4 Bolivia's energy transition in harmony with nature

Reality or delusion?

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Introduction

Bolivia faces significant energy-related challenges that demand urgent responses. Firstly, while being one of the most biodiverse countries in the world, economic activities and development projects, such as oil and gas exploitation and large infrastructure projects, are leading to biodiversity degradation and socio-ecological conflicts (Romero-Muñoz et al., 2019). The country is also particularly vulnerable to the consequences of anthropocentric climate change. For instance, glacier retreat due to warming temperatures is threatening water supply (Escurra et al., 2014; Seiler et al., 2015; Schoolmeester and Verbist, 2018), therefore jeopardising electricity generation. Secondly, with a poverty rate of 34,6% (World Bank, 2020b) and a growing population and energy demand (INE, 2014; CAF, 2016, p. 6), Bolivia is struggling to satisfy the basic needs of its population. Thirdly, the country's economy heavily relies on hydrocarbons – especially natural gas – which represented up to 7% of the GDP and 55% of exports in value in 2013 (INE, 2020a, b). However, its stability is threatened by hydrocarbons price volatility and looming depletion of reserves – natural gas is set to dry up by 2025 (Villegas, 2018, p. 6). Therefore, Bolivia must urgently find other income resources to reach economic and income diversification (Fattouh et al., 2019, p. 45). To deal with these challenges, Bolivia is undertaking an energy transition from fossil fuels towards renewable energy sources (UNFCCC, 2016, pp. 8–9) that, at least on paper, moves away from traditional anthropocentric paradigms.

Indeed, energy transition plans worldwide follow an anthropocentric approach. The reason is that the existing energy system operates within the dominant human-centred or anthropocentric paradigm. Anthropocentrism sees humankind as more valuable than all other non-human organisms and environmental systems and involves their subordination, denying that "they have value in their own right" (Washington et al., 2017; Kopnina et al., 2018, p. 115). Ecocentrism, in contrast, provides a more radical expression of a re-evaluated, re-envisioned relationship between human beings and nature; one that recognises the material agency and the legal subjectivity of natural entities, ecological integrity and the intrinsic value of all lifeforms and ecosystems, and the sufficient (as opposed to optimal) accommodation of human use and occupancy within ecological constraints (De

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Lucia, 2015; Washington et al., 2017; Kotzé and Villavicencio Calzadilla, 2017, p. 413).

In the current anthropocentric energy system, energy sources are viewed as inert materials (objects) that exist solely to satisfy the needs and desires of human beings (subjects). The value of these resources is defined by their utility to humans rather than their intrinsic value. Yet, this is "a view with grave ecological blindness" (Bosselmann, 2017, p. 151). The anthropocentric approach of the fossil-fuels-based energy system was already evident at the First Earth Summit, held in Stockholm in 1972, which put environmental issues on the global agenda for the first time. For instance, the Stockholm Declaration states that natural resources (including energy sources) must be safeguarded for the benefit of humans (United Nations, 1972, principles 2 and 5). Therefore, while energy needs of all mankind are considered, the general needs of other species are not.

As the transformation of the anthropocentric, centralised, large-scale and unsustainable energy system is imperative to respond to the human-induced global socio-ecological and climate crisis, discourses on energy transition revolve around the notions of "modern energy transition" (Morgan, 2015; Vavilov, 2016), "sustainable energy transition" (Solomon and Krishna, 2011), "just energy transition" (McCauley and Heffron, 2018) and theories of "energy justice" (Sovacool and Dworkin, 2014; Guruswamy, 2015; Jenkins et al., 2016). However, these frameworks follow the same human-centred approach promoted by western ideology and traditions that may not be entirely appropriate to deliver a real transformation towards a future energy system that is more just and less ecologically destructive (Sovacool et al., 2017, p. 678; Castán Broto et al., 2018, p. 645). Indeed, actions to foster "sustainable" or "modern" transitions may have negative socio-environmental impacts, reproduce entrenched forms of inequality and create further injustices (Avila, 2018; Villavicencio Calzadilla and Mauger, 2018; Roddis et al., 2018). Some argue that this anthropocentric energy transition towards renewable energy sources "is a program of economic growth for the Global North which threatens to exponentially increase sacrificed zones" and "will come at the cost of the exploitation of … territories and communities, all while intensifying the ecological crisis" (Mining Watch, 2019). When renewable energy projects are deployed on an industrial scale, the risk is to replace fossil fuels extractivism by renewable energy extractivism (Howe and Boyer, 2016), promoting forms of "green colonialism" (Willis, 2019; Evans-Pritchard, 2020) or "energy colonialism" (Batel and Devine-Wright, 2017; Dunlap, 2018).

Against this reality, an energy transition based on non-western and non-human-centred approach is taking shape in Bolivia. With a view to transcend the anthropocentric orientation of the country's legal system,[3] a radical regulatory reform has taken place since 2009, aiming to protect Mother Earth or *Pachamama*. The new Constitution, which recognises the importance of protecting Mother Earth, led to the adoption of new legislation and policy frameworks that, taking an ecocentric approach, recognise and protect the rights of Mother Earth. This innovative regulatory avenue has a direct implication on the country's

energy system and its transition – toward an ecocentric (energy) system – as it recognises its impact on Mother Earth. On paper at least, these ecocentric-oriented regulatory instruments provide a solid legal framework for overcoming the ecologically destructive extractivism of fossil fuels by recognising the intrinsic value of nature and her ecosystems – such as rivers and watersheds – and viewing all living beings as parts of an interconnected and interdependent web of sub-systems (Imran et al., 2014, p. 137). This is important because, as it has been noted, "[n]on human and non-sentient forms of life almost always have no voice, or recognition and status, in energy decision-making fora" (Sovacool et al., 2017, p. 688).

