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Clean Energy and Water Conflicts: Contested Narratives of Small Hydropower in Mexico's Sierra Madre Oriental

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ABSTRACT: Small hydropower is poised to undergo a global boom, potentially accounting for as much as 75% of new hydroelectric installations over the next two decades. There are extensive bodies of literature arguing both that small hydropower is an environmentally benign technology benefitting rural communities, and, conversely, that unchecked small hydro development is a potential environmental calamity with dire consequences for rivers and those who depend upon them. Despite this debate, few studies have considered the ways in which small hydropower is socially constructed in the sites targeted for its development.

This paper focuses on the Bobos-Nautla River Basin, in the Sierra Madre Oriental of Mexico, where numerous small hydropower projects are planned. The central argument is that the dominant framing of small hydropower in Mexico focuses on claimed benefits of 'clean' energy, sidelining any consideration of impacts on water resources and local environments. However, even if this narrative has dominated policy-making, it is being actively contested by a social movement that constructs these projects as water theft.

The narratives surrounding small hydropower are reconstructed from interviews with government officials, activists, NGO workers and residents of communities near project sites conducted during ten weeks of fieldwork in 2014. The results of this fieldwork are contextualised by an overview of evolving trends in hydropower governance globally that situates the boom in small hydro within shifting relationships between states, international financial institutions, and private finance, as well as an historical account of the evolution of hydropower governance in Mexico that speaks to long-standing conflicts over water use for hydroelectric generation.

KEYWORDS: Hydropower, institutions, governance, environmental politics, Mexico

INTRODUCTION

Small-scale hydropower is poised to undergo a global boom, with The World Small Hydropower Report estimating that 173 Gigawatts of capacity remain to be developed (Small Hydro World, 2013). While dwarfed by estimates of potential large hydropower, small hydro will be distributed across a greater number of sites, potentially accounting for as much as 75% of new projects over the next two decades (Zarfl et al., 2015). The literature on small hydropower, as a recent review has suggested, evinces a great deal of uncertainty on even basic notions such as the definition of 'small', which is widely varied and inconsistent (Kelly-Richards et al., 2017). Furthermore, there is a latent debate between scholars who argue (or assume) that small hydro is an inherently benign alternative to large dams (Dudhani et al., 2006; Bakiş, 2007; Dursun and Gokcol, 2011; Khurana and Kumar, 2011; Ohunakin et al., 2011), and those who have been compiling evidence of its significant environmental and social impacts (Gleick, 1992; Frey and Linke, 2002; Erdogdu, 2011; Abbasi and Abbasi, 2011; Bakken et al., 2012; Islar, 2012; Kibler and Tullos, 2013; Premalatha et al., 2014; Punys et al., 2015; Kumar and Katoch, 2015; Benezam et al., 2016; Bilotta et al., 2016).

This ongoing debate suggests that the nature of the small hydropower issue is unsettled. Is it, as Strauss et al. (2013) would have it, a "positively valued alternative energy option"? Is it a way to

alleviate energy poverty and spur economic development in remote mountainous regions (Ahlborg and Sjostedt, 2015)? Or, alternatively, does a boom in small hydro portend despoliation of rivers and water-grabbing at the hands of transnational capital (Shaw, 2011; Islar, 2012)? Despite the coexistence of these competing narratives within scholarly debates – suggesting that there are multiple ways to make sense of small hydropower – few have considered how this problem is constructed in the context of ongoing struggles in the sites where such projects are being developed. Rather than attempt to establish the truth of small hydropower's costs and benefits, then, this paper draws on Hajer's (1995: 14) approach to environmental discourse, which suggests that environmental conflict should be seen "as a complex and continuous struggle over the definition and meaning of the environmental problem itself".

Focusing on a river basin in central Mexico, the Bobos-Nautla, that has become a site of struggle over small hydropower projects, this paper asks how the problem of this technology's impact is socially constructed in discursive struggles between a range of actors including bureaucratic functionaries, engineers, environmental activists, and rural communities. The main argument is that the dominant narrative surrounding small hydro in Mexico has framed it as an energy problem, with claims of benefits being shared by local communities, the electric grid, and the environment. This discourse precludes any deliberative process that would recognise the rights of affected communities, and account for and mitigate the potential impacts of these projects on water resources and local environments. An alternative framing is being advanced by a social movement that seeks to construct small hydropower as indicative of a broader set of socio-environmental problems that can only be addressed through significant changes in governance. The ability of this movement to delay and alter the course of several proposed projects suggests that the construction of this problem has not reached what Hajer (1995) calls 'discursive closure' – a stable narrative that defines a policy problem.

This paper picks up on an argument made by several observers of hydropower governance and the 'water-energy nexus'. First, that decision-making authority is invariably fragmented among a panoply of actors, and that water and energy policy are often not well-integrated (Bauer, 2009; King et al., 2013). Second, that policies meant to encourage hydropower development increasingly consider the energy and climate change dimensions while ignoring the implications for water use and allocation (Pittock, 2010; Hussey and Pittock, 2012).

The rest of the paper is structured as follows: In the next section I elaborate on the conceptual and methodological approach; I then review trends in the political economy of hydropower that have changed the discursive and institutional terrain of conflicts over its governance; next, I trace the history of hydropower governance in Mexico; I then present the case study of hydropower conflicts in the Bobos-Nautla, which is divided into three parts – the arguments of hydropower proponents, the counter-narrative of opponents, and the points of ambiguity and contradiction in these arguments that suggest a lack of discursive closure.

ENVIRONMENTAL DISCOURSE AND SMALL HYDROPOWER

My approach draws on the work of Hajer (1995), who sees environmental politics not as a conflict between solutions to a given problem, but as a struggle to define the nature of a problem. His 'argumentative' approach provides a useful framework for understanding the debates surrounding small hydro in my case study of the Bobos-Nautla Basin. In this section, I briefly outline the core of this approach, and explain how it aides in structuring the rest of the article.

The crux of Hajer's (1995: 53) approach is to follow the struggle for discursive hegemony as different actors try to make others see problems according to their view. He sees these argumentative struggles as taking place between competing 'discourse coalitions', which operationalise particular narratives ('story-lines') that draw together fragmented and contradictory discourses into "tropes that rationalise a specific approach to what seems to be a coherent problem" (ibid: 63). Policy-making then depends on

achieving 'discursive closure' by piecing together story-lines and knowledge claims into a definition of a problem that erases uncertainty and alternative meanings.

The suggestion of Hajer's framework is to trace story-lines by following the actors who produce them – whether environmental activists or bureaucratic functionaries – and observing how coalitions form around a particular narrative. Analysis then becomes about illuminating "the places, moments, and institutions where certain perceptions of environmental change and social development emerge...and should reconstruct the argumentative struggle that determines which perceptions at some point start to dominate the course of affairs in environmental politics" (ibid: 19).

Although Hajer has been criticised for overemphasising the role of discourse in environmental politics (Hannigan, 2006), he also emphasises the relationship between institutions and the story-lines that seek to define a problem. Institutional arrangements, in this framework, are seen as the precondition for the formation of discourses; a discursive formation, in turn, can affect changes in institutional arrangements (Hajer 1995: 13, 60). Attending to the connection between discourses and institutional arrangements surrounding water infrastructure projects also draws on the approaches of Orlove and Caton (2010), who see these as two aspects of water as a 'total social fact', and of Molle (2009), who draws attention to the role of discursive power in shaping decisions about management and control of river basins.

