

# BI-DSC – Building Integrated Dye Sensitized Solar Cells (321315-BI-DSC)



Universidade do Porto

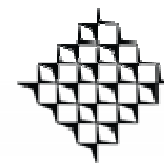
Faculdade de Engenharia

**FEUP**

Chemical Engineering Department

Adélio Mendes

FEUP, July 15<sup>nd</sup>, 2015



**lepabe**

Laboratory for Process Engineering,  
Environment, Biotechnology and Energy

# Project's data



Founding entity and grant type: **ERC – Advanced Grant**

Acronym: **BI-DSC**

Code: **321315**

Title: **Building Integrated Dye Sensitized Solar Cells**

Starting date: **March 2013**

Duration: **60 months**

Budget: **1 989 300,00 €**

Web site: **<http://www.bi-dsc.pt>**

# Laser sealing station



# Project's main objective



Contribute to an enhancement in the performance and reliability of DSCs and solve the critical constrains that prevent their commercialization. Main targets are:

- Glass sealing;

- Improved photoelectrode;

- ETCO technology;

- Graphene counter-electrode;

- Carbon quantum dots;

# Laser sealing station





# Results



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**DYESOL**  
GLOBAL LEADERS IN DYE SOLAR CELL TECHNOLOGY

0 ITEM \$0  
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### NEWS

Customer News & Specials  
Blog  
Media Coverage

### ARCHIVES

- ▶ July 2015
- ▶ June 2015
- ▶ May 2015
- ▶ April 2015
- ▶ March 2015
- ▶ January 2015
- ▶ December 2014
- ▶ November 2014
- ▶ October 2014
- ▶ September 2014
- ▶ August 2014
- ▶ July 2014
- ▶ June 2014
- ▶ May 2014

## DYESOL AND EFACEC SEAL A DEAL

Jan 22, 2015

**Sydney, 22 January 2015** – Today, Dyesol Limited and EFACEC of Portugal have completed due diligence and signed an agreement to exploit proprietary, laser assisted, glass frit sealing technology developed by EFACEC and the University of Porto in the manufacture of glass substrate, solid-state DSC (ssDSC) solar panels.

As a first instalment, Dyesol will pay EFACEC €500,000 over a 15 month period during which the technology will be modified for use in perovskite based photovoltaics. Staged payments will be milestone based with successful achievement of the final technical specification triggering a further payment schedule of €1.7 million over 24 months. A further €2.8 million is payable as a royalty pending the commercialisation of the process in Dyesol's proposed solar panels and modules. The structured financial transaction has a potential maximum total consideration of €5 million after which the ownership of the IP will be fully assigned to Dyesol.

The low temperature, laser-assisted sealing technology has already demonstrated excellent performance in both low temperature applications and high-speed processing. Hermetic sealing, which provides panel integrity for both oxygen and moisture, is the essence of durability and long life. Dyesol believes that this technology is an essential element in its entry strategy for both the PV and BIPV markets. It also believes that ssDSC will be sufficiently low-cost and durable to compete effectively with incumbent PV technologies in a wide range of applications.

Mr Ian Neal, Dyesol chairman commented:

"Durability is the greatest technical challenge in the PV market. This proprietary sealing technology has the potential to deliver 20 year plus life to solid-state DSC products in multiple applications, including BIPV, and we are very excited about its commercial prospects."

Dyesol is on schedule to produce demonstration prototype panels in 2016, leading to mass production in 2018.

# Preparing a winning application

# Preparing a winning application



Notice: I have no experience in  
evaluating ERC grants.

The assessment weights equally the researcher's CV and the project.

