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ARENDI S.p.A.

START-UP OF A INDUSTRIAL LINE FOR THE PRODUCTION OF THIN FILM PHOTOVOLTAIC MODULES

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**“Leading Low-Carbon Technology in Italy and the U.S. :
Moving Research from the Laboratory to the Market”**

Rome May 26, 2009

ICE – Istituto Nazionale per il Commercio Estero

Moving Research From Lab to Industry

- CdTe-CdS PV modules are very stable and made with easily scalable techniques
- University of Parma began lab tests several years ago
- An Italian Newco (Arendi) has been established in 2006 to invest in the industrial project
- An industrial line based on well known technology (sputtering) and some patented innovative solutions (Closed Space Sublimation) is under start-up in Northern Italy

Moving Research From Lab to Industry

- The project has been fostered by the Italian Ministry of Environmental and the Region Lombardia
- Target Annual Production is 15 MWp equivalent to 200.000 PV modules with size 0.6 m by 1.2 m
- Site and facilities already designed for a 30 MW production
- Highly automated industrial line

Arendi partners:

- Euroenergy Srl - Marcegaglia Group (engineering and contracting in renewable energy field)
- Solar Systems & Equipments Srl (research in PV field, in cooperation with University of Parma)
- Alchimia Spa (financial partner)
- Banca Ifis SpA (financial partner)
- Studio Galli Ingegneria Spa (engineering)

Partners for Industrial Phase:

- Basic Design - Italy
- Equipment Supply- Italy
- Human Resources - Italy
- Raw materials EU – USA – Far East
- Sales Market - Italy and Southern Europe

Short Description of the Technology:

- Arendi has developed a new simplified process
- The innovative solutions are protected with five patents
- Lab efficiency close to 16%