This relationship between the social construction of small hydropower and the institutional arrangements that underpin the struggle to define the problem provides the structure for the following sections. First, I situate the boom in small hydropower in relation to broader shifts in the governance of hydropower globally. Then, I look at the historical development of institutional arrangements for hydropower governance in Mexico through the course of several waves of reforms in water, energy, and environmental policy. These sections illuminate several factors that influence the formation of discursive coalitions and story-lines in the case of the Bobos-Nautla Basin, notably, the changing role of the state and the rise of private finance, and the fragmentation of authority among disparate bureaucratic agencies. In section five I look at how institutional arrangements and discourses interact to produce different ways of framing the problem of Small Hydropower in the Bobos-Nautla.

The notion of a discourse coalition – a set of story-lines, the actors who advance them, and the practices in which this activity is based (Hajer, 1995: 65) – helps to frame my methodological approach to this research. During ten weeks of fieldwork in Veracruz in 2014, I conducted semi-structured interviews with government officials from federal, state and municipal entities, NGOs, activists, and residents of communities adjacent to the proposed hydropower projects.¹ These interviews were conducted as both formal meetings in government offices and 'walk-along' conversations (Hammad, 2014) in sites along the Bobos-Nautla River and its tributaries. In addition to interviews, I engaged in participant observation with a group of activists organising against hydropower in the basin, attending a number of meetings, and gathered information from planning documents, environmental impact statements, and laws that are either publicly available or were obtained by filing information requests with the federal government.²

As the argumentative strategies of particular actors emerged through interviews and close-reading of documents, I used the claims made as a prompt for further discussion. For instance, I used claims about the contentious issue of the impact of hydropower on community water sources to elicit responses which illuminated the story-lines that would be invoked to support or challenge those claims, and to understand how actors frame their own position in relation to the arguments made by others. In

¹ This research formed the basis of an MA thesis (Silber-Coats, 2015). Interview subjects are identified either by a pseudonym or a description of their title and/or social position.

² These requests were filed through www.infomex.org.mx

a number of cases, I conducted follow-up interviews to continue triangulating these claims and the reaction to them by different actors.

THE CHANGING POLITICAL ECONOMY OF HYDROPOWER

Recent literature on hydropower has drawn attention to its resurgence under the banner of 'low-carbon energy'. In response to the crisis of the 'hydraulic mission' model of river basin development posed by the rise of transnational anti-dam movements (Khagram, 2004; Conca, 2006; Molle et al., 2009a), relationships between states, International Financial Institutions (IFIs), private investors, and civil society actors have shifted dramatically. These shifts suggest several explanations for the surge of small hydropower, and also illuminate the terrain upon which struggles to construct its meaning occur.

Beginning in the late 19th century, modernist projects of "subduing nature and marshalling water" through massive infrastructure projects began to take off (Molle, 2006). This model of river basin development relied on a powerful, central state, as well as a network of transnational experts, bi- and multi-lateral development banks, and an elite group of multinational corporations (Conca, 2006). By the 1990s, social and environmental movements mobilising against large dams began to win major victories, with the World Bank cancelling a high-profile project, ultimately leading to the formation of the World Commission on Dams and its recommendations for new norms in dam development (ibid; Dubash, 2010).

Yet, even as the number of new dams being completed worldwide dropped dramatically in the 1990s, the World Energy Council (a UN body) predicted that global hydropower capacity would double by 2020 (Churchill, 1997). These confident projections have been echoed by numerous recent calls to expand investment in hydropower, such as a report from the Stockholm Environment Institute declaring that increasing hydropower capacity is the only option for Latin America to address climate change without having to "abandon development" (Escobar et al., 2011). At least 3,700 major dams are under construction globally, and recent projections suggest that hydropower capacity could nearly double once again over the next two decades (Zarfl et al., 2015). However, this latest wave of projects is being brought to fruition through new financial practices, by a different set of actors, and are framed differently from those of the earlier era of 'high modernist' (Scott 1998) river basin development.

The trend has moved in two directions – increasing private investment, as well as direct financing by national governments of emerging economies, notably China (Moore et al., 2010). Each of these is suggestive of distinct (but potentially overlapping) geographies. The rise of private finance suggests that decisions about how and where to invest in new hydropower could be driven largely by the financial calculations of investors. As nation-states also expand their role in the sector, however, there is a changing geopolitics to hydropower development. An emerging trend here is its use to promote regional economic integration, exemplified by China's role in the Mekong Basin and plans afoot in Central America (Molle et al., 2009b; Perry and Berry, 2016). The role of IFIs in promoting hydropower has changed, but is still significant. The World Bank's lending for hydropower has increased steadily since reaching a nadir in 2001, totalling USD8.8 billion between 2002 and 2014 (Rex et al., 2014). However, the Bank has shifted away from financing projects directly and towards funding ancillary infrastructure (such as transmission lines) and acting as "facilitators and problem mitigators" (Hirsch, 2010; Merme et al., 2014: 26).

These trends dovetail with deregulatory policies in the electricity sector that were promulgated around the globe beginning in the 1990s. While these reforms often resulted in a hybrid of state and private control of the power sector (Victor and Heller, 2007), this trend of restructuring electric utilities towards the market meant that investments in hydropower were increasingly embedded in a context of "rapid technological change, complex financial engineering, and a lot of financial information" (Briscoe, 1999: 461). The discursive re-framing of hydropower as low-carbon energy has been further bolstered by market mechanisms such as the sale of carbon credits through the Clean Development Mechanism

(CDM), which has been criticised for channelling funds to projects with significant social and environmental impacts (Erlewein and Nusser, 2011; Haya and Parekh, 2011; Finley-Brook and Thomas, 2011). Whether explicitly funded through climate change mitigation efforts or not, the private financing of hydropower is often tied to other forms of 'green' investment such as the emerging green bonds market (IHA, 2015). More than simply private, then, many of the new players in the hydropower sector are financial actors, leading some to suggest that current booms in hydropower development may be driven by profits derived from financial speculation rather than the generation and sale of electric power (Ahlers et al., 2015; Loftus and March, 2015).

How does small hydropower fit into this picture? One explanation for the surge of interest in small hydro is that large dam sites have already been developed, and those with lower potential remain to be exploited (Paish, 2002). It can also be seen as a reaction to anti-dam movements, with smaller projects – especially those defined as 'run-of-river' – promoted as a less harmful alternative to large dams (Kelly Richards et al., 2017).³ The rise of small hydro can also be understood in relation to the trends of privatisation and financialisation. Smaller projects are less capital-intensive, can be built faster, and are seen as less risky than large dams, making them more attractive to private investors (Kumar et al., 2011). In some cases, such as in Turkey, market-based reforms to the electricity sector have coincided with the creation of incentives to attract private investment in small hydropower (Baris and Kucukali, 2012). As I will argue in the following section, the rise of small hydropower in Mexico has also been driven by privatisation.

As these trends illustrate, there are links between discursive shifts in the dam debate – the reframing of hydropower as green/clean energy – and changing institutional arrangements. Both of these raise important political questions. The 'greening' of hydropower, as Fletcher (2011) has suggested, has created a situation where narratives that invoke claims of environmental stewardship are crafted both in support and in opposition to dam projects. In addition to changing the terms of the debate, these claims allow for coalitions of actors to coalesce around story-lines that shape flows of capital and the exercise of authority in hydropower governance. In the next section, I move from this general panorama to focus on the historical development of hydropower governance in Mexico.

HYDROPOWER GOVERNANCE IN MEXICO

The hydraulic bureaucracy, or 'hydrocracy', of Mexico's federal government is said to be remarkably resilient in the face of political and institutional change (Wester et al., 2009). Yet, transforming rivers and using water for hydroelectricity has never fit neatly into the picture of a singular, autonomous water authority enacting its version of the hydraulic mission. This authority has been exercised instead by a competing electric bureaucracy, and is now shifting to the private sector. Though scholars of water governance in Mexico have documented a shift from a 'hydraulic leviathan' model (Musetta, 2009) based on expanding infrastructure – especially irrigation – to a neoliberal approach that emphasises efficiency and cost-recovery (Aboites, 2009; Scott and Banister, 2008; Wilder and Romero Lankao, 2006), scant attention has been paid to the water implications of transformations in the energy sector. This section provides a historical overview of hydropower governance in Mexico, situating changes in energy policy within broader political and institutional shifts.

