Jose Maria Valenzuela
University of Oxford
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Use It or Lose It: Why Retaining Local Institutional Capacity Matters for Energy Planning

Summary: *Building and maintaining local capacity in energy planning is crucial for making informed investment and regulatory decisions and adapting to changing circumstances within the sector. However, changes in planning tools, prioritizing short-term solutions offered by external consultants over local institutions, and constrained funding arrangements can undermine local expertise, as evidenced by Mexico's experience after liberalization reforms.*

Why it matters: *The loss of local energy planning capacity can hinder a country's ability to effectively plan for its future. Governments and international partners often put significant resources into "capacity building" programs while simultaneously stripping local organizations of their planning responsibilities and funding. Mexico's experience underscores the fact that often, the best way to build and maintain local expertise is not through one-off training programs, but by ensuring local institutions have continuous real-world opportunities to conduct analysis and engage directly with government.*

Institutional and human "capacity building" is a central dimension of much international cooperation and development assistance. Multilateral bank loans, bilateral cooperation, and philanthropy programs often include significant components to enhance the skills and knowledge of public or industrial professionals. But, ultimately, capacity is not built through one-off trainings but instead developed and maintained through continued application or 'learning-by-doing'.[1] This is particularly true for electricity planners, who must integrate constantly changing circumstances into their analyses to offer useful insights for investment and regulatory choices. Local pools of energy planning expertise help policymakers reconsider the ever-changing possibilities and limitations within energy systems. Local and international NGOs can also benefit from tapping into pools of local expertise when deliberating the future of energy.

Building this capacity is one thing, but maintaining it is quite another. Maintaining local capacity is not easy or automatic. When organizations develop valuable expertise, it is only fair to hope it will be a permanent gain, but this is not always the case. Some capacity dwindles due to insufficient staff and personnel rotation or as tools grow outdated. The more fundamental problem occurs when the enduring relationships between governmental bodies and local institutions engaged in the planning process are disrupted. This can happen as an unintended consequence when planners find it easier or cheaper (in the short term) to turn to

[1] See Richard M. Locke and Rachel L. Wellhausen (eds). 2015. Production in the Innovation Economy. Cambridge: MIT Press; and Gary Herrigel. 2010. Manufacturing Possibilities: Creative Action and Industrial Recomposition in the United States, Germany, and Japan. Oxford: Oxford University Press.

project-based external consultants over local institutions, or when planning is done in-house with teams that cannot redeploy their skills to other possible users.

One stark example of this occurred in Mexico. The government's drive to modernize energy planning after liberalization reforms resulted in a steep form of capacity attrition and limited the pool of local expertise available to support government and non-government planning efforts. Mexican authorities trusted liberalization would open up access to an international market of consultants. They were not wrong. However, relying on international consultants is not necessarily the best approach. Consultants might provide a quick turnaround for a specific product (for example, a set of generation optimization projections). However, Mexico's decision to tap external consultants ultimately undermined the capabilities of the local research electricity institute, which could have become a valuable pool of expertise for governments and other stakeholders.

Lessons from Mexico's Electricity Sector

In 2013, Mexico approved a major liberalization reform that opened wholesale power generation to competition and, partially, the retail market, ending CFE's (the state utility) dominance.[2] The utility remained the owner and operator of the transmission and distribution grids under the operational guidance of a newly unbundled system operator. Core energy planning moved from the hands of the utility to the Ministry of Energy. (This is not exceptional — in recent years more governments have taken direct responsibility for energy planning including, for example, Chile and the United Kingdom.) In Mexico's case, this change was followed by the partial loss, or attrition, of energy planning capabilities in local research institutions. A combination of three major decisions led to expertise attrition.

Retiring planning tools

For decades, Mexico's utility and its tech provider, the state-owned Institute for Electric Research (IIE, renamed National Institute for Clean Energy and Electricity in 2016), used the WASP software, originally developed by the Tennessee Valley Authority in the 1970s for power expansion planning. After taking more ownership of planning, the government adopted the more flexible Plexos energy planning tool. They hired international consultants and trained personnel within the Ministry of Energy with the support of international cooperation. Meanwhile, the utility and the IIE fell behind — their energy modeling capabilities became side-lined and obsolete in the new institutional context. For the IIE, this resulted in fewer opportunities to continue using their planning capabilities, resulting in a gradual depletion of skills and experience. For the country, this meant losing a key local source of expertise. The choice to retire a set of models and skills does not need to result in capacity attrition as long as local institutions can catch up to the new tools and re-establish their capabilities. But their chances of catching up depend on the existence of alternative working arrangements.

