LET THERE BE LIGHT IN MEXICO! ANALYSIS OF THE STRATEGIC HUMAN RESOURCES TRAINING PROGRAM FOR THE ENERGY INDUSTRY

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The Reform and Its Prospects

No other natural resource in the world stirs up as many expectations and disappointments as petroleum. Beyond its commercial value, a barrel of oil contains all kinds of prospects. For the inhabitants of countries rich in energy resources, especially developing nations, oil offers the promise of wealth, economic development, a decrease in cost of the standard of living, etc. One of the prospects is the expectation of increased and better job opportunities. The federal government’s message calling for support for the energy reform in Mexico was based on this last promise.¹

These expectations were awakened in Mexico by the 2013 reform, which not only involved a mere change in the rules but also delineated the reinvention of the country’s energy model. The constitutional changes promised to transform the industrial sector as well as the country’s economic, political, and social bases. The shift from multiple state monopolies to a model of dynamic competition in the hydrocarbon and electricity sectors marked a break from the vestiges of a monolithic regime with the construction of an open industry. The dissolution of the exclusivity of Petróleos Mexicanos (PEMEX) and the Federal Electricity Commission (CFE) aimed to shake the impenetrability of the entire sector and open up a reserve of industry-related professions. Since the reform, the professional world has opened up to those wishing to dedicate their careers to this industry. Opening the industry broke down walls that previously had been restraining knowledge.

Expanding employment opportunities in the industry was expected to rejuvenate the connections between employers and job seekers. An industry open to competition cannot stand on the work of civil servants and employees hired through personal, union, or political connections alone; rather, it must make room for “meritocracy.” Competition should be extensive, not only for companies and resources, but also for human beings. After decades of nepotism in CFE and PEMEX, the reform efforts required these organizations to open up the job market and offer opportunities to talented people. The reform involved a knowledge-based meritocracy and competence development system with new technical, management, and even cultural knowledge, eradicating the inbreeding in PEMEX, CFE, the government, and private actors who were too comfortably settled within the old regime.

The change in the energy industry was swift. The constitutional reform was approved in just two weeks, without any opposition from other political parties or trade unions. Furthermore, secondary laws were implemented without any conflict in August 2014. It seemed that the country would transform at the same pace as these changes to the legal framework, encouraged by the predictions of President Enrique Peña Nieto’s government. Extremely optimistic investment figures were announced along the entire hydrocarbon

¹ Various television spots broadcast by the federal government claimed that more actors and competition would lead to more job opportunities. For example: https://www.youtube.com/watch?v=kQYdBztIALE, visited on December 3, 2015.
and electricity value chain. But what about the people? How should they be trained to face the challenges of a newly reinvented industry? At the time the reform was launched, they did not foresee the turbulence or pressure changes to come in the industry. The secretariat of energy (SENER) announced that 135,000 jobs would be available in the industry by 2018, based on the understanding that the reform would grant privileges without obstacles.

Secretary Joaquín Coldwell’s comments on the need to train human capital were relatively negligible in an environment focusing on investment. What has remained unclear is the capacity of the workers producing value and growth in both the private and public sector. Due to the speed of the reform, there is a significant learning curve along with few economic and human resources. This should not be underestimated, considering that the model’s success depends on good governance. The energy reform put civil servants to work as quickly as possible. In less than a year, the federal government had reformed the Constitution, issued a considerable body of legislation, established “Round Zero” with PEMEX, and launched a tender process for contracts. All of these actions were taken without the public’s knowledge due to the closed nature of the industry. The regulatory agency in Mexico had never tendered petroleum contracts before and the SENER had only designed one such tender process. The pace was intensified. As everything happened rather quickly, it was reasonable to question whether the government, the new State-Owned Productive Enterprises, and private initiatives would be able to offer the necessary supply of qualified personnel to make certain prospects a reality.

This paper offers a critical analysis of the federal government’s efforts to build public policy for human capital through a specific instrument called the “Strategic Human Resources Training Program for the Energy Industry,” released in February 2014. The purpose of this paper is to assess the viability of this program, considering organizational theory and institutional analysis in light of these questions: What is the Strategic Program’s vision for the energy industry, and how does it shed light on the problems of human capital formation? Which connections and mechanisms would make the program viable? How does the government’s volition interact with market dynamics? Is the government aware of the market and its uncertainties? Without satisfactory answers to these questions, the program’s potential effectiveness is questionable.

This paper also establishes a basic vocabulary for discussing “human capital.” What does this concept suggest and why do we prefer it to others, such as “human resources,” despite its controversial nature? Its use is questionable, since training people in this industry not only presents an educational challenge, but also a quantum leap in work culture. Until the present day, civil servants and employees of PEMEX and CFE have not been exposed to the dynamic fluidity of an open job market with different demands, pressures, and

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From December 2013 to August 2014, reforms were approved to Constitutional Articles 25, 27, and 28; nine new laws were issued and 12 were reformed.

Investment figures were announced by the Secretariat of Energy, the National Science and Technology Council, and the Secretariat of Public Education.

“Round Zero” was resolved, while secondary laws still had not been approved. This process allowed PEMEX to retain certain areas where it had productive investments through an application process with the secretariat of energy.
objectives. A strategic program with a \textit{strategic vision} must address these complex issues and different possibilities for handling them. Without these considerations, one may question whether the Strategic Program is in fact better than other planning instruments issued by the Mexican federal government.

The Strategic Program document was written with a conscious choice of terminology that may be considered controversial for those who have denounced “commercial objectification” from an ideological perspective, not so much in reference to natural resources as Mexico and its people. If political leaders opposing the energy reform were to claim that “petroleum is not for sale,” it would be much less acceptable to speak of human beings as “capital.” Gary Becker, Nobel Prize laureate in economics, speaks of certain people’s aversion to referring to human beings as capital in which “it would be good to invest,” with the prospect of obtaining returns. This reflection is relevant in a country where, rather than just being a profitable business, the energy industry has the dual vocation of functioning as both a business and a welfare system. The Mexican energy duopoly is unique due to its welfare component, with energy expenses at prices controlled by authorities who are more concerned with political popularity than business profitability. There is a common perception that the corpus of PEMEX and CFE personnel are “martyrs” keeping the country and its inhabitants afloat through their hard work and despite a lack of resources; consequently, referring to said personnel as “resources,” or even worse, “capital,” could be considered dehumanizing them as interchangeable goods.

The energy reform has placed PEMEX and CFE in a different category with clear business repercussions. The name “Productive State Enterprise” indicates the abandonment of the aid model and the rebirth of these organizations with a business vocation. If creating value is the new constitutional mandate for productive enterprises, these “martyrs” should be transformed into employees and civil servants equipped with the material and intellectual resources to fulfill this mandate.

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5 This sentence was used in particular by opposition leader Andrés Manuel López Obrador in opposition to President Calderón’s energy reform in 2008.

6 Becker explains: “However, I should add that the concept of human capital remains suspect within academic circles (for if capital exploits labor, does human capital exploit labor too – in other words, do some workers exploit other workers?). In Gary S. Becker, \textit{Human Capital. A Theoretical and Empirical Analysis, with Special Reference to Education.} 3rd ed. (Chicago and London: The University of Chicago Press, 1964), p. 75.

7 According to professor Isabelle Rousseau, both PEMEX and CFE are privileged instruments in terms of their national economic and social development strategy, which impedes them from economic development like that of other petroleum companies with clearly commercial purposes. See Rousseau, “Las Transformaciones de la Política de los Hidrocarburos en México en el Contexto de la Transformación Democrática. Esquemas Organizacionales y Estrategias de Actores (1989-2004).” El Colegio de México, 2006, p. 29.