Hydropower and early electrification

The origins of electric power in Mexico are closely tied to hydroelectric plants that were built to power mining operations and textile factories in the late 19th century (Ramos-Gutierrez and Montenegro-

³ For a reaction to this from an industry perspective see IHA (2015), which argues that this leads to policies that unfairly discriminate against large dams.

Fragoso, 2012), transforming landscapes that had once been seen as 'inconvenient' – mountainous terrain incised by rushing rivers – into a boon for industry (Castañeda González, 2005: 125). An influx of investment by American, Canadian, and British investors in the late 19th Century quickly expanded the number and size of these plants, leading to the formation of regional private monopolies that sold excess power to urban consumers at exorbitant prices (Parra, 1988).

In early attempts to regulate the electric industry, the post-revolutionary state exhibited what Aboites (1998: 101) refers to as a 'two-faced' tendency – attempting both to curb the excesses of the foreign industrialists, while also acting to protect them by repressing labour movements that threatened their profits. A series of short-lived federal bureaucracies⁴ directed at regulating the electric utilities in the 1920s and 30s emphasised the need to reign in their unrestricted use of 'hydraulic resources' and "convert the use of waters for generation of power into a social function of the State, rather than one of speculative companies" (Díaz Molina and Saldaña, 2013). Although the Constitution of 1917 had declared that water was 'original property of the Nation', and the influence of the hydrocracy grew with the establishment of the *Comisión Nacional de Irrigación* in 1926, the use of water to generate power – either to regulate or expand it – was never within the purview of the central water authority.

In 1937, the federal government established the *Comisión Federal de Electricidad* (Federal Electricity Commission, CFE). Initially, the CFE was in competition with the private electric utilities, but the latter were expropriated in 1960 when president Adolfo López Mateos nationalised electricity. The CFE, charged with expanding the nation's electric networks – including, but not only, by developing hydropower projects that dwarfed those of the private companies – thus gained significant authority in water governance. For the technocrats and engineers of the hydrocracy (by this period reorganised into the *Secretaría de Recursos Hidráulicos*), the decision to divide control over federal waters by allowing the CFE to develop hydropower was long resented (Aboites, 2009: 78).

The competing interests of these bureaucracies manifested in diverging regional foci over the following decades: generally, the SRH concentrated on expanding irrigation in the arid North, while the CFE focused on hydropower projects in the humid south (ibid; N. Robinson, 2009).⁵ As another example of the conflicts over the use of water for hydropower, a system of hydroelectric dams built by the CFE during the 1940s in Valle de Bravo, west of Mexico City, was later decommissioned to become part of the Cutzamala system that now provides water to the capital (Descroix et al., 2004). This increasing competition for water, along with growing demand for electricity, led the CFE to rely increasingly on thermal generation – produced principally by burning subsidised oil – which surpassed hydropower as the leading source of electricity in the 1970s (Jano-Ito and Crawford-Brown, 2016).

Hydropower and neoliberalism

Since the 1980s, energy policy in Mexico has been in the midst of an overhaul that has broad ramifications for hydropower governance. Beginning with the debt crisis of 1982, the model of federal resource allocation that had funded the CFE's major dam projects collapsed (S. Robinson, 2000). A series of institutional changes, ranging from subtle policy shifts to wide-ranging constitutional reforms, have reshaped hydropower governance in significant ways. The broad trend has been a shift away from a centrally planned energy system towards a competitive market structure, with the state acting as a facilitator to private investment.

⁴ These include the *Comisión Nacional de Fuerza Motriz* (1923-26) and the *Departamento de Potencialidad Hidráulica* (1934-37).

⁵ A series of River Basin Commission projects that operated from the 1940s to the 1980s did see cooperation between the CFE and SRH over hydropower development, but as Barking and King (1970) note, these were treated as separate from the Commissions' main work.

This trend embodies a certain ambiguity, as anthropologist Scott Robinson's report on Mexico to the World Commission on Dams suggests. He argues that while this emerging model may reflect "a legacy of State impunity converging with a rampant privatisation process ignoring the rights, human and environmental, of those impacted by energy infrastructure projects", it may also provide a greater opening for civil society to influence policy than one based solely on the dictates of an authoritarian state (S. Robinson, 2000: 5).

The shifting terrain of dam politics in Mexico reflects broader trends in the relationship between the state and civil society – the emergence of new actors asserting the rights of historically marginalised groups, along with new configurations of authoritarian rule and neoliberal reforms that shift functions of the state to the private sector (Fox, 2000). Debates about the changing nature of the Mexican state are multifaceted. A vast literature has charted a transition from authoritarian to democratic rule (e.g. Woldenberg, 2012), while some critics have focused on continuity of violence and coercion from the post-revolutionary era of PRI rule through the supposed "transition to democracy" (Pansters, 2012).

These apparent contradictions – the hollowing out of state functions along with the continued pursuit of big infrastructure projects, and a democratic opening accompanied by renewed repression – are perhaps best viewed through the lens of Nuijten's (2004) conceptualisation of the Mexican state as a 'hope-generating machine'. This is the notion that each new presidential administration generates hope through promises of new programmes and institutions. To whatever degree the state has become fragmented by neoliberal reforms, the idea of the state as a unified, coherent force is reinforced in the imagination of those seeking redress of injustices through the bureaucratic machine, which in fact operates in an atmosphere of "opacity, distrust, and conspiracy" (Nuijten, 2004: 211).

These changing state-society relations can be seen in several ways in hydropower governance. In the case of dam projects developed under PRI rule, potential resistance was typically circumvented by technical experts representing the state who would convince or coerce leaders of local communities to offer their support (Velázquez García, 2010). In parallel with the dissolution of single-party rule, the CFE has turned to a public-private partnership model, in which private capital is used to finance a project and the revenue from the power the CFE markets flows back to investors.⁶ This approach has allowed the CFE to build large hydropower dams that had been on hold, such as the 750MW La Yesca in Jalisco, completed in 2012 (Olvera Molina, 2011). At the same time, anti-dam movements have emerged to challenge these projects, with some success. Most notably, a project called La Parota in Guerrero (first proposed in 2000) sparked a movement that has, so far, prevented it from moving forward (Fox et al., 2009; Sabás Vargas, 2012). This conflict also gave rise to MAPDER,⁷ a national anti-dam organisation. For Gómez Fuentes (2015), the emergence of MAPDER under the presidency of Vicente Fox in 2000 reflected both the political opening occasioned by the end of single party rule, and the new administration's tendency to discard practices that the state had long adopted to pacify such movements.

In addition to the CFE's continued pursuit of mega-dam projects such as La Yesca and La Parota, a second shift in energy policy that began in the 1990s has had important implications for hydropower development. Beginning with a reform to the *Ley de Servicio Público de Energía Eléctrica* (Public Service of Electricity Law) in 1992, private companies were allowed to build their own generating capacity. Under this law, they could either sell power to the CFE as 'small producers', or contract to sell power to a wholesale consumer as 'self-suppliers' (Huacuz, 2005).

⁶ This operates through a budgetary scheme known as PIDIREGAS - *Proyectos de Inversión Diferida En El Registro del Gasto* – Investment Projects with Deferred Expenditure Registration.

⁷ *El Movimiento Mexicano de Afectados por las Presas y en Defensa del Río* (the Mexican Movement for People Affected by Dams and in Defence of Rivers).

