

# whiteR

Project brochure  
Mid term edition

## FUNDING PROGRAMME

7th Framework Programme (FP7).  
FoF.NMP.2013-2: Innovative Re-Use  
of Modular Equipment Based on  
Integrated Factory Design.

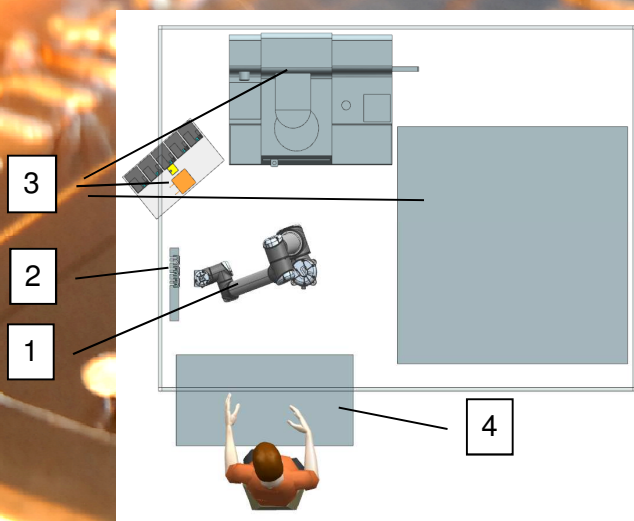


# white'R results

WHITE'R is a self-contained white room consisting in a multi-robotic island that can be easily integrated in existing production shop-floors. It empowers the handling, assembly and disassembly of high value added optoelectronic products. The island's devices - robots, operation units, transport, handling and tooling systems - are conceived as "Plug&Produce" reusable modules properly configured coherently with the production requirements.

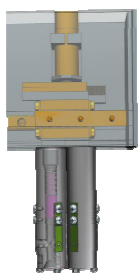
## white'R system architecture

After 18 months of development the architecture of white'R island has been defined. white'R cell is highly reconfigurable through a modular approach based on three main working area and two inter-operational buffers. The robot can hold diverse end-effectors in order to cover a wide field of possible applications.



The robot (1) is close to an inter-operational buffer (2) containing the various end-effectors and modules not in use in a specific time and to the working stations (3). Mounting operations that can not be conveniently automated are realized by a human operator (4).

**Concept layout of white'R island**



**End-effectors**



white'R island configuration is innovative and will help to increase competitiveness of optoelectronic assembly operations:

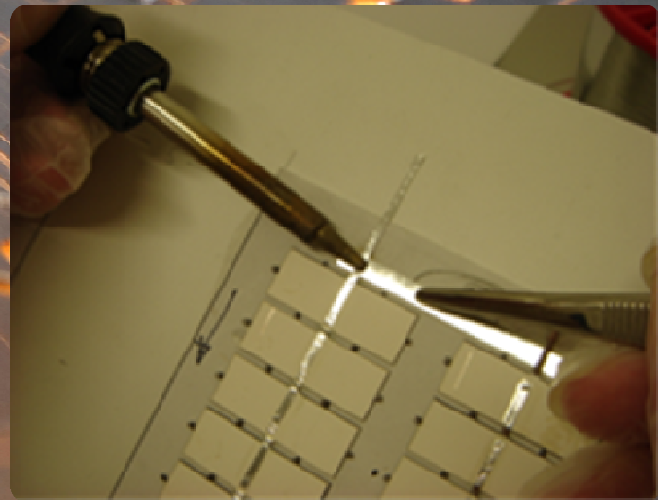
it allows to easily and flexibly integrate white room operations in non white room environment with a very limited investment

## white'R island benefits

- 50% reduction of cost compared to current productions system leveraging highly flexible automation to reduce manufacturing cost, since manual packaging accounts for 60 to 80 percent of the cost of a optoelectronic component;
- 75% set-up and ramp-up time reduction by self adaptive reconfigurability thanks to easy plug/unplug of machinery components;
- All components of the production system reusable re-assembled and upgraded in a new different to prevent the risk of dedicated equipment obsolescence;
- Creation of a EU/International standard for optoelectronic package configuration in order to enhance equipment reusability.

