



Natureza & Conservação

Brazilian Journal of Nature Conservation

Supported by Boticário Group Foundation for Nature Protection

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Essays and Perspectives

Another blown in the wind: bats and the licensing of wind farms in Brazil



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ARTICLE INFO

Article history:

Received 23 May 2015

Accepted 4 September 2015

Available online 9 October 2015

Keywords:

Chiroptera

Clean energy

Environmental licensing

Renewable energy

Wind energy

ABSTRACT

Brazil is the third largest market for new investments in wind power in the world and thousands of turbines will become operational in the coming years. Wind power is necessary but, as any other source of energy, it has environmental impacts, especially on bats. Due to such rapid expansion and the volume of investments on course, an analysis of the current environmental licensing of wind farms in Brazil is necessary. Here we compared normatives from Brazil with similar ones from Portugal, the United States and Canada. By using 21 driving questions, we detected that there is no an international standard in the licensing of wind farms, ranging from simplified to rigorous approaches, from mandatory to voluntary normatives. Despite having specific and mandatory legislation dated from 2014, Brazil's federal and state normatives have a vague and relaxed approach regarding the possible impacts of wind farms on bats. Larger wind parks can be fractionated in smaller units, licensed based on simplified and less rigorous studies, but with no explanation on how or when such fractionating may occur, neither details on when adopt it. Only Brazilian legislations do not clearly specify the procedures and the minimum necessary effort for pre and post-installation, and which should be the mitigation measures adopted for the impacts of wind farms. The Brazilian federal and state normatives must be revised and until that, the current EIA procedures should be seen as insufficient to accurately determine the real impact of wind farms on the Brazilian bat fauna.

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Introduction

Wind power generation is among the fastest growing electric sources across the planet and the global wind capacity

exceeded 336 GW in 2014 (WWEA, 2014). Brazil follows such tendency and the country has become the third largest market for new investments in wind power in the world (WWEA, 2014). Brazil is expected to be in the top 10 wind power

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<http://dx.doi.org/10.1016/j.ncon.2015.09.001>

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generators in the near future, with potential to generate 300 GW (ABEEÓlica, 2012; WWEA, 2014).

Like any other form of electricity generation, wind power has pros and cons. Wind farms can affect the flying fauna, especially bats, with impacts ranging from behavioral disturbances to the death of animals by collision with turbine blades or barotrauma (Kunz et al., 2007a; Baerwald et al., 2008). If cumulative, such impacts can have severe medium and long-term effects on bat populations (Kunz et al., 2007b), involving both local and migratory species (Voigt et al., 2012). There is a need for further studies and better regulation of the impact assessment studies of wind farms on bats (ASM, 2008; Arnett et al., 2013; Bernard et al., 2014).

Established in Brazil in 1981, the environmental licensing is an administrative act granting the license requested by an entrepreneur to projects that can produce any degradation in the environment. In Brazil, this process is divided into three phases: the preliminary license (*Licença Preliminar* – LP), requested in the preliminary phase of the project planning; the installation license (*Licença de Instalação* – LI), authorizing the start of construction or installation project with the fulfillment of previous requirements; and the operation license (*Licença de Operação* – LO), which authorizes the operation of the project with the fulfillment of all the conditions required by the previous licenses (Brasil, 1997). The authorities responsible for the environmental licensing were established by Law 140/2011, and include the federal licensing agency (IBAMA), state or even municipal agencies (Brasil, 2011; CONAMA, 2014).

Until 2014 there was a conflict between the regulations for the licensing of wind farms in Brazil due to the Resolutions 01/1986 and 279/2001 by *Conselho Nacional do Meio Ambiente* (CONAMA), which differed on the need to apply an EIA or just a Simplified Environmental Report (*Relatório Ambiental Simplificado* – RAS) for wind parks (Barbosa Filho and Azevedo, 2013). Article 2 of CONAMA's Resolutions 01/1986 requires the submission of EIA for electricity generation plants above 10 MW, whatever the primary energy source, i.e. virtually all Brazilian power plants. However, Article 1 of CONAMA's Resolutions 279/2001 allowed the adoption of RAS for projects with low environmental impact, including wind farms and other alternative energy sources.

More recently, CONAMA's Resolution 462 of July 25th 2014 established new procedures for the environmental licensing of wind parks. This resolution aimed to resolve the discrepancy between the previous resolutions and provided legal support for those analyzing the licensing process. Thus, it was decided that the RAS would be acceptable for projects with low environmental impact and state agencies should be responsible for most of the licensing (see Table S1).

Although there are reports of mortality in the few areas monitored (e.g. Barros et al., 2015), in Brazil 70% of areas with high wind potential do not have sufficient information for the analysis of the likely risks and impacts on bats (Bernard et al., 2014). Northeastern Brazil, the largest wind potential in the country, has no published data on the mortality of bats, confirming the existence of gaps on the information on real impacts and ongoing mitigation measures (Bernard et al., 2014). Such reality shows that the licensing of wind farms in the country needs improvement. Maps identifying environmentally sensitive areas, a clearer legislation and the

dissemination of technical information on wind farms and their impacts are urgent for the improvement of the wind farms licensing process in the country (Brasil, 2009; Bernard et al., 2014). To contribute to such a discussion, here we compare the strengths and weaknesses of Brazilian current normative for the licensing of wind farms with similar legislation from other countries, focusing on potential impacts on the chiropterofauna.

Methodology

We compared the Brazilian standards and procedures on the licensing of wind farms with similar legislations from Portugal, the United States (federal, hereafter USA, and those from the states of Pennsylvania and California), and the Canadian provinces of Ontario and Alberta. In Brazil, we present both the federal normative (hereafter Brazil), as well as the state normatives for Rio Grande do Sul, which has the oldest commercial wind farms in the country, and Bahia, the state with some of the largest operating wind parks. Portugal was selected as a member of the European Community, due to the easy access of its normative, and due to the fact it was published in 2014, the same year of publication of Brazil's latest normative, allowing a comparison of two very recent norms. United States normative was selected as an example from North America, as well as due to the country's economical position, existence of a long history of environmental impact assessments with regulatory frameworks usually developed in association with specific sectors. In Canada, the licensing is not done at the federal level, so Alberta and Ontario were included due to their very detailed provincial normatives and licensing system, oriented for the protection of bats. Our selection of Canadian provinces and American states followed suggestions of professionals consulted in those countries (Table S1). All consultations were held between May 2014 and August 2015.

Twenty-one driving questions were established to facilitate comparison between the normatives consulted, ranging from the existence of specific legislation, to the necessity and validity of the licenses, and details of the monitoring procedures (Table S2). We considered two specific criteria in the analysis of the specificity: (1) the existence of standards aimed exclusively for wind power, and (2) the existence of standards directly oriented for bats in the environmental impact assessment. To access the completeness of the legislation we set two classes based on the number of responses to eight of the 21 questions (numbers 13–21; Table S2): incomplete, for one to four questions included in the licensing process; and complete, for more than four questions.

Results

Specificity and completeness

The nine cases we analyzed predict specific licensing systems for wind power, but in Portugal, USA, Pennsylvania and California standards are voluntary, i.e., should not be taken as an obligation by the entrepreneur, while in Brazil, Bahia, Rio

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