San Dimas TDC Solar Project
John Handy, Federal Business Development Manager
September 28, 2016
Agenda

1. REC Overview
2. Project Objectives
3. Selection Criteria
4. Project as Bid and Constructed
5. Project Performance
6. What has changed since 2010
7. Recommendations
End-to-end turnkey commercial solar energy solutions.

**Financing**
- Tailored Financing Solutions and modeling:
  - PPA
  - Lease
  - Cash

**Development**
- Market and Policy Research
- Site Evaluation and Preliminary Design
- Energy Usage and Rate Analysis

**Engineering**
- Electrical Design
- Civil Design
- Mechanical Design
- Permit and Record Plan Sets
- Utility and Local Jurisdiction coordination

**Procurement**
- Material Selection
- Subcontractor Management
- Material Flow
- Logistics

**Construction**
- Project Management
- Site Supervision
- System Types:
  - Ground
  - Roof
  - Carports
  - Trackers

**O&M**
- Full in-house O&M
- Warranty Administration
- Asset Management
- System Upgrades
- Performance Guarantees
19 Years of Expertise

More than 550 projects totaling over 200 MWs
Continual Innovation in Energy Services

As the energy ecosystem evolves, we invest in ongoing R&D to enhance our customers’ solutions and increase their return on investment.

For example, we are working with other Duke Energy companies to build an integrated energy solution that combines solar, storage and data management.
San Dimas Project Objectives

• To generate enough on-site to provide for the majority of the electrical needs
• Additional power can be produced within the budget
• Excess power may be purchased by Southern California Edison
• Currently use is approximately 371,000 kWh/year
Selection Criteria (Best Value)

Not necessarily the highest technically-ranked or proposing the largest PV system

• Design Concept
• Ability to complete the work by December 15, 2010
• Past performance & experience
• Output in kWh & System size in kW
• Ability to provide a Performance Data Provider

Available budget of $1,435,587.00
## System Specifications

### As Proposed

- 302.7 kW DC
- 250 kW AC
- 105-calendar day timeline
- Completion Dec, 2010
- 594,091 kWh within the first year.
- $1,435,587 ($4.74 / Watt)

### As Built

- 302.7 kW DC
- 250 kW AC
- Awarded July 2010.
- Timeline extended due to Mods
- Completed January 14, 2011
- 532,333 kWh the first year.
- $1,484,863.49 ($4.905/Watt)
- 9 MODS

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First year credit to SDTDC and National Forest SCE accounts of more than $13,000
## Contract Modifications

<table>
<thead>
<tr>
<th>MOD</th>
<th>Price Changes</th>
<th>Time extension</th>
<th>Reason</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$20,450</td>
<td>Not stated</td>
<td>Upgrade Security System</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>none</td>
<td>Additional Funding as previously described</td>
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<tr>
<td>3</td>
<td>$21,715.00</td>
<td>Not stated</td>
<td>SCE interconnection Upgrades</td>
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<td>4</td>
<td>$7,111.49</td>
<td>30</td>
<td>Install 400MCM wire per SCE direction</td>
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<td>5</td>
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<td>180</td>
<td>SCE Interconnection Discussions – USFS &amp; SCE</td>
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<td>6</td>
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<td>240</td>
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<td>180</td>
<td>SCE Interconnection Discussions – USFS &amp; SCE</td>
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<tr>
<td>9</td>
<td>0</td>
<td>90</td>
<td>Extend period of performance to July 22, 0213</td>
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</table>
# Current State

## System Performance

<table>
<thead>
<tr>
<th>Year of Operation</th>
<th>Budgeted Energy (kWh)</th>
<th>Actual Energy (kWh)</th>
<th>Production Vs. Budget</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>476,971</td>
<td>531,958</td>
<td>111.5%</td>
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<tr>
<td>2</td>
<td>474,586</td>
<td>537,589</td>
<td>113.3%</td>
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<tr>
<td>3</td>
<td>472,213</td>
<td>501,759</td>
<td>106.3%</td>
</tr>
<tr>
<td>4</td>
<td>469,852</td>
<td>429,055</td>
<td>91.3%</td>
</tr>
</tbody>
</table>

Total-Lifetime: 1,893,623 kWh 2,000,361 kWh 105.6%

*The system performance is Actual Energy / Budget Energy. The Budgeted Energy comes from an engineering model of the PV system and does not factor for real-time weather conditions.*

## System Health

<table>
<thead>
<tr>
<th>Year of Operation</th>
<th>Expected Energy (kWh)*</th>
<th>Actual Energy (kWh)</th>
<th>Performance Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>419,343</td>
<td>531,958</td>
<td>1.27</td>
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<tr>
<td>2</td>
<td>426,364</td>
<td>537,589</td>
<td>1.26</td>
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<tr>
<td>3</td>
<td>407,675</td>
<td>501,759</td>
<td>1.23</td>
</tr>
<tr>
<td>4</td>
<td>348,864</td>
<td>429,055</td>
<td>1.23</td>
</tr>
</tbody>
</table>

Total-Lifetime: 1,602,245 kWh 2,000,361 kWh 1.25

*The System Health is Actual Energy / Expected Energy. Expected Energy is Predicted Energy corrected for actual, real-time, weather conditions.*
What Has Changed in 6 years

- Cost – comparable system is $3.12 / Watt a 37% drop
- Module efficiency is incrementally improved
- Utility rates are generally higher
- Sources of Funding
- O&M department has expanded from 2 to 21 employees
Recommendations

• Contractor responsible for the interconnection application
• Validate the proposal data against the attachments
• Consider an O&M contract
  • Washing array when performance meets a minimum threshold
  • Active system health monitoring
  • Can be wrapped with a performance guarantee
  • Insures data platform is kept current
Thank You

John Handy
805-709-8134
Jhandy@RECSolar.com