Government entities created in the wake of these reforms – the Energy Regulatory Commission (CRE) and the National Commission for Efficient Energy Use (now CONNUE, formerly CONAE), have helped promote small hydro under this model. However, the definition of 'small' has been flexible. CONAE has focused on promoting private investment in 'mini-hydraulic' power, which it defines as 5 MW or less. The 2008 Renewable Energy and Energy Transition Finance Law (LAERFTE), in contrast, defined hydropower of 30 MW or less as 'renewable', a classification that makes projects eligible for tax breaks and other incentives (Panico, 2014).⁸ However defined, these policies helped to create a link between small hydropower – hovering around the 30 MW limit – and the new model of private development.

What might this mean for water governance? A World Bank plan for Low Carbon Development in Mexico argues that tapping the potential of small hydropower might be slowed by conflicts with other water users:

[development of small hydropower] is hindered by the high level of uncertainty over water concession licenses... and over the availability of water once the plant is in operation, when the resource will be shared with other uses, such as fishing and irrigation. The schedule for resource sharing is determined by Conagua [the federal water agency], which has traditionally given priority to non-power activities. This practice significantly increases the financial risk of hydropower projects and has discouraged private participation in small-scale hydro (Johnson et al., 2009).

Although in this document the World Bank makes no specific policy recommendation on this point, a presidential decree in 2011 modified the National Water Law to exempt projects of up to 30 MW from the need to obtain a concession for water use. In a memo explaining the decision, the director of Conagua noted that the previous policy was "failing to realise the potential of exploitation and sustainable use [of water], since it could not be destined for more than one productive activity" (SEMARNAT, 2011).

This policy is clearly intended to signal to potential hydropower investors that water will not be allocated to other uses if this means diminishing their power output. Yet, rather than overtly declaring hydropower to be a higher priority than fishing, irrigation, or indeed domestic use or environmental flows, the policy simply ignores the possibility of such trade-offs, treating water use for small hydro as no water use at all. This practice can perhaps best be seen in light of the long-standing tendency to remove hydropower from the administrative authority of the hydrocracy. The 1992 National Water Law (LAN), for instance, defined hydropower as a 'non-consumptive use', and therefore not considered to affect water allocation for other purposes. Yet, in creating total bureaucratic ignorance (cf. Mathews, 2014) of water use for small hydropower, this policy goes a step further. Moreover, whereas conflicts between the hydraulic bureaucracy and the CFE have been long-standing, this policy divides authority not between government agencies, but between the water authority and private developers.

From 2013 to 2015, President Enrique Peña Nieto pushed through a series of constitutional amendments and 'secondary laws' known collectively as *la reforma energética* (the energy reform). Though primarily aimed at the oil and gas sector, the reforms also included a major overhaul of electricity (Álvarez and Valencia, 2015).⁹ Under the new model, electric generation would be opened to

⁸ In response to lobbying from the Mexican Association of Hydroelectric Energy (AMEH), which represents the private hydropower industry, this limit was reformed in 2011 to include projects with a capacity larger than 30 MW (Imagen Radio, 2013). In order to qualify, a project would have to have a 'power density,' or ratio of power produced to surface area inundated, of 10 Watts/m².

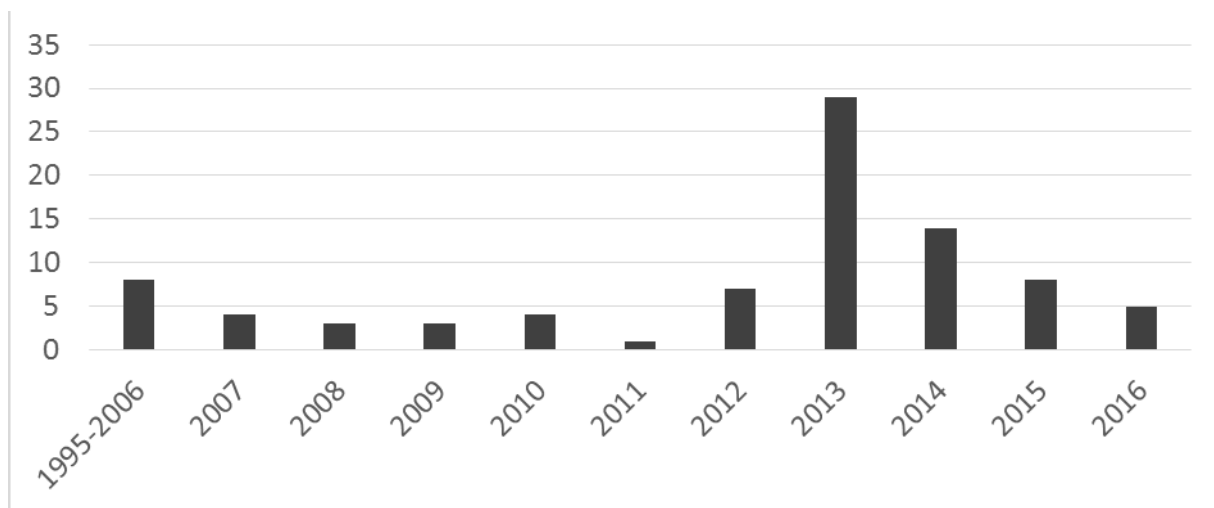
⁹ According to an official at the Secretaría de Energía whom I interviewed in 2016, the inclusion of a reform to the electric power sector was pushed by the outgoing Sub-Secretary of Electricity María de Lourdes Melgar Palacios's desire to cement her legacy (she was later appointed Sub-Secretary of Hydrocarbons). This American economist, who occupies a position of

the private sector, and power would be sold on a competitive market run by a central grid coordinator, the new National Centre for Control of Electric Energy (CENACE). A new market for Clean Energy Certificates is also being created, with the goal of reaching 35% 'clean' power by 2024.¹⁰

Though much of the public discourse surrounding the electricity side of the energy reforms touted the potential to lower the cost of power for the general public, backers of the reform package in Washington, DC emphasised the need to lower power costs for large industrial consumers (Goldwyn et al., 2014).¹¹ In addition to setting up new markets and new entities to oversee them, the reforms extended the notion of the 'public interest' (*utilidad pública*), a concept long used to justify expropriation of land and water for energy projects, to be applicable to private projects (Vargas Suarez, 2015).

A more thorough and detailed discussion of the energy reforms is beyond the scope of this article, and, because implementation of the new policies is still in the early stages, its impacts are emergent. However, these most recent reforms can be seen as the latest step in a longer trajectory of increasing private participation in the electric power sector. These policy shifts set up many of the elements that are used to construct story-lines around small hydropower in the Bobos-Nautla Basin, such as the relationship between private hydropower companies and the state, and the effect of water use for small hydropower on other users.

Figure 1. Permits issued for sale of energy from private hydropower projects by year.¹²



significant influence in designing the new power markets described his role in the reforms, "like being at a Grateful Dead concert and they ask you come up on stage and jam with the band."

¹⁰ This goal is defined in the 2015 Law of Energy Transition (*Ley de Transición Energética*). In the new legal framework, 'Renewable' and 'Clean' are defined separately. Clean energy includes all hydropower, with no size limit. Renewable energy for hydropower is still defined as 30 MW or less, or a power density of 10 Watts/m² of inundated area.

¹¹ Cables from 2009 and 2010 (released by Wikileaks in 2015) speak of the influence of U.S. State Department officials in the energy reform. See: www.desmogblog.com/2015/08/07/hillary-clinton-state-department-emails-mexico-energy-reform-revolving-door

¹² Data is from the Comisión Reguladora de Energía (CRE), available at www.cre.gob.mx/documento/1814.xlsx. Last updated June, 2016.

