An SME cost-competitive approach to provide CSH

Miguel Frasquet
One minute about me

Early research Almería, Spain
Direct steam generation at DISS loop (PSA)
Head of Solar R&D Dept. at CTAER (Almería)

PhD Solar Thermal Enhanced Oil Recov.
Masdar Institute (Abu Dhabi)
China University of Petroleum (Beijing)

Role of data in Energy Markets
Master in International Business Administration (UAL)
Data science (Saarland University)

Since June 2016 ...

European Startup Award 2017 (Climate)
Traditional vs SME approach

Meat processing industry (Valencia) Spain

<table>
<thead>
<tr>
<th></th>
<th>Large company</th>
<th>SME</th>
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<td>Annual thermal energy demand</td>
<td>27.6 GWh</td>
<td>1.34 GWh</td>
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<tr>
<td>Available surface</td>
<td>12,400 m²</td>
<td>1,790 m²</td>
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## Traditional vs SME approach

### Meat processing industry
(Valencia) Spain

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<tr>
<td>Fuel price</td>
<td>0.0187 €/kWh (NG)</td>
</tr>
<tr>
<td>Decision process</td>
<td>&gt; 3 decision makers</td>
</tr>
<tr>
<td>Energy density</td>
<td>2.22 MWh/m²</td>
</tr>
<tr>
<td>Market*</td>
<td>0.9 %</td>
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*Data & Trends EU Food and Drink Industry 2017*
Main challenges in the SME approach

<table>
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<th>Market</th>
<th>Extremely <strong>atomized</strong> market (In Spain +3M companies)</th>
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<td>Very difficult to reach them</td>
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| Product                             | In medium and small projects, **Engineering & fixed costs** become significant |
Case-by-case approach for assessing the market

Large industry approach  36.8 GW

SME approach   7.1 GW
Case-by-case approach for assessing the market

PABLO - Probabilistic Algorithm for Better Lead acquisition

PHASE 1 - Municipality resolution

\[ X = 8142 \]

Example for textile industry

\[ X' \leq X \]

\[ 100\% \]

\[ 57\% \]

\[ 43\% \]

\[ 4.8\% \]

PHASE 2 - Industry resolution

\[ Y_x \]

100%

43%

26%

PHASE 1 - Industry resolution

Minning (3)

Chemical (14)

Sewage TP (62)

Textile (5)

Laundries (21)

Food&Bev (42)

Agro (15)

Paper (4)
Case-by-case approach for assessing the market

Who is who
Estudio geolocalizado del potencial de aplicaciones de calor solar de proceso en media temperatura

Who is who (II)
Segundo estudio geolocalizado del potencial de aplicaciones de calor solar de proceso en media temperatura
How to study 400 industries in 5 months

Large industry approach

>4200 €  2 weeks

SME approach

Free  30 seconds
How to study 400 industries in 5 months

ReSPl
www.ressspi.com

Open-source online calculator for CSH
Python 3
https://github.com/mfrasquet
6 countries

Integration concepts IEA Task 49
Input form with Firewall
Optimization algorithm
Online Front-end

9 x Integrations concepts

9 x Integrations concepts

Local Search
Hill-Climbing (first/best acceptance)
Simulated Annealing
Threshold acceptance
Tabu search
Late Acceptance Hill-Climbing

LCOE

Production & Demand
How to make SME projects cost-competitive

Large industry approach
In-situ ad-hoc construction

SME approach
Pre-assembled standard modules

ref: Soltigua 2014 - InSun project
How to make SME projects cost-competitive

1=100
No foundation
Self-calibrated
Ready to be connected in 1 hour

100=1
Standard power-block in rack
The SME market is extremely **heterogeneous** and **scattered**, and therefore it is necessary to try new strategies to reach them.

SME market is a **game of numbers** that you cannot play alone.

With standardization SME projects are **cost-competitive**.
Have fun, and enjoy the sun!!  Thank you

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