



# ABENGOA

## Best practice on operations and maintenance of CSP projects

17/05th/2018

Solar Department





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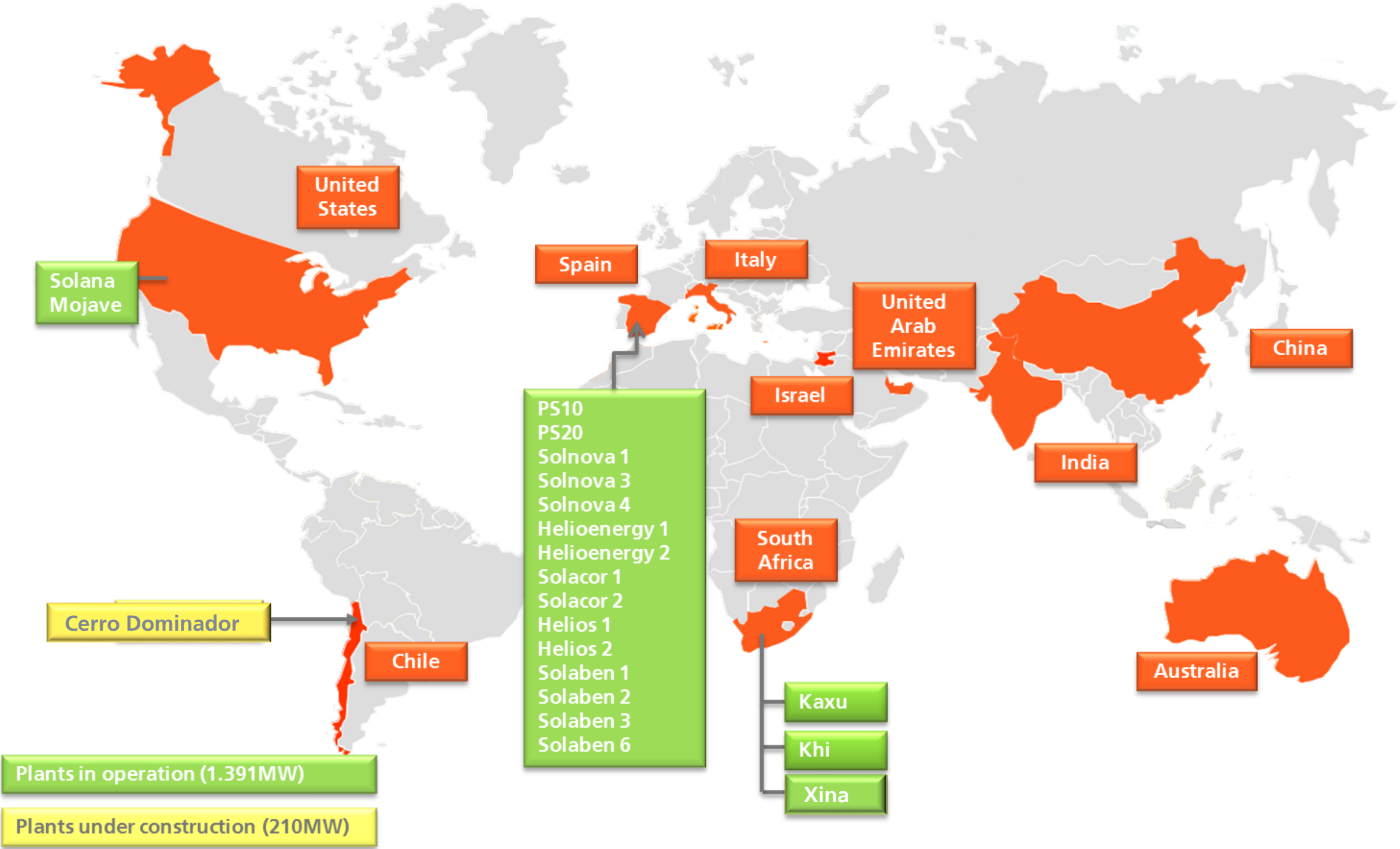
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# Solar Thermal O&M Map