8 Ibid.

9 Rocío Nahle, current member of the Democratic Revolution Party for the state of Veracruz, made the following statement in response to the author’s comments regarding the underuse of petrochemical plants: “Miriam Grunstein should come and check on the field workers to see how they work and how they keep PEMEX petrochemical plants in operation, with budgetary deficiencies and limited human and material resources; the workers, operators, and engineers are essentially making miracles; they are the true heroes and the reason why the national petrochemical industry has not shut down.” Retrieved from \url{http://www.imagendelgolfo.com.mx/resumen.php?id=144145}.
Speaking of an investment in human capital “implies technical, financial, legal, administrative, and social considerations.” The literature on techniques for building and measuring human capital policies suggests a multifaceted approach. Without this holistic vision, there are significant blind spots impeding the establishment of critical paths that would allow us to see whether the formation and transformation of human beings is achieving the desired purposes. The idea is to see whether investment in human capital can be transferred to the quality of goods and services, company profitability, and substantial improvements in the standard of living. In the words of public administration scholar David Arellano, a human capital strategy should “rediscover the importance of human beings as individuals and diverse groups, not as ‘resources,’ and deal with them through a directional process that is not limited to merely describing but also proposing methods for advancement and development.”

What remains unclear is how to transmit this knowledge, how to apply it, and for what purposes. In Mexico, the education given to a young person who wants to enter the industry is not the same as the education that must be given to industry veterans. Due to the significant changes in the industry, these veterans require further knowledge without discrediting the knowledge they have already accumulated. A very important question in the case of Mexico is what to do with the knowledge of those who have already acquired experience under the old model. The risk of thinking that the “the old guard” of CFE and PEMEX workers is already obsolete would be a serious claim with significant social consequences; consequently, an attempt should be made to integrate veterans into today’s industry.

Another important question is the definition of ex ante indicators that allow us to measure the scope, deficiencies, and achievements of public policy. If the government’s intention is to carry out a strategy for building human capital, it should analyze the vast international literature regarding these experiences, focusing special attention on the limitations presented by certain indicators, in particular “traditional” measurement methods. A study

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12 See the diagnostic section of the Strategic Human Resources Training Program for the Energy Industry, which states: “It is evident that foreseeable generational replacements are necessary for the main companies (PEMEX and CFE) due to employees retiring in upcoming years. The retirement forecast for PEMEX over the next six years is 29,837 people, 22,438 of which are unionized employees performing technical responsibilities and 6,869 hold trusted positions, performing professional and executive roles. The replacement of technical, professional, and executive employees for both companies will be a major challenge due to their experience and knowledge accumulated over the years. In the case of CFE, 4,877 of the total 117,552 employees have been working in the organization for at least 25 years and will reach retirement age between 2014 and 2018.” Retrieved from http://www.gob.mx/sener/acciones-y-programas/programa-estrategico-deformacion-de-resources-humans-en-materia-energetica-pefrhme-7732.
by the Organisation for Economic and Cooperation Development (OECD)\textsuperscript{13} pointed out that some of the most common indicators are “incomplete,” as they don’t establish a clear relationship between the level of knowledge and the generation of well-being. Salary, for example, was mentioned as one of the incomplete indicators, which does not necessarily allow us to draw a connection between knowledge and remuneration. This study indicates that not even workers’ “productivity”\textsuperscript{14} is a complete indicator of the quality of human capital. Outside of the context in which other variables are at play, the study claims that the impact of human capital formation does not allow for an adequate qualitative assessment, insisting that one cannot speak of the formation of human beings without considering the specifics of the political and social context. Speaking of education and the transfer of knowledge within an isolated circuit impedes us from seeing the full panorama. The OECD was right to introduce indicators such as inclusion policies for targeting workers of different genders and marginalized communities, access to health and services, and social and geographic mobility, as well as other factors that go beyond corporate profits.\textsuperscript{15}

Another fundamental issue is the uncertainty associated with efforts to train human beings. Employers will follow their own free will or what the job market will allow., according to their specific circumstances. Manuel Molano Ruiz, adjunct director from the Mexican Competitiveness Institute, points out that the state or the private sector can invest any amount of resources in training human beings for a specific activity; however, there are a number of unforeseen factors that may impede these people from dedicating their time to the activities for which they were trained. On the other hand, there is the question of the volatility of industries and markets. This point is crucial for understanding the potential impact of consolidating a human capital policy for the industry, which is now entering turbulent waters and massive layoffs,\textsuperscript{16} as it may call into question the need to promote personnel training. Nevertheless, as an industry with wide-ranging and long-term impact on the country, it would be foolish to stop the efforts to further build a body of knowledge in Mexico.

**The Present Past: What to Do?**

The state of Mexico’s energy industry stands in sharp contrast to the global experience, since industry knowledge has been concentrated in a duopoly. By not working for the government, PEMEX or CFE, or their contractors and consultants, there were no significant opportunities for workers to obtain education or a specialization within the energy sector.

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\textsuperscript{13} Bassi and McMurrer, “Indicators of Human Capital Investment and Outcomes from the American Society for Training & Development.”

\textsuperscript{14} Ibid.

\textsuperscript{15} Ibid.

Amongst students, there is a public tale of a professor from the National Autonomous University of Mexico who always asked the following question: Why would a young person want to study oil engineering in Mexico if the only employment option was PEMEX? There is a common perception that a significant group of unionized, trusted PEMEX and CFE employees are comfortable in their positions and satisfied with the state of affairs. It is also assumed that there are a number of respectable civil servants and high-level, high-performing employees without any convincing empirical evidence in this regard.

The issue is that these perceptions do not allow us to make a clear assessment of the competencies of PEMEX and CFE personnel. Informal conversations with civil servants at the SENER and the National Council for Science and Technology (CONACYT) revealed the difficulties of establishing information exchange mechanisms with the productive state enterprises. The absence of institutional mechanisms helps PEMEX and CFE avoid providing information to assess the existing knowledge in their organizations. The lack of information revealed to the government and the public could be due to various causes, none of which are mutually exclusive: productive state enterprises do not keep systematic, continuous control of their employees’ competencies. And if said information were in fact available, there are various reasons for potential resistance to its dissemination, even with legal consequences. At such a precarious evolutionary moment in time, examining the competencies of civil servants and employees in the productive state enterprises could call into question management, hiring, and employment policies. The fact that PEMEX’ and CFE’s civil servants and employees fall short compared to their counterparts around the world is an important indication that the state’s management has failed.

The high concentration of “know-how” in the energy industry should make it easier for the government to analyze the aptness of the corpus of knowledge regarding hydrocarbons and electricity and its ability to face change of the magnitude of the energy reform. In addition to the aforementioned impenetrability of PEMEX, the degree of outsourcing has further complicated an analysis of the knowledge within the organization. Hiring service companies and independent contractors to do substantial work for the state productive enterprises (EPE)\(^\text{17}\) complicates data collection. However, neither PEMEX nor its contractors are the exception to the rule, but rather part of a pattern. Studies by the International Labour Organization (ILO)\(^\text{18}\) claim that the secrecy surrounding information on PEMEX employees is true across all companies, including both oil and service companies. In certain cases, this is due to the fact that such information is considered to be private, since human capital is viewed as a competitive advantage. Nevertheless, due to PEMEX’ and CFE’s specific circumstances, including the reform, there are reasons why public policy should reveal what kind of knowledge and skills their civil servants and employees have. The reluctance to reveal this information has an obvious impact on the ability to make a proper assessment of the country’s competencies within the energy industry.

