

---

*Status*1 | 2 | 3 | 4 | **5** |**Please Check Your Paper One More Time.**Then scroll all the way down to the bottom of this page and "Conclude Submission".

---

## Bioelectricity and 2G-bioethanol: competing for sugarcane biomass

**Roberto C. Giordano**<sup>1</sup>, Felipe F. Furlan<sup>1</sup>, Caliane B. B. Costa<sup>1</sup>, Antonio J. G. Cruz<sup>1</sup>, Rafael P. Soares<sup>2</sup>, Argimiro R. Secchi<sup>3</sup> and Raquel L. C. Giordano<sup>1</sup>, (1)Chemical Engineering Department, Federal University of Sao Carlos, Sao Carlos, Brazil, (2)Chemical Engineering, Federal University of Rio Grande do Sul, Porto Alegre, Brazil, (3)Chemical Engineering Program, COPPE, Federal University of Rio de Janeiro, Brazil

Modern first generation (1G) ethanol-from-sugarcane industries use the biomass residue (bagasse and, more recently, part of the trash) for co-generation of electricity, which may be delivered to the grid. Production of 2G bioethanol will certainly be integrated to the 1G process, in order to take advantage of the logistics that is already set for transportation of the lignocellulosic feedstock. Consequently, competition between bioelectricity and bioethanol is a key factor to define feasible operation modes for the sugarcane-based biorefinery. This problem is constrained by the energetic demands of both processes, which must remain self-sufficient. Therefore, any tool for economical analysis of this process must rely on validated mathematical models of the integrated process, coupled to an optimization algorithm that can handle this non-linear, constrained problem.

A prospective analysis of this problem for different scenarios of relative prices is undertaken. The computational tool uses an equation-oriented process simulator (EMSO, [www.enq.ufrgs.br/trac/alsoc/wiki/EMSO](http://www.enq.ufrgs.br/trac/alsoc/wiki/EMSO)) and a global optimization algorithm (Particle Swarm Optimization, PSO), following a feasible approach. Thus, all solutions comply with the plant energetic autonomy. The biochemical route is the case study: enzymatic hydrolysis of biomass and ethanolic fermentation of hexoses and pentoses. Different technologies of bagasse pretreatment were simulated.

The high volatility of the relative prices of ethanol and electricity in Brazil was taken into account. Within this context, there was an indication in favor of more flexible industrial plants that could support diverting a fraction of bagasse (or trash) from hydrolysis to co-generation in response to changes in the economic scenario.

---

**Paper ID#:** 20956**Password:** 747533**Title:** Bioelectricity and 2G-bioethanol: competing for sugarcane biomass**Topic Selection:** Biofuels and Biorefinery Economics & Commercialization**Preferred Presentation Format:** Oral**Submitter's E-mail Address:** roberto@ufscar.br**Has this abstract been previously published or accepted for publication:** No**Is the submitter a student:** No**Withdraw if preferred format cannot be accommodated:** No**First author*****Presenting Author***

Roberto C. Giordano  
Chemical Engineering Department  
Federal University of Sao Carlos  
c.p. 676  
Sao Carlos,  
Brazil

**Phone Number:** 55-16-33518708**Fax Number:** 55-16-33518266**Email:** roberto@ufscar.br**Second author**

Felipe F. Furlan  
Chemical Engineering Department  
Federal University of Sao Carlos  
c.p. 676  
Sao Carlos,

Brazil

**Phone Number:** 55-16-33518708

**Fax Number:** 55-16-33518266

**Email:** felipef.furlan@gmail.com -- Will not be published

#### Third author

Caliane B. B. Costa

Chemical Engineering Department

Federal University of Sao Carlos

c.p. 676

Sao Carlos,

Brazil

**Phone Number:** 55-16-33518708

**Fax Number:** 55-16-33518266

**Email:** caliane@ufscar.br -- Will not be published

#### Fourth author

Antonio J. G. Cruz

Chemical Engineering Department

Federal University of Sao Carlos

c.p. 676

Sao Carlos,

Brazil

**Phone Number:** 55-16-33518708

**Fax Number:** 55-16-33518266

**Email:** ajgcruz@ufscar.br -- Will not be published

#### Fifth author

Rafael P. Soares

Chemical Engineering

Federal University of Rio Grande do Sul

Porto Alegre,

Brazil

**Email:** rafael@enq.ufrgs.br -- Will not be published

#### Sixth author

Argimiro R. Secchi

Chemical Engineering Program

COPPE, Federal University of Rio de Janeiro

Brazil

**Email:** arge@peq.coppe.ufrj.br -- Will not be published

#### Seventh author

Raquel L. C. Giordano

Chemical Engineering Department

Federal University of Sao Carlos

c.p. 676

Sao Carlos,

Brazil

**Phone Number:** 55-16-33518707

**Fax Number:** 55-16-33518266

**Email:** raquel@ufscar.br -- Will not be published

---

#### FINAL STEPS

1. **Check spelling and contact information.**
2. **Make necessary corrections:**
  - Click any value in the Abstract Control Panel you want to change (e.g., Title, Author names)
  - Edit the information and click the submit button.

3. **Click** [here](#) **to print this page now.**

[Conclude Submission](#)