Geographies





# Solar Thermal O&M Map

Resources

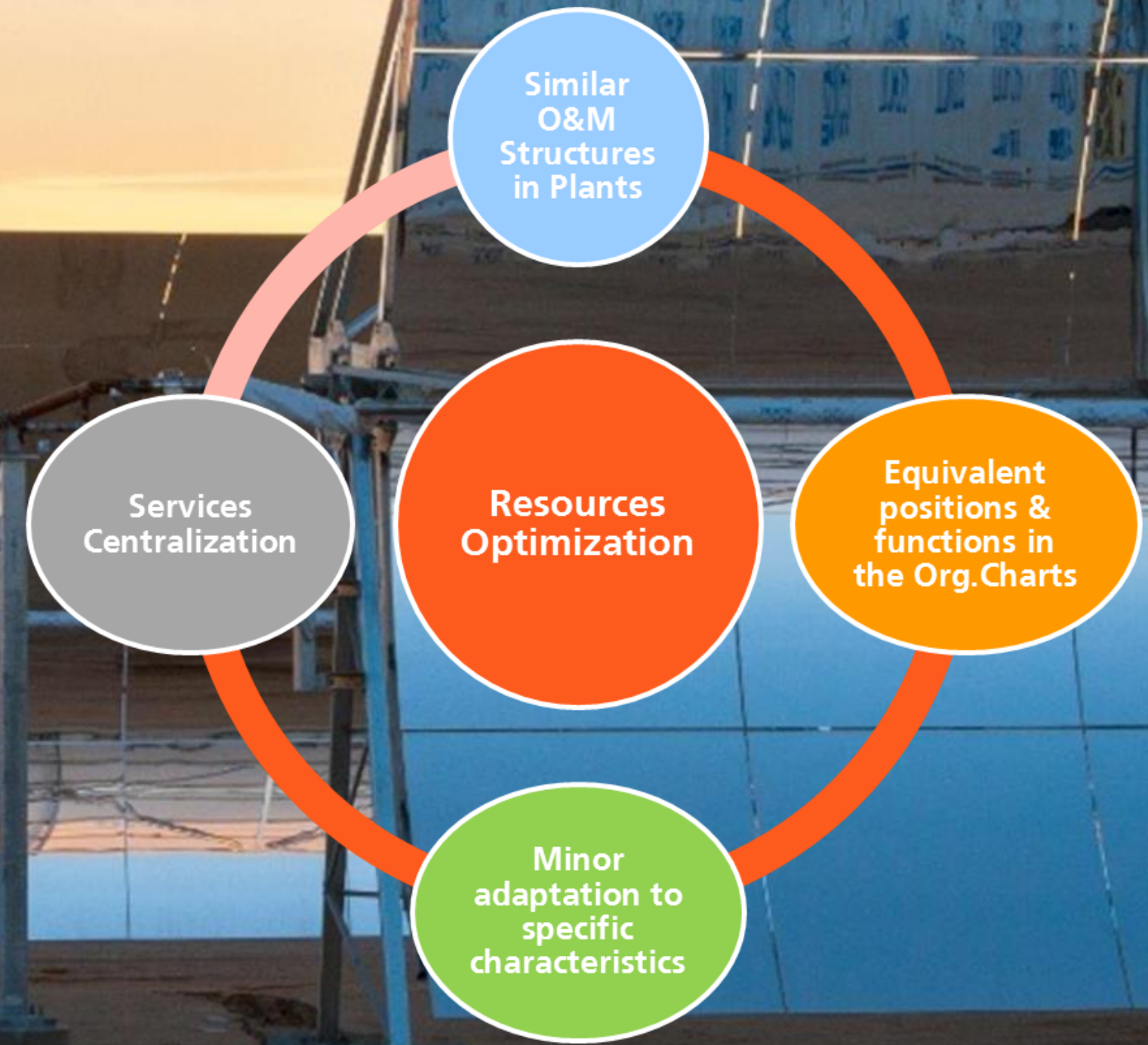


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# 2

## O&M Organization





# O&M Organization

## Similar O&M Structures in Plants

- Simplifying management and control
- Improving communication at the same levels of management
- Making easier the experiences transfer between the different organization management blocks
- Allowing the comparison of the organization blocks performance