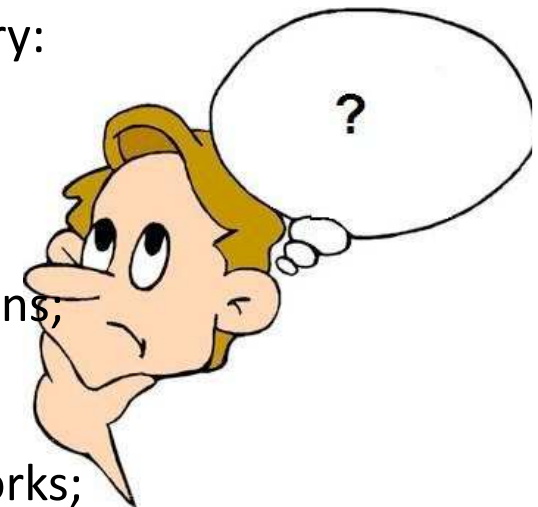
In my opinion, for preparing a winning application it is necessary:

1 – Very good CV, namely:

- a) Articles & patents;
- b) National and international projects & collaborations;
- c) Collaborations with industry;

2 – A disruptive new idea; Give evidences that this idea works;

3 – Write the project for the evaluators; address systematically the  
assessing questions.





# Preparing a winning application



# Preparing a winning application



Notice: I have no experience in  
evaluating ERC grants.

Be convincing:

- 1 – You must believe deeply in your proposal;
- 2 – The panel should easily realize that you deeply believe on it.

Be perfectionist:

- 1 – No wording or grammar mistakes;
- 2 – Follow the notation rules;
- 3 – Use figures and photos.

Budget:

- 1 – Ask as much money as you can justify.

# To prepare a winning application



Notice: I have no experience in  
evaluating ERC grants.

Be prepared for:

- 1 – Getting the project approved, or;
- 2 – Rewrite and submit it again!



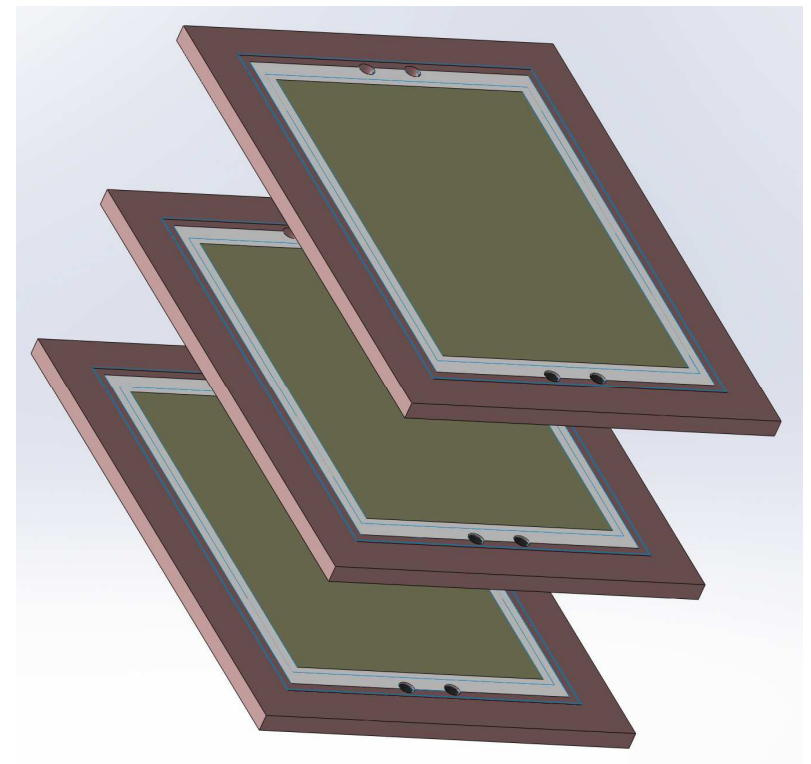
# Winning the money...



Winning the money:

