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# Task 45 – SUBTASK C

## Large Systems

Large solar heating/cooling systems,
seasonal storages, heat pumps

**2011-10-24/25**
**Banff**

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# SUBTASK C Milestones & Deliverables

| | |
|---|---|
| C-D1 | Overview on applications and system configurations |
| C-D2 | Updated database for large systems > 0.5 MW |
| C-D3 | Guidelines and tool(s) for feasibility and sensitivity analysis |
| C-D4 | Models and case studies for ESCo services |
| C-D5 | Procedures for system performance guarantee/check, monitoring and surveillance |
| C-D6 | Guidelines for planning, installation, commissioning, operation and monitoring |
| C-D7 | Inputs for Design Handbook |
| C-D8 | Input to Task web site |
| C-D9 | Subtask C Summary Report |



# Work Progress D1 - SOLID

Overview on applications and system configurations

- D1.1, 1.2 Systematic categorization of large solar systems with respect to applications, components, component types and detailed description
  → Results: spread sheet distributed (including description), weak response ACTION needed!

**Discussion/correction to workplan:**

- Extend timetable to project end (more data)
- How detailed system description?
- How motivate partners to fill in the spread sheet?
- Categories to add:
  - climate, energy gain, shadows (%), operating time, pipe insulation, ?
- Input from Asia? How?
- Input from Task 38 lagged (started last week)

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# Work Progress D2 - CHALMERS

Updated database large systems > 0.5MW

- D2.1, 2.2, 2.3 Data base preparation, fill in and maintenance

→ Results: Presentation of Jan-Olof Dalenbäck

**Discussion/correction to workplan :**

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# Work Progress D3 - AIGUASOL

Guidelines and tools for feasibility and sensitivity analysis

- D3.1 Does a large solar system fit into the surrounding regional/national energy system (competition with waste heat, integration in the free market for electricity, …) (each national representative)
- D3.2 Tools for facilitating feasibility studies: overview on calculation tools providing strong/weak points and user categories
- D3.3 Develop a dedicated pre-feasibility tool

→ Result: Presentation of Oriol Gavalda

**Discussion/correction to workplan :**



# Work Progress D4 - SOLID

Models for ESCo services

- D4.1, 4.2, 4.3 ESCo compendium with models, best practice, barriers, examples; examples of different countries
  → Results: - Draft of ESCo Compendium is ready
  - List of Actors
  - Spread sheet existing solar thermal ESCo ready and pre-filled with results from BioSolEsco, but not distributed yet
  - ESCo calculation tool

**Discussion/correction to workplan :**

- Distribution of spread sheet? Results awaited? Or take the ones from BioSolEsco….
- At the end of project another call round for new ESCos

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# Work Progress D5 - PlanEnergi

Procedures of performance check

- D5.1, 5.2, Procedures and recommendation for monitoring, performance check and surveillance of systems;
  → Results: SDH performance guarantees

**Discussion/correction to workplan :**

- SDH performance guarantees upgrade for solar cooling, heat pump, process heat

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# Work Progress D6 - SOLID

Guidelines for planning, installation, commissioning and operation

- D6.1, 6.2, 6.3, 6.4 Draft of guidelines; Input for handbook
  → Results: - Draft guideline implemented in handbook and distributed for comments
  → <u>all response will be implemented</u> !

**Discussion/correction to workplan :**

- Separate guideline and handbook?
- How detailed?

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# Work Progress D7, D8, D9

Input for design handbook, webpage and summary report

- D7 Input in design handbook started already
  Result: First distribution round is over – all response will be implemented in the handbook

**Discussion/correction to workplan :**

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# Time Table/Work Progress

| | 2011 | | | | 2012 | | | | 2013 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **C-D1. Overview system categories** | | | D | | R | | | | | | | |
| **C-D2. Updated database large systems >0.5MW** | | | | D | $R_1$ | | | | | | | |
| **C-D3. Guidelines and tools for feasibility incl. sensitivity analysis** | | | | | | | | D | R | | | |
| **C-D4. Models for ESCo services** | | | D | | R | | | | | | | |
| **C-D5. Procedures for performance check/monitoring/surveillance** | | | $D_1$ | | | | D | | | | | R |
| **C-D6. Guidelines for planning, installation, commissioning, operation** | | | | | | | | | D | | | R |
| **C-D7. Inputs for design handbook** | | | | | | | | | D | | | R |
| **C-D8. Input to task website** | | | | | | | | | | | | |
| **C-D9. Subtask C Summary Report** | | | | | | | | | D | | | R |

Milestones: D: Draft reports(s); R Final reports(s); $R_1$: First Report; $D_1$: First Draft


Thank you!

# Solar Cooling ESCo 2011

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solarinstallation+design

## Largest Solar Cooling Installation Worldwide

# Solar Cooling ESCo 2011

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## United World Colleague Singapore Opens 09/2011

- 4.000m² Solar Panels
- 1,6 MW cooling load
- 2200 MWh/y DHW + cooling
- Investment 4,5 Mio €
- Energy Price Singapore 0,27 S$/kWh (16 cent)
- Payback 8,1 years
- Energy savings: > 675.000 S$/kWh/y (387.000€)

# Solar Cooling ESCo 2011/2012

SOLID solarinstallation+design

## Multiplication Factor:
## Desert Mountain Highschool (Erection Phase)


- 1,8 MW cooling load
- 2600 MWh/y DHW + cooling
- Investment 5 Mio €
- Payback 11 years (no funding)

# Further Installations

- Installation just started: 4.500m² for a prison in Arizona (enlarged to 9.720m² in 2013 planned)
  500ton chiller
- Gatorade (softdrinks): start up 04/2011 of 2400m² process heat
- Installation started: 600m² heat for Hyatt in Caribbean and 1200m² for Hyatt Phoenix
- Operation start in Graz 10/2011, 700m² heat for fair area
- 1MW ( 1200m²) process heat for meat processing company in 2012

In last planning phase:

- **15.000m²** with 125.000m³ large seasonal storage in Graz; SDH; installation planned for 2013
- **15.000m²** solar cooling for Airport Jamaica