The achievement of the objectives will be demonstrated by **2 different demonstrators** where the same white'R island will be reconfigured to be used in two different real industrial environments

- the first one that of the production of equipment for laser processing (Prima Power)
- the second one that of the production of solar energy systems (SCT).



## white'R applications in diodes and solar panels manufacturing

The manufacturing island resulting from the design process has been conceived to accomplish the production requirements while minimizing the layout dimensions. As a results, compact and agile equipment has been preferred to other solutions. In addition, the reconfigurability feature preserves the users from the risk to be unable to match possible future evolutions of the family of products, in terms of demand and technological features.

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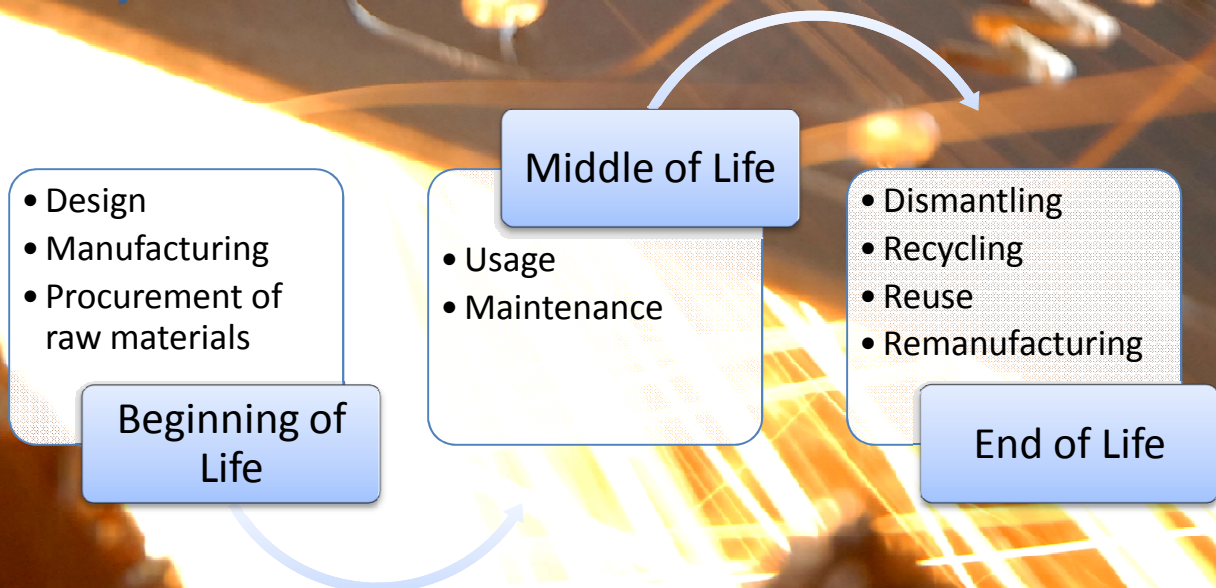
## Ecolabelling

Basing on requirements from current regulation framework a specific Green Labelling Methodology has been developed and made available for use in the rest of the project.

In a nutshell, white'R **Green Labelling Methodology**:

- Is integrated with ISO standards, with MEErP methodology and with PEF EC guidelines, which have been collected for partners consultation in a shared repository;
- Exploits MEErP Ecoreport Tool made available in the framework of Ecodesign directive to assess environmental impact related to beginning of life and end of life of white'R island;
- Makes use of a new specific white'R Ecoreport tool, in the form of a MS Excel spreadsheet, to assess quantitatively the environmental impact of white'R island's use phase integrating product and process description related to the two demo application, assembly of multi-emitter diodes and PV panels;
- Makes use of a new high level KPI framework in order to guarantee a real economic and industrial sustainability of the environmentally optimal solution developed basing on state-of-the-Art indicators.