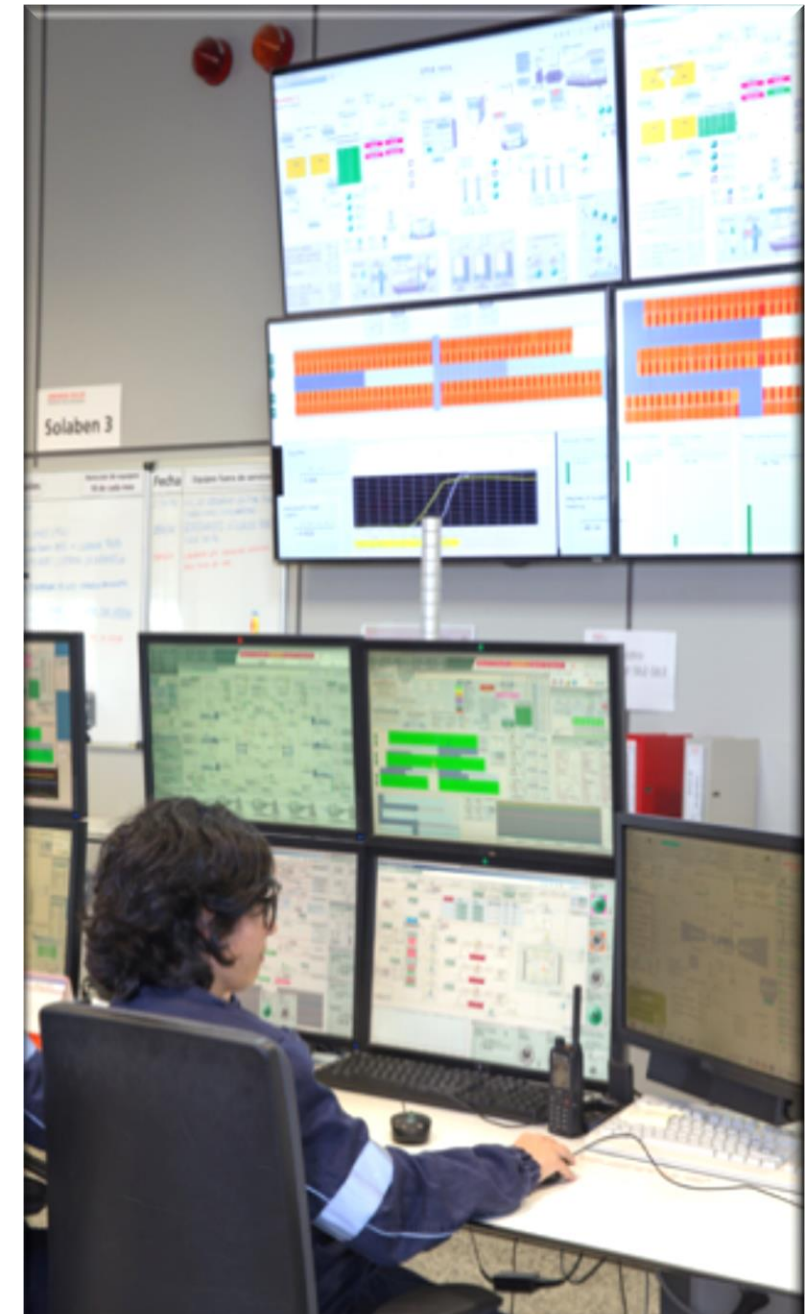
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# O&M Organization

## Equivalent Positions with same Functions

- Making easier the replacement of vacant positions
- Providing homogeneity for performance evaluation
- Improving the transmission of know how
- Simplifying the training processes



# O&M Organization

## Minor Adaptation to Specific Characteristics

- Only new organization blocks or positions if required by differential/new technologies

## Services Centralization

- To reach the benefits of synergies among the plants on efficiencies and costs reduction

### Engineering Services

- Centralized performance analysis
- Standardization of engineering and operations procedures
- Homogeneous criteria for improvements and systems automation
- DCS and I&C maintenance support
- Centralized analysis of incidents

### Operations Services

- Homogeneous operations management processes
- New operations teams recruitment and training
- New operations processes support