While some studies examined Bolivia's experiment with the rights of nature (Lalander, 2014; Villavicencio Calzadilla and Kotzé, 2018) and others presented the country's regulatory framework applicable to renewable energy sources (Zegada, 2016), this paper is the first offering a critical analysis of the country's energy transition applying a "rights of nature" lens. Despite the fact that the energy transition is a broad topic and will have to take place in all the components of the energy system, this paper focuses on the electricity sector – especially on grid-connected electricity generation – as it is the low hanging fruit of the current energy transition in most countries.[4] This approach allows for an early analysis of the implementation of the energy transition towards renewable energy sources. This desk-based legal research focuses on the analysis of energy-related policy and legal documents in force in Bolivia as well as scholarly and grey literature. In terms of temporality, this paper centres its developments on Evo Morales' presidential mandates, running from early 2006 to the fall of 2019, as they were marked by a claimed reorientation of the country's policies towards a paradigm of harmony with nature. With this paper we aim to present Bolivia's experience in order to provide a basis for a global discussion and debate about how to rethink and conceptualise an energy transition in harmony with nature.

This paper has five sections. The introduction is followed by a section analysing the constitutional and statutory developments on the rights of Mother Earth in Bolivia and their implications for the country's energy transition. The next section reviews Bolivia's current electricity sector, its normative framework and the related energy transition policies and goals in order to determine their compatibility with the laws on Mother Earth. The fourth section critically examines the contradictions and tensions inside and between the previously discussed policy and regulatory frameworks and provides an example that illustrates such contradictions: the controversial mega hydroelectricity project of *El Bala-Chepete* in the Amazon Region of the country. The paper concludes that undertaking an urgent energy transition in harmony with nature is a daunting task, even in a country that has enshrined the rights of Mother Earth in its legal framework if such framework lacks coherence and implementation. Finally, recommendations to facilitate such an energy transition in Bolivia and in any country wishing to go beyond the anthropocentric, ecologically destructive energy system are made.

Bolivia's constitutional and statutory developments on rights of Mother Earth and their implication over the energy sector

The election of Evo Morales as President of Bolivia in 2006 started a new chapter in the country's history marked by drastic transformations which included *inter alia* the implementation of radical constitutional and legal reforms. Following a challenging process that involved broad participation, especially by indigenous people, Bolivians approved a new Constitution and statutory regulations that not only made possible the recognition of ancient indigenous principles, but also the construction of a legal structure for the protection of nature or Mother Earth through an ecocentric approach.[5]

The legal regime on the rights of Mother Earth

The Bolivian Constitution, approved in 2009,[6] considered one of the most radical constitutions in the world, introduces transformational legal novelties. In addition to being one of the most progressive regarding the recognition of indigenous rights,[7] it also constitutionalised the protection of Mother Earth or *Pachamama* and related ancestral indigenous principles, especially those that underpin the Aymara culture, such as *Vivir Bien* or *Suma Qamaña* (living well), as an attempt to defend and protect Mother Earth based on her intrinsic value. The incorporation of the ecocentric worldview in the Constitution was a major achievement for Bolivian society. It was especially so for indigenous people and organisations who, in response to ever-increasing environmental degradation, re-imagined the protection of Mother Earth during the constitutional drafting process in a manner that transcends the prevailing anthropocentric orientation of the previous legal and economic systems (Villavicencio Calzadilla and Kotzé, 2018, p. 404).

Although the Bolivian Constitution does not explicitly entrench the rights of Mother Earth, as its Ecuadorian counterpart does (Kotzé and Villavicencio Calzadilla, 2017), it includes ecocentric-oriented provisions recognising the importance of protecting Mother Earth. For instance, when providing for an environmental right of the population, the Constitution extends its protection to "other living things", declaring that the exercise of such a right "must be granted to individuals and collectives of present and future generations, as well as to *other living things*, so they may develop in a normal and permanent way" (art. 33).[8] The Constitution also acknowledges that without the integrity of nature a new state will be impossible, as it "recognizes ecological integrity as the basis of the Bolivian constitutional state" (Villavicencio Calzadilla and Kotzé, 2018, p. 403).

According to the Constitution, *Vivir Bien* is one of the ethical and structural principles of the state (art. 8 (I)). *Vivir Bien* is an alternative cultural development vision that draws from ancestral practices and philosophies and is founded on eco-centrism. By seeking balance and harmony with nature or Mother Earth, it opposes the dominant neoliberal, consumerist, anthropocentric, growth-without-limits

paradigm that for decades has promoted the domination and exploitation of nature and of vulnerable people in Bolivia and elsewhere in the world (Gudynas, 2011; Gudynas and Acosta, 2011; Radcliffe, 2012). Therefore, its inclusion as a founding principle guiding state action is highly relevant for a "new" Bolivia as it attempts to create a framework for re-conceptualising the relationship between human and nature on the basis of their interdependence.

The constitutional requirement for a new, integrated form of development towards *Vivir Bien* in harmony with nature led to the adoption of two radical legal constructs intended to confront juridical anthropocentric orientation. Such statutes, based on an ecocentric counter-narrative, are the Law of the Rights of Mother Earth (*Ley de Derechos de la Madre Tierra*, 2010) and the Framework Law of Mother Earth and Integral Development for Living Well (*Ley Marco de la Madre Tierra y Desarrollo Integral para Vivir Bien*, 2012).

