

Technology of detachment: The promise of renewable energy and its contentious reality in the south of Colombia

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Abstract

Taking infrastructure as the means to control space, this paper analyses the large-scale hydro-electric dam project “El Quimbo” in Huila, South Colombia, and the environmental conflict it caused. The paper argues that instead of acting as a “technology of engagement” that extends vital infrastructure into marginalised territory, the dam functioned as a “technology of detachment” that destroyed the social and physical infrastructure in place, fragmented territory and marginalised affected populations further. While localised marginalisation can be considered an unintentional side-effect of a project, which otherwise serves the “greater good”, critical conceptualisations of the capitalist state see purpose behind these impacts. Governments use infrastructural objects as tools for social engineering, subjugating their population to control and discipline in line with their biopolitical project. The paper analyses how far this subjugation was visible in the El Quimbo dam case, and critically reflects on the promises of renewable energy. It brings novel insights to the infrastructure citizenship debate by highlighting that infrastructure can act as intermediary between state and citizens but, in the same way, can hamper citizenship formation.

Keywords

Colombia, energy justice, hydroelectricity, infrastructure, renewable energy

Introduction

In a social and democratic State under the rule of law, a general and abstract priority cannot be given to the general interest and to the predominant vision of ‘development’ or ‘progress’ brought by infrastructure works, when these affect the fundamental rights of people.

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This ruling of the Colombian [Constitutional Court in 2013](#) (Sentence T-135/13) marked a milestone in the El Quimbo dam conflict. Since the Colombian energy company Emgesa (majority-held and controlled by the multinational Enel Group) acquired the environmental licence for the hydroelectric dam at the El Quimbo gorge, province Huila, in 2009, people have resisted the dam realisation and connected processes of resettlement in the fear of losing not only their homes, but the most fertile lands of the region, livelihood, community and their cultural heritage.¹ Despite the lack of public support, the infrastructure project went forward and the affected populations together with urban professionals and activists started to denounce the company's in-compliance with the environmental licence and violations of the peoples' rights.

One of the most contentious issues was the socio-economic census of the affected populations that left many families unrecognised who were economically dependent on the valley. Sentence T-135/13, cited above, granted them the recognition of damages by the dam, re-emphasised the company's responsibility to re-establish their living conditions to an equal or better standard, reminded the National Agency for Environmental Licences to monitor the company's compliance and highlighted that an abstract idea of the "general interest" cannot prevail over the fundamental rights of the people.

The dam project with an installed capacity of 400 MW started operation in December 2015. It flooded more than 8500 hectares of protected and arable lands along the upper stream of Colombia's most important waterway, the Magdalena River. Despite the above court ruling, it displaced around 1500 people and left them and many more unemployed and without subsistence. The compensation mechanisms meant to mitigate the impacts enforced the fragmentation and marginalisation in place.

A dam, as any infrastructure project,² shapes space, in terms of accessibility and connectedness and in terms of social-environmental relations, behaviour and subjectivities. It can function as a *technology of engagement*, connecting people and raising equality. But it can also act as a *technology of detachment*, fragmenting landscapes, divorcing people from their territory, each other, and the state. Some of these impacts could be regarded as unintentional side-effects of projects that otherwise serve the common good. In this article, I argue that many socio-political consequences are by design, following the agenda of accumulating capital and centralising state (elite) power. The case of renewable energy infrastructure, like hydroelectric dams, is emblematic as it is not only promising development but to be sustainable, clean and climate friendly. It bears an intrinsic legitimisation with the risk that upsides are overplayed, downsides are downplayed, and contentions silenced.

In this article, I take infrastructures as a means to control space, mediating between states and citizens, politics and life (Amin, 2014; Hope, 2021: 14). I ground my theoretical framing of infrastructure as technology of politics (engagement/detachment) in the literature on the promise of infrastructure (Appel et al., 2018; Harvey and Knox, 2012), infrastructural violence (Rodgers and O'Neill, 2012) and infrastructural citizenship (Amin, 2014; Hope, 2021; Lemanski, 2020). I link core ideas of the above reading to Latin American conceptualisations of the capitalist state and extractivism that seek to understand the complex relations between contemporary extractive politics, the colonial heritage, ontological suppression, and resistance (Gudynas, 2018; Moncayo, 2012; Svampa, 2019) and to environmental and energy justice debates to holistically analyse the complex ways infrastructures act upon social-environmental relations (Angel, 2016; Burke and Stephens, 2017; Sovacool et al., 2017). Combining these ideas, this study contributes to the research being done in geography and political ecology on "the *production of space* and on the intersections between geographical [and other] knowledge and technologies for the inscription of that knowledge and how these articulate with *structures of domination*" (Brosius, 1999: 282 emphasis added).

Aligned with the political ecology case study (Helmcke, 2022), this paper is based on participant observation and interviews with different stakeholders during two periods of fieldwork: 3 months in 2012, before the dam construction was finalised, and 9 months in 2016–17, after the initiation

of operation. The information is complemented with follow-up online interviews in 2022, and the analysis of secondary documents and discourses released around the case since 2009 (public hearings, roundtable discussions, press releases, news articles, legal documents and academic publications).