\(^{17}\) EPE is the Spanish acronym for state productive enterprise ("empresa productiva del estado"), which was recently officially determined in Constitutional Article 28. The specification of being productive logically implies that they must be established within a meritocracy system.

Mexico is unique in certain aspects within the energy industry, while it follows global patterns in regards to other aspects. The aging of the industry’s critical mass is a global reality, and technological advancements have already surpassed its capacity to produce talent capable of applying said developments. Mexico is atypical in that many of its workers are long-term employees; PEMEX and CFE have older employees whose experience is limited to these organizations’ activities. And since the former Mexican duopoly has not reached beyond the country’s borders, its workers have not had the mobility or exposure to the wealth of the work culture in the rest of the world. Conversely, the rest of the world has not shared Mexico’s experience, and consequently the energy sector has been limited to the implementation capacity of companies within the industry. Similarly, the Strategic Program emphasizes human capital formation for activities that are still sporadic in Mexico, such as deep sea exploration and the production and development of unconventional resources. In terms of electricity, deficiencies are primarily noted in the development of clean energy. However, what is missing from this program is a mature feasibility analysis of the short- and mid-term possibilities of establishing conditions for Mexican companies to enter deep sea exploration in addition to conventional resources, particularly when production has slowed due to the drop in hydrocarbon prices. The implementation of new electricity technologies in Mexico is also uncertain due to its long tradition as an oil producing country, rather than as an innovator in electricity infrastructure. Mexico must reflect more on its capacity to partake in innovative electricity projects.

**Strategic Human Resources Training Program**

In September 2014, the federal government released the “Strategic Human Resources Training Program for the Energy Industry.” This Strategic Program seems to have been launched with the same haste as many other reform instruments. What assessments did the federal government make to conceive this program? Even the minor analytical components in the document are brief and superficial. The baseline for the document is the reform itself, and no substantial references are made to the industry’s historical context or its impact on human capital. It seems to be suspended between an absence of the past and an uncertainty regarding the future. Reviewing other cases around the world suggests that formulating this type of strategy should at least require: 1) preliminary studies of the available supply and demand of human resources, considering a wide variety of positions within the energy industry; 2) a study of the disparity between current human resources supply and forecasted demand; and 3) another study on the academic offerings that may help shrink these disparities. These three provisions involve quantitative and qualitative studies, specialized consulting, and a substantial capacity for data collection and processing, all of which require time. These tasks were not undertaken before the program was

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19 Ibid.  
20 The Strategic Program was released by the National Science and Technology Council, the Secretariat of Public Education, and the Secretariat of Energy.  
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launched. The Strategic Program followed the course of political haste and, consequently, its deficiencies. The Strategic Program narrates the story of the reform from which it came, considering the general issues at hand and expounding upon the legal structure supporting it. Finally, it establishes a cumbersome organizational structure for executing various implementation phases. It seems unable to clearly define a vision for the industry under construction or a strategic outline for satisfying its human capital needs. That begs the question, what exactly is the Strategic Program? Does it even apply to any known tradition of political instruments?

Life Is What Happens While the State Is Busy Making Plans

An analysis of the Strategic Program allows us to understand the government’s expectations of the benefits of the energy reform at the time it was drafted; even when the price of oil had already dropped to $40 per barrel or less on a global scale, there were reasons for maintaining an optimistic outlook. The experts predicted a favorable market for new investment flows. Therefore, the Strategic Program came at a time when it was assumed that Mexico would be an attractive country for a new industry, which requires dynamic mechanisms for human capital formation and recruitment. More than one year later, the sector has cut back on employment, only keeping the jobs at the core of its business. The question now is whether it would be advisable for the government to focus its efforts on training personnel when neither the industry nor PEMEX or CFE have an urgent need for said personnel. Looking at the situation through a shortsighted vision, it would seem that, at least in the next few years, there may not be any room for significant job opportunities for fresh blood, while the veterans at PEMEX and CFE may see themselves in a precarious situation considering the financial, organizational, and operative conditions of EPEs. On the other hand, those who see the energy reform as a long-term undertaking might even suggest that the industry’s crisis could be taken as a respite for designing a more robust strategic program than the 2014 initiative.

The Strategic Program was launched at a difficult time. Enthusiasm for the reform was still thriving, but the country was shaken due to failures in state institutions and good

22 At the time this paper was written, there were no assessments on any of these topics published on the Secretariat of Energy’s website.
23 See the section of the Strategic Program on the matrix of objectives, strategies and lines of action, pp. 27-28.
24 The 2013 World Energy Outlook did not predict the price drop associated with the decrease in demand in Asia and Europe or the impact this would have on the global surplus of crude oil. See http://www.worldenergyoutlook.org/media/weowebsite/2013/weo2013ch01scopeandmethodology.pdf.
26 In contrast to what is occurring in Mexico, oil companies have few permanent employees and subcontracting is extensive. This is what it means to lighten the labor load for companies. See Graham, “Working Conditions of Contract Workers in the Oil and Gas Industries.”
27 In terms of PEMEX’s workforce, there is no clear, transparent prediction of what will happen.
governance. On September 26, 2014, 43 student teachers disappeared in the municipality of Iguala. Corruption scandals devastated the country.\textsuperscript{28} And in October the price of the oil barrel fell to $40 due to a decrease in demand in Asia, the second major price drop. All of this flooded the terrain in which the energy reform was to be implemented. Even after Peña Nieto’s administration announced that the country had been saved from the grip of poverty and organized crime, the international media continued to call Mexico out as a country lacking the rule of law.

It is not difficult to trace a common thread between the drop in oil prices, the disappearance of the student teachers in Ayotzinapa, accusations of corruption, and the education problem in Mexico. The quality of the rule of law is at least a considerable discouragement to investors. A country perceived as not having rules or authority is not very auspicious for good investment. Speaking of human capital, the tragedy of the student teachers in Ayotzinapa had repercussions on the issue of education and associated inequality. Mexico has huge deficiencies in the quality of its education, which, in addition to a questionable rule of law, diminishes the credibility of an industry that could possibly generate favorable conditions\textsuperscript{29} for the formation of an extensive “critical mass” that is intellectually capable and highly specialized.

The Strategic Program does not identify any of these complexities, but instead reflects a simple reality similar to the national planning instruments issued every six years with each new presidential term. The program is rooted within the discourse of national planning, which is traditionally static and reflects absolute determination, despite its diverse ambitions. Professor Guillermo Cejudo describes national planning as a liturgy, a sort of “simulation” calling for democratic participation, when in reality, the president’s volition is behind it all.\textsuperscript{30}

According to Cejudo’s critical description of national planning, such static liturgy directly applies to the Strategic Program. Despite the fact that one might envision this effort as the result of a dynamic exchange among academics, industry, government, and civil society, the line of discourse echoes the tone and content of traditional national plans. The document clearly shows a response to the president’s mandate rather than serving as an analytical, pragmatic exercise. The document does not present a profound or clear vision for how to transition from a closed paradigm to a market paradigm. Instead of presenting a

\textsuperscript{28} This refers particularly to the extraordinarily luxurious house that inexplicably happened to be the First Lady’s estate, in addition to scandals regarding obscure contracts with contractors who are apparently friends of President Peña’s administration, in addition to the luxurious property owned by the current treasury secretary while he was employed as the president’s campaign manager.
\textsuperscript{29} For a proper, brief analysis of the education situation in Mexico in regards to the energy industry, see Lisa Guáqueta, “Education, Employment Opportunities, and Energy Reform in Mexico.” Rice University’s Baker Institute for Public Policy, Houston, Texas, 2014, \url{https://bakerinstitute.org/files/8089/}.
process and structure to support a human capital policy, it is an exemplary reflection of the abstract, imprecise language of the national planning discourse.