The Law of the Rights of Mother Earth is the world's first statutory law recognising the rights of nature or Mother Earth. It enumerates specific rights to which nature is entitled – such as the right to life, to maintain and regenerate her life cycles and structures, and to be restored (art. 7). It also contains a set of legally binding principles – such as the principles of harmony with nature and of defence and respect for her rights – that attempts to go well beyond the principles of anthropocentric sustainable development (art. 2). Moreover, the Law establishes that "all Bolivians" are responsible for the exercise of Mother Earth's rights (arts. 8–9).

The Framework Law of Mother Earth and Integral Development for Living Well (hereafter Framework Law), was created to operationalise the Law of the Rights of Mother Earth in the context of the so-called integral development for living well in harmony with nature. According to the Framework Law, *Vivir Bien* means "living in complementarity, in harmony and in balance with Mother Earth and societies, in equality and solidarity and eliminating inequalities and mechanisms of control and domination" (art. 5.2). Thus, *Vivir Bien* must be achieved in a way that is complementary to the rights of humans and the rights of Mother Earth (art. 9). Moreover, to balance development on the one hand and the protection of nature on the other, the Framework Law refers to "integral development" as an alternative form of development that must be promoted and implemented in a way that respects the rights of Mother Earth. Integral development, which is linked to the implementation of integrated measures to create and reinforce social, spiritual and material conditions, capacities and means aimed at facilitating and strengthening community linkages, is therefore not the end result, but the process leading to *Vivir Bien* in harmony with nature (art. 5.3).

The Framework Law also lays the foundation for the design of environmental policies and serves as a normative umbrella under which other sectoral laws, such as on energy, must operate. It means that this law is of preferential application compared to related laws dealing with natural resources – such as energy sources – and their extraction, and also guides sectoral legislative developments at all levels of the state (national, departmental and municipal).

Mother Earth's legal framework as a legal basis for an energy transition in harmony with nature

The Bolivian legal regime on the rights of Mother Earth, analysed in the previous section, provides an opportunity for the Andean country to move away from deeply embedded paradigms – such as the anthropocentric paradigm – towards an altogether more careful ecological approach (Villavicencio Calzadilla and Kotzé, 2018, p. 423). On paper at least, this legal framework seeks to overcome the ecologically destructive extractivism – for instance, of fossil fuels – that threatens Mother Earth and to provide responses to the country's energy and environmental challenges. Thus, it sets the legal basis for an ambitious transformation of the country's fossil fuels-based energy system by increasing the use of renewable energy sources and fighting climate change through an ecocentric rights-based approach.[9]

Recognising that energy sources constitute strategic resources and that access to them is a fundamental and essential right for the development of the country, the Bolivian Constitution declares that it is the duty of the state to promote and develop the use of new forms of alternative and environmentally friendly energy (arts. 378 (I) and 379 (I)).[10] Alternative energy sources are essentially renewable energy sources except for large-scale hydroelectricity (Ministerio de Hidrocarburos y Energía, 2011, p. 3). This constitutional mandate calls for the diversification of the energy matrix towards renewable energy sources and integrates the protection of Mother Earth as a condition. Moreover, the Constitution declares that the state and the population have the duty "to conserve, protect and use natural resources in a sustainable manner, as well as to maintain the equilibrium of the environment" (art. 342), and that the exploitation of renewable energy sources must take place "in a sustainable way, [while] respecting the characteristics and natural value of each ecosystem" (art. 380 (I)).

Turning to the Law of the Rights of Mother Earth and the Framework Law, both include key provisions guiding the country's energy transition in harmony with nature. For instance, the Law of the Rights of Mother Earth requires that human activities – including e.g. the exploitation of conventional and alternative sources of energy – must achieve a dynamic balance with the cycles and processes inherent to Mother Earth (art. 2.1). In order to ensure the respect for Mother Earth's rights, the Law declares that it is the state's duty to develop policies and actions to protect Mother Earth, while natural persons and public and private legal entities shall ensure sustainable use of her components, including energy sources (arts. 8–9). In particular, the state has the duty to develop policies to ensure the long-term energy sovereignty by means of savings, the increase of efficiency and the gradual incorporation of clean and renewable alternative sources into the energy matrix (art. 8.4). Such an obligation, which conceives the energy transition as a narrow set of technical changes – energy savings, energy efficiency and transition towards alternative renewable sources – should, however, be interpreted in the light of the other state's duties laid down by the Law.

In essence, these duties require public policies to avoid causing the overexploitation of Mother Earth's components, the extinction of living populations and the alteration of the cycles and processes that ensure life (art. 8). Instead, the state must develop balanced forms of production and consumption to satisfy the needs of Bolivians for living well, while safeguarding the regenerative capacity and integrity of the cycles, processes and vital balance of Mother Earth (art. 8.2). Moreover, the state must develop policies to protect Mother Earth from the structural causes and effects of global climate change (art. 8.3). Considering that the current energy system is the most responsible sector for climate change worldwide – and the second in Bolivia, after deforestation (ClimateWatch, no date) – this provision intrinsically applies to the country's fossil fuels-based energy system and stresses the duty of the state to transform it by establishing the necessary policies to achieve a shift to clean and renewable energy sources while protecting Mother Earth's rights.

The Framework Law, for its part, establishes that the activities of exploration, exploitation, transformation, industrialisation, transport and commercialisation of renewable and non-renewable natural resources shall be carried out respecting the rights of Mother Earth and guaranteeing the maintenance of her regenerative capacity (art. 15). Thus, by recognising that the economic relations are limited by the regenerative capacity of Mother Earth and her ecosystems, the Framework Law specifies that the state shall progressively create and strengthen more sustainable and cleaner production patterns through, *inter alia*, "the promotion of the use and exploitation of renewable natural resources" and "the progressive transformation of the country's energy matrix towards renewable and cleaner sources" (art. 15 (1) (2)). On energy specifically, it places on the state the obligations: to establish policies and measures for a gradual increase of renewable energies in the mix; to ensure a gradual but steadily increasing share of electricity generation from alternative energy sources; to develop alternative renewable energy generation plans, programmes and incentives for domestic production and use with priority for solar and wind energy, micro-hydropower and energy savings; and to promote technologies and practices with the highest efficiency of energy production and use "in harmony and balance with the life systems and Mother Earth" (art. 30).