I will begin with briefly reviewing the above literature to develop my theoretical framework. Second, I will dive into the context of the case study showing how the dam has been politically endorsed. Third, I will compare political claims with the actual reality created by the dam investment advancing my conceptual understanding of the technology of detachment. Finally, I propose options for renewable energy to act as technologies of engagement and suggest that future energy transition research and policymaking draw upon this framework to productively explore the interplay between objects of infrastructure and the social-ecological context of their implementation and operation.

Infrastructure and the politics of space

Space has been widely identified as being a materialised social relationship (Swyngedouw, 1992: 417–418). Social life has historically configured space, while the character of space has influenced daily life (Goonewardena et al., 2008). Capital seeks the command over the powers of space (resources, labour, energy) and, as such, the “control and organization of the socio-spatial fabric of daily life” (Swyngedouw, 1992: 428). The expansion of capital into new frontiers often leads to a contradiction in territorial organisation: “a struggle over the command of space as a force of production or as ‘living’ space” (Swyngedouw, 1992: 425).

While the old enclosure and primitive accumulation have historically privatised land and alienated people from the product of their labour (Marx, 2009), the new enclosure and accumulation by dispossession centralise ownership and integrate life-spheres into the market that have so far escaped commodification, for instance public utilities or ecosystem services (Harvey, 2004). The notions of development and modernisation are powerful devices to mask unequal capital accumulation as being in the common interest (Moncayo, 2012: 39).

Infrastructure is key for extending the economic order into territory. As a “technology of integration” (Harvey and Knox, 2012: 529), it connects products, people, and energy with markets, facilitating the free circulation of capital across space and promising progress, profit and better life (Appel et al., 2018; Harvey and Knox, 2012: 534; Larkin, 2013: 332). Further than turning human and more-than human relations into objects of the markets, infrastructure turns them into subjects of the “singular authority of the modern [capitalist] state” which strengthens its sovereignty (Anand, 2018: 158). As the state is able to facilitate, shape and constrain infrastructural development in its territory, infrastructures “operate as technologies for materialising state presence in people’s lives” (Harvey and Knox, 2012: 530; Uribe, 2019). Larkin (2013: 327) emphasises that infrastructural objects never operate in isolation but as systems. The more centralised the coordination of such systems, the more centralised is the power of the state (Bridge et al., 2018: 2; Meehan, 2014). The assembling of infrastructure in space is essentially a biopolitical project (Gupta, 2018: 65; Scott, 1998).

Particularly, energy infrastructure is of vital importance to economic development as it is to state-building. As the European Commission (2011) points out, it is the “central nervous system” of any economy (2011: 7). McNeish and Borchgrevink (2015) explore the links between different energy technologies and exploitive practices, as well as energy and (state) power. They point out that “a national electricity grid is a powerful symbol of the internal socio-political coherency of the modern nation-state. [...] Efforts to expand the grid are at the same time attempts at integrating the nation and extending the state’s reach” (McNeish and Borchgrevink, 2015: 14–15). Similarly, Powell (2010) shows in her work *Landscapes of Power*, how energy infrastructure development in the Navajo territory (First Nation, US) is used to create not only new “objects”, economies and markets,

but also new modes of production, knowledge, relation and identity. Infrastructural development meant in her case the forceful assimilation of local cultures to the capitalist project of the state, as well described by [Dunlap \(2018\)](#) in the case of massive wind farm expansions in Oaxaca, Mexico.

The power of infrastructure does not have to follow capital's demands but can facilitate basic needs of a population. Access to affordable electricity and potable water are considered fundamental human rights. Citizenship rights "are typically framed around access to infrastructure" in the context of informal, densely populated urban agglomerations ([Lemanski, 2020: 2](#)). Here, the provision of such infrastructure might require a centralised coordination of generation, distribution and consumption. If this is not guaranteed in an equal manner, disadvantaged population groups might "enact" their citizenship through informal connections or self-construction of such systems, captured by the concept infrastructural citizenship ([Lemanski, 2020](#); see also [Amin, 2014](#)).

In more marginal, rural areas this provision can be much less regulated and decentral. [Hope \(2021\)](#) shows in the case of a remote Indigenous reserve, territory as well as infrastructure are used as means to negotiate citizenship within the Plurinational State of Bolivia: mega-infrastructure that enforces a national citizenship versus decentral infrastructure that allows for self-regulation and citizenship as equality in difference and that pushes for different relationships to land and place. The latter system would support a "living" space that is not necessarily subjected to capital demands but to human wellbeing. I argue that a state's sovereignty is strengthened if it follows the principles of environmental justice and the context-specific social-ecological requirements and prerequisites of a region ([Powell, 2021](#)).³ Local populations would build their citizenship by actively engaging in finding sustainable futures for themselves and their environment. Contrary to a technology of (market) integration, infrastructure would function as, what I term, a technology of engagement.