STORY-LINES OF SMALL HYDROPOWER IN THE BOBOS-NAUTLA

The Bobos-Nautla River Basin, which descends from the rugged, forested mountains of the Sierra Madre Oriental to the coast of the Gulf of Mexico (see Figure 2), provides a unique lens on these institutional shifts in hydropower governance. In the early 20th Century, the river and its tributaries were the site of a protracted struggle over a series of grand schemes proposed by European investors – all of which ultimately failed.¹³ The CFE declared the Bobos-Nautla a "National Reserve of Hydraulic Energy" in 1954, though only two projects were completed in the 1950s as attention shifted to rivers with greater potential. After a long hiatus, the reforms of the 1990s once again attracted the attention of planners wishing to realise the latent potential of this 'reserve'.

Since then, the Bobos-Nautla has become the focus of efforts to realise the new model of private sector-led small hydropower development. Although the CFE has played an important role in establishing the potential of hydropower in the basin – through a 'Grand Vision' plan in the 1990s, and more recent studies (e.g. Garcia Ortiz et al., 2010) – development of this potential has been left to private companies. A project called Escalona has been planned since 2006, followed by at least nine additional private projects, yet none have been completed.¹⁴ Because of this, the impacts that projects would have, as well as details of who are behind them and why – and even the basic question of how many projects are planned for the basin – remain points of contention.

Despite the slippery nature of these projects, Environmental Impact Statements for ten projects submitted between 2006 and 2014 indicate that they would have a total generating capacity of 126 MW, calling for roughly 23 kilometres (km) of diversion infrastructure (tunnels, canals and tubes), and 24 km of new transmission lines. Only one of the plans calls for a dam-reservoir design, while the rest employ a diversion scheme – channelling water into tunnels blasted through the surrounding mountains and discharging it downstream.¹⁵ Several of the projects are grouped into 'cascades' where the outflow from one project is immediately diverted into the next (see Figure 2).

The business practices of the private companies developing these projects makes them difficult to trace. Each project is backed by an ostensibly Mexican corporation, with no information given about their parent companies. The available information, however, suggests that they are backed by international clean energy finance firms. A cascade of three projects on the Jalacingo River has been reported in the local media to be backed by a Spanish company called Impulsa Generación Renovable (IGR).¹⁶ The Escalona project, in an application for carbon credits through the Clean Development Mechanism, lists a company called LEAF Clean Energy – a U.S.-based private equity firm – as the owner of the project.¹⁷

The story-lines surrounding development of small hydropower in the Bobos-Nautla form two coherent narratives – one that frames small hydro projects as a rational use of resources with positive social and environmental effects, and a counter-narrative that argues that they portend wholesale dispossession of communities and theft of water for private gain. While each of these narratives is

¹³ These historical conflicts and the archival citations are detailed in Silber-Coats (2015).

¹⁴ The exact number of projects in the basin is a matter of considerable debate and speculation. Between 2006 and 2014, ten Environmental Impact Statements were filed. In 2015, two projects suspended their plans, and were replaced by plans for four projects in the same section of the river.

¹⁵ See Egge and Milewski (2002) for an explanation of different hydropower designs, and Kelly-Richards et al. (2017) for a further discussion of these classifications.

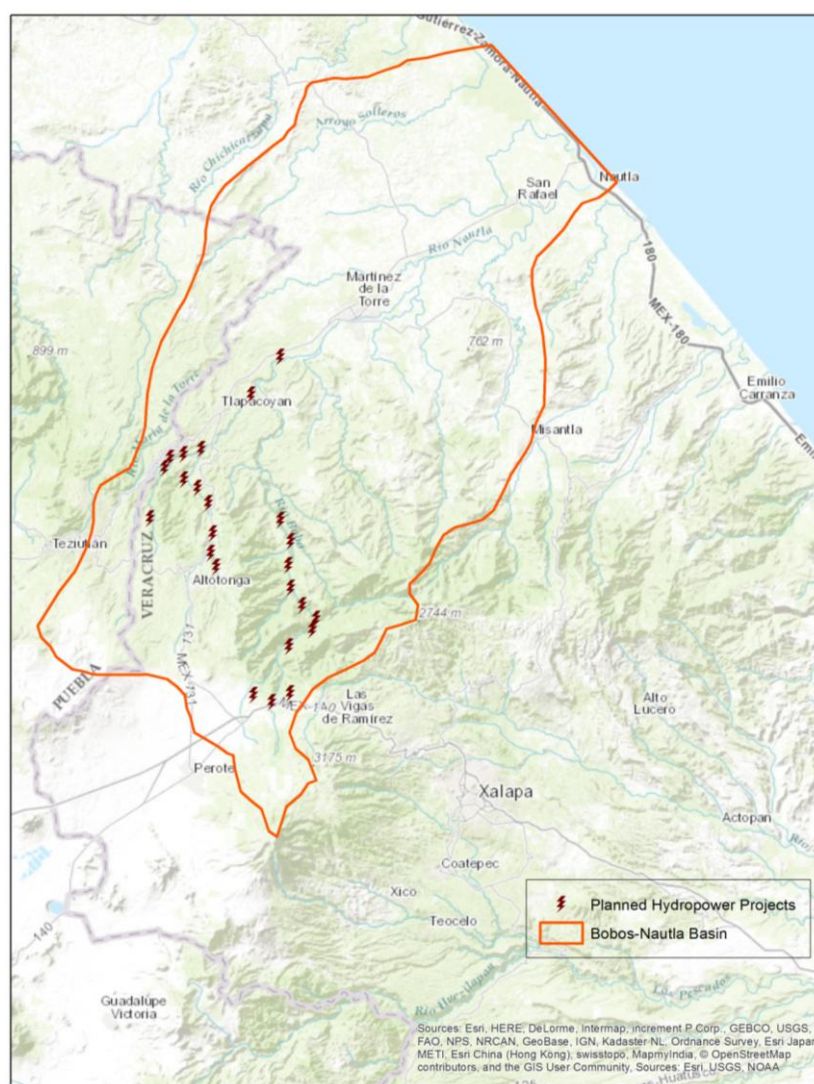
¹⁶ The company's website (www.grupoimpulsa.es/donde_estamos.html) lists Mexico as among the countries where they operate, but does not mention specific projects.

¹⁷ I spoke with a project manager from LEAF who confirmed they own this project and one other in the basin. Although based in Washington, DC, LEAF's application to the CDM lists its country of origin as the Cayman Islands, which is commonly used as a tax shelter.

constructed by a fairly predictable coalition of actors – with government functionaries, industry boosters and developers producing the first, while environmental activists and NGOs advance the latter – these coalitions are beset by considerably more ambiguity than their at times polemic rhetoric would suggest.

This section is organised into three parts. First, I trace each of these two story-lines, paying attention to the actors that produce them, the claims they make, the alternatives excluded from their narratives, and the ways in which they have influenced policy. Following this, I focus on the margins of these story-lines, the moments and issues which illuminate the contradictions and ambiguities that beset the construction of the small hydropower problem (cf. Hajer, 1995: 78). In this final subsection I consider the potential for a reframing of small hydropower as a locally managed energy source for rural communities, and the institutional barriers to realising this vision.

Figure 2. Map of potential sites of hydropower projects in the Bobos-Nautla Basin.



Note: This map is based on Garcia-Ortiz (2010), a paper by CFE engineers that calculates hydropower potential in the basin. The original map is of low resolution, so locations of projects are approximate (map created by the author).