In the light of the above, Bolivia's energy transition in harmony with nature must aim for a future energy system respectful of the rights of nature, therefore guaranteeing the integrity, diversity, equilibrium, resilience, restoration and flourishing of the indivisible, interrelated, interdependent and complementary community of all living systems and living organisms – human and non-human – constituting Mother Earth.

The following section explains to what extent the energy regulatory and policy framework in force in Bolivia enables the country's energy transition towards an energy system that safeguards and protects Mother Earth's rights, referring in particular to grid-connected electricity generation as it is the spearhead of the Bolivian transition.

Bolivia's electricity sector: towards a diversification in harmony with nature?

Bolivia's electricity policy, actively developed during the mandate of former President Morales, aims first to organise the diversification of an electricity matrix historically relying on hydroelectricity and natural gas. This is actually a general goal of the region's countries (Noura Guimarães, 2020, p. 10). Second, under this policy, Bolivia should also start exporting power to its neighbours.

Over the past decade and a half, electricity generation in Bolivia has been increasingly dependent on natural gas. To cope with a quadrupling demand between the early 1990s and 2018, generation followed a steep curve. As Figure 4.1 shows, from 1992 to the early 2000s, the shares of hydroelectricity and thermal generation (almost exclusively from natural gas) in the total electricity production were comparable. However, over the past 20 years, hydroelectricity generation stagnated while thermal generation (still overwhelmingly from natural gas) tripled (Autoridad de Fiscalización y Control Social de Electricidad (AE), 2019, pp. 30 and 63–65).

As a result, the total installed electricity generation capacity (the sum of all the installed electricity plants connected to the national grid – the SIN) in 2018 was heavily based on natural gas. The same year, out of 2,138.74 MW of total effective capacity connected to the grid, 1,374.8 MW were thermal, 671.9 MW hydropower, and a negligible 92 MW alternative energy (not fossil nor large hydro)

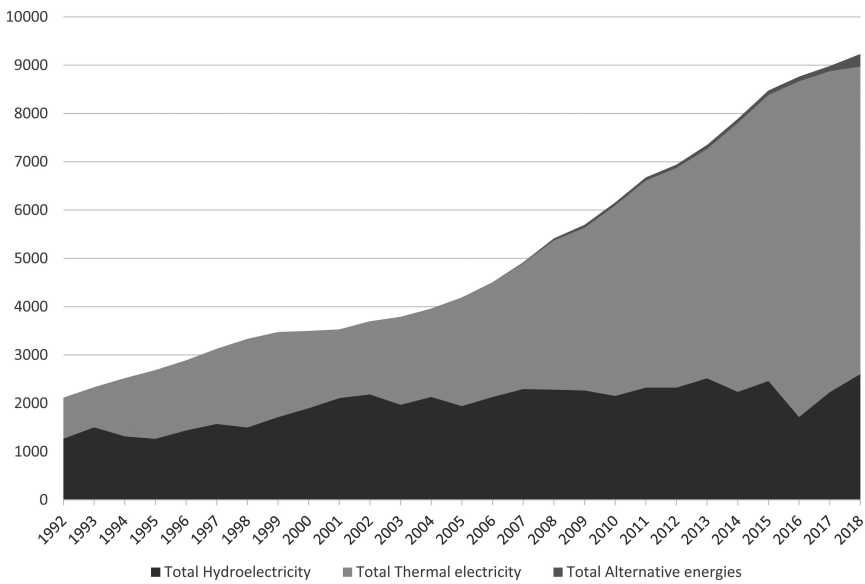

Figure 4.1 Yearly evolution of hydroelectric, thermal generation and alternative energies (GWh) (SIN) (1992-2018). Created by the authors, based on AE's data (2019, pp. 63–65).

(AE, 2019, p. 17). This situation is the reflection of the orientations taken by the past but also current electricity legal and policy framework.

In principle, according to the country's Mother Earth legal framework, the natural gas and hydroelectricity based electricity system should have started a transformation towards a much higher use of alternative renewable energy sources. However, as of 2020, no piece of legislation on the electricity sector has been adopted since Mother Earth laws entered into force. The only electricity law that exists dates back to 1994 and it was not amended to include the more recent Mother Earth orientation.[11] Yet, many decrees were adopted, but mainly to reorganise the sector itself, not to change the way electricity is produced (Jimenez Rivera, 2018, pp. 59–61). As a consequence, to analyse the developments related to the energy transition in harmony with nature, we must turn to the energy policy documents.