Latin America, as other parts of the developing world, has experienced a turn to infrastructure-led development since the 2000s – called the global infrastructure turn ([Dodson, 2017](#); [Enns and Bersaglio, 2020](#)). Instead of following advanced understanding of sustainability issues and the necessity for a just energy transition, this turn went hand in hand with a new wave of extractive practices that exploit raw materials for the export markets ([Gudynas, 2018](#); [Svampa, 2019](#)). Infrastructural investments have mostly followed the goal to enable the advancements of these industries into evermore remote regions of "untapped" resources and energies ([Bebbington et al., 2020](#); [Hope, 2021](#); [Uribe, 2019](#)).

The new forms of control over space disrupt its human and more-than human relationships. By assimilating the region and its people to the market forces, these investments often go against local aspirations and enforce harmful social order associated with dispossession, displacement and increased inequality. When infrastructure becomes the means to produce landscapes of harm, [Rodgers and O'Neill \(2012: 404\)](#) speak of "infrastructural violence". Along the line, several researchers have highlighted that infrastructure projects might indeed exclude certain population groups from benefitting from the built system, or might even inhibit them from practicing their daily life, marginalising them further (e.g. [Bichsel, 2016](#); [Dunlap, 2018](#); [Harvey and Knox, 2012](#); [Loftus et al., 2016](#); [Mains, 2012](#); [Powell, 2010](#); [Strang, 2016](#); [Uribe, 2019](#)). Connecting this to [Santos' \(2017\)](#) concept of "territorial alienation", where the new land use is foreign to its inhabitants, drastically changing existing human and other-than human relations, I frame infrastructure as technology of detachment – detachment from the modes of production, from the living space and from citizenship formation.

In this article, I analyse infrastructure as technology of government to control the politics of life by either engaging people in the state-building project as citizens of equal rights for self-determination, or detaching them for the liberation of their cheap labour and consumer power. The infrastructure of concern here is not only the hydroelectric powerplant El Quimbo itself but also the infrastructural changes it brought about in the region.

El Quimbo dam and the promise of renewable energy

In 2008, the national government, then under President Álvaro Uribe, declared the lands of El Quimbo valley a zone of “public utility” (Resolution No. 321; [General de la República, 2011](#)). The national company for energy generation Emgesa (at that time privatised and subsidiary of Endesa/Enel Group) acquired the rights to the dam project soon after, starting the acquisition of lands and doing “exploration works” months before the environmental licence was granted.⁴ Because the lands were declared public utility, the individual and community businesses’ landholders lost their property rights. Their only option was to sell to the energy company that was able to determine the negotiated price threatening with uncompensated eviction if no agreement was reached in due time.⁵ This centralisation of land ownership can be regarded as accumulation by dispossession.

The legal mechanism that allows to set aside private property rights was established by the 1991 Constitution originally to expropriate large landowner whose land use did not correspond to “public utility and social interest” (e.g. with no productive activity; [Bonilla, 2011](#)). To legitimise the use of this tool for the flooding of the most fertile lands in the region (divided into 809 plots largely used for agricultural production, like cattle and fish, tobacco, rice, cacao, oranges, lime, plantain, yucca, avocado), the national government endeavoured to paint a picture of the hydroelectric project being in the national, general interest.

Former president Juan Manuel Santos laid the first stone of El Quimbo in 2011. In his opening-day speech, he said, “It is a great day for Huila and Colombia. This dream has lasted 50 years. With this dam, the Magdalena River will be controlled so that in winter the coast and the rest of the country will not flood” ([Argüello, 2011](#)).⁶ He continued by noting the importance of the day “for us, for the confidence of the world in Colombia, for the confidence of the investors in Colombia, for what this means for our economy, for what this means for the well-being of Huila, for the welfare of the country” ([Dinero, 2011](#)). He concluded his speech by explaining that the objective of “these great works” was “to find a balance, a balance between the financial-economic and the preservation of the environment, the social responsibility” ([Dinero, 2011](#)).

This narrative of progress and modernisation is not new to mega-dam constructions. Already in the 20th century, large dams were symbols of modernity and *man’s* control over *nature* ([Kaika, 2006](#)). Since the early 2000s, hydroelectricity experienced a revival as renewable energy source, that together with solar and wind power, would be necessary to ameliorate climate change ([Killingtveit, 2014](#)).

The World Energy Council defines renewables as “forms of energy which are not exhausted by use.” Hydroelectricity is considered renewable because its source of energy (run-off water) is not directly subtracted from the system (the water cycle), but as in the case of reservoirs, only periodically stored. As long as there is water flowing in the river, or as [Killingtveit \(2014: 455\)](#) puts it, “as long as the sun shines,” the water is returned to the water cycle through evaporation, and energy can be generated. The technology is considered not to emit many greenhouse gases. Branding dams “clean” or “green” creates the impression that they would not pollute the environment and are inherently sustainable ([Kuriqi et al., 2017](#)) – a discourse proven useful for global investors, like the World Bank, to defend investments in large hydroelectric projects ([Goldman, 2005](#)).