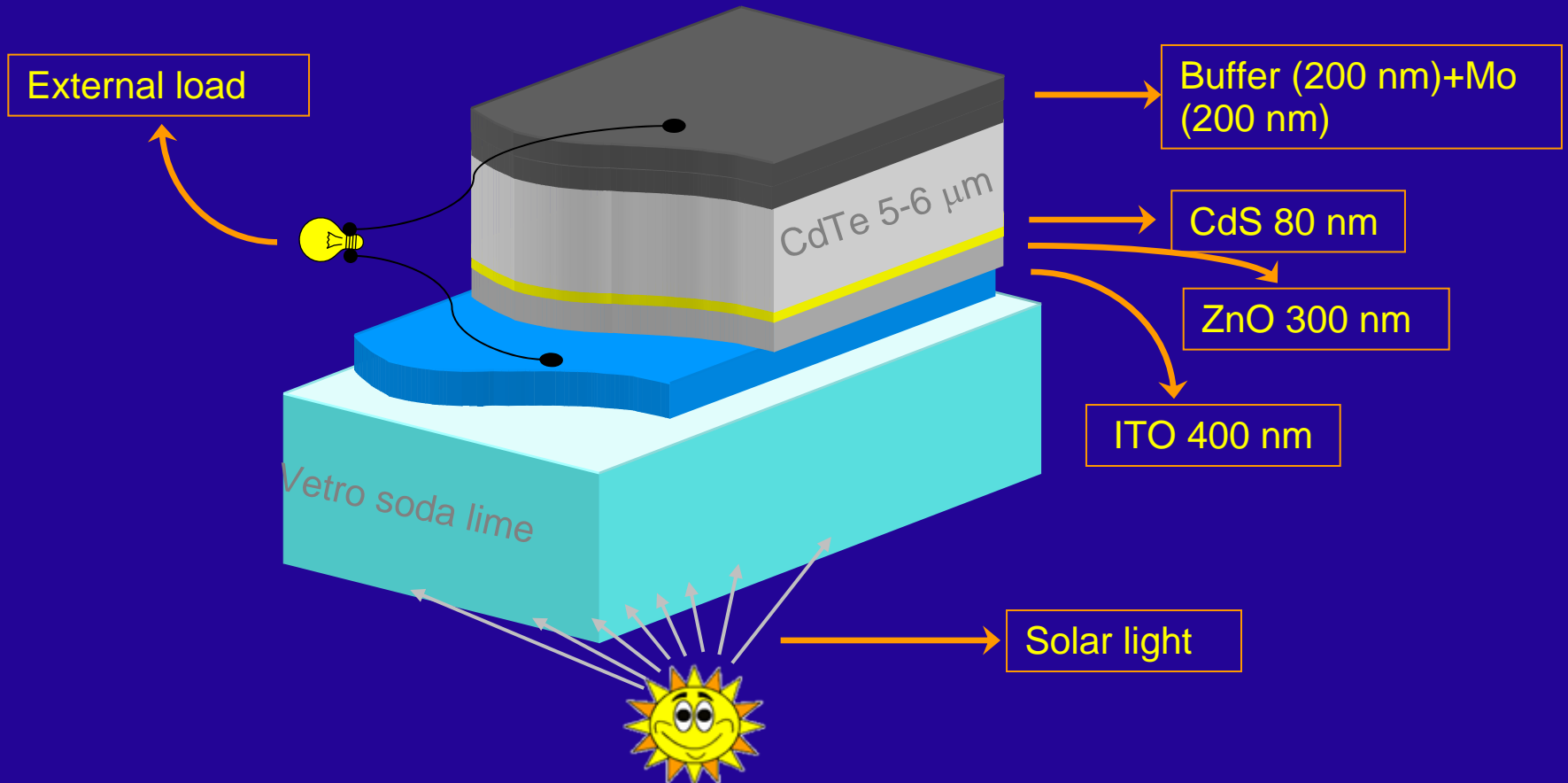


Structure of CdS / CdTe Cell :

The CdTe/CdS thin film cell is composed of four layers:

- The Transparent Coating Oxide (TCO) layer, acting as front contact
- The CdS layer, acting as n-type partner
- The CdTe layer, acting as p-type absorber
- The back contact

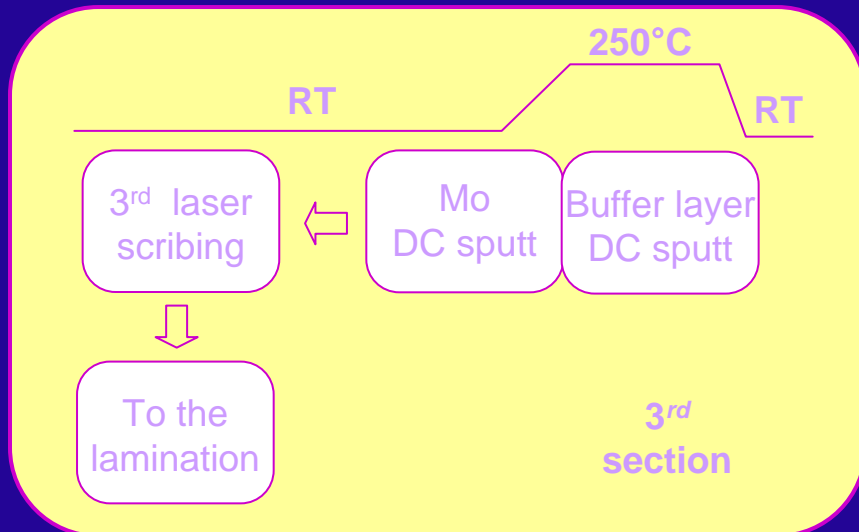
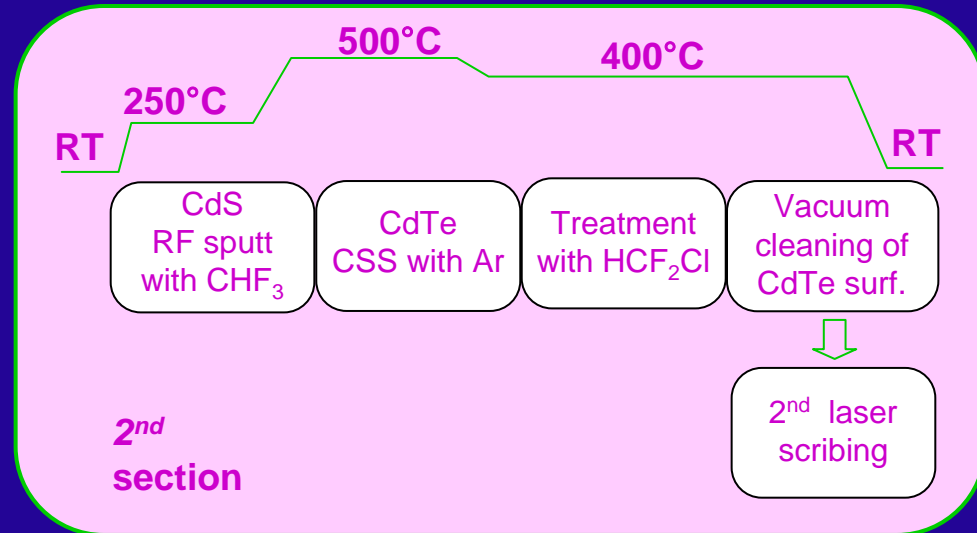
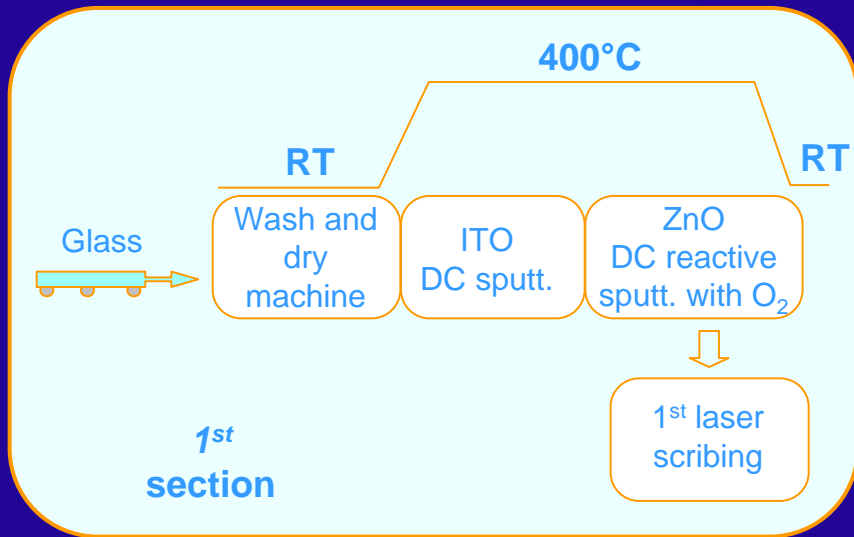
Structure of CdTe / CdS cell