The electricity-related policy documents adopted over the past 15 years have consistently presented two overarching objectives: diversification of the energy sources, and exportation of electricity to neighbouring countries. Both goals are mentioned in the 2007 National Development Plan (*Plan Nacional de Desarrollo*), the major policy document adopted before the 2009 Constitution but already aiming at *Vivir Bien* in harmony with nature (Ministerio de Planificación del Desarrollo, 2007, p. 124). They also appear in pillar 6 of the 2013 General Economic and Social Development Plan (*Agenda Patriótica 2025*), which sets the long-term development objectives of the country for 2025 (Ministerio de Planificación del Desarrollo, 2013). However, in this central policy document already, diversification means: hydropower first, and some development of other renewable energy sources. Indeed, pillar 6 expects that Bolivia will "fully use its hydroelectric potential and successfully develop large-scale renewable energy projects (such as wind energy, biomass, geothermal or solar)".[12]

To find the numbered targets for the implementation of the electricity policy objectives, it is necessary to analyse the various policy documents adopted since 2014. We commence with the diversification claim. The 2015 Economic and Social Development Plan (*Plan de Desarrollo Económico y Social 2016–2020 en el Marco del Desarrollo Integral para Vivir Bien* – PDES) foresees an addition of 1,447 MW of hydro (small and large), 1,096 MW of thermal (natural gas burning combined cycles) and 411 MW of alternative energy sources (wind, biomass, solar and geothermal) to be connected to the grid between 2015 and 2020. In total, the grid-connected installed capacity in 2020 should reach 4,878 MW, to be compared with 1,924 MW in 2015 and 2,138.74 MW in 2018 (Ministerio de Planificación del Desarrollo, 2015, pp. 150 and 154).

For the other plans, aiming at 2025, the focus is placed even more on hydropower. The 2014 State Electricity Plan (*Plan Eléctrico del Estado Plurinacional de Bolivia 2025*) proposes to add 5,552 MW of mega hydroelectricity installations (over 990 MW of capacity), 1,599 MW of large-scale hydroelectricity installations (over 80 MW of capacity), and 1,108 MW of thermoelectricity installations. In contrast, alternative energy sources would add a meagre total of 183 MW – it has been raised to 411 MW by the 2015 PDES as written above. In total,

the plan foresees a total installed capacity of 4,353 MW in 2025 (Ministerio de Hidrocarburos y Energía, 2014, pp. 85–88 and 124), which is surprisingly less than the 2020 target of the 2015 PDES but also not coherent with the simple addition of all the planned new installed capacity per energy source. Adding to these fluctuating and sometimes contradicting figures, the 2018 Sectoral Development Plan – Energy (*Plan Sectorial de Desarrollo Integral Para Vivir Bien – Sector Energía 2016–2020*) sets the target of 469 MW of alternative energy sources installed capacity by 2023 (Ministerio de Energías, 2018, p. 55). But it is not clear if this target only concerns the capacity connected to the national grid or also accounts for the capacity connected to isolated systems.

As shown by Figure 4.2, diversification in the policy documents actually means a transition to an electricity matrix dominated by (mega and large) hydroelectricity, with a still significant share from natural gas and a very limited one from alternative sources. This planned electricity matrix is developed to serve the second main electricity policy objective: the exportation of electricity to neighbouring countries – mainly to Brazil – a goal labelled as "Bolivia, regional energy centre".[13] This is based on the rationale that Bolivia is geographically at the centre of South America, and that it has a high renewable energy potential. This objective is supposed to turn the electricity sector into "one of the most significant contributors to the development of the country" (Ministerio de Hidrocarburos y Energía, 2014, pp. 99 and 108). To reach this goal, four mega hydroelectricity complexes (sometimes with various large-scale dams) are scheduled, in order to

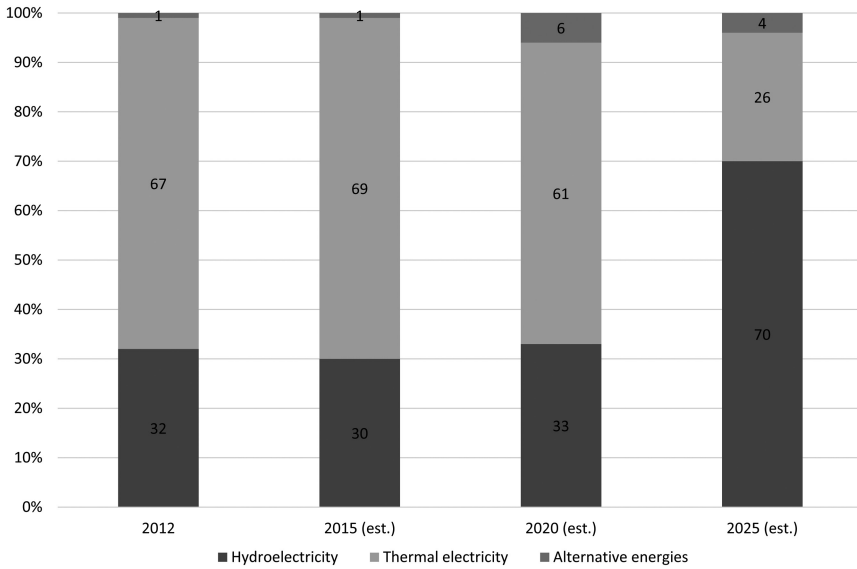

Figure 4.2 Evolution of the electricity generation's share per energy source. Created by the authors, based on the Ministerio de Hidrocarburos y Energía's data (2014, p. 127).

produce massive electricity surpluses to export (Peredo Beltrán, 2018, p. 16). The increased generation from thermal and new renewable sources would also add to this surplus (Ministerio de Hidrocarburos y Energía, 2014, p. 112). Overall, the electricity policy would translate as follows:

> [Eventually,] the development of the electric infrastructure will consist in 3000 MW for the internal demand and 10000 MW for the export of electricity.
>
> (Oficina Económica y Comercial de la Embajada de España en La Paz, 2019, p. 29)

This rise in production is to be followed by an extension of the transmission grid, to be increased three-fold between 2012 and 2025 (Ministerio de Hidrocarburos y Energía, 2014, p. 123), and the construction of interconnections with four neighbouring countries: Argentina, Brazil, Peru and Paraguay (Ministerio de Energías, 2017, p. 71).