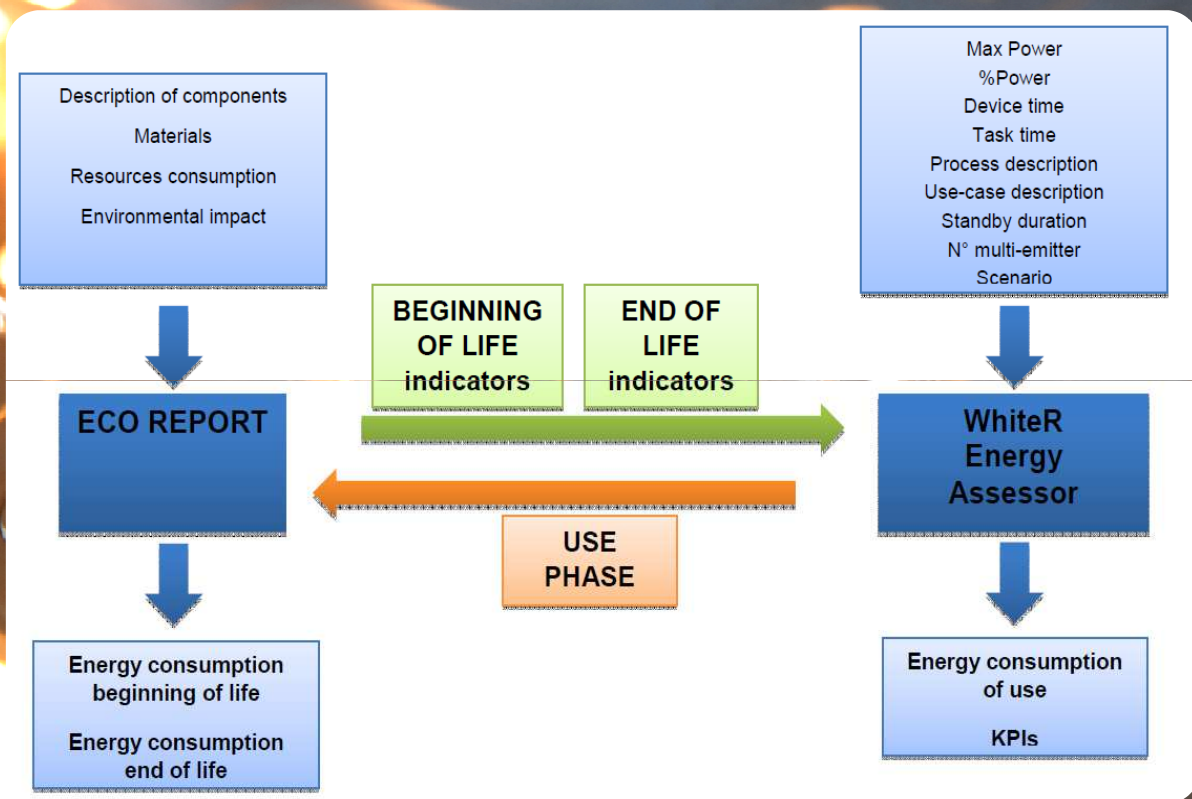
### Life Cycle Process of WhiteR Island



# white'R Energy Assessor Tool

To ease the exchange of information a "white'R Energy Assessor Tool" has been setup in the form of a MS Excel spreadsheet, including, customised for both the industrial use cases (multi-emitter diodes and PV panels) white'R bill of materials, bill of process, KPIs, scenarios, also implementing the MEErP EcoReport Tool 2011 made available by the European Commission in the framework of the EcoDesign directive.