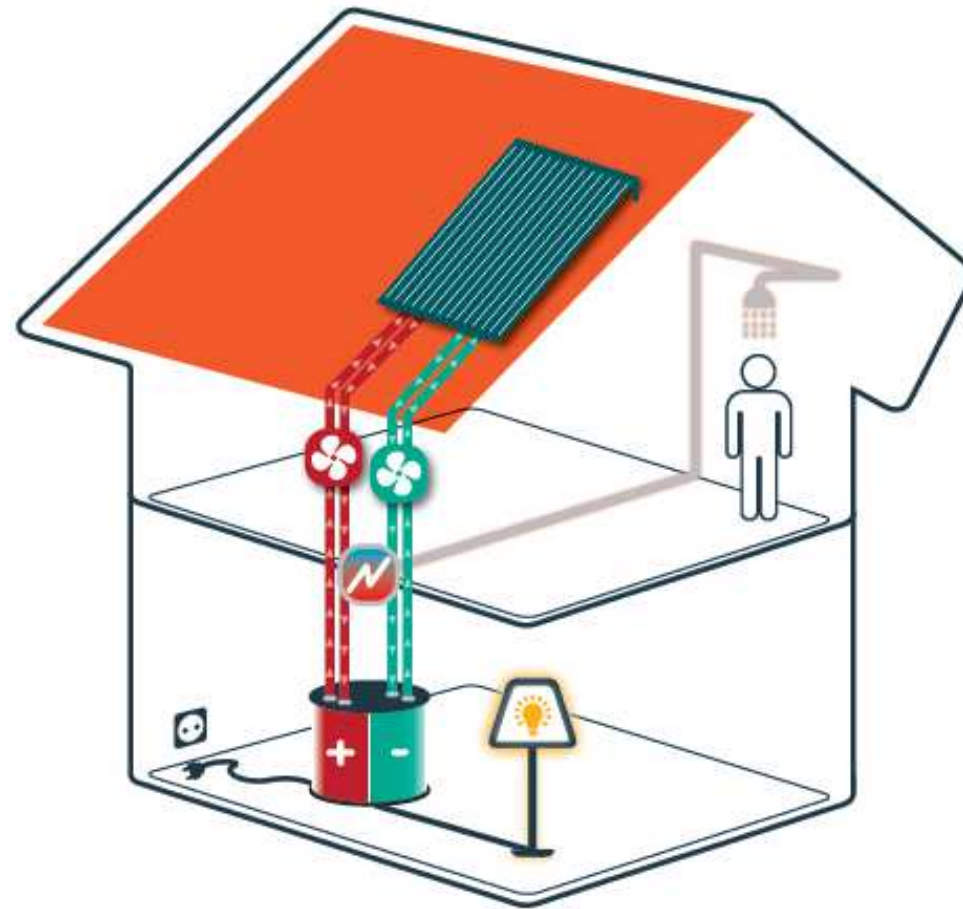
- 1 – Have fun with your project and;
- 2 – Prepare new ones!