Story-line one: Small hydropower as a modernising force

A key element of this narrative is the claim that small hydropower will bring economic benefits to communities near project sites. As Jacobo Mekler, president of AMEH, the hydropower industry association argued in a radio interview, these projects bring employment to "remote regions where there are no jobs" (Imagen Radio, 2013). Companies working in the Bobos-Nautla justify projects with the logic that it is "inarguable that electric energy is indispensable for improving quality of life (...) [and that it] contributes to the maintenance of social and economic stability", generating "socioeconomic benefits in rural communities" and "[power] supply in remote zones" (Proyecto Ocampo, 2012: 13). Such claims of benefits for rural communities are intermingled with assertions about the technical benefits of small hydro for the electric grid, such as reduced transmission losses and increased reliability of power supplies.¹⁸

This narrative creates a sense of inevitability around hydropower development in the Bobos-Nautla, and other adjacent basins along the steep, humid slope of the Sierra Madre Oriental – a notion of topography as destiny. The existence of "an important *altiplano* [high plain] region which slopes down to the coast, and an extensive network of surface hydrology" (ibid) make hydropower development seem a sensible and natural outcome. As an environmental consultant who has worked extensively in the region put it, "thirty per cent of the water in this country flows through the state of Veracruz and ends up in the Gulf. We need to learn how to take advantage of it".

A report on the future of small hydropower published by CONAE in 2000¹⁹ – which again points to the Bobos-Nautla as a paradigmatic site for development – makes broad claims about the local benefits that such projects will bring. As this agency sees it, small hydropower is part of a broader energy transition away from large, central generating stations to one of 'distributed generation' where isolated rural communities, urban municipalities and industry will all benefit from cheap, clean, locally generated energy.

Such visions belie the reality of who is actually positioned to benefit from these projects. Rather than extending cheap electricity to rural areas to spur local growth, the emerging pattern is one of extraction – energy produced in these remote regions fuels distant urban and industrial sites. The explanation for this contradiction lies in the conditions for private generators set by the 1992 reforms. 'Self-supply' (*autoabastecimiento*) can be done in one of two ways – either 'local' or 'remote'. Local self-supply, as when a power plant is sited close to a site of consumption in a mine or factory, was prevalent in the early history of Mexican hydropower in the late 19th century (Parra, 1988). Currently proposed projects, however, predominantly use the remote model where electricity is 'injected' into the national grid, meaning that an equivalent amount of power can be delivered to a distant customer (CFE, 2012). Projects that operate as 'small producers' sell power to the CFE, meaning that they, too, feed the grid rather than providing power specifically for local consumption. The proposed projects in the Bobos-Nautla operate under both schemes, with self-supply clients including subsidiaries of a mining company

¹⁸ These claims are based on the notion that small hydropower, unlike other renewable energy sources like solar and wind, can be dispatched as needed to balance supply and demand in the grid. This is based on the questionable assumption that the river flow needed to produce power is and will be continuously available (see Abassi and Abassi, 2011 for a discussion of the faultiness of this assumption, particularly given the uncertainty of future climate on stream flow in mountain regions where small hydropower development is taking place).

¹⁹ This report has no title, no date (though references in the text suggest it was published in 2000), and is no longer available on the agency's website. It makes reference to a 1995 study of the potential for small hydro in Veracruz and Puebla. When I filed a request for the original study, I was sent a copy of this 2000 report.

called *Minera Autlán*.²⁰ None of the proposed projects in the Bobos-Nautla partner with a local community or municipality,²¹ as CONAE once predicted they would.

A second element of this narrative is the argument that small hydropower projects have little or no impact on water flows. The engineer who manages the two existing CFE hydropower projects in the Bobos-Nautla Basin described small hydropower as "a very noble technology with no capacity to affect the environment" (Interview, 7/22/14). An official at Conagua's regional office in Xalapa, the capital of Veracruz, who is familiar with the Bobos-Nautla projects commented that, "if they have any effect on water, it would be to improve water quality by aerating it" (Interview, 6/20/14). These arguments are also advanced in Environmental Impact Statements for the proposed projects, which invariably claim that no other water users will be affected by diversion for hydropower. In negotiations between a project called PH1 and SEMARNAT (the Secretariat of Natural Resources) over approval of the Environmental Impact Statement, the company claimed that because the project "has the quality of taking and conducting water in the flow of the current [*al hilo de la corriente*] without damming", it should not be required to present a detailed study of hydrologic impacts.

These claims are questionable. Though the specifications vary for each proposed project, the general principle is to divert water into a series of tunnels, tubes, and canals, which measure anywhere from a few metres to more than a kilometre in length, before being forced through a turbine and then returned to the river channel. Claims about the overlooked effects of these diversions figure prominently in the formation of a counter-narrative about these projects, to which I turn next.

Story-line two: Small hydropower as water theft

If the first story-line constructs small hydropower development as part of a process of modernisation, bringing stability to the grid and economic growth to rural communities, an alternative narrative advanced by a coalition led by the *Alianza de Comunidades Usuarios del Rio Bobos-Nautla* (Alliance of User Communities of the Bobos-Nautla River) paints a very different picture. The *Alianza* is a group of environmental activists that formed to 'defend the river' in response to the announcement of plans for hydropower projects in 2009. Led by one-time *diputado* (congressman) and avowed communist whom I will call Carlos, the small group includes teachers, shop owners, river rafting guides,²² and local politicians, based mainly in the city of Tlapacoyan – in the centre of the basin – with some regular participants from rural communities close to the sites of the proposed projects. They are closely linked with LAVIDA (*La Asamblea Veracruzana de Iniciativas de Defensa Ambiental*),²³ a coalition of activists based in the state capital of Xalapa. The story-line and discourse coalition that they have constructed through meetings to *concientizar* (raise awareness) in rural communities and legal actions to detain projects, has several key elements, of which I highlight three: an argument that small hydro projects are a scheme to 'steal water'; a related argument that constructs privatisation as the root of the problem; and an argument that hydropower development is sowing social discord.

²⁰ Self-supply clients for other small hydropower projects include other mining interests, Walmart, Kimberly-Clark, textile manufacturers, and major airports around the country.

²¹ Out of 49 contracts for self-supply of small hydropower, four include public entities (state or municipal governments) as clients, while the rest would provide power to industrial consumers.

²² A high profile dam conflict took place in Jalcomulco, Veracruz, coming to a head in 2014 a few months before I conducted this research. In that case, whitewater rafting guides led a protest that halted plans for a large dam concessioned to the Brazilian construction giant Odebrecht. Although the Bobos-Nautla is renowned among whitewater kayaking enthusiasts, the discussion among members of the *Alianza* often turned to why tourism operators in the basin were, by and large, reluctant to join their cause.

²³ The Veracruz Assembly of Environmental Defense Initiatives.

Claims about the effects of small hydropower on other uses of water take several forms. Despite the apparent abundance of water that has made this basin attractive to hydropower developers, there are contentious debates surrounding the impact of projects on other water users. Many communities in the area draw their domestic water supply from gravity-fed systems, built and managed by local 'water committees',²⁴ which bring water from small tanks built around springs and seeps in the mountains to the village centres. Tlapacoyan, a city of around 50,000, relies mainly on a system that diverts water directly from a tributary of the Bobos-Nautla.

The claim that the projects will affect community water supplies is difficult to prove or disprove. This is not a question of allocating the river's flow to competing uses, but of whether building the infrastructure required for hydropower projects – including constructing roads and blasting tunnels with dynamite – would affect the subsurface hydrology that sustains flows to community water supplies. To answer this question would require a study of the local hydrogeology that has never been done.²⁵ The Conagua official quoted in the previous section derided the notion of conducting such a study, telling me, "I don't need to do a study. I can *prove* that the springs are not connected to the river". Though he implied that such proof had been obtained related to springs in the Bobos-Nautla, he declined to offer any further details, or even to confirm if the agency maintained a record of this evidence, telling me, "there is no need" (Interview, 6/20/14).

Members of a water committee in the community of Hueytamalco, who allowed me to attend a group meeting and a maintenance visit to their water system, spoke about how hydropower developers are plotting to dispossess them of the water systems that they have worked for years to create. The president of the committee recounted a long history of conflict with the municipal government over control of their water system, concluding that, "it's just like now with the hydroelectric projects". "They are going to take the water away from us", added another committee member in agreement. In spite of these convictions, their water system is not close to any of the proposed projects, though springs that supply other communities are. In El Mohon, near a series of potential project sites on the Jalacingo River, a member of the community's water committee predicted that hydropower companies would soon, "come and put a tube above our water intake and steal the water, although many people don't believe it" (Interview, 7/30/14).