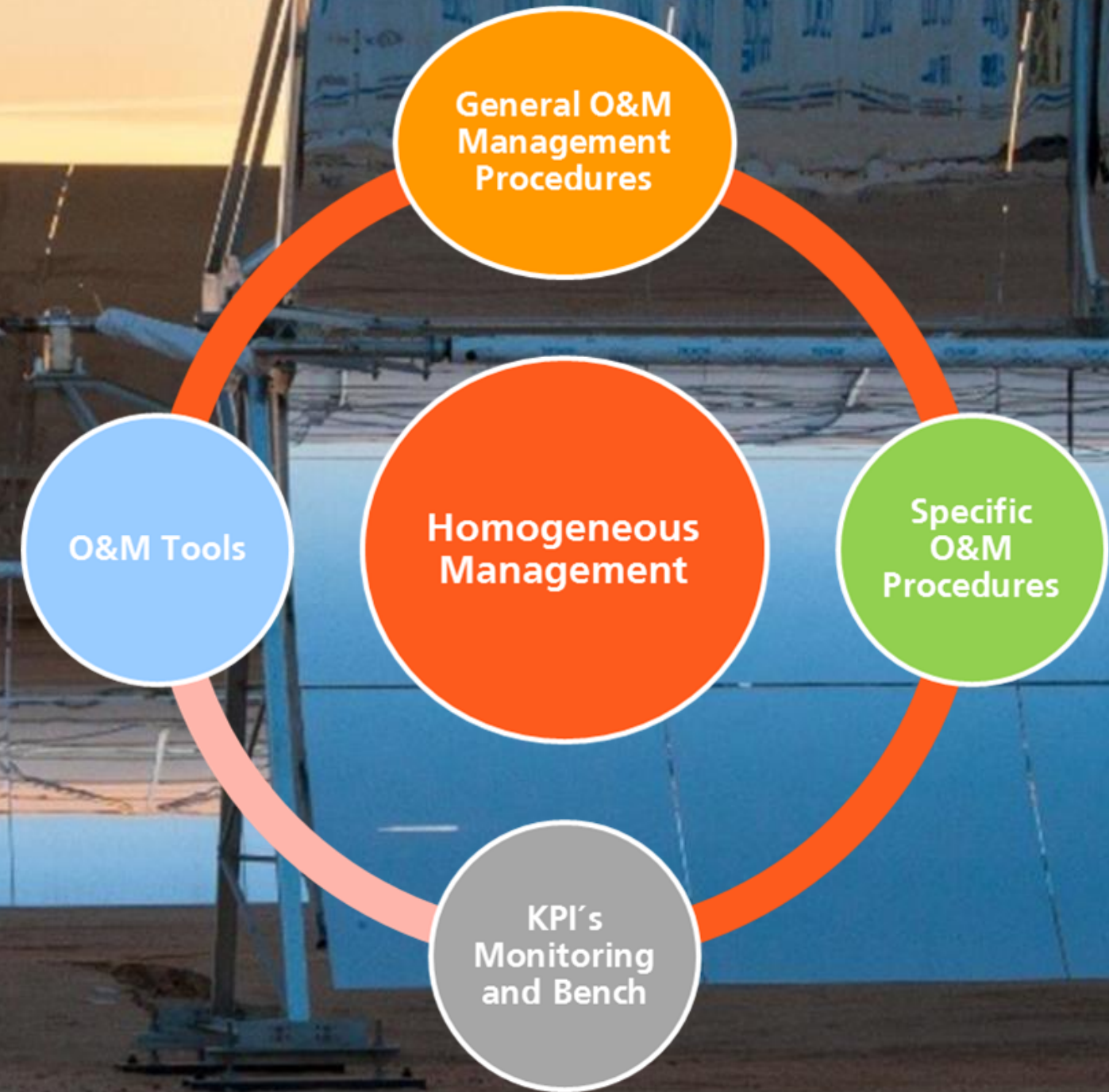
### Maintenance Services

- Homogeneous maintenance management processes
- Predictive maintenance
- Solar fields optimization
- Solar receivers (tubes) replacement/alignment
- Maintenance of cleaning trucks



# 3

## O&M Management





# O&M Management

## General O&M Management Procedures

- Establishing general guidelines on solar plants management
- Establishing the modus operandi with the staff departments (H&S – Q&Env. Department, Purchasing Department, Costs Control Department, Technical Department, Centralized Maintenance and Operations Departments)
- Establishing the internal coordination meetings among the different plant organization blocks
  - Org.Charts, Structure and Functions
  - Coordination of Meetings and Committees
  - O&M Specific Management Tools
  - Reporting and Dashboards
  - Objectives and Action Plans
  - Maintenance Management
  - Events Management
  - Budgets Control
  - Mobilization and Training