Also, the company Emgesa and the Colombian government constructed and promoted a narrative about the El Quimbo dam combining powerful discourses of progress, development, energy security, clean and renewable energy, and environmental management. For instance, Emgesa claimed that El Quimbo would generate, together with Betania (an older dam downstream), eight per cent of the national energy demand (which was already saturated mainly through other hydroelectric power schemes) and create 3000 jobs. Despite producing clean energy, Emgesa would socially invest and reforest habitats in the region ([Minambiente, 2009](#)) that it otherwise presented as economically inefficient and ecologically degraded. Local farmers would have for too long relied on

traditional crops and practices that were outdated and unproductive. At the same time historic human interventions would have degraded the local ecosystems, making their loss neglectable (see Helmcke, 2021; Ingetec SA, 2008).

The discourse of development proves to be a powerful tool, not only promising well-being with technological advancement, but also devaluing and subjugating existing localised socio-economic structures as “under-developed” or “backward” (see Escobar, 1984). Using the idea of evolution (modernisation), it justifies the sacrifice of these life forms (similar to the discourse of race; see Foucault, 2003: 256).

In response to the increasing social tensions in central Huila in 2012, then-president Santos clarified: “It is certain that the government will exercise the principle of authority, where it must be exercised. We are not going to allow a few to prevent the general interest from prevailing.” He continued:

after many negotiations and much conversation, there was a group of people who manipulated, who wanted to prevent such an important work as that of El Quimbo, which will generate clean energy, necessary energy [...]. There was an incident; a person actually suffered a mishap in one eye, but in general terms that eviction developed in a normal way, [not only] using the strictest protocols in the defence of human rights and the rights of citizens, but fulfilling a constitutional duty (El Espectador, 2012).

Ex-president Álvaro Uribe expressed his opinion on Twitter: “It is of grave importance that the communities of Huila do not understand that the Magdalena River is a useable source of energy. The hydroelectric plants will bring development to the country” (Tweet by AlvaroUribeVel, 19 March 2013). The above statements stigmatise the local opposition presenting its members as being only a few, who do not grasp the wider importance of the project for the nation. They would be “enemies of development” (Naranjo Aristizábal, 2014: 115).

Another symbol of development was the Viaduct El Balseadero that Emgesa installed to connect the left flank of the reservoir with the right. Reaching a length of 1.7 km, it is Colombia’s longest suspension bridge. During the inauguration of the viaduct, Juan Manuel Santos emphasised the importance of the investment: “This infrastructure results in prosperity and well-being.” But he added: “There is not a longer viaduct than the one we have just inaugurated. The reason behind it is to bring development and prosperity to this whole region of Colombia, which has been *abandoned* for decades” (Canal, 2015; emphasis added). This resonates with the infrastructural investment being a technology of integration. An abandonment of economic investment means an abandonment by the (capitalist) state, and now the state complied by bringing development to the region.

Using narratives of the common interest, the company and the political leaders created a “dazzling picture” of progress and national modernization around the dam (Bridge et al., 2018: 5; Dye, 2016; Larkin, 2013) to “enchant” the public (Harvey and Knox, 2012). The picture allowed for hard interventions while following “clear political motivations”: to “empower capital at the expense of civil society” (McNeish, 2017: 501).

Technology of detachment

*“The company created false illusions”.*⁷

The dazzling picture of infrastructure as technology of integration is connected to several problems. Infrastructural development does not always bring what it promises and, in some cases, can obstruct citizenship formation. In this section, I will uncover the different dimensions of detachment that emerged with the El Quimbo dam realisation, namely physical, social, and political

detachment. I will start with elaborating on how El Quimbo caused physical detachment in two ways, first through ecosystem fragmentation, second through infrastructural violence.

Physical detachment I: Ecosystem fragmentation

A large dam reservoir fragments and alters ecosystems. Next to the loss of fertile soils and habitats, it changes the groundwater level and causes waterlogging and salinity of surrounding lands. It changes the river flow regimes, water temperature and quality affecting aquatic and riparian species upstream and downstream. Increased sedimentation pollutes the fresh water, and the stagnant water body facilitates the agglomeration of bacteria restricting the local availability of clean water (WCD, 2000: 78–81). Against common assumption, a reservoir contributes to climate change. Construction works, loss of vegetation and the slow decomposition of organic material in the reservoir emit substantial amounts of greenhouse gases, especially in tropical regions, in the first 20 years of a dam's operation (Fearnside, 2016; Fearnside and Pueyo, 2012; WCD, 2000).

Also, at El Quimbo the environmental impacts reached beyond periodic localised constrains. The reservoir restricted the tropical dry forest habitat, an endangered biome in Colombia and worldwide (Pizano and García, 2014). It displaced terrestrial species and impoverished living conditions of riverine species, changing temperature, nutrition and oxygen levels in the water, as well as restricting their migration pattern. As a consequence, fisherfolk of the region experienced a drop in fish, and farmers uphill of the reservoir noticed new pests, increased temperatures and winds affecting their crops.