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[2] Mexico is inhabited by about 130 million people, has a 99.5% electrification rate, and a land area equivalent to South Africa and Botswana combined or continental Europe west of Berlin. The country's power system has more than 80 GW of installed generation capacity and about 100 thousand km of transmission lines.

Diverting responsibilities from local planning teams to international consultants

Organizations and individuals develop skills when completing difficult tasks and resolving problems. An institution in charge of energy planning needs to continuously acquire, develop, and maintain skilled employees. And, the higher the stakes of energy planning, the more important it is to maintain strong capabilities. When governments delegate planning responsibility to a research institution, researchers face greater risks than when running energy models for academic papers. In the past, Mexico's government delegated most of the planning to the utility, which relied on IIE's support. When the government decided to take over planning responsibilities they hired international consultants, yet they could have delegated (or contracted) responsibilities to the IIE to support the Ministry of Energy in the long term. From the government's perspective, it is a choice about who is best suited to support its planning work, but it would be a mistake to focus only on short-term results. Experts in the government will need external support every time there is a new planning challenge, like the irruption of new technologies that require modeling. In a relevant example, between 2008 and 2012, the government relied on the management consultancy PwC to set up the country's first renewable energy targets. As a result, in 2013, the next time the government had to define a target, there was still no relevant expertise inside the Ministry. Had the IIE supported the target-setting process since 2008, both the researchers and the government officials would have had a pool of tools, expertise, and experience to set the new target.

Cutting off funding for institutions

In day-to-day operations, funding arrangements — whether recurring contracts or a funded work program — dictate delegation and responsibilities. Utilities usually have internal resources for planning, but this is not the case for research centers or even some government offices, especially in developing economies. Resource-constrained institutions cannot maintain, refine, or improve people's skills if they are not being used. In Mexico's story, while the utility had a choice to keep using the WASP tool for internal planning purposes, the IIE had no resources to maintain its planning capabilities without new government contracts. These unfavorable conditions coincided with personnel retirements at IIE, which could not be followed by the hiring of new talent to potentially catch up with the government's preferred tools.

Mexico had a Plan B. The attrition of certain capabilities did not result in the disappearance of planning altogether because most of the workload shifted to the system operator, which was unbundled from the utility. System operators are characterized by their rich pool of experts capable of long-term planning. However, system operators focus only on official grid expansion plans, and their skills and capabilities cannot be used beyond regulated activities. In practice, this means that other institutions cannot approach the system operator to help them produce locally relevant planning exercises. Even governments might find it difficult to rely on them to produce more speculative planning required to explore alternative futures for the electricity system, like those used to create decarbonization pathways under the Paris Agreement.

Building and maintaining human capacity is a race of endurance in which policymakers must invest in local capabilities, even if this requires time and patience. For instance, in Chile's highly liberalized electricity market, the government assumed the role of energy planning in coordination with a new independent system operator but chose local research university centers (i.e., the Energy Institute of Universidad de Chile) as knowledge partners. This arrangement enabled the country to maintain and expand the pool of expertise both within government institutions and in an academic setting, maintain a stream of training, and encourage local research institutions to expand into industrial consulting.

Conclusion

The Mexican example highlights that tools, responsibilities, and funding are all means by which governments can create the conditions for maintaining local planning capabilities. These insights are relevant to the international community. Development and climate programs should prioritize working with local institutions, even if less expedient than international consultants. Ultimately, governments and utilities are best placed to think about the multiple benefits and uses of planning tools, assign responsibilities, and channel funding to maintain modeling capacity. In the case of Mexico, openness to international consulting markets and a robust system operator satisfied the Ministry of Energy’s most critical short-term planning needs, but along the way, the country lost a fantastic source of local knowledge and skill. The good news is that rebuilding capabilities is always possible.