In a nutshell, the energy policy of the country does not only aim to answer a steeply increasing local energy demand but also to turn the country into South America's powerhouse. The necessary increased electricity generation is claimed to come from a diversification of the matrix, but Bolivia will in reality still rely on the same non-environmentally friendly energy sources as during the past decades: large hydropower and natural gas.

Rhetoric and contradictions on Bolivia's energy transition in harmony with nature

This section explores some of the shortcomings and contradictions of the previously analysed legal and policy frameworks on energy and Mother Earth protection and provides a crucial example illustrating such contradictions as well as Bolivia's struggle to achieve an energy transition in harmony with nature.

Contradictions in the legal framework on Mother Earth

Despite their great importance, the Bolivian Constitution and the statutory regulations on Mother Earth include contradictory provisions that confront and, in fact, undermine the country's aspiration of an energy transition in harmony with nature.

The Constitution contains several provisions regarding the use and exploitation of renewable and non-renewable natural resources in which such activities are explicitly defined as essential purposes and functions of the state (arts. 9 and 316.6). The industrialisation and sale of these resources are even defined as a "national priority of the State" (art. 355 (I)). These provisions are important for the development and promotion of research and the use of new forms of production of alternative energy compatible with the environment (art. 379 (I)). However, they also refer to non-renewable natural resources – such as fossil fuels – which are characterised as "matters of necessity and public utility" (art. 356) and are part of

the government's post-neoliberal agenda which is dangerously close to a classic neoliberal agenda (Villegas, 2018, p. 10).[14]

Furthermore, while the Constitution includes a single and vague article referring to the development and promotion of research and the use of new forms of production of alternative energy (art. 379 (I)), a lengthy chapter, comprising ten articles, is devoted to hydrocarbons (Title II, Chap. III). Article 360, for instance, declares that it is the prerogative and duty of the state to "promote [the] comprehensive, sustainable and equitable development [of hydrocarbons]" and to "guarantee energy sovereignty". It is on this basis that, for example, the Bolivian government eased environmental standards to allow oil and gas exploration in protected areas traditionally inhabited by indigenous peoples, and already affected by oil and gas exploitation.[15] While these governmental decisions were defended on the premise that they would contribute to the socio-economic development of the country,[16] they represent lost opportunities to invest in renewable energy.

Regarding the Framework Law, as discussed earlier, it specifies that the state has the obligation to establish the energy policy and measures to progressively transform the country's energy mix. However, such transformation does not only refer to the gradual increase of renewable energies, but also to the replacement of liquid fuels by natural gas. Thus, while the law omits to provide a timeframe or set specific measurable targets related to the transformation of the energy mix, it moreover reinforces the country's preference for natural gas. Precisely, on this basis, the exploration of shale gas deposits by means of hydraulic fracturing in different regions of Bolivia is under debate.[17] In addition, the Framework Law's lofty aspirations for a gradual increase in renewable energy sources are held back by other provisions legalising extractivism – mainly of minerals and hydrocarbons – as a way of achieving *Vivir Bien* (art. 26.1), instead of pursuing alternative ways to generate income to meet the economic and social demands, such as investment in renewable energy resources. The pro-extractivist provisions included in the Framework Law not only counterbalance its ecocentric provisions, but also undermine the country's energy transition in harmony with nature.

The contradictions and rhetoric of an energy diversification policy

The current energy policy of Bolivia reflects internal contradictions and contains goals that run counter to the country's aspiration of an energy transition in harmony with nature.

As discussed earlier, energy policy documents claim that the electricity generation matrix will be diversified towards a higher share of alternative renewable energy sources. Yet, the focus is actually placed on large and mega hydroelectricity projects as well as on thermal generation from natural gas. While Bolivia is already affected by extreme events such as droughts and floods (Perez, 2017), these two water-intensive technologies are not only vulnerable to these events, but they also cause negative impacts on local population, biodiversity and ecosystems (Zarfl et al., 2019; The Union of Concerned Scientists, 2014).

Despite its environmental impacts, the use of hydraulic fracturing for exploiting shale gas reserves within protected areas has been a feature under the former and the current transitional government (Meng, 2017; Hill, 2015; Mamani, 2020). Moreover, several of the mega hydroelectricity projects announced in Bolivia's policy documents will be located in the Bolivian Amazon region, affecting not only large biodiversity-rich protected areas, but also the indigenous and local populations who live there (Coaquira Siñani, 2010, pp. 67–68; Ribera Arismendi, 2010, chap. 2, 3 and 4), as illustrated by the case of the *El Bala-Chepete* project.[18]

Although the energy policy states that Bolivia will move from "being solely a hydrocarbon and mining country" to one where renewable and non-renewable natural resources are exploited "in harmony and equilibrium with Mother Earth" (Ministerio de Planificación del Desarrollo, 2013, pp. 13 and 15), building large and mega hydroelectricity plants and thermal power stations will necessarily take a heavy toll on the environment and on local populations, representing a step back in the protection of Mother Earth and in Bolivian society's capacity to live in harmony with nature. Moreover, exporting electricity to neighbouring countries to generate supplementary revenues will lead to an outsizing of the installed capacity, maintaining Bolivia in the extractivist economy (Villegas, 2018, p. 20) it claims to have escaped (Ministerio de Planificación del Desarrollo, 2013, pp. 15–16).

