from COFIDE. In that case, the IFI must give no less than 3 days notice to COFIDE, before the prepayment.

In 2009, in addition to financing both the conversion and purchase of CNG vehicles, COFIDE supported the winning bid to operate CNG busses in the new Bus Rapid Transit (BRT) system el *Metropolitano*, by approving US\$200 million for financing the acquisition of 567 new CNG busses by the 4 concessionaires. This new initiative led other bus operators in the city, outside the BRT corridor, to seek out the support and guidance of COFIDE for their operations. As a result, between 2009 and 2011 COFIDE approved financing for the acquisition of 714 new CNG busses for public transportation.

"The reason I switched to CNG four years ago is because I now earn 70% more due to the lower cost in fuel, and owning not renting my taxi. It took me less than 30 days to obtain the loan from the bank, and I am quite content with the change."

Another strategic investment made by COFIDE was to dedicate more than US\$6M for the removal and destruction of outdated busses. Despite municipal legislation that obligated busses greater than 20 years old to be removed from circulation in the metropolitan area, there were no incentives nor alternatives to help the bus owners comply. As a result, the outdated busses either stayed in circulation or were re-sold in the interior of the country. The

-Sr. Eduardo Alberto Fiestas
Taxi Driver in Lima

Active NGV Vehicles and # of Gasocentros



resources made available by COFIDE enabled the Municipality of Lima to purchase the oldest, most polluting busses in circulation and destroy them.

OBJECTIVES AND BARRIERS

OBJECTIVES

COFIDE launched the COFIGAS programme in 2006 with the following objectives:

- Facilitate the conversion of machines, equipment and motors that utilize contaminating fuels, to CNG.
- For the benefit of the Nation, take advantage of the opportunity to utilize a less expensive and less polluting fuel, that has a better performance than other fuels.
- Compliment traditional financial services, with the application of a new technology (INFOGAS) developed by COFIDE.
- Finance private investments for the construction of infrastructure and a distribution network for CNG, that includes filling stations, regional distribution centers, and specialized transportation fleets.
- Introduce improved controls and supervision of the production, distribution and consumption of CNG- under the responsibility of the OSINERG (Supervisory Organism of Investments in Energy and Mining)²⁶ and respective national ministries.
- Introduce ICT mechanisms for CNG markets, such as the “smart charging” technology, that creates an efficient and low risk method for loan repayment.
- Introduce the use of environmental financial instruments, adding value and profit to clean industries.



BARRIERS

There were several challenges to the successful implementation of the COFIGAS programme, including:

- Initial ICT technology challenges with the INFOGAS operational software. First, the lack of the necessary ICT hardware for implementation, commercialization, control, etc. had to be solved with specialized international providers. Then, the rapid growth of the program significantly strained personal and technical capacities.
- Historically, the great majority of the taxi drivers in Lima actually rent their taxis, they don't own them. Therefore, most drivers did not have established credit.
- It was recognized that in addition to introducing cleaner fuels to the transportation system, it was still necessary to address the real challenge of permanently removing the most polluting busses from circulation.
- Institutional Challenges. First, the time-limited mandates of succeeding governments could be a risk to long term stability of investments, and secondly, the lack of political support to implement regulatory norms for the *Gasocentros*, certifiers, and conversion workshops. The importation of CNG cylinders and pressure regulators, as well as taking the all the different steps necessary for complete programme implementation were major challenges for the COFIGAS programme.
- Operators. The integration of all the commercial entities in the CNG chain into a legal framework across national and different subnational jurisdictions. It was difficult to incorporate every business in the CNG network into a networked real-time information system.

²⁶ <http://www.osinergmin.gob.pe/newweb/pages/Publico/1.htm?4983>

TIMELINE

- In 2004, Peru began creating a regulatory base for the nascent NGV industry. In October, 2004, the National Commission for the Promotion and Use of Natural Gas was established, comprised of representatives from the Ministry of Energy and Mines, the Ministry of Production, the Ministry of Transport and Communications, the Ministry of Housing, Construction and Sanitation, COFIDE and the National Environment Council (CONAM). The mission of the National Commission is to develop and promote markets for industrial, vehicular and residential gas.
- In 2004 CALIDDA was awarded the concession for commercial distribution of natural gas in the area of Lima and Callao. Through this agreement, CALIDDA has the responsibility to make all investments related to creating the CNG distribution network for industrial, residential, and vehicle services sectors. This CNG distribution concession is exclusive until 2016, and then in a shared market till 2034.
- In February 2005, regulations were established for the implementation and operation of “Establishments for the Public Sale of CNG.” At the same time, the INFOGAS ICT Control System for Charging CNG and the Supervisory Committee was created. (Decreto Supremo No. 006-205-EM of February 4, 2005)
- In October 2005, the Supervisory Committee passed a resolution naming COFIDE as the administrator of the INFOGAS System for a 10 year period.
- In 2006, COFIDE launched the COFIGAS programme (Programme for Financing the Conversion of Natural Gas), and applied the defined Standardized Financial Products.
- In 2010 COFIGAS began expanding to other cities in Peru.