The perceived risk to community water supplies has formed the basis for legal battles to prevent projects from moving forward, led by the *Alianza*, sometimes in partnership with the *Centro Mexicano de Derecho Ambiental* (CEMDA). In 2010, the municipal government of Tlapacoyan, backed by members of the *Alianza*, initiated a 'constitutional controversy', a claim before the Supreme Court which argues that its rights were infringed when SEMARNAT approved projects called PH1 and PH3.

Tlapacoyan's water source lies downstream from where these projects would return the water they divert to the river channel, raising the question of how the city's water supply would be impacted. When I put this question to Carlos, the *Alianza* leader, he summed up his position by stating that hydropower projects, "are going to do away with the rivers, and that's all there is to it". In Tlapacoyan's argument, which won the approval of the Court, it asserts that "any project of deforestation or construction on the Jalacingo River (...) geographically affects the hydrological basin which originates there, by the desiccation that it would cause" (Controversia 89/2010).²⁶ In this way, they construct hydropower as a threat to rivers that exceeds the specific details of any proposed project. This

²⁴ As Davila Poblete (2006: 49) notes, rural water committees, unlike many other local water management institutions in Mexico, have maintained a high degree of autonomy from the hydrocracy.

²⁵ A similar debate has played out over small hydropower in the Himalayas, with some attributing drying springs to hydropower projects while others argue that these are natural changes in water flow (Erlewein, 2013; Rana et al., 2007).

²⁶ Although the Supreme Court invalidated the environmental impact assessment for these projects in 2011, the company behind them resubmitted the proposals to SEMARNAT in 2012, where they were reapproved.

argument resonates with the local perception that river flows have been diminishing in recent decades, an observation made repeatedly by older residents of the area.

A case being brought by CEMDA against a project called Ocampo-Cuetzalin argues that the risk of damaging community water supplies poses a threat to the human right to water, which was enshrined in Mexico's constitution in 2012. Arguing on behalf of the "peasant [*campesino*] class of the Bobos-Nautla basin", the lawsuit (in this case, an injunction [*amparo*] before a district judge) asserts that the springs that supply water to the communities constitute a 'common good' which is being threatened by the hydropower projects. In 2015, the district court ruled in CEMDA's favour, stating that "water should be treated as a social and cultural good, not as a fundamentally economic one" (Queja 137/2015).²⁷

Arguments about small hydropower as thefts of water are not strictly about the risks that projects pose to community water systems, but are often tied to broader claims about privatisation as a pernicious force. For instance, Isidro, a river rafting guide and member of the *Alianza*, elaborated on a theory shared by many in the group: that the true interest of project developers is not in energy but in water. "If they take the water out of the river for the dam, then there won't be any water in Tlapacoyan. Where will the municipality get its water? They will have to buy it from the dam, and instead of paying an annual fee people will have to pay by the cubic metre", he told me (Interview, 7/22/14).

Members of the administration of a municipal government in the basin, who oppose hydropower projects in spite of the official support of the mayor, told me they were convinced that developers were planning to collect water and export it to Spain (interview, 8/14/14).

In a less far-fetched theory, Carlos predicted that hydropower companies could make claims on community water sources:

Let's say the dam is down here... they have a concession for a quantity of water. They have their private water and they generate energy... [but] if a community over here [uses water], the businessman shows up – 'hey, you're taking my water. That water is for the dam! Because I have a concession you have to make sure I get however many millions of litres, and my litres of water are composed of all the runoff from the springs in the surrounding area (Field notes, 6/12/14).

However, this notion fails to take into account the removal of the requirement for small hydropower projects to obtain a concession for water use, of which Carlos was unaware.²⁸ Each of these theories contains some elements drawn from a real precedent – for instance, Carlos explained this claim by saying that "this is the news that [anti-dam activists] brought us from Oaxaca" – but is also hyperbolic. My concern is not to evaluate the truth of these claims, but to make the point that they contribute to the formation of a story-line about small hydropower that has become a focal-point of opposition. That these narratives take the form of conspiracy theories that circulate among those closest to project sites, but farthest removed from the decision-making process, should perhaps come as no surprise. As Lomnitz (2001: 158) argues, those whose voices are excluded from the public sphere in Mexico have long relied on personal sources of information – gossip and rumour – rather than official ones.

²⁷ This case continues to work its way through the courts, and as of August, 2016 the lawyer bringing the case for CEMDA told me it is likely to reach the Supreme Court (Xavier Martinez, personnel communication). See www.cronicaveracruz.com/falta-una-resolucion-final-para-detener-completamente-hidroelectricas-en-veracruz-autoridades-ambientales-inoperantes/ for a summary of the case.

²⁸ I discovered this regulatory change after completing fieldwork, in part because none of my interlocutors seemed to be aware of it. In addition to Carlos, my informant at Conagua insisted that as the sole authority over national waters, his agency would determine whether or not to grant a concession for small hydropower projects. However, in line with the regulatory decision, the projects proposed in the basin after 2011 do not have any record of a concession for water use in the public registry.

This narrative further resonates with a conviction that these particular projects are merely one expression of a broader trend of dismantling the public interest in resource governance through neoliberal reforms – including the *reforma energética*, details of which were being presented to the public during my fieldwork. This notion was expressed by Carlos in a meeting in a rural community where, after explaining that the hydropower projects would belong to private companies, he asked the audience, "I was always taught that water, petroleum, and electric energy belong – to whom?" A query that was met with cries of "to the people!" (Field notes, 6/12/14).

Another element of this narrative is the notion that hydropower developers are intentionally generating conflict within communities to neutralise opposition. During a series of meetings in rural communities along the Filobobos River that I attended with members of the *Alianza* and LAVIDA, the activists warned of company representatives posing as 'social scientists' who would come and, in the guise of conducting a survey, convince people to support the projects. "What the company does", said Fernando of LAVIDA, "is send professionals dedicated to deceiving society, saying they will come with jobs and that they're going to build a road" (Field notes, 8/12/14). In communities along the Jalacingo River, too, people spoke of payments and construction projects that company representatives had offered – including an offer to build a swimming pool to compensate for damage to the river. Some community members were rumoured to have formed 'committees' to manage funds expected to come from hydropower companies, though such arrangements are shrouded in secrecy.²⁹ Benicio, a member of the *Alianza* from a community on the Jalacingo River, recounted how initial opposition to the projects had faded since they were first announced in 2009:

People were with us, against the hydropower projects. Even three times we collected signatures... and everyone signed against the projects. But now with the change in the mayor's office... they rejected the signatures. The mayor [*presidente municipal*], with the company, came to offer people houses, to pave the road to the river, payment of 250 thousand pesos, jobs... Now there are only about sixty of us who are against the projects (Field notes, 6/16/14).

In the analysis of the municipal officials who theorised about exporting water to Spain, the hydropower developers are exploiting existing fractures in rural communities by bribing local *caciques* – landed elites – who could pressure others to support projects. They also pointed to the system of electing an 'agent' of the municipal government (*agente municipal*) in each rural community as a factor that leads to conflict. "The worst part is, they hold a public assembly where everyone can see who votes for whom, so everyone is divided and looking to punish people who didn't support them", one of these officials told me (Interview, 8/14/14).