The first text it cites is the National Development Plan (PND 2013-2018), which the federal executive branch issues every six years. These plans present lines of action for the federal public administration, but they are “dead letters” in so far as they are not properly planned or budgeted and do not take into account the collaboration of all the implicated parties. Scholar George Boyne, cited by Guillermo Cejudo, points out that “it is not clear why or how planning even works.”

The section in the PND that most clearly refers to the Strategic Program is Point III, “Mexico with Quality Education,” which highlights “the role of education in the overall development of the Mexican people, achieving human capital that is prepared in order to transition to a society with an economy of knowledge and innovation.” It states that in order to achieve this goal, “it is necessary to implement policies that reduce the gap between the level of what is taught in schools and the knowledge and tools required by the job market, as well as how to provide incentives for further investment in science and technology.”

Regardless of the consistencies between the text of the Strategic Program and the PND, the question is how feasible and effective the Strategic Program’s implementation will be within the problematic context of education in Mexico. The Strategic Program includes the same lines of action for the energy industry the PND established for education in science and technology in Mexico, which presents a major challenge of shifting from noble aspirations to tangible results. In general terms, the PND speaks of modernizing the educational infrastructure by updating the equipment used in workshops and laboratories based on demographic conditions.

The program also supposedly adheres to Point 3.1 of the PND: “ensuring that study plans and programs are relevant and contribute to the successful advancement of students’ academic careers, while engaging in meaningful learning and developing competencies,” pursuant to a stimulus for plans and programs, evaluation and certification system reforms, and the development of basic education for science and technology research activities. It also alludes to reinforcing “education for employment” by promoting technical and vocational careers, as well as student exchange programs and graduate student and professor residencies at foreign institutions. The document also discusses the need “to contribute to high-level human capital formation and development” by increasing the number of scholarships, reinforcing the National Researcher System, stimulating the quality of graduate programs, supporting existing research groups, expanding cooperation

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31 Ibid. The Planning Law indicates that a National Development Plan (PND) should be developed at the beginning of each presidential term, establishing the executive branch’s main lines of action. This plan is also described in industry, institutional, regional, and special programs.

5 Ibid.

32 Ibid., p. 11.

34 See the Strategic Human Resources Training Program for the Energy Industry, p. 11.
for scientific research and technological development, and incorporating other countries’ successful experiences. Although unnecessary, it is understandable that some of the PND’s lines of action are repeated in the Strategic Program. Nevertheless, the fact that the program does not establish clear mechanisms for implementing the PND’s “lines of action” is a major oversight.

Along these same lines, the Strategic Program calls for consistency with a litany of programmatic instruments, such as the “2014-2018 Special Program in Science, Technology, and Innovation (PECITI),” which reiterates objectives that have already been repeated ad nauseam, such as efforts aimed at “high-level human capital formation and development,” and “contributing to the generation, transfer, and progress of knowledge associated with higher education institutions (IES)” and research centers with companies.” As if further basic instruments were necessary, it also mentions the Energy Industry Program and the “2013 National Strategy for Energy Transition and Sustainable Energy Use (ENTEASE),” which cites objectives similar to those previously mentioned, but in the area of sustainable energy savings. As if this were not enough repetition, it seems that parts of the “2014-2018 Special Program for Renewable Energy Use (PEAER)” and the “2014-2018 National Program for Sustainable Energy Use (PRONASE)” were copied and pasted. Last but not least are the Strategic Program’s similarities to the Education Sector Program, which reiterates the aforementioned lines of action and objectives without sufficiently developing a critical path for establishing a series of objectives and challenges, which are abstract at best. This leads us to the essential question: where is the strategy in this Strategic Program?

The Essential Question: Is the Program Really “Strategic”?  

If a strategic program should be easily distinguishable from a general, abstract planning document, then what makes a program strategic? There is no simple answer to this question and no useful working definition of “strategy.” Nevertheless, organizational theory helps us understand the nature and content of strategy. Arellano, the public administration scholar, summarizes and explains the concept of strategy as a continuous process with a future orientation, clear objectives, and motivations arising from a “holistic” vision involving value judgments in order to be flexible in the face of change. More importantly, strategy mobilizes resources.  

*A contrario sensu*, Arellano emphasizes that a strategy is not a predictive exercise, but rather an understanding of persons whose worldview differs from our own. Consequently, a strategic approach does not necessarily mean that it will be carried out in a rational, linear world. On the contrary, strategies are implemented within a sphere of contradictions, in which actors have opposing interests in a mobile, changing system. Therefore, a strategy should not propose to control actors, but rather to connect them through negotiation and power relationships. Arellano also clearly marks the difference between the classic

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35 Strategic Program, p. 11.
conception of planning and strategic thinking. Strategy is not a direct, simple derivation of a “plan,” but rather it outlines alternative paths to take advantage of opportunities and face challenges within changing contexts. According to Arellano, “strategy is becoming a very important instrument for change in various organizations. And the public sector is no exception. However, the use of strategic instruments *in and of themselves* will not change anything.”

The issue, therefore, is not whether the federal government *should* carry out a strategic program, but rather the feasibility of it taking shape according to the terms established in the program document. Aside from seeking alternative paths to avoid obstacles and maximize opportunities, this instrument is a classic expression of linear volition abstracted from the complexities of its intended purpose. By presidential mandate, the federal government is attempting to weave an extensive web of very thin threads to sustain networks of information, collaboration, implementation, and monitoring for a wide range of educational programs in the energy industry.

Furthermore, the federal, centralized nature of the energy sector’s stewardship, based on its constitutional framework, complicates the implementation of policies and human capital, among other things. The federal government has attempted to extend its reach in the realm of energy in order to resolve an infinite number of issues in areas that remain otherwise untouched by the authorities. Mexico is a large country whose energy potential extends throughout different regions. With energy industry authorities located in Mexico City and limited human capital within the organizations to carry out their own training policies, it is reasonable to question whether the objectives can be successfully implemented and monitored throughout Mexico. It is doubtful that federal authorities can collect and process all the diverse, disperse information throughout the entire country. It is an extremely lofty ambition to conceive a strategic program capable of reaching every nook and cranny, and may even be unfeasible if multiple closely knit coordination mechanisms are not established among the country’s various authorities. Given the disparate educational conditions in Mexico’s different geographic regions, the Strategic Program’s implementation presents significant challenges on a national scale.

One of the greatest challenges in forming a strategy lies in having a clear direction. The government must have a perspicuous vision of the purpose of said strategy, as well as a specific mission. Both of these aspects can be complex and dynamic, but they should be reasonably well defined. Far removed from any logical lines of reasoning, the program’s vision for the energy industry is mentioned at the end of the document: an “attractive

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37 Ibid.
38 Ibid.
39 Ibid.
40 In accordance with Article 73 of the Political Constitution of the United Mexican States (The Constitution of Mexico).
41 Arellano mentions that a lack of vision is the first reason why strategic plans fail: “A vision inspires commitment and focuses on action.” Arellano therefore confirms that “strategy therefore becomes an act of intelligence and maximum sensitivity,” p. 82.
industry for investment and professional development, with adequate talent at all echelons of the job market.“42

This vision is composed of rather vague, disjointed objectives, such as modernizing the productive state enterprises, minimizing the industry’s financial and environmental risks, implementing planning and supervision of the national electricity system, attracting more investments, guaranteeing greater energy supply at better prices, and complying with energy efficiency, quality, and reliability standards, in addition to other benefits that do not point toward any clear strategic direction.