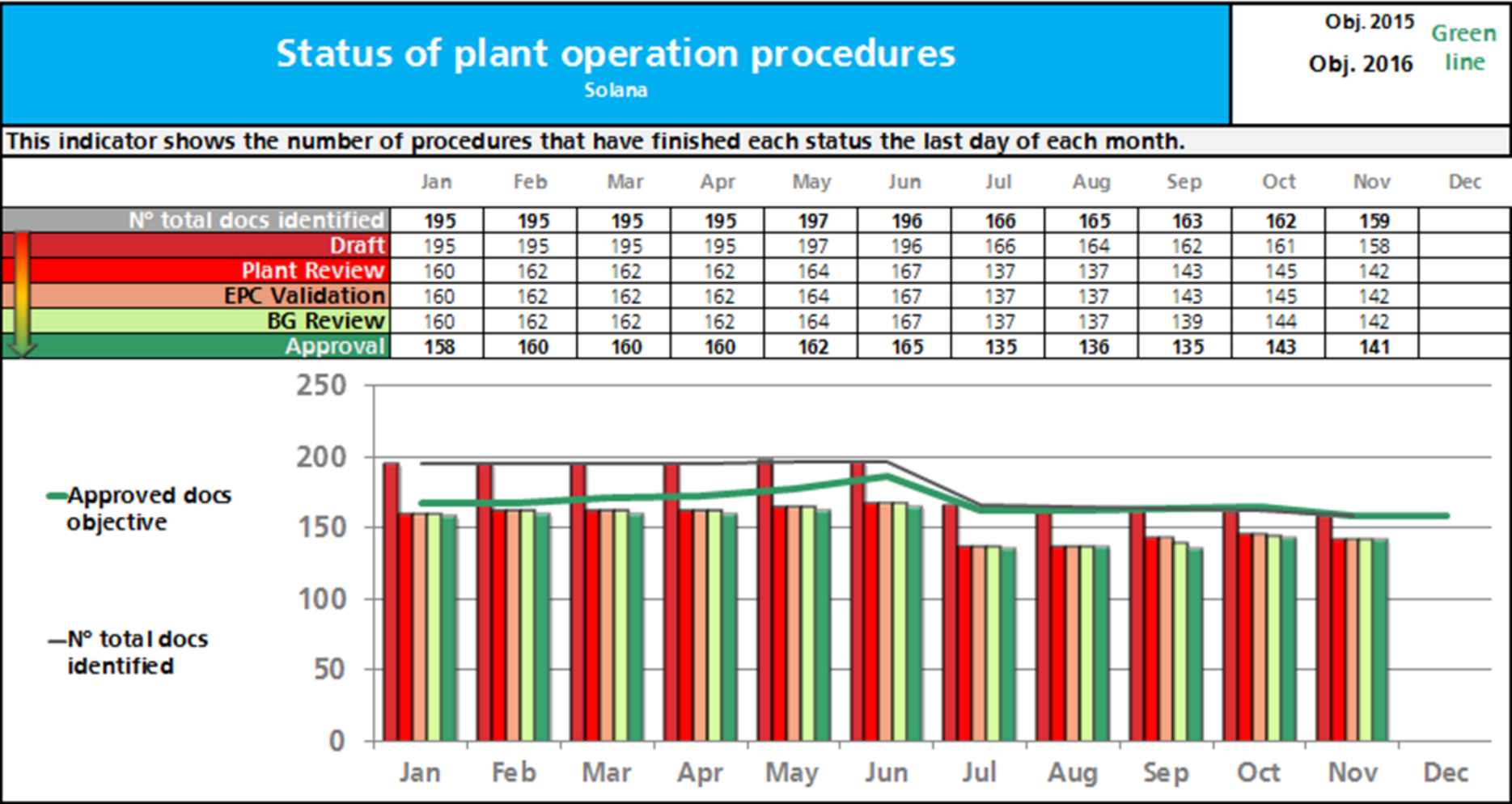




# O&M Management

## Specific O&M Procedures

- Developing and improving specific Operations and Maintenance procedures
- Auditing the use of the specific Operations and Maintenance procedures
- Controlling the standardization of specific Operations and Maintenance in all plants





