

Solar Technology Research at Sandia

PV and CSP

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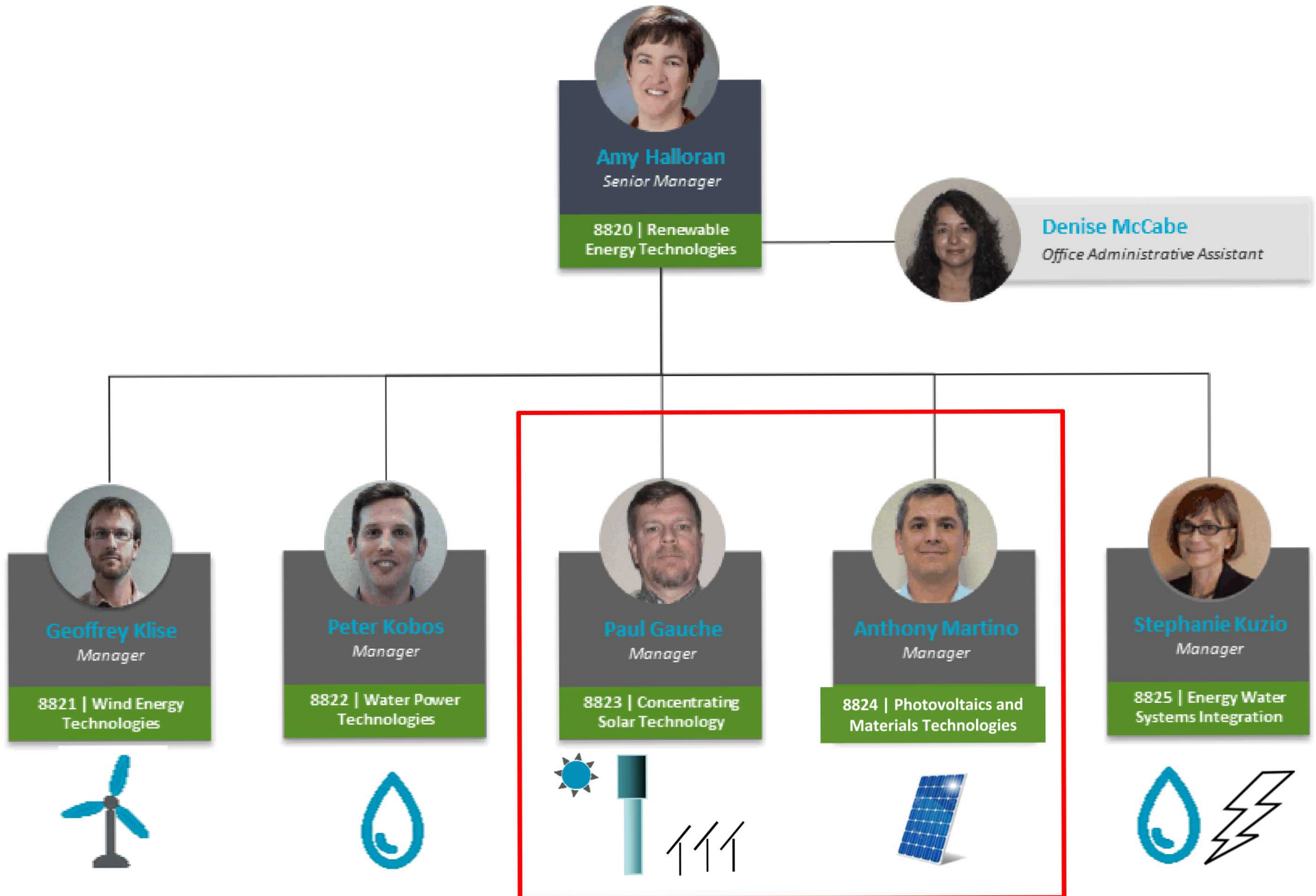
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Renewable Energy at Sandia



Sandia Photovoltaic Systems Evaluation Lab



Images courtesy of Bruce King, SNL



- Evaluate photovoltaic system and component reliability and degradation rates
 - Bifacial research project
- Validate models of energy yield