The energy company Emgesa did not see any proven link between their reservoir and the reported impacts. Their mitigation strategy, to repopulate the reservoir with artificial bread fish and to reforest an uphill pasture, did not effectively recreate habitat and excluded humans from its use. As the repopulated fish struggled for survival in the reservoir waters, the company had no interest in fishing activities which became a charged offence. The reforestation committed to in the environmental licence was still restricted to a pilot area (1%) 2 years after the dam initiated operation and is only accessible for participants in guided tours. As such, the reservoir fragmented ecosystems and physically detached landscapes, humans and other beings. Associated environmental change impacted the local infrastructure which amplified the physical detachment experienced by the people.

Physical detachment II: infrastructural violence

Restrictions to the use of public infrastructure was felt soon after the construction started. Construction vehicles intensely rotated along the river causing the increased erosion of roads, noise and air pollution as well as security issues for people walking the roads. On 8 August 2011, the bridge “El Paso del Colegio” collapsed. The bridge had connected the western municipalities of Huila with the provincial capital Neiva and the South–North route of the country. Without the bridge, these municipalities became isolated. El Paso del Colegio is situated over the Magdalena River just downstream of the dam construction. Opponents of the dam argued that the daily circulation of loaded tippers going to the dam site had exceeded the capacity of the bridge and caused its collapse (Diario del Huila, 2011). Additionally, the company had extracted materials for construction from the riverbank, which had caused sedimentation affecting the stability of the bridge (Contraloría General de la República, 2011; Diario del Huila, 2014).⁸ Emgesa countered that the bridge was already poorly maintained, and therefore the collapse would fall under state responsibility (Emgesa, 2012).

As nothing was done, truck drivers, merchants and cooperatives, who depended economically on the connection, blocked several roads several times in protest. As a short-term fix, Emgesa put a

ferry into operation, which allowed the transfer of two passenger cars at a time, during specific hours of the day.⁹ People not seated in a vehicle had to cross the river by canoe (*Contraloría General de la República*, 2011; *La Nación*, 2012a; 2012b). After 17 months the bridge was partly useable again and only in December 2015, the government opened a new bridge to replace the old one (*La Nación*, 2015a).

Also after the dam had started operation, it caused damages to the local infrastructure. In August 2019, the record high water level at El Quimbo reservoir caused the erosion of parts of its banks. One segment was carrying the motorway connecting the north to the south of the country. For 21 days the connection was shut down completely and people had to travel via the west flank of the reservoir, a route which is mountainous and poorly maintained. As part of the environmental licence, Emgesa had committed to invest in the (western) road infrastructure by building a ring road to connect the municipalities of the left bank (*Minambiente*, 2009). At the time of the road collapse, the highway was still only a plan on paper; its realisation in negotiation with regional and national administrative divisions lasted until the end of 2018 (*Medina Torres*, 2018). It was the suspension bridge Emgesa focused on to demonstrate its social commitment to the region.

The suspension bridge over the El Quimbo reservoir connected only what it had previously detached, the west and the east flank (previously connected by several bridges and cable cars). The lighting which Emgesa installed 4 months after the inauguration in October 2015, lasted only 90 days. The length and straightness of the lanes turned the bridge into a perfect racecourse. Soon residents and local mayors complained about parties, races and excesses taking place on the bridge during night-time hours. After several fatalities early 2018, a Huilan newspaper described the viaduct as the viaduct of sex, drugs, alcohol, anger and death (*Perdomo*, 2018). Intended as a symbol of technological genius and progress, it became a symbol of insecurity.

The dam itself was of course an attribution to the energy system. Prior to the dam development, the majority of local households were connected to the regional power distribution grid (provided by the public company *Electrohuila*). During the dam construction, local power grids were dismantled and the connection over the reservoir restored. This did not improve the existing local power distribution, which is known for its high costs (relative to the Colombian market) and regular blackouts. As the electricity generated by the El Quimbo turbines is channelled into the central power grid, the benefits of the project did not reach the populations carrying the burden of the project. This makes El Quimbo dam a case of distributional injustice. Energy justice would require the populations that bear the impacts of an energy technology to also benefit from its profit: access affordable electricity and shares (*Siciliano et al.*, 2018).¹⁰

In total, the dam construction inflicted infrastructural violence as it did not improve local electrification but restricted people's mobility and activities beyond the local. It raised costs and insecurities and had lasting consequences on local economies. The disruptions physically detached geographies and marginalised vulnerable population groups further. The compensation mechanisms did not re-establish connectivity but extended detachment into the social sphere by producing first, territorial alienation and second, ruins of the future.

Social detachment I: Territorial alienation

The collective resettlement programme at El Quimbo was meant to restore housing, to maintain the social fabric and to re-establish economic activities for the directly affected by providing new agricultural production schemes, education and technology (*Ingetec SA*, 2008). In practice, Emgesa "negotiated" compensations only with head of households individually and many struggled to prove their right for compensation. As fertile lands were limited and expensive, Emgesa had trouble acquiring enough lands of equal or better characteristics. It translated the promise of the

environmental licence to improve living conditions into building modern houses. Even though many families have now more rooms, it did not increase utility.