This illusory diversification of the energy matrix breaches constitutional and statutory provisions concerning the protection of Mother Earth. It violates both the constitutional principle of environmental preservation in energy sources exploitation and the requirement of sustainable exploitation of renewable natural resources respecting the characteristics and natural value of ecosystems (arts. 378 (I) and 380 (I)). When projects are located in the Amazonian region, they would furthermore potentially breach the constitutional requirement of "special protection" for this region "because of its high environmental sensitivity, existing biodiversity, [and] water resources" (art. 390 (I)). And, above all, they would threaten the very heart of the new ecocentric paradigm formulated in the Law of the Rights of Mother Earth and the Framework Law. Eventually, it is the entire energy policy of disproportionate generation increase through large hydroelectricity and natural gas, mainly for exports, which represents a serious threat to Mother Earth's rights. This energy policy, which follows an economic development model qualified as "occidental, capitalist, neoliberal and extractivist" (Villanueva I., 2013), while claiming to include Mother Earth's protection as a foundational aspect (Laure, 2016), would hardly lead to an energy system that respects the rights of Mother Earth and guarantees the integrity, diversity, equilibrium, resilience, restoration and flourishing of the community of all living systems.

Damming Mother Earth: when practice falls short of rhetorical promise

The tensions between the vision of an energy transition in harmony with nature and an extractivist and anthropocentric energy policy are particularly visible in one emblematic case: the hydroelectric *Bala-Chepete* dam project. The project

Figure 4.3 The gorge of *El Bala*, from the Beni River (this zone would be flooded if the *El Bala* dam project is successful). 2018. Picture taken by the authors.

reveals the actual continuity of the country's energy policy over the past decades (regardless of political changes). In reality, Bolivia follows a common long-standing trend among Amazonian countries, with over a hundred large dams already built on the Amazon river and its tributaries and close to 300 still to come (Castello and Macedo, 2016, pp. 990–992).

The idea of a mega dam in the gorge of *El Bala*, through which the Beni River runs (see Figure 4.3), dates back to the 1970s. After having been studied for two decades and rejected in the past, the project was reactivated in 2007 to run new feasibility studies and then qualified of national priority (Decreto Supremo N° 29191, 2007; Ribera Arismendi, 2010, p. 107).

The 2014 State Electricity Plan provides that the *El Bala* project would have an installed capacity of 1,680 MW (Ministerio de Hidrocarburos y Energía, 2014, pp. 110–111). However, the project includes another dam some 55 kilometres upstream: *El Chepete*. Together, *Bala* and *Chepete* dams represent a potential installed capacity of over 3,000 MW (Molina Carpio et al., 2019, p. 2). According to the state power company, the estimated construction cost amounts to between US$ 6 and 8 billion (ENDE, 2019; Solón, 2019), a sizeable portion of Bolivia's GDP estimated at US$ 40 billion in 2018 (World Bank, 2020a). The generation costs for this dual project would end up between US$ 55/MWh and US$ 81/MWh, if the project faces no costs overruns, which is unlikely (Ansar et al., 2014; Köberle et al., 2018), and would in any case be uncompetitive for the designated exportation market: Brazil (Solón, 2019).

According to the former government, this project was supposed to bring economic incomes from electricity exports, and be a stepping stone to turn Bolivia into the regional powerhouse. However, due to its apparent lack of competitiveness on the Brazilian market, the project has been qualified as a political rather than an economic one (Villegas, 2018, p. 18). In addition, hydroelectricity dams were generally presented by the former government as a key technology for fighting climate change (UNFCCC, 2016, pp. 5 and 9).

The potential negative impacts of the *El Bala-Chepete* project on the environment and local populations, especially indigenous people, are significant. It would flood an area of 771 $Km,^2$ affecting the Amazonian forest and natural protected areas, especially the Madidi National Park – considered the most biodiverse natural area in the world (Gorman, 2018) – and the Pilón Lajas protected area (Solón, 2017). In addition to causing huge CO_2 and methane emissions (Fearnside, 2016; Ribera Arismendi, 2018, p. 4) and having a vastly negative climate footprint, this operation would have major impacts on biodiversity and ecosystems (Pacheco, 2019) and would force thousands of indigenous people out of their land (Heras, 2017; Elwell, 2018). However, it has been denounced that no public consultation of the potentially impacted people has been undertaken following the feasibility studies conducted between 2015 and 2017 (*Tribunal Internacional de Derechos de la Naturaleza*, 2018, p. 6; Paredes Tamayo and Fernández Reyes, 2019). Yet, early consultation on decisions which could affect the environment or on the exploitation of natural resources is a constitutional obligation affirmed in various provisions.[19] This apparent disregard for constitutional rules in order to proceed with a mega dam project places the former Bolivian government in the same category as "strong or authoritarian state government[s]" (Schapper and Urban, 2019, p. 1).

Due to all these potential impacts and the absence of consultation, the project met with opposition from the local indigenous groups who resolved to block the gorge in 2016 to stop the feasibility studies (Achtenberg, 2017). In return, they were violently criticised and intimidated by Bolivia's former President and Vice-President, who vowed to ignore them and considered them foreign-funded activists (Achtenberg, 2017; Moorman, 2017, pp. 43–44). Since then, studies have resumed, but at the time of writing, their results had not been published. This unfair project development process, riddled with conflicts between local indigenous communities and the state, directly or through mandated companies, is not new in Bolivia. Misicuni's dam (Hoogendam and Boelens, 2019) and Rositas' dam (Villegas, 2018, p. 10) are other examples of conflictive energy projects in Bolivia.[20]

Thus, the *El Bala-Chepete* project seems to violate various of the rights recognised to nature in the aforementioned legal framework and especially in the Law of the Rights of Mother Earth. For example, Mother Earth's rights to life, to maintain and regenerate her life cycles and structures, and to be restored, can be considered as threatened by such a project (*Tribunal Internacional de Derechos de la Naturaleza*, 2018, p. 5). In any case, this project and such kind of developments in the energy sector in Bolivia can in no way be considered to be supportive of an energy transition in harmony with nature.