Finally all the relevant public material has been filed in project repository to form a "Green Labelling Library" for future consultation, including MEErP complete Guide, EuPLot5 complete final report, PEF complete Guide, ISO14020, ISO14021, ISO14024, ISO14025, ISO14044, ISO14955-1



## Architecture of the white'R Energy Assessor Tool

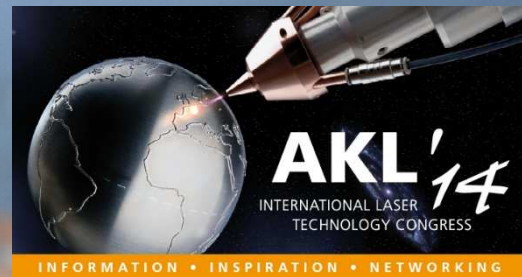
TIME	INPUT	TIME	MACHINE DEVICES												
			10	20	30	40	50	60	70	80	90	100	110	120	130
			PC	Schermo 19"	Laser CCD	Ultrasonic	Glue injector	Heat gun	Current driver	Robot	UV lamp	Camera	Wire tool	Hot plate	Soldering tip
P	ST000 Standby	1	1	1	1	1	1	1	1	1	1	1	1	1	1
R	AA005 Active alignment of FAC	5	5		4										
O	AA007 Active alignment of Mirror	12		12	3										
D	CL004 Cleaning of Submount	0													
U	CL005 Cleaning of FAC	0													
C	CL006 Cleaning of SAC	0													
T	CL007 Cleaning of Mirror	0													
	CL008 Cleaning of Focusing Lens	0													
	CL009 Cleaning of Fiber Holder	0													
	CL010 Cleaning of Package	0													
	CL011 Cleaning of Lid	0													
	CL012 Cleaning of Pins	0													
	CL013 Cleaning of Optical fibre	0													
	DA004 Deposit optical adhesive on Submount	50	2		20			50							

## Energy Assessor Tool - Diodes

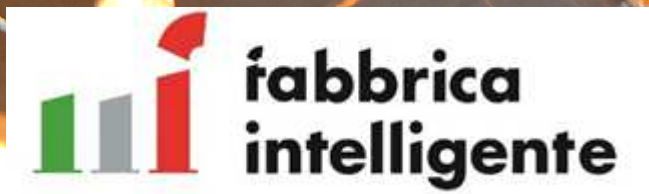
# Initiatives

## Dissemination activities

- Relevant events
- International publications
- Clusters
- Stakeholders groups



- \* Fraunhofer ILT - AKL International Laser Congress, 07-09 May 2014
- \* Hannover Messe 2014 VISION 2014, 04-06 November 2014, Stuttgart - Germany
- \* 12th EMVA Business Conference, 15-17 May 2014, Vienna - Austria
- \* Fabbrica Intelligente 2014 - Milano



## Future events

- ICNN 2015 (Exhibition)
- World Congress on CI 2016
- EANN 2015
- ICANN 2015
- Industrial Technology 2016
- EVOL 2015 - Lausanne
- Cleanzone 2015 - Frankfurt

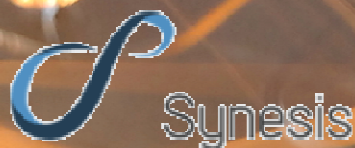
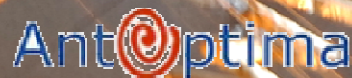
- Courses (University, other)
- Operations

Advanced & Sustainable Manufacturing and Operations Management  
Mechanical, Electronics, Management Courses

## Consortium

Excellence in their respective fields of expertise has been the guiding principle in assembling the white'R team. We have strived to achieve balance among academic and research institutions, system development companies, and industrial end users to form a "Lean and Efficient Organization".

The development of white'R solutions is endorsed by a number of technology providers on the basis of the functional, operational and performance specifications given by the end users with the support of the company enabling the technology transfer.





## useful links and contacts



**Project website** [whiterproject.eu/](http://whiterproject.eu/)

**Linkedin group** [www.linkedin.com/groups/whiteR-EU-Project-6544764](http://www.linkedin.com/groups/whiteR-EU-Project-6544764)

**Factory of the future website** [http://ec.europa.eu/research/industrial\\_technologies/factories-of-the-future\\_en.html](http://ec.europa.eu/research/industrial_technologies/factories-of-the-future_en.html)

**Contact** [info@whiterproject.eu](mailto:info@whiterproject.eu)