The former rural houses were quite open and wide, while the new rooms are closed up. As a result, they provide a different sense of space for each family member. Alejandra explained, “They turned out so compact... not appropriate for farm life”. They provide no space for chickens to run through and the neighbours would complain about the noise and smell: “There are confrontations caused by the nearness of the houses”. Sofia did not move into the new house. She was one of the household heads who Emgesa resettled individually. Emgesa built a new house onto the farm, but the family chose to stay in the old building existent on the property. It is traditionally shaped (c-form), open with patio and many plants. Sofia, who shares the home with her kids, mother and uncle, said that they would not feel comfortable in the new house.

Fisherman Fernando from Veracruz had no option. When Emgesa finally dismantled his home, he had no other place to return to despite the new white house in the resettlement Montea. He says that the building is not convenient for him; he has nowhere to leave his tools and equipment and there is no workspace. Likewise, Fernando’s neighbour points out that in his old house he was able to have a workshop to run a business, but that the new house does not allow this activity (La Nación, 2015b).

Laura was resettled to Montea as part of her husband’s compensation. Because she had owned a shop at the entrance of Veracruz, a little corner shop was built into her husband’s house. There she offers packaged goods for daily consumption, like toilet paper, chewing gum, lemonade and beer. Laura explains how bored she is, sitting in front of the shop each day waiting for customers who do not come. Previously, her shop was the main meeting point for the labourers going in and out of the valley. In the morning, they would pass to get a coffee and, in the evenings, they would mingle to have some beers and listen to music. In the resettlement area, there are no labourers passing and the residents buy what they need in the towns. Laura says she is now much more dependent on her husband’s income.

The design of the houses and the greater distances to the productive fields have enforced gender division. Women who formerly earned additional income outside their home, might now be restricted to domestic work. The gardens and fields do not offer space for subsistence or informal jobs. An elderly woman of Rioloro spoke of the pindo palm tree that used to grow beside the river and of women who used to bind the leaves into artisanal farmers’ hats to sell at the market. With the rising water level, the pindo palm habitat disappeared.

The new agricultural lands drastically limited the production strategies of the “beneficiaries.” Without irrigation technology on most of the lands, inhabitants are only permitted to keep a handful of cattle – an occupation new to many of the inhabitants and without much prospect. The limited availability of land keeps the herd small. Fernando, resettled to Montea, declares: “For me it is a thousand times better to work down there [fish along the river] to my preference in a house of *bahareque* [bamboo and clay], but free.” The former flexibility was lost and experiences and acquired skills became, in part, superfluous.

The situation resembles what Santos (2017) terms “territorial alienation”, where the new design of the living space, and the productive activity of primarily cattle herding does not align with past practices and the fisherfolk identity. The product of labour (milk, meat) has the single purpose to be sold on the market. Most products of daily consumption now have to be bought. On the former lands, this was only partly the case and subsistence combined with informal exchange formed an essential part of the livelihoods. An inhabitant of Montea says, “We were taught to live in the countryside, to live in a community, where what one lacked was supplied by the other. But here no one has anything” (La Nación, 2015b). Furthermore, the resettled population lost the feeling of independence, having no alternatives and relying on essential services of the towns, outside their decision-making capacity.

The planning and implementation process of the compensation mechanisms brings to the surface issues of procedural justice and recognition (Siciliano et al., 2018). The people who experience the impacts and who are directly targeted by interventions are not consulted about their needs and wishes. Even in spaces of participation, like during public hearings and several community meetings, the local population did not feel being listened to or being taken seriously as knowledgeable actors of equal footing with the company's experts.

The resulting separation of living and workspace as well as the monotonous design of the houses and neighbourhoods reflect key characteristics of capitalist organisation, like individualisation and market dependency (Harvey, 1985; Suárez Gómez, 2017: 48; Tyner, 2012: 31). The territorial alienation restricted people's range of activity, caused isolation and social tensions. It detached people from each other, their local cultural and economic organisation. This was not limited to the resettlement areas.

Social detachment II: Ruins of the future

The large-scale land enclosure led to the drastic decrease of employment in the region, which caused outmigration and the shutdown/merger of many public institutions. For instance, as the number of households of Veracruz (76) reduced to 19 in Montea, it was difficult to legitimise an own community council. It could not claim an own school or kindergarten. Even though Emgesa replaced former community buildings in the resettlement area, like school and chapel, these remained unused while requiring constant maintenance.

For Eva, agricultural worker of the village Rioloro and the sister of Laura (shop owner in Montea), these problems of the resettlements are problems of the spoiled: "They are ungrateful. [...] The place which suffered is Rioloro." Eva has always lived in Rioloro, a village considered only indirectly affected by the dam, and had worked in the valley before the project's realisation. For her and her colleague Juan, it is astonishing that the fisherfolk of Veracruz now lives in new houses, while Rioloro, the former prosperous entrance to the agricultural fields of El Quimbo valley, is left behind forgotten. Inhabitant Tea confirms, "Rioloro is totally run down" and neighbour Ana María says it is in "standby" mode.