Conclusion and recommendations

Bolivia's ambition to develop an energy transition in harmony with nature aims to confront, on paper at least, the current (anthropocentric) approach to energy transitions and invites to think about alternative ways to understand the energy system. However, as revealed in this chapter, implementing an energy transition that safeguards and protects Mother Earth's rights is a daunting task, even in a country that has adopted ecocentric laws. Of course, law has its limitations and, in the case of Bolivia, the government has overused the rhetoric of living in harmony with Mother Earth, while in practice perpetuating and reinforcing dominant paradigms of extractive economic development based on socially and ecologically destructive projects.

The paper demonstrates that an energy transition in harmony with nature requires not only legal and policy frameworks recognising Mother Earth's rights, but also that these are consistent and effectively implemented. The issue of enforcement is capital, as shown in Bolivia where policy documents and energy projects contradict the essence of the law. Beyond these aspects, an energy transition in harmony with nature implies a radical and urgent transformation of energy infrastructures and policies towards a not only low-carbon but a fundamentally less ecologically damaging energy system. In parallel, such changes must help reaching *Vivir Bien*, which involves human and non-human communities living together without power asymmetries. This can only happen if the capitalist logic of the destruction of Mother Earth for the ever-increasing production of goods and services for humans is abandoned. Something that was claimed but, at least for the moment, not achieved in Bolivia.

For an energy transition in harmony with nature applicable in Bolivia and anywhere else, we list two overarching recommendations, which can be applied immediately or gradually over time, and always through a justice lens. Yet, we invite further interdisciplinary research to be conducted on this non-western and non-human-centred framework and to propose ideas and mechanisms for its implementation.

Firstly, respect for the rights of Mother Earth to life and to the regeneration of her life cycles and structures must be ensured. This supposes to ban policies and projects that are notoriously destructive of Mother Earth (and her human and non-human communities), including: fossil fuels extraction, large and mega dams, any large energy project in a protected area or in biodiversity-rich areas, even when not officially protected (such as parts of the Bolivian Amazon). For all other energy policies and projects, the possible impacts (economic, social and environmental) must be carefully studied, including the cumulative impacts, e.g. of various small dams on a river (Castello and Macedo, 2016, p. 994). The results of these studies must be fully available to the public. Nowadays, there are numerous solutions for small to medium-scale renewable energy projects, which are more prone to be respectful of Mother Earth, economically achievable in developing countries, and socially not detrimental, under some conditions such as being local-community led.

Secondly, participatory decision-making processes respectful of all (human and non-human) living beings must be developed. To avoid reproducing the injustices of the current energy system, decision-making power on the energy transition must be shared between the various actors involved, including affected local communities and indigenous people as well as, when existing, independent representatives of Mother Earth (such as a Mother Earth Ombudsman). The local communities and indigenous people are often the ones who know best the intrinsic worth of nature and her ecosystems and the representatives of Mother Earth can be entitled to act on her behalf.

Notes

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2 We would like to express our gratitude to all the reviewers for their comments and suggestions.
3 In the context of anthropocentric legal systems, nature is considered as "a lifeless, inert machine that exists to satisfy the needs, desires (and greed) of human beings" (Burdon, 2013, p. 818).
4 As shown by REN 21 (2019, p. 29): "As in previous years, renewables saw far less growth in the heating, cooling and transport sectors than in the power sector".
5 In contrast to the anthropocentrism of the western philosophy that considers nature as a set of resources that can be owned and exploited to satisfy human beings' needs, Mother Earth or *Pachamama* is defined as "a dynamic living system comprising an indivisible community of all living systems and organisms, which are interrelated, interdependent, and complementary, and which share a common destiny". Thus, Mother Earth is a subject that "takes on the character of collective public interest" (Ley de Derechos de La Madre Tierra, 2010, arts. 3 and 5). An English version of the law can be found at: http://181.224.152.72/~embajad5/wp-content/uploads/2017/12/rights-of-mother-earth.pdf
6 An English version of the Constitution can be found at: www.constituteproject.org/constitution/Bolivia_2009?lang=en
7 See, for instance, Lalander (2017, p. 465).
8 Emphasis added.
9 Applying the ecocentric approach to energy systems, Sovacool et al. (2017) consider that "[a]n energy system is right when it tends to preserve the integrity, diversity, resilience, and flourishing of the whole community, involving direct caring relationships and formal rights of nature" (p. 682).
10 The environmental legislation, adopted prior to the Bolivian Constitution but still in force, also refers to this duty (Ley de Medio Ambiente, 1992, art. 74).
11 *Ley de Electricidad*, 1994.
12 Translation by the authors.
13 See a critic in Villegas (2018).
14 As a general trend already described for Ecuador and Bolivia (Andrade, 2016, p. 118; Renfrew, 2011, p. 584).
15 See, for instance, Supreme Decree 2366, 20 May 2015, legalising exploratory drilling in Bolivia´s protected areas and national parks; and Supreme Decree 2549, 14 October

2015, extending the so-called "oil border" into the Amazonian and Gran Chaco regions of the country.
16 Supreme Decree 2366, ibid., art. 1.
17 See section: 'The contradictions and rhetoric of an energy diversification policy'.
18 See section: 'Damming Mother Earth: when practice falls short of rhetorical promise'.
19 See art. 30 (II) (15) concerning indigenous people; 343; 352; 378 (II); and 391 (I) for being in the Amazonia.
20 This is also the case of Ecuador, the only South American country having enshrined the rights of nature in its Constitution (Kotzé and Villavicencio Calzadilla, 2017; Purcell and Martinez, 2018; Teräväinen, 2019).

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