It is remarkable that these objectives do not indicate any perceptible paradigm shift from the previous model, which was dominated by PEMEX, CFE, and the heavy hand of the state. Strengthening the former monopolies, decreasing prices and risks, and even ensuring efficiency, quality, reliability, and transparency are not fully consistent with the system of competition manifested in the constitution, since these factors are attributed more to state control than the market. It is unsettling to hear talk of the transformation of human beings simply to maintain the same old narrative of state protection. This leads us to question why the government doesn’t focus more on training personnel in order to prepare them for an environment of competition. Why is there no discussion of how this policy could help position Mexicans to reach the same level as professionals in the most advanced energy industries? The objective should be to introduce knowledge, technology, and competencies.

The government that created the Strategic Program does not offer a profound or sensitive vision of the energy reform. The document portrays a landscape in which the organizations and human beings in this industry march mechanically in unison. The document depicts groups of people as a series of beings “exuding an impersonal rationale,” without attending to their social, cultural, and personal circumstances and needs.

Another very important unresolved factor in the program is the identification of stakeholders involved in this transition. Where are the public and private education centers? Chambers of commerce? Companies? Civil society associations interested in human capital formation? There is no mention of a philosophy or a value system other than the government’s volition. Considering all of these deficiencies, it is rather pointless to ask the final questions about a specific mission and possible changes, much less answer such questions.

Another focal point in the Strategic Program’s objectives that requires attention is the role of PEMEX43 and CFE in said objectives. What is interesting to note is not so much their

42 Strategic Program, p. 25.
inclusion, but rather their prominence. An important feature of the reform involves repositioning PEMEX and CFE as significant complementary components in the sector rather than being the central focus of the industry. In other words, with this reform, the needs of PEMEX and CFE should no longer dictate public policy; rather, they must cooperate with the other actors involved, which may have radically different characteristics and modes of operation. It is clear that PEMEX and CFE should be included in public policy regarding human capital development, as long as said development is not solely focused on strengthening their positions. One of the most significant critiques of the Strategic Program is that it seems to be primarily focused on PEMEX and CFE, while it should actually be expanded to incorporate a much broader perspective. The new model should support training young personnel and bringing veterans up to speed, while PEMEX and CFE remain an important part of the company “ecosystem.” New (and old) employees in the national energy industry should be trained for mobility, breaking away from the antiquated notion that all careers in the energy industry must necessarily end up at PEMEX or CFE, notwithstanding their undeniable importance. It would be a very interesting exercise to develop mechanisms to delineate the similarities and differences between the human capital needs of PEMEX and CFE and the rest of the industry. As complex as this would be, it would provide a more comprehensive, historical vision of the industry and its actual needs in the present day.

If we consider that the program has overstated the roles of PEMEX and CFE, the absence of academia becomes quite clear. Even before the program was released, educational institutions throughout the country were already reacting to the potential demand for human capital. Independently of the president’s request, industry training initiatives were already being developed for personnel in different parts of the country. Public and private higher education institutions began to promote educational programs in these areas. A study of the academic offerings, which is still being prepared by the SENER, shows an increase in different kinds of personnel training programs. Individual efforts are being made, although possibly isolated cases, to offer “hard” and specialized training (in fields such as engineering, geology, geophysics, etc.) as well as auxiliary training (in accounting, administration, economy, and law). It would have been wise to incorporate the vision of

43 Point 5 of the Mexican Petroleum Law indicates that this EPE may perform technological research and development activities, among others, as necessary for its work in the petroleum, petrochemical, and chemical industries, in addition to the commercialization of technological products and services resulting from said research and training for highly specialized human resources. These activities may be performed directly by the Mexican Institute of Petroleum or any other specialized third party.

44 The following are worthy of mention: the Energy Center at the Autonomous Institute of Technology of Mexico, the new master’s in energy law degree from the Autonomous University of Nuevo León, the University of Monterrey, and various schools and institutes in the state of Tabasco, as well as energy programs currently under development in the Government School of the Monterrey Institute of Technology. Due to the recent nature of these efforts, the degree of success and the quality of the resulting human capital still remains to be seen.

45 At the time this paper was written, the final versions of these studies had still not been published and therefore cannot be cited due to fact that they are just preliminary versions.

46 Nevertheless, the draft of this study contains a lot of quantitative information, but there is no assessment of the degree of depth and relevance of the programs.
a relevant number of these educational centers when developing the Strategic Program to seek points of convergence and analyze any discrepancies. It is important for the authorities who are directly involved in promoting human capital to explore these different efforts further in-depth in order to learn about their strengths and weaknesses, and especially to prevent their dispersion. However, measuring the potential of the emerging educational offerings requires a significant institutional commitment, significant resources, and, above all, methodological rigor. To begin, it would have been a good idea to include the perspectives of institutions that have been actively participating in generating knowledge for the industry, such as the Mexican National Polytechnic Institute, the National Autonomous University of Mexico, and, of course, the Mexican Institute of Petroleum.

Now that we have considered the question of whether the Strategic Program has any characteristics that could be in fact considered strategic, we can conclude that, considering organizational theory, this instrument has more in common with government tools that perpetuate traditional planning in Mexico (which consist of a univocal, abstract, frequently ineffective volition) than refined conceptions of strategic thinking. This hypothesis is supported by an analysis of the program objectives. First of all, we have noticed confusion regarding the terminology used, which is symptomatic of the uncertainty over the steps to be taken in order to make human capital formation viable. Now that we have discussed the purposes of the Strategic Program, we will address the four immediate objectives it should fulfill. In order to dispel any confusion, we could define the objectives discussed above as the program’s final goals, while the objectives analyzed in the following paragraphs could be considered more immediate milestones that must be met in order to achieve the program’s ultimate goals. These objectives include expanding a quality, pertinent educational offering; increasing the number of programs that promote excellence and offer competence certifications; creating training centers; and conducting campaigns for training and updating.

Once again, we enter into very intangible territory. How to expand a “quality” and “pertinent” educational offering? What would the state do to encourage the “promotion and/or formation of specialized, high-level human capital,” as well as training and competence certification programs? To answer these questions, we will then take a closer look at the so-called “strategic conditions,” which should in turn be (or at least are intended to be) implemented through lines of action. With this analysis, we hope to finally find more specific proposals for clear-cut solutions. For now, we can at least say that while the “purposes,” “objectives,” and “strategic conditions” are too general in nature, many of the diverse “lines of action” seem exceedingly limited. The document makes a quantum leap from concepts that are all too abstract to what could be considered entirely too specific.

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47 Andrew Sharpe, “The Development of Indicators for Human Capital Sustainability,” p. 56.
We have reached the pinnacle of the document, where the “strategic conditions” will close the gap in the Strategic Program’s so-called lines of action, which are as follows:  

1. Information for opportune decision-making  
2. Employees that are prepared to handle industry operations  
3. Talent that generates and applies high-value knowledge, products, and services  
4. An energy industry that attracts talent  

In order to fulfill these strategic conditions, the following is necessary: 1) identification, collection, and classification of key information and good international practices regarding talent supply and demand, 2) industry technology trends and opportunities that allow us to define priority academic areas and specializations for the immediate future, which consequently require the state’s initiative, 3) proposal of new strategies, through analyses and studies, for facing the challenges identified in the Strategic Program, and finally, 4) identification of future needs for human capital development.