Short Description of the In-line Process:

Divided in three sections :

- Section 1 : TCO
- Section 2 : CdS and CdTe deposition with CdTe treatment in Cl atmosphere
- Section 3 : Back Contact



Technology topics

- **Innovative technologies**
 - Full dry process
 - CdS deposition obtained with RF Sputtering
 - Innovative back contact
- **Adopted standards**
 - Continuous production cycle with very limited emissions

Strengths

- Robust production process
- Industrial scalability
- Thin Film technology minimizing utilization of raw materials
- High efficiency modules
- Stability over time

Enviromental aspects

Arendi is part of the PV Cycle organization founded in July 2007 to implement the photovoltaic industry's commitment to set up a voluntary take back and recycling programme for end-of-life-modules and to take responsibility for PV modules throughout their entire value chain.

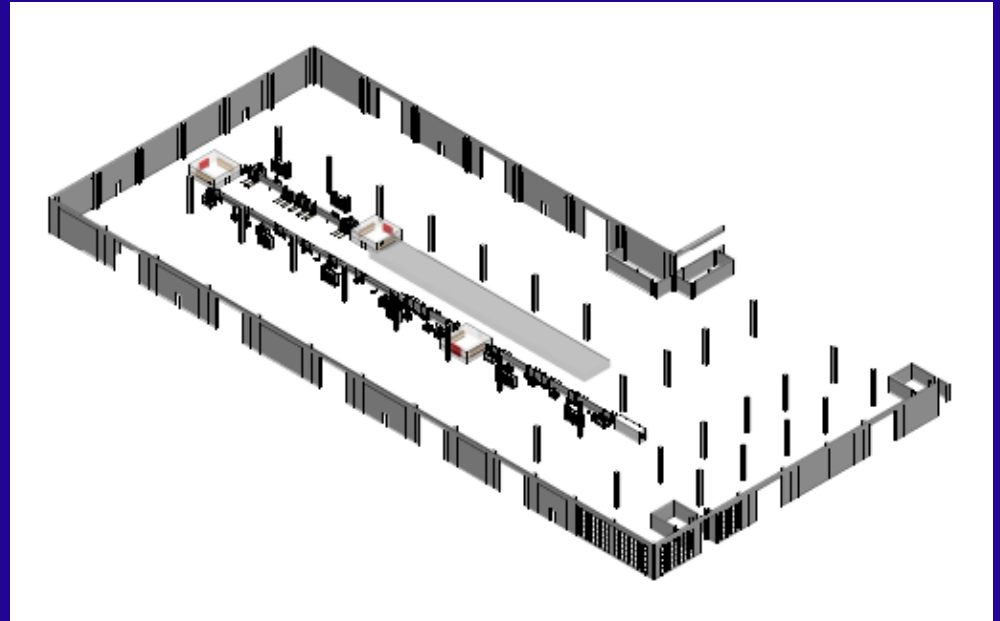
Our Company is therefore strongly committed to offer a truly sustainable energy solution today to help prevent climate change tomorrow

Cooperation with U.S. organization

- A fruitful cooperation has been established with First Solar on Environmental Safety and Health (EHS) in order to avoid any misunderstanding with our local institution on this important topic.
- Contacts with Universities through our technology partners

State of the project

- June '07
Start of the executive planning
- September '09
Delivery of first equipment and start set-up
- December '09
Delivery of the complete industrial line
- January '10 – March '10
Start of modules production



The Italian response to the demands of the international photovoltaic industry:

- Arendi investment is the sole project developed at the date in Italy on an Italian proprietary know how
- The project is well positioned to effectively compete in the global photovoltaic market
- The competitive industrial cost will allow a more widespread diffusion of the photovoltaic applications
- Solutions are already available for total building integration



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Contact

Production Site

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THANK YOU FOR THE ATTENTION