New RFB sealed without compressing metal plates



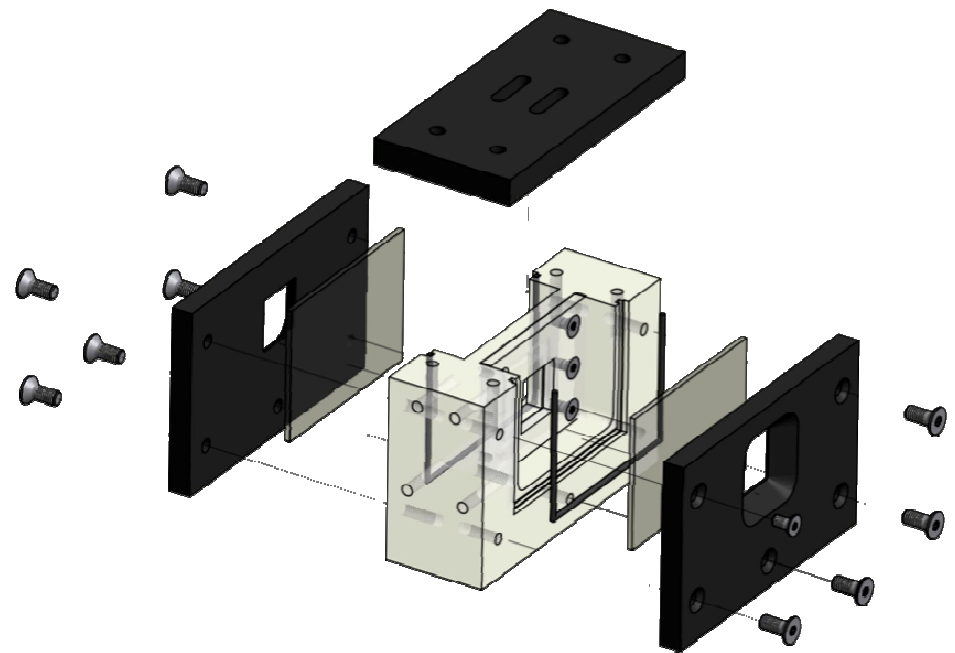
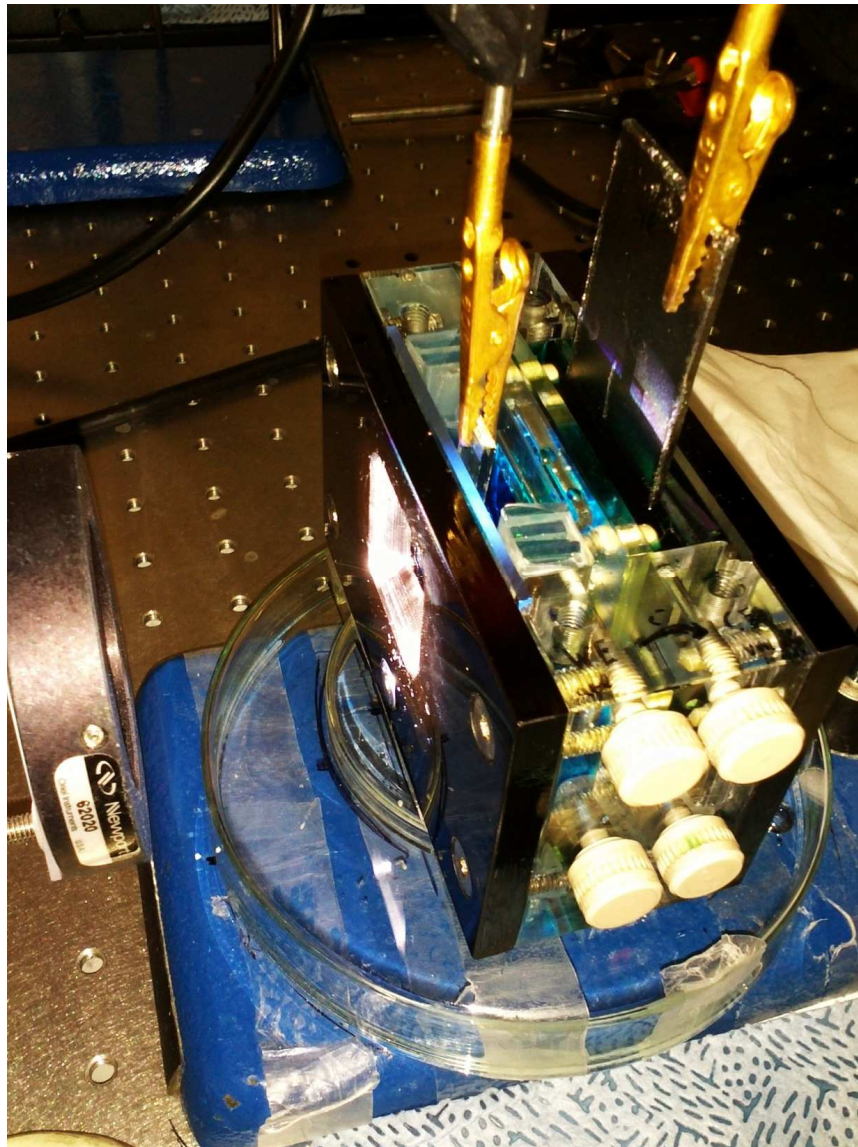
# Solar chargeable redox flow battery

