	Organic PV	**VTT** **Polymer solar cell processing facility**
Location of the infrastructure :	Oulu, Finland	www.vtt.fi
Contact person :	Sanna Rousu	Phone : +358 20 722 2070 E-mail : sanna.rousu@vtt.fi

Objectives :	• R2R processing for OPV cells/modules • Material performance testing and up-scaling into pilot scale
Main features :	VTT has several roll-to-roll (R2R) pilot production machines for processing of flexible organic photovoltaics (OPV) in form of polymer solar cells: 1. PICO pilot production machine including 2 gravure printing units for thin film printing, R2R thermal nanoimprinting unit for nano structuring of polymer layers. The machine has thermal, UV and IR drying units. Also, corona treatment is possible as well as lamination for encapsulation. 2. ROKO pilot production machine has four replaceable printing units. A desired combination of printing units can be built up using forward- or reverse gravure, flexography and rotary screen units. Material drying is done using thermal, IR or UV drying. A corona unit exists for substrate treatment, and lamination for encapsulation. The machine has also etching process for metals and ITO. 3. NICO inert atmosphere pilot production machine was developed in FACESS-project (FP7-ICT-2007-1-215271). Machine includes 2 printing units (gravure, rotary screen) for material deposition, IR dryers and laminator. Machine can be operated under nitrogen or argon gas. 4. Laboratory scale table top printing machines (gravure -, flexography -, screen printing) are available for material and substrate testing before up-scaling to pilot machines. Characterization equipment includes white light and mechanical profilometers and SEM. IV measurements can be done under AM1.5 reference.
Limitations or constraints :	Pilot R2R web width on machinery is 200 mm or 300 mm, up to 500 m length Minimum solution “ink” quantity in pilot scale 250 ml Presence of VTT’s personnel technical and scientific required
Typical services or results :	Users get access to test their own materials formulation for flexible polymer solar cells through manufacturing at state-of-the art machinery and in-house developed equipment for processing and rapid testing of solar cells. In particular, users get access to unique know-how on processing solar cells. 1. Access to use pilot production machines and related equipment in collaboration with technical and scientific assistance of VTT’s personnel. The production machines will enable users to fabricate cells in VTTs standardised layout using their own materials. The standard layout comprises laboratory printed solar cells on a flexible substrate with metalized electrodes patterned to fit in rapid testing equipment. The transnational access will support joint activities on developing protocols for lifetime test of OPV, protocols for fast screening of materials and elucidate degradation mechanisms. 2. The transnational access is offered for initial tests of user’s materials formulation for producing flexible solar cells by R2R printing techniques (gravure, flexography and rotary screen). The product is typically a roll of printed solar cell modules in a standardised layout and eventually, the modules are cut out and delivered as single modules in an amount comparable to a roll size. The details of the standard structure are subject to changes.
Examples of research projects :	R2R pilot processing of OPV cells/modules Material testing and development in pilot scale