These statements lead us to the conclusion that not only would it be necessary to meet one of these conditions in order to implement a human resources strategy, but rather nearly all of them should have been fulfilled *ex ante*, prior to the program’s release. In short, what the government calls “strategic conditions” for the program’s implementation are actually the minimum inputs required to issue said instrument. Otherwise, how could an appropriate scenario conducive to human capital formation be established?

Two of the strategic conditions (prepared employees, talent that generates knowledge and added value) remain in the realm of abstraction. The last condition (industry that attracts talent) should not be a contingent condition of the Strategic Human Resources Training Program, since the degree of demand within the sector (and therefore its attraction) depends more on industry and market conditions than the intellectual quality of its participants. Even though education can positively influence the configuration of an attractive energy industry, there must be adequate demand and appropriate conditions for its integration.

The wording of the second strategic condition (prepared employees) is extremely vague since: “it is based on coordinating policies and programs among various federal departments and organizations, as well as the participation of the research centers, institutes, and educational institutions that offer graduate, undergraduate, higher education, and mid-level technical programs and job training” through stimulus actions for training qualified people, “as well as the establishment of alliances to expand and consolidate educational, scientific, and technological development capabilities, including engineering, physics, math, economy, administration, social, and law, among others.”

The text cited above refers to the “harmonization,” or coordination, of programs in different institutions, without providing any clues as to what that could mean. At this point, it is still unclear which “development and stimulus actions” the text is referring to without

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48 Strategic Program, p. 25-28.
any further specifics as to how to establish “alliances to expand and consolidate educational, scientific, and technological development capabilities.” Having reached the end of the document, the reader is left with many questions regarding the government’s strategy for carrying out such a monumental task. However, what follows in the end is a litany of vague and reiterative statements, such as those cited earlier in this paper. Once again, the text speaks of “stimulating,” “developing,” and “strengthening” without specifying a critical path.

Since directly citing all of the strategic conditions would only offer very vague ideas for personnel training, we will only discuss the most specific conditions. A relevant point concerning the strategic condition “talent that generates and applies knowledge” is the creation of a CONACYT-SENER academic chairs program, which an initiative that could be an important incentive for developing education in the energy field, which is currently limited to a finite number of institutions and has not grown in proportion to the industry’s potential due to its state of duopoly. The question is therefore how to reinforce these incentives so that people will not only be willing to learn, but also to teach. The professionalization of education in the energy industry is a fundamental issue that is not included in the Strategic Program, not even superficially. Lastly, the strategic condition regarding attracting talent is discussed in equally intangible terms, as it proposes providing incentives to spark the interest of young talent by creating new programs and disseminating energy-related issues.

The final section of the Strategic Program document “presents a matrix that summarizes the set of objectives, strategies, lines of action, as well as the departments responsible for their implementation.” These lines of action are divided into three timeframes: “immediate, short- and mid-term actions.” The program lists a vast number of tasks related to the abovementioned strategic conditions in a series of tables. We have selected what we believe to be the most important of these conditions.

The “information for decision-making” condition consists of collecting data regarding the demand for human capital, academic programs, and matriculation and graduation rates. In order to verify whether this condition is met in the short-term, we propose developing technological tools to identify human capital requirements; computing platforms to detect technological opportunities; establishing a group called “Talent Observatory” that would be formed by SENER, the secretary of public education (SEP) and/or CONACYT; and conducting analyses and studies on models for generating strategic information. In other words, we propose collecting data to verify information concerning supply and demand and academic opportunities concerning human capital. The mid-term strategic conditions include consolidating national data platforms in georeferenced modalities. More than a strategy, the document presents a huge banquet of data. Finally, we insist that most of these lines of action (particularly those that are most immediate) should have been carried out

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49 Strategic Program, p. 43
50 Strategic Program, p. 30.
51 Ibid.
prior to the program’s release. The other lines of action, which also point toward the creation of diverse information systems, could be important in so far as they present current, complete, and accessible data.

We should also mention the strategic condition of creating “personnel prepared to attend to the industry’s needs.” It is important to emphasize that many of these actions were already being developed before the reform took place. Many alliances and agreements between educational institutions and research centers in Mexico and abroad already had been established for quite some time. 52 An interesting, necessary line of action would be to further rapprochement among companies within the industry as well as increasing the private sector’s participation in technical and professional training. Private sector involvement (through companies, chambers of commerce, or other actors) is an excellent practice for these kinds of public policies because it connects them to the job market and its needs.

Another very important strategic condition involves developing “talent that generates and applies high-value knowledge, products, and services.” Upon reviewing these lines of action, some of their results can be assessed to a certain extent since they were already implemented prior to the reform. Among others, this includes SENER-CONACYT’s project to create specialized professorships and use sector funds for research and development, which we will briefly analyze in this paper in order to explain their challenges and achievements thus far.

We should mention that there is a brief section at the end of the Strategic Program document dedicated to the issue of research and education for people who already have training in the energy field and who are apt for human capital formation, but might also need further training to expand their knowledge in the field and bring them up to speed. The program attempts to solve this problem through the creation of CONACYT-SENER professorships, which were still not open to the public at the time this paper was written. The criteria for professorship selection will be important in determining the profiles of teachers and researchers who are qualified to conduct research projects and train new generations of talent that will produce “high-value knowledge, products, and services.”

Some of these lines of action are not exactly relevant to human capital formation policy in terms of its educational and academic aspects, but are rather employment-related issues; one example would be the reinforcement of CFE’s and PEMEX’s “plans, career paths, and retirement.” 53 This is an important topic, but it refers more to employment than educational policies. The other lines of action include a long miscellaneous list of good intentions—without any clues as to implementation mechanisms. Their objective is to improve nearly everything: research and education infrastructure, Public Research Centers

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52 Some of these alliances are between the National Autonomous University of Mexico and the University of Texas at Austin; BP launched a professorship program at the University of Anáhuac, and the University of Texas at Austin received funds from the U.S. Department of State to offer technical training consulting services to the federal government.

53 Strategic Program, p. 30.
(CPI), higher education institutions, and aid for research and innovation. Some of the proposals that are currently on hold include the “launch of the 2015 Innovation Stimulus Program” and so-called “centers for the promotion of entrepreneurs associated with companies in the energy industry,” which the program does not describe at all in detail in terms of estimated time frames or implementation phases.

Another element of the strategic condition on talent generation is the stimulus for “Mexican Centers for Renewable Energy Innovation (CEMIE),” which “consist of higher education institutions and research centers that have developed relevant technological knowledge in the area of renewable energy, as well as companies interested in the use of the technologies developed for each different type of energy.” These CEMIEs are intended to connect research and the industrial sector in order to contextualize innovations within a market setting. According to a memo issued by the SENER and CONACYT, “the idea is for the CEMIEs to allow the industry to break down barriers and make the most of scientific and technological challenges facing the country in order to implement sustainable energy use.”

Since the CEMIEs were only just recently made public, it is impossible to make any valid assessments regarding their results.

Before moving on to subsequent lines of action, it is important to mention the impact that the SENER-CONACYT sector funds for technological development and human capital formation have on sustainability and hydrocarbons in Mexico. These funds are considered to be the basis for the “human capital that applies talent,” strategic condition and serve to further highlight its importance. To understand why they were created, we should first clarify that the CONACYT-SENER-Hydrocarbons and CONACYT-SENER-Energy Sustainability sector funds are resources that have been allocated since 2007, six years before the last reform. The goal was to address the main opportunities for improvements in technological development and training specialized human resources for the energy industry in Mexico, which was then conceived as a duopoly. These funds, which were created prior to the 2013 reform, were intended to solve the needs of an industry dominated by PEMEX and CFE. Due to the change in models, these funds should be reoriented to a market that is barely beginning to take shape. The scope and utility of these projects should be evaluated in the future based on a criteria of maximum transparency and critical thinking, since they are financed with public resources.