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## Recruitment and Training



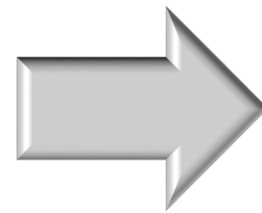


# Recruitment and Training

## Challenges to be faced in New Geographies

- The new plants include new technologies
- Transferring culture and ways to do is more complex in remote geographies
- Expats have a high cost and mobilization time is limited
- Proposed strategy is based in local personnel
- The selection process starts two years before expected COD

Local key positions  
selection



- Plant Manager
- Operation Manager
- Maintenance Manager
- Engineer Manager
- Solar Field Coordinator



# Recruitment and Training

## Training for the key positions

- Integrating local key personnel into plants (depending on the language and others considerations) for training during a long period, (one to two years)
- Training in corporate and management procedures and O&M specific management tools...
- Living the day to day in the plant (different locations) next to the homologous position
- During a certain period they will manage the position being closing supervised by the assigned trainer
- Additional support to be provided by centralized Operations and Maintenance departments in new technologies issues



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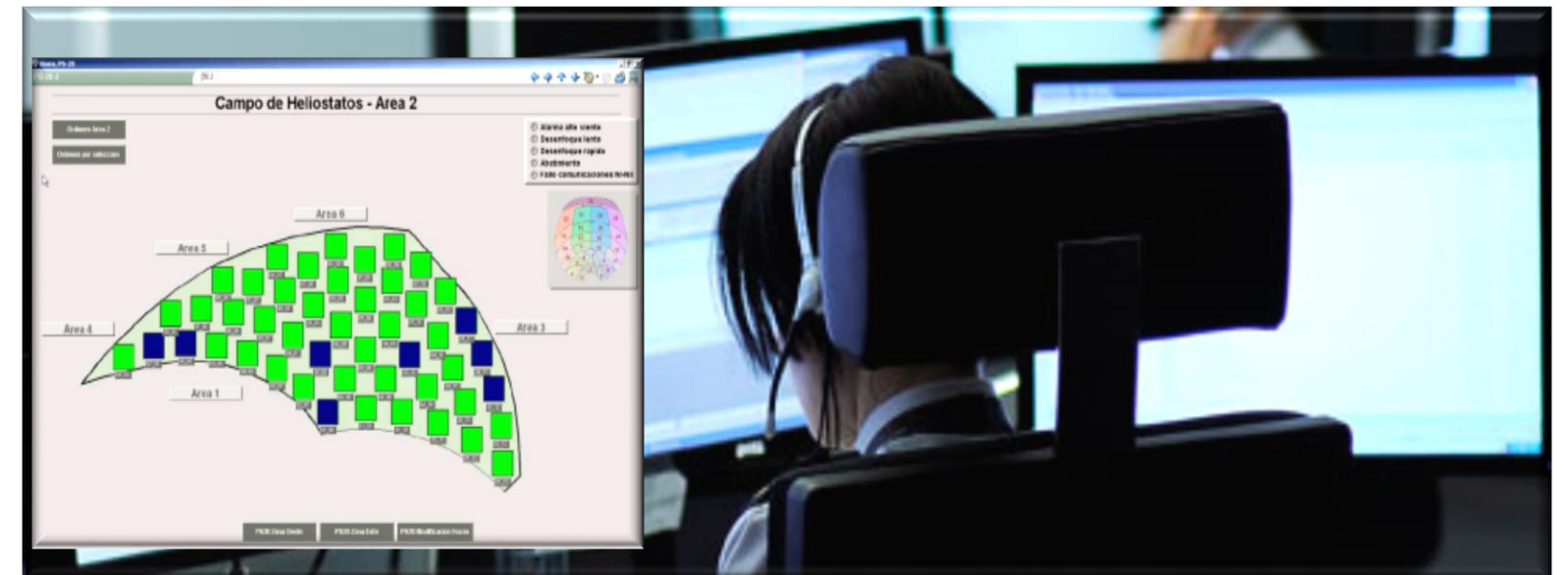


# Recruitment and Training

## Practical Training, Simulator and In-plant Training

- An advanced plant simulator has been effectively employed for training control room operators
- This systems allows to take experience on daily plant routines as start-up, full load generation, cloudy transients generation, generation strategies based on thermal storage systems, plant shut-down
- This system also allows to prepare crews for incidents response

- In-plant training, integration of control room and plant operators in active O&M teams in closer plants in commercial operation, to be trained by experienced personnel
- Integration of experienced personnel from commercial in active O&M teams in plants coming into operation for supporting new teams







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