Pride and envy have enforced past disagreements between the sister communities. Neither of them likes to be dependent on the other. However, Montea is equipped with a new and technologically advanced water treatment plant, in contrast to Rioloro whose tap water comes directly from the heavily polluted Loro River.¹¹ By 2022, the plant at the resettlement had not been put into operation. The problem is that it is a very modern and technically elaborate plant, which could provide water for around 500 people. Financially it makes no sense for Montea to activate the plant. The community would need to employ a technician to run the plant (in 2017 one employee of Emgesa still maintained the plant). It would also demand too much energy for only 19 households.

The people of Montea hope to use the plant together with Rioloro and share costs. Rioloro has had drinking water issues for many years. Some inhabitants claim that they once had a well-functioning treatment system, but the construction of the dam damaged the pipeline network and the plant decayed. Others state that the tap-water has never been drinkable. In 2016, the community council of Rioloro appointed a water committee to take charge of resolving the issue. The committee's position was that the plant in Montea is too expensive and that Rioloro has a functioning plant itself; it just needs to be repaired. Emgesa denies responsibility, but the municipality had assigned funds for the project. By August 2022, Rioloro and Montea were still relying on water tanks coming to town.¹²

In light of the poor infrastructure of the area, one might ask why Emgesa decided to concentrate on one water treatment plant, while ignoring all the issues surrounding it. One reason is symbolism. Together with the "longest suspension bridge of Colombia", the technically advanced water

treatment plant lends enchantment to the project as a symbol of progress and modernity. It is the soft technology of promising social development (Dunlap, 2020: 13). Emgesa used these single projects as showpieces to underline their social investment in the region and to distract from the other problems it neglected. I argue that the water treatment plant as well as many of the new community spaces built, like chapels and schools, are what Gupta (2018) terms “ruins of the future.” These are infrastructural projects which were never finished or never used as intended. Their function was primarily symbolic or aesthetic, to reflect an idea of progress, order and beauty (Gupta, 2018: 67). They do not serve their intended purpose, but work as technologies of social detachment in that they fuel dependencies and resentments between neighbours, beneficiaries of resettlement and people “left behind.”

The vanishing of former social and cultural anchor points, like chapels (one of cultural heritage) and irrigation systems, further disrupted customs which had traditionally connected community members to each other, to their history and environment (see Li, 2013). In total, the compensation mechanisms functioned as an extension of the process of detachment initiated by the new enclosure of the lands. In combination, physical and social detachment left their imprint on local state-citizen relations.

Political detachment: Marginalisation

The spatial reconfiguration together with the energy injustices experienced throughout the project’s realisation increased uncertainty, insecurity and mistrust towards governmental institutions that had failed to protect the interests and rights of its people.

While the environmental licence and ministry should guarantee that the mitigation plans maintain and rebuild community structure, and achieve social inclusion, it became apparent that it permitted processes of detachment between people, communities, humans and their environments, production and consumption. The compensation scheme acted as what Suárez Gómez (2017: 48) calls “a new device of capital subalternization” that created “extremely fragile and disposable communities.” The new built environment disrupted living spaces and inhibited people in counteracting the capitalist vision.

At the public hearing in 2016, people expressed their frustration with state authorities, calling the government’s relationship with the energy company a “matrimony” and claimed that the government would “mock” the communities: “There you see that there is no support for us.” As also the public hearing did not change much for the affected populations, the feeling of political detachment, being marginalised from decision-making institutions and one’s citizen rights (for e.g. participation, compensation), was reinforced. It had become clear to the affected populations that the energy project did not serve the greater good, but the expansion of capital into territory and life spheres as well as the centralisation of state (elite) power.

A mega-dam is not only a symbol of state power over nature and modernisation, it supports capital accumulation and the political centralisation of a nation. Rusca et al. (2018: 871) note that “large water infrastructures, like dams, are observable representations of the modern state imaginary and a powerful means of production and reification of state-space.” They further open territories for energy-intensive ventures like mineral extraction. Mining concessions have been granted at high speed along the western and central Andean cordilleras (El Quimbo dam is located in between both) and Emerald, part of the Chinese Sinochem corporation, has extracted oil and continuously expanded its activity in the protected mountain wetland east of the El Quimbo valley since 2011 (Wu, 2019). The missing benefits for the people in central Huila, while witnessing obvious profits generated through the exploitation of their territories, weakens citizenship formation.