## The concept - cogeneration



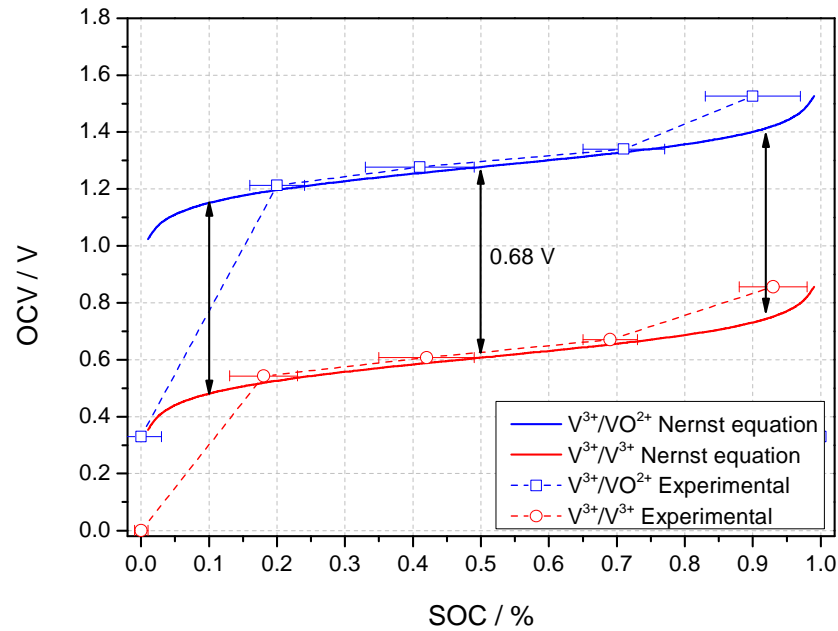
**Sunlight** -> storable electrochemical energy and heat

# Solar chargeable redox flow battery



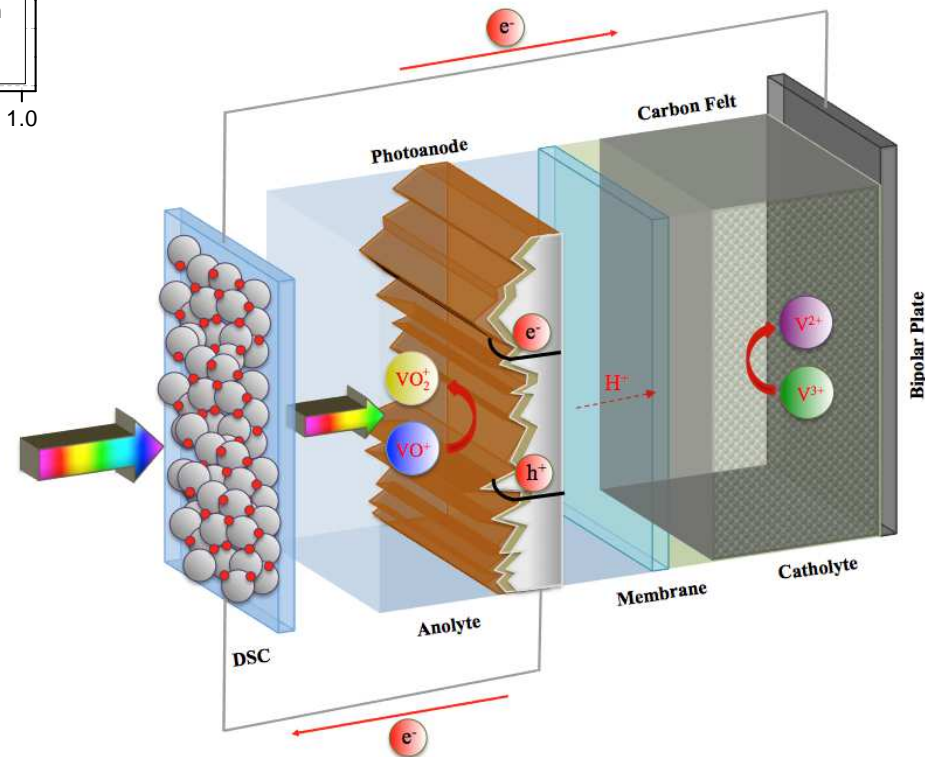


# Solar chargeable redox flow battery



0.68 V extra to charge a standard all vanadium redox flow battery

Tandem Configuration



# Acknowledgements



Luísa Andrade

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Carlos Costa

and the whole research team.





**Questions are welcome**