Leaders of the *Alianza* and LAVIDA use these divisions to craft a narrative of outsider interference, contrasted with calls for unity at the scale of the river basin. Carlos' speeches in each of the meetings I attended began with a detailed list of facts about the Bobos-Nautla Basin – its dimensions and surface area, the names of tributaries and of towns along each one, concluding with a declaration that "it is one river". He followed this framing of the River Basin as a unifying force with calls for the assembled community members to join the *Alianza* in "defending the river", by calling for "a forum where every legitimate member of the community can say I agree or I disagree with the dam, because the river corresponds to us...and we each need to make the decision in the sections of the river where we are" (Field Notes, 8/10/14).

²⁹ A man who was rumoured to be the president of one such committee was evasive when I asked him about it, at first denying that it existed, then confirming its existence but offering no details. A representative for IGR, the company behind the projects on the Jalacingo, refused my request for an interview.

Ambiguity in hydropower story-lines

The two story-lines – small hydropower as a modernising force, and small hydropower as water theft – are cast in stark opposition to one another. Yet, it would be incorrect to see these as polarising narratives that can be used to sort all actors in this conflict into two opposing camps. Instead, several actors have adopted a more ambiguous stance to the problem of small hydropower. I argue that this reflects a lack of discursive closure – that is, a problem whose definition is still unsettled. I offer three examples to illustrate this point.

First, there is the case of ProNatura – an environmental NGO that promotes biodiversity conservation – and its relationship with the hydropower developer *Impulsa Generacion Renovable* (IGR). IGR has formed a partnership with ProNatura to re-establish the native cloud forest in the catchment above its projects on the Jalacingo, operating on the theory that a healthy forest will ensure a steady flow of water to its turbines. In official literature, ProNatura endorses the notion that "micro-hydroelectric" plants, "although they continue to imply social and environmental risks (...) are perceived to be more compatible with sustainable development", and that their development in the Bobos-Nautla will combat poverty (ProNatura, 2014: 72). The lead ecologist for ProNatura's regional office, in contrast, explained that, "The problem is the way the companies and the government are opening the door to foreign capital and how this capital, in an abusive way, is imposing itself on communities, even tricking people, saying... 'this is going to be a small project'", but also actively defended the organisation's partnership with IGR saying, "it's better to work with them, because otherwise they will do whatever they want" (Interview 6/24/14).

Second, negotiations between hydropower developers and SEMARNAT – the environment ministry – over approval of Environmental Impact Statements reveal a struggle within the agency to define the nature of the problem. The first of the recent projects in the Bobos-Nautla, Escalona, was rejected in 2006 for violating a state-level environmental zoning law for the Bobos-Nautla Basin.³⁰ Despite arguments from Escalona that the project will have no effect on the river's ecology or other water users, SEMARNAT opined that "it will require diversion of a quantity of the hydrologic flow of the river (...) which will affect environmental conditions" (SEMARNAT, 2006). After a reversal of opinion by the state government's *Secretaria de Desarrollo y Medio Ambiente* (SEDEMA – Secretariat of Development and Environment) as to the compatibility of hydropower projects with the zoning law, the project was approved in 2008. After approving additional projects in 2009 and 2010, SEMARNAT delayed – but ultimately granted – approval of the Ocampo-Cuetzalin project due to its failure to document potential impacts on the river's flow. In contrast to its earlier denials, the response of the developer seems to acknowledge the severity of potential impacts, but counters that "if using water for generating electricity... should be consistent with the demands for aquatic life... the ecological flow should also allow for the viability of investment... because for every litre per second left for environmental flow, small hydro plants reduce their production of renewable energy" (Proyecto Ocampo, 2012: 77).

The Ocampo-Cuetzalin project is the same one that sparked the Supreme Court case brought by Tlapacoyan, which was approved by SEMARNAT a second time after the Court invalidated the original permit. As members of the *Alianza* and LAVIDA observed, these later approvals were granted by the state office of the federal agency, while the more critical reviews were conducted by the central office in Mexico City. The political calculation behind this move, and its influence on this administrative process, is a matter of speculation which I will sidestep. The point I wish to emphasise is that the trail of documents left by these negotiations suggests that the argument that small hydropower is environmentally benign has not achieved complete hegemony within SEMARNAT, and that the construction of the problem as a water conflict holds some currency within the agency – even if

³⁰ The *Ordendamiento Ecológico del Territorio*.

narrowly framed as an environmental impact with little consideration of the community water-source issue.

A third strain of ambiguity – and, I suggest, the potential for a different narrative to emerge – can be found within the arguments presented by the *Alianza*. Here I am referring to a certain resonance between the claims of hydropower proponents and those of the opposition on the potential local benefits of small hydropower. On one occasion, Carlos, the *Alianza* leader, asked me rhetorically, "What if the projects were for the *campesinos*? Well, I would have to be in favour, no? Electricity is very expensive". A member of a water committee from a community on the Jalacingo echoed this sentiment saying, "[w]ith these projects, it's all going to be for someone else. I wish the government had come and said "this project is for the community, here are the engineers [*técnicos*], develop it with them. This is our land and it should be for us to exploit" (Field Notes, 7/30/14).

As we have seen earlier, economic benefits and provision of low-cost power in remote areas are a key part of the story-line adopted by small hydropower proponents. However, these local benefits are unlikely to be realised under the current model, which favours an extractive approach. The notion of small hydropower as a community-based energy source remains, instead, an empty promise of industry promoters, far removed from the reality of how these projects are being imposed on the landscape and exporting the benefits that they generate. Yet, these comments suggest that if small hydropower development were designed to actually provide local benefits, the reaction to them could be different.

CONCLUSION

Although the Bobos-Nautla hydropower projects remain in limbo, there is every reason to think that they will, sooner or later, become reality. Challenges in the courts may delay or lead to the cancellation of any particular project, but the underlying economic calculus that attracts developers has only become more favourable. With Mexico's reformed energy policy poised to incentivise 'clean' technologies including small hydropower, it appears likely that these projects and more like them will become an important component of Mexico's grid in the coming decades.

Yet, as planners in the Energy Ministry scramble to design the new markets in a way that will allow them to achieve ambitious decarbonisation goals – a particular challenge in the current glut of cheap fossil fuels – significant consequences of small hydropower development are being side-lined. In particular, the potential risk to community water sources in areas adjacent to projects, and the attendant ecological effects of diverting a high proportion of streamflow.

In one sense, there are strong echoes of the early history of electricity in Mexico, when private hydropower companies exploited falling water with little regard for the ways this might impact other users. The reaction to this situation helped spur the expropriation of privately owned energy infrastructure, and led to the formation of the CFE with its programme of big infrastructure projects. Now, once again, the focus is on opening up rivers to private development. Not only is there a lack of adequate institutional capacity to account for and mitigate the effects of water use by private hydropower companies, but existing regulations – such as the approval of a water concession – have also been swept aside to attract investment. So far, in the Bobos-Nautla case, the issue has not been how to account for and mitigate the impacts of water use for small hydropower, but rather a struggle for any official recognition that this *is* an issue.

The divergent social constructions of small hydropower that I have charted in this paper speak to how, as Bijker (2007) argues, different value systems can be embedded in the same water infrastructure technologies. That is to say, there is no singular truth about what small hydropower is. The case that I have presented calls into question the notion of small hydropower as an empowering energy solution for rural communities (Kumar et al., 2011), pointing instead to a model that more closely resembles what Shaw (2011: 753) describes as "willy-nilly industrialisation of the landscape".

Yet, this does not mean that this is an inherent characteristic of the technology, any more than an instance of small hydropower being used to extend electricity to a remote village can be used to make broad generalisations.

The question then becomes one of determining what sorts of values and social relations are embedded in small hydropower. This means paying particular attention to energy institutions and networks that set rules about who can build and own such a project, and who benefits from the power generated. In order to understand the consequences and limitations of these institutional arrangements, it is also important to consider how small hydropower is perceived in the places that are the targets of development, to look at the formulations of the problem that have been excluded from official calculations.

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