Conclusion: Potentials for a technology of engagement

This case study exemplified the need of the energy transition to acknowledge the intrinsic power of its “renewable” technologies to trigger multiple dimensions of detachment. Like any other infrastructure, renewables can irreversibly change living spaces with environmental, social and political consequences that could outweigh their promised economic benefits. In recent years, researchers have directed their attention to the “extractivism of renewables” (see [del Bene et al., 2018](#)). They see green energy as “a synecdoche of anxieties and frustrations regarding broader extractive practices that the people feel powerless to confront” ([Argenti and Knight, 2015](#): 784; see also [Howe and Boyer, 2016](#)). This is not limited to hydroelectricity. For example, Mexico’s large-scale investments in wind energy generated national and international controversies, as the distribution of costs and benefits did not match with local aspirations ([Dunlap, 2018](#); [Howe and Boyer, 2016](#)). European investments in solar and wind energy parks in Greece sparked similar discontent and resistance ([Argenti and Knight, 2015](#); see also conflict around wind parks in Norway, [Fjellheim, 2020](#)). These cases manifest that green infrastructure does not automatically lead to sustainable development and social-environmental wellbeing. To find locally acceptable solutions that build on the prerequisites and requirements of living spaces would require investing in technologies of engagement.

As technology of engagement, the El Quimbo dam would have never taken shape as it did. It would have been acknowledged, as the Constitutional Court had foregrounded in 2013, that the general interest brought by infrastructure works cannot prevail over the fundamental rights of people; that the number of hectares flooded, the agricultural lands destroyed, and the unemployment caused would not justify the electricity produced for the profit of a transnational firm. And it would have been established that the local populations could indeed need an improvement in infrastructure provision but not in form of a large dam that fragments and detaches the region, but instead materialises in smaller investments that stabilise the local power grids, for instance with community-owned small run-off hydropower schemes, that would finance water treatment as well as road and bridge maintenance.

Now that the dam has been built, Emgesa could re-establish lost connectivity and wellbeing by realising what it had promised during several compensation negotiations, like the western ring road or an affordable water treatment. The participation of the local population and local administrations in the planning and elaboration of such projects is essential to their successful implementation. Working closely with the community councils could “democratise infrastructure.” Instead of involving single households or family members as separate units in compensation “negotiations,” communities could consult and discuss with each other what would be beneficial for all its members. This would increase the trust in state institutions and tighten state-citizen relations.

Throughout this article, I have brought to the surface different processes initiated by the energy project which resulted in spatial reconfigurations that increasingly resembled the capitalist order. Emgesa accumulated land and resources for profit generation through the new enclosure, and limited additional costs by ignoring chains of physical, social and political detachment connected to environmental fragmentation, infrastructural violence, territorial alienation, ruins of the future and marginalisation. It fragmented spheres of life – the environmental, the social and the economic – and detached and abstracted livelihoods from living spaces, and households from communities. This rendered ecosystems exchangeable, humans and culture relocatable and life dependable on the market.

The case shows the spatial power of energy infrastructure to shape relations between humans, relations between humans and the environments and between citizens and the state. It emphasises the need for the energy transition to be just, to value not only renewable energy sources but also the specific social-ecological potentials in place. Future research and policymaking can draw upon

the proposed framework to productively explore the interplay between objects of infrastructure and the living space of their implementation and operation to act as a technology of engagement, rather than of mere market integration and detachment.

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Notes

1. Central Huila had been traditional Farc-Ep territory, but the guerrilla retreated into more marginal regions in the early 2000s. As such the valley in question had been peaceful prior the project's initiation, with stable land ownership regimes since the 1980s.
2. I concentrate here on physical (hard) infrastructure rather than social (soft) infrastructure.
3. Distributional, procedural and recognition justice; specific to energy justice: Energy generation and distribution that is accessible (availability, affordability), safe (transparency, accountability, sustainability) and accepted (participatory, intra-generational equity, inter-generational equity, and responsibility; see [Heffron and McCauley, 2017: 659](#); [Siciliano et al., 2018: 2](#)).
4. The information regarding investors of the project is not transparently available. *Reuters Latin America* stated in 2009 that main lenders would be the InterAmerican Development Bank, the Andean Development Corporation and local banks.
5. Quotes and information on the case are taken from personal interviews, if not otherwise stated.
6. The potential flood control of the dam only extends for a few kilometres downstream until it reaches another older dam reservoir - Betania.
7. Fisherman of Veracruz ([Naranjo Aristizábal, 2014: 130](#)).
8. Emgesa extracted sands from both riverbanks. After the bridge had collapsed it probably concentrated on the western bank to avoid the need for river crossing. New locations for sediment extraction were included in the environmental licence after it had been granted, without taking out additional studies ([Pérez Trujillo, 2019](#)).
9. Emgesa's newsletter "*La Buena Energía de El Quimbo*," Edition 1 June 2012.
10. Emgesa pays bonuses (1% of its profits) to the six affected municipalities.
11. The river receives sewage from upstream settlements and the run-off water from the coffee plantations, which carries chemicals from fertilisers, herbicides and pesticides ([Ingetec SA, 2008: 478](#)).
12. It is the oil company that drills for petrol in the eastern hills, Emerald Energy, which sends the water tanks. During Easter in 2017, no water tank came to Rioloro for 3 weeks.

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