An interesting aspect of the amounts and destinations of these funds in that the program has incomplete information regarding: 1) The origin of these funds, which ultimately were established in the Mexican Fund for Stabilization and Development that was created by the energy reform to make the petroleum resources “independent” of the fiscal temptations of the treasury secretary, even though the secretary of the treasury sits on the fund’s technical committee and therefore has specific weight in deciding where these resources are allocated; and 2) A comprehensive table listing the beneficiaries of the SENER-CONACYT

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54 Ibid., p. 38.
55 The resources for these funds come from the creation of a contribution that falls under PEMEX’s responsibility, which “is equal to 0.65 percent of the value of crude oil and natural gas extracted during the year.”
Hydrocarbons Fund and the SENER-CONACYT Sustainability Fund. Regarding the first issue, it is interesting to note the funds’ focus on deep water and nonconventional resource projects when, given the specific circumstances of the petroleum market, these projects would have little viability in Mexico, at least in the short and medium term. The specific amounts of the funds are as follows: for SENER-CONACYT Sustainability Fund, the approved amounts are MXN$ 4,266,097,372.53 with an expected investment in human capital of MXN$ 1,210,513,218.00; for the SENER-CONACYT Hydrocarbons Fund, the approved amount is of MXN$ 6,048,000,000.00, with an expected investment in human capital of MXN$ 248,262,534.00.\(^{56}\)

The fourth and last strategic condition, entitled “energy industry that attracts talent,” is by far the least defined in terms of lines of action. It is clearly focused on the younger population, with the intention of awakening the industry’s vocation. These lines of action consist of providing incentives to pique the interest of young talent, offering recognition for the different categories, levels, and types of top jobs in the energy field. There is also talk of a National Science and Technology Award and reinforcement of the so-called Science Clubs. These good intentions also include sparking interest among children and young people in science and engineering through the inclusion of developmental and scientific dissemination organizations, as well as other educational institutions, in addition to providing educational materials and organizing specialized job fairs at universities in Mexico and abroad. Furthermore, the text alludes to a commitment to create an Energy Orientation Program, without explaining what it is. As if that were not enough, it mentions organizing “ongoing” guided visits to companies. Lastly, it refers to a conference program and the creation of a competition called “Little Oil Men” to inspire children to discover the fascinating world of subsoil.

**Who Knows? Program Evaluation**

Like any public policy, this program requires evaluation mechanisms to measure its effectiveness. We should remember that the analytical literature on this subject has been critical of the traditional indicators used to measure human capital.\(^{57}\) An initial observation of the indicators chosen to measure the results of this program shows that they are noticeably slanted toward the academic phase of personnel training. The program’s success is measured with indicators related to the academic offering and the number of corresponding graduates. This approach may be appropriate for new generations that have barely started in the industry, but not for many veterans in the industry, whose “transformation” may occur in a more practical context rather than academic. Next, we will analyze the 14 indicators chosen by the authorities to measure the impact of the Strategic Program: the first verifies the creation of the National Register of Human Capital Needs in the Energy Industry; the second verifies the creation of an analysis of insufficient amounts of talented persons per year; the third measures the rate of change of the indicators proposed by the Talent Observatory.

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\(^{56}\) For the items related to the different beneficiaries of the Strategic Program funds, see p. 29.

\(^{57}\) Andrew Sharpe, “The Development of Indicators for Human Capital Sustainability,” p. 64.
Once again, there is confusion between the means and the goals. Information is a way to generate strategy—it is not a goal in and of itself. Ideally, a register of human capital needs should be developed as a support instrument for the program, but it could not be considered to be an indicator of success. The same is true of the second indicator regarding the analysis of insufficient numbers of talents, which is also a means but not a goal. The third consists of new indicators proposed by the Talent Observatory (which will monitor the advancement of the Program) over time.

For the strategic conditions regarding training “prepared human capital” and “talent that generates and applies knowledge,” a number of indicators are employed that have nothing to do with the job market (employment supply and demand), but rather the academic offering and the number of graduates from these programs. One indicator is based on measuring the supply of human capital calculated by the number of completed programs in the energy industry, “in technical education, undergraduate, and graduate degrees.” Another indicator evaluates the rate of change for people taking specialization courses in energy-related topics.  

The indicators for the last strategic condition (industry that attracts talent) are the least specific and significant. The first two are related to the possibility of providing incentives for the production of graduate and undergraduate theses related to the energy industry. The third indicator measures the annual change in the number of job fairs held in various regions. The fourth indicator verifies the first edition of the “Little Oil Men Competition,” and the fifth indicator measures the annual change in the number of participants in this competition. It is not clear how useful the indicators are regarding the number of theses “related” to the energy industry, since the thesis topic does not usually determine a student’s professional career path, much less at the undergraduate level. It is also not clearly understood how monitoring the number of industry fairs could be indicative of the industry’s attractiveness for young talent. It would be better to not even mention the “Little Oil Men Competition” as a serious indicator for attracting talent. Lastly, we should mention that these so-called indicators will be monitored by the “monitoring committee,” formed by the Strategic Program’s technical monitoring committee, which is led by the secretariat of energy with the participation of SEP, the Secretariat of Foreign Affairs, CONACYT, PEMEX, and CFE.

It will be interesting to track the evolution of this program and its goals as they take shape when the monitoring committee’s decisions are made public. At the present time, more than a year since the Strategic Program’s release, the academic offerings continue to grow as institutions search for ways to create new courses, conferences, training programs, and research. What is uncertain is the logic behind these efforts and where they are headed.

58 The first three indicators are intended to assess the scope of the increase in the human capital supply in the energy industry. These indicators are linked to the area of responsibility of each department involved. For example, CONACYT will be responsible for measuring the percentage of graduates from the National Quality Graduate Degree Program (PNPC) in energy-related topics, while SEP will be responsible for the same indicator for undergraduate students and technical or vocational degrees.

59 Strategic Program, p. 36.
Even when there is an idea of the path to follow, there are huge blind spots in terms of where it is supposed to lead.

Although the indicators established by the government may be inappropriate or insufficient, we still have to acknowledge that it is quite a complicated task to define them. Despite recognizing the potential positive impact of investing in human capital, most organizations do not measure their effects, most likely due to the difficulty of reaching robust conclusions regarding their impact. The fact that organizations get by without any generalized systematic assessments means that there is still a need for standard or basic indicators to measure the benefits of these efforts.

Despite these difficulties, a lack of or inadequate measurements of human capital investments inevitably has one or more of the following three consequences: 1) It is possible that bad investments may go unnoticed; 2) It will not be possible to distinguish between good and bad investments for the same reason, which generally leads to organizations decreasing their investments; 3) In regards to private organizations, which depend on a positive reaction to financial markets, this leads to the abandonment of human capital projects due to the difficulty in verifying their effectiveness and profitability.

One of the biggest challenges in developing indicators is the large quantity of data that must be collected and selected in order to weigh the relative effectiveness of human capital investments in different scenarios and based on different approaches. Nevertheless, data should be collected according to a common methodology. Accordingly, a group of companies created the Performance Metrics Working Group to develop a series of benchmarks regarding the results of educational and training activities. These companies designed a series of questions in order to analyze employees’ reactions to their educational and training experiences. Recently, companies have recognized that this information is useful for measuring the mid- and long-term effects of investments and changes in professional behaviors that may arise from these programs. Lastly, this group developed a system for disseminating this information for comparative purposes, including total expenditures per employee, whether these expenditures may be deducted from their salaries, the percentage of employees that are eligible for these programs, training hours per employee, number of employees per instructor, and training methods (on-site or online, etc.). The system also classifies the types of expenses per program, payments made to contracted companies, reimbursement expenditures for fellowships, and payments for educational technology, among other indicators.

