DAIRY PRODUCTION AND ENERGY CRISIS IN GOIÁS:
ANALYSIS OF RURAL DEVELOPMENT AND SOLAR ENERGY

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Introduction

Dairy producers in Goiás, a **Brazilian midwestern state**, have been facing troubles due to poor performance of its energy company (ENEL), which was privatized in 2017.
In 2019, family farmers made serious allegations about energy supply interruptions, instability and huge delays in responding to demands because of staff cuts. Even though these families live in a region with a great capacity photovoltaic energy, they cannot avoid using traditional and non-renewable energy matrices, such as oil and hydroelectric because access to solar panels are still too expensive. To understand the challenges for expanding solar energy use in Brazil, mainly in the countryside, specifically in Goiás, in order to promote social, environmental and economic development, **this research analyzes public policies for rural development and the obstacles that prevent solar energy from becoming a main source of energy in the countryside**.

Materials and Methods

- Identify and discuss **existing public policies** to increase solar energy usage and Brazilian **dependency on hydroelectric and thermoelectric** power.
- Collect **data on dairy production in Brazil and Goiás**.
- Establish a **profile of dairy producers** in Goiás.
- Discuss the consequences of **predominant energy sources on dairy production**.
- Research prices for **installing solar systems** on rural areas.
- Collect data on dairy **farmers annual income**.
- Discuss the **access of dairy producers to public policies** and the possibility of expanding solar energy in the countryside.

Results

ENEL did not invest the amount upon maintenance, which caused severe damage to dairy activity. **The high costs for implementing photovoltaic** systems and the **absence of incentives** by the government part are obstacles to the autonomy and better living conditions of family farmers in Goiás.
Although **farmers express their will to cease dependency on non-renewable energy matrices**, the expansion of Goiás Solar Program is not enough to successfully resolve energy distribution crisis in the state, which if successfully overcome could lead to increased individual and collective freedoms.

Energy matrix	Potency (percentage of Brazilian Total) 2019
Solar	1,3%
Hydroeletric	59,8%
Thermoelectric	25,1%

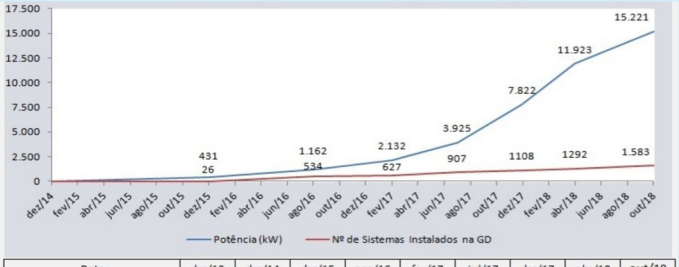
(ANEEL, 2019)

Number of installed energy systems in Goiás as of January 2020	
Countryside / rural areas	503 consumer units
Comercial / urban areas	1722 consumer units

(ANEEL, 2020)

- The European Union, India, the United States, China and **Brazil** are, respectively, the greatest milk producers in the world (FAO, 2020).
- In 2018, **consumers in Goiás had no energy power for 26 hours on average** (ALEGO, 2019).
- **52% of dairy production result from family farmers work**. 50.056, of the 72.353 total farms, are family farmers (IBGE, 2019b).
- **Goiás State is one of the greatest producers of dairy in Brazil** (IBGE, 2019b).
- In Goiás, almost **50 thousand families produced more than 1,4 billion liters of milk in year 2017** (IBGE, 2019b).

Distributed generation growth in Goiás (kW/n. of Consumer Units)



Data	dez/13	dez/14	dez/15	ago/16	fev/17	jul/17	dez/17	abr/18	out/18
Potência (kW)	2	21	431	1.162	2.132	3.925	7.822	11.923	15.221
Nº de Sistemas Instalados na GD	2	4	26	534	627	907	1108	1292	1.583

(GOIÁS, 2019)

Average costs for on-grid solar energy system installation (2020) – 500kWh	**R$19.900,00 – R$24.500,00**
Monthly bill payed to ENEL - 500kWh	**R$310,00**

(RESEARCH PRICE MADE BY THE AUTHORS IN 2020)

Dairy Production in 2017	
Brazil	30 billion liters
Goiás – farms / liters	72.353 farms - 2.670.391 thousand liters

(IBGE, 2019a)

Dairy producers in Goiás: average income in 2017	
5%	< R$ 1.000,00
25%	R$ 1.001 < x < R$3.000,00
45%	R$ 3.001 < x < R$ 5.000,00
25%	> R$ 5.001,00

(FREITAS; WANDER, 2017)

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