SUCCESSSES

The impressive results of the transformational programme include:

- Between 2006 and 2014, COFIDE approved 97,405 financial credits in the COFIGAS programme for more than S/. 2,227,339,000 (US\$ 740,594,846 in 2014 dollars).²⁷
- More than 94,500 vehicle owners (the majority of them taxi drivers, who previously rented their taxis) have established credit and successfully received loans through the COFIGAS programme.
- Between 2006 and 2014, a total of 199,276 vehicles had converted to CNG (156,676 vehicles have been converted from diesel or gasoline and 42,600 were new CNG vehicles).
- Between 2005 and 2014, INFOGAS registered CNG sales amounting to 3,095,161,000 m³.
- More than 500 formal, national companies and over 7,000 direct sustainable jobs have been created.
- COFIDE approved US\$200M for financing the purchase of 567 new CNG busses for the 4 operating concessionaires in Lima's public-private “el Metropolitano” BRT system (launched 2010). This brought additional estimated financial benefits of US\$85M in addition to lowering the fare to riders by 40% compared to actual market prices (estimated savings of more than \$500M).
- Dedicated US\$ 6M for the scrapping of outdated, polluting busses in Lima.
- Between 2006- 2011, it is estimated that the financed, new 146 CNG busses for public transport (outside the Metropolitano BRT) had generated value-add of more than US\$27M due to the reduction of fuel costs.
- Restructured the public transport system with CNG buses and support to the BRT, resulting in estimated emission reductions (ER) of 23.5 MtCO₂e over the next 10 yrs.
- The total accumulated benefits generated by COFIGAS between 2006-2011 are estimated at more than US\$ 4.8 billion in investments (1.8% of the GDP)²⁸.

²⁷ <http://www.infogas.com.pe/images/pdf/estadisticas/12-2014/estadsticcas-15.pdf>

²⁸ http://www.infogas.com.pe/index.php?option=com_content&view=article&id=15&Itemid=8

- Estimated GHG ERs of the converted automobiles is 3.4 MtCO₂e (through 2013), with an additional 8.5 MtCO₂e over the next 10 yrs.
- In 2010, it was determined that the air quality in Metropolitan Lima had improved by a 30% reduction in both PM and SO₂ levels.

REPLICABILITY AND SUB-NATIONAL EXPANSION

With the success of the COFIGAS programme in Lima, in 2010 COFIDE began to scale up the programme and expand in other provinces in Peru, outside of Lima. Today, while the grand majority of CNG is being used in Metropolitan Lima, more than 6% of the total CNG is now sold in provinces outside of Lima and Callao.²⁹ Other cities participating in the CNG transformation include Chimbote, Chincha, Ica, Chiclayo, Piura, and Trujillo. Additionally, the Ministry of Energy and Mines has proposed the introduction of the COFIGAS programme to 12 developing cities in the mountainous regions of Peru, including Apurimac, Ayacucho, Puno and others. Along with financing for CNG vehicle conversions and purchases, the operations in smaller cities will also include initiatives for financing domestic gas for residential use. In many cases this will replace the use of heavy particulate generating wood fuels in the home.

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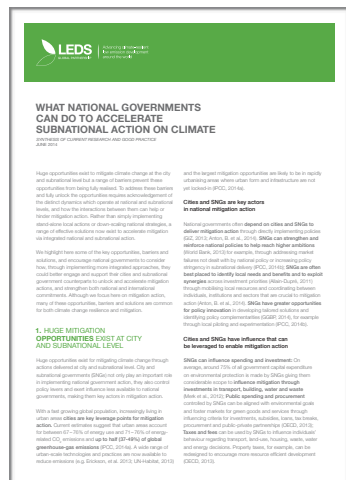
Prepared for the Low Emissions Development (LEDs) Global Partnership Working Group on Sub-National Integration. Authors: Scott A. Muller, Jessica Tantalean Noriega, Daniel González Hernández

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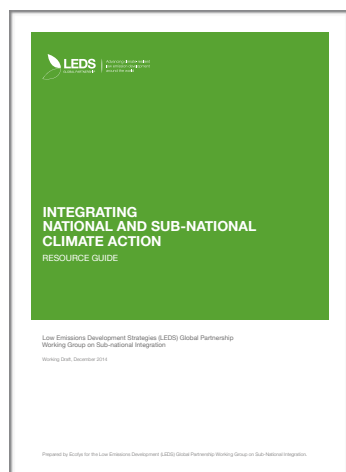
²⁹ <http://www.infogas.com.pe/images/pdf/estadisticas/11-2014/estadisticas-11.pdf>

AVAILABLE RESOURCES AND ASSISTANCE

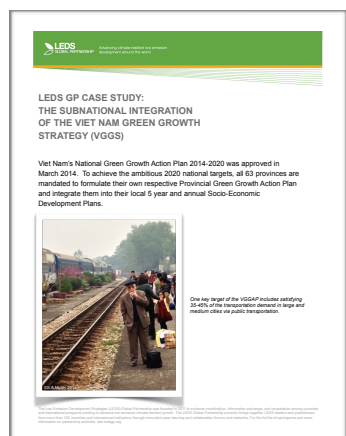
SELECT DOCUMENTS OF THE LEDSGP WORKING GROUP ON SUBNATIONAL INTEGRATION³⁰



[Synthesis of Current Research and Good Practice on Subnational Integration](#), “What National Governments Can Do to Accelerate Sub-national Action on Climate.”



[Resource Guide: Integrating National and Subnational Climate Action](#). Based on the latest practitioner and research insights, it is illustrated with case examples from around the world and outlines the key opportunities, barriers and solutions for improving integrated climate action. An initial list of useful resources is also included for the reader to explore further.



[LEDSP Case Study: The Subnational Integration of the Viet Nam Green Growth Strategy \(VGGS\)](#). Viet Nam's National Green Growth Action Plan 2014-2020 was approved in March 2014. To achieve the ambitious 2020 national targets, all 63 provinces are mandated to formulate their own respective Provincial Green Growth Action Plan and integrate them into their local 5 year and annual Socio-Economic Development Plans.

³⁰ See <http://ledsgp.org/planning/NationalSubnationalLEDS/documents>