Companies who have used the Performance Metrics Working Group indicators report that the results are mainly utilized for internal purposes. A large number of companies have stated that they use these indicators in order to position themselves alongside the competition and adapt to trends in knowledge-based improvements for their employees. Meanwhile, few of these companies have used them for public purposes, while the

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60 Bassi and McMurrer, “Indicators of Human Capital Investment and Outcomes from the American Society for Training & Development,” p. 4-8.
Analysis of the Strategic Human Resources Training Program

Association for Talent Development (ASTD) has used this data in an aggregated way as a group of organizations for different public uses. The ASTD document does not include said purposes, although the indicators do in fact help in assessing the state of human capital in one or more economic sectors.

It is important to note that there is still no systematic assessment for the reliability or soundness of these indicators, but the fact that many organizations use them is a signal of their trust in them. This set of benchmarks is one of the most significant achievements for obtaining information related to the evolution of human capital in these organizations. The contribution of this information from the aforementioned group of organizations has created an incentive for more employers to adhere to this practice.

This reflection allows us to apply critical thinking to the 14 Strategic Plan indicators selected by the government. Aside from the conditions we do not consider to be indicators, but rather prerequisites for the creation of a human capital policy (such as sources of “opportune information”) and those we consider to be inconsequential, such as the Little Oil Explorers Competition, we have noticed a bias in the set of indicators chosen by the federal government for the Strategic Program, since it does not distinguish between indicators that go beyond academia and those that pertain to the energy industry. This leaves out the indicators related to workers who are already considered to be within the industry, as well as those that may enter the industry without undergoing formal education processes. Theses, degrees, diplomas, and certifications do not make an industry, nor do they necessarily make their recipients qualified industry participants.

**Hands On! Conclusions and Recommendations**

Our analysis of the Strategic Human Resources Training Program for the Energy Industry could be briefly summarized: it is not structured enough to be considered a program, let alone offer a strategic focus for such a program’s implementation. The following sums up the arguments that have led us to these conclusions.

First of all, the document refers to different planning instruments without reaching a more profound, specific vision than what is expressed in said instruments. The reason why the program is not clearly established is actually due to the fact that the document’s analysis is extremely brief. At the time it was written, there was very little information available regarding the industry’s current situation that could help explain the real context in which this program was based. Therefore, there are only a few pages of basic concepts regarding aging technicians, the poor quality of the knowledge left by the monopolies, and the backwardness and deficiencies of complex hydrocarbon operations, such as deep sea exploration, nonconventional resources, and renewable energy and new “sustainable” technologies in electricity. The brevity and poor quality of this analysis is most likely due to the haste with which the program was created. This program seems to be more of a

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61 Bassi and McMurrer, “Indicators of Human Capital Investment and Outcomes from the American Society for Training & Development,” p. II.
response to the president’s call of “let there be light” than a profound, thorough, and mature reflection of the real costs and efforts involved in initiating an undertaking of this magnitude.

Another problem is that the program was issued in an uncertain scenario in which the mysterious number of 135,000 jobs would appear as a result of the reform. This does not mean that the program should predict the future; however, due to its “strategic” nature, it should have at least gone to greater lengths to find alternative approaches to handling different scenarios. The part of the document that should have been the most coherent—the executive section—instead creates confusion on the program’s purposes, objectives, strategic conditions, and lines of action. In the end, what should have been a strategy has become an endless “to do” list that the government has yet to fulfill.

What the federal government truly needed in order to develop a successful program was time. Everything was done immediately under the president’s order of “let there be light.” With the haste of this mandate, there wasn’t enough time to analyze the current state of human capital or develop a new vision that not only renewed the industry’s regulations but also its human resources. Presidential volition and political negotiation may influence the legal field, but it cannot guide human motivations or outcomes. With all of its imperfections, the market would do better to generate and retain a professional vocation than to follow all of the exhortations of the president and his government.

Below are some general suggestions that could be useful for the government to improve the Strategic Program’s deficiencies. The first recommendations are based on an OECD document that addressed the problem of human capital from the perspective of public policy:

1. **Prioritize attention on education.** There is a noticeable lack of attention on the work of education professionals in this program (both teachers and administrative staff). Even when the lines of action refer to the analysis of educational programs and curriculums, they do not mention monitoring their quality and keeping the teaching staff up to speed. It is important to evaluate the preparation of the critical mass, not only in terms of learning, but also teaching. As it is a new industry model, the challenge is even greater since the educators will have to be educated, which may be achieved through agreements with foreign organizations that already have consolidated competitive energy models.

2. **Leadership for teachers and students.** It is crucial for educational center directors to be sensitive to the needs of curriculums created for training energy specialists. This requires leadership, not only in terms of content, but also in terms of the capacity to build institutional programs with a vision of industry training in order to create dynamic communities of knowledge that are able to find financing and are attentive

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62 Bassi and McMurrer, “Indicators of Human Capital Investment and Outcomes from the American Society for Training & Development.”
to public policy commitments for building human capital. These leaders must pay special attention to comprehensively forming knowledge, skills, and competencies in their institutions in order to optimize their students’ achievements.

3. **Strategic management of human capital in regards to the job market.** This consists of aligning curriculums, teaching, and measures for professional development with the available supply of positions in the market. This implies raising awareness among educational leaders and teachers about the industry’s new dynamics. There is no better incentive to enter and stay in the industry than a sector that is receptive and aware of the value of national human capital. This means that training should have the permanent objective of “rewarding the most effective personnel, improving those who achieve average performance, and correcting (or even getting rid of) people who fall below the average.” 63 Leaders and teachers should therefore be aware of industry standards.

4. **Education and work are systems of rewards and consequences.** An important message regarding education is that both “school” and “work” life should be systems in which the greatest efforts and achievements are rewarded with progress, and vice versa. 64 This is especially important in the Mexican energy industry, where merit-based promotion has been strongly questioned. The existence of “inherited” positions and/or appointments thanks to political connections have made PEMEX and CFE, as well as other public organizations, more like circles of friends and influences rather than organizations participating in a meritocracy. Furthermore, an important element of education should be to familiarize teachers and students with objective, transparent evaluation systems.

5. **An explicit, transparent, and accountable evaluation system.** The previous principle cannot be applied without criteria to assess the effects of such a system. This brings us back to the complex issue of indicators discussed earlier in this paper. Of all the principles mentioned here, this is possibly one of the most complex to specify due to the great number of subjects and organizations (public and private) that will have to make assessments while also being assessed.

The idea of this study is not to belittle the intentions or the efforts of the federal government in issuing its Strategic Human Resources Training Program for the Energy Industry, although we do consider it to be immature, and therefore unviable, according to the terms in which it has been proposed. We insist that the formation of a real strategy of this kind will be concomitant, rather than a precursor, to the rebirth of this industry in Mexico. With a snap of their fingers, Enrique Peña Nieto’s government rushed to build an industry in the sky, which will supposedly require 135,000 new bodies. There is a lot more to be done before Mexico can see the light.

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63 Bassi and McMurrey, “Indicators of Human Capital Investment and Outcomes from the American Society for Training & Development.”
64 Ibid., p. 6-10.
References


Ernest and Young. 2011. “Human resources in Canada’s oil and gas sector. A snapshot of challenges and directions.”


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