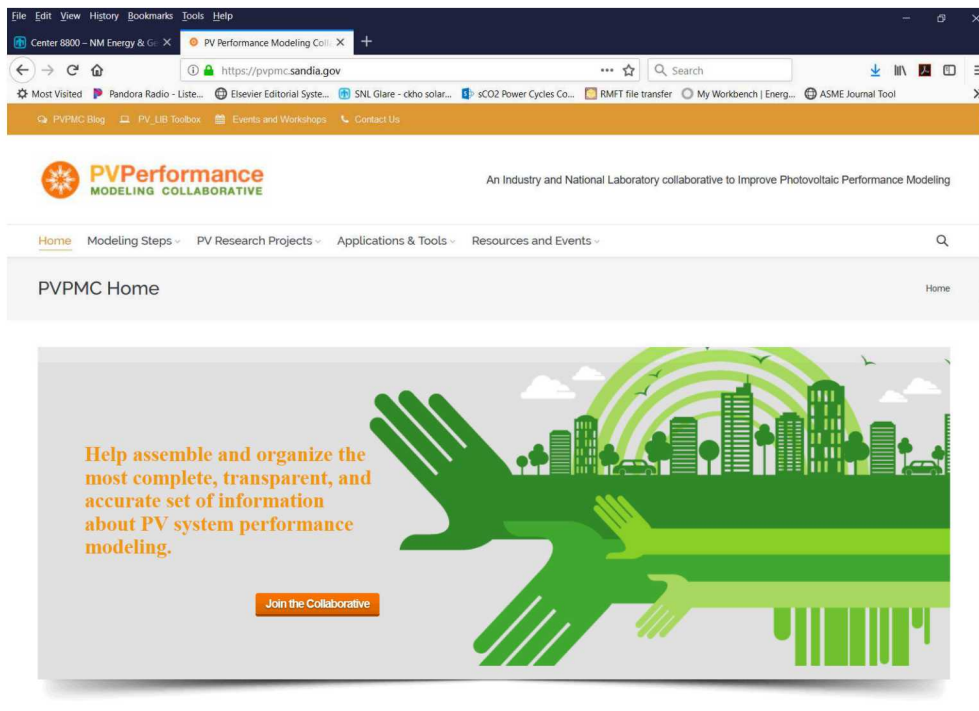


PV Performance Modeling Collaborative



Cliff Hansen, SNL

- pvpmc.org
 - Online reference for PV system modeling
- PVLib for Matlab and pvlib-python
 - Open source implementation of PV modeling tools



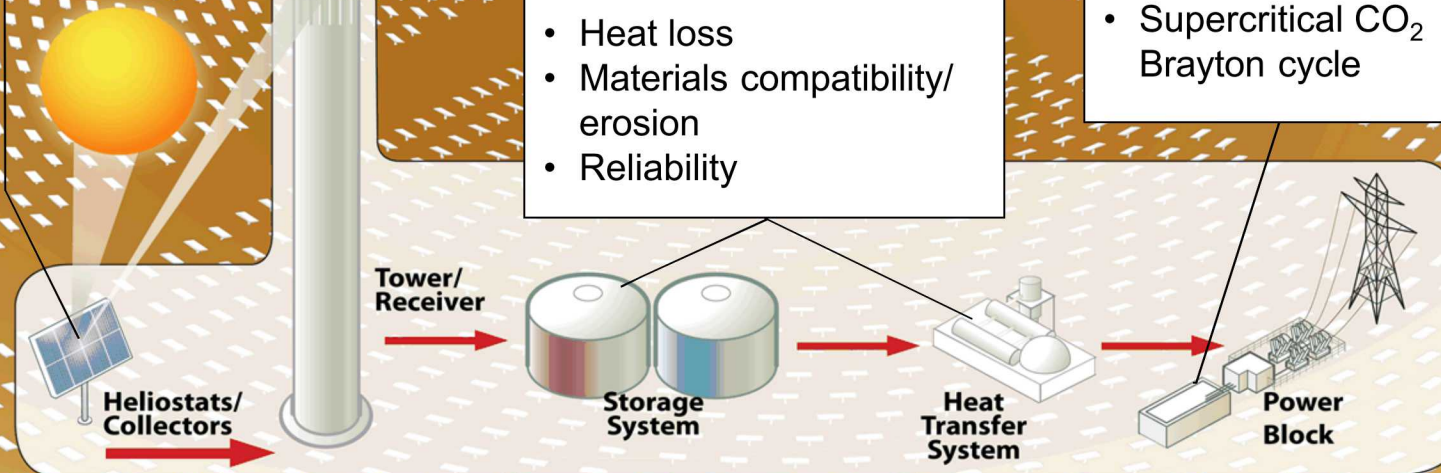
Concentrating Solar Power (CSP)

- Selective absorbers
- High temperature, low-cost materials
- Higher efficiencies

- Reflectivity
- Tracking
- Alignment
- Reliability

- Heat loss
- Materials compatibility/erosion
- Reliability

- Supercritical CO₂ Brayton cycle



Falling Particle Receiver

National Solar Thermal Test Facility

Sandia National Laboratories, Albuquerque, NM



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Backup Slides

Timeline of CSP Development

Solar One and
Solar Two
10 MW_e
Daggett, CA
1980's – 1990's



Stirling Energy Systems
1.5 MW_e, AZ, 2010



Ivanpah,
steam, 377
MW_e, CA,
2014



1970's

1980's –
1990's

2000's

SunShot
2011 -



National Solar Thermal Test Facility
6 MW_t, Albuquerque, NM, Est. 1976



SEGS, 1980's
9 trough plants
354 MW_e, CA



PS10/20,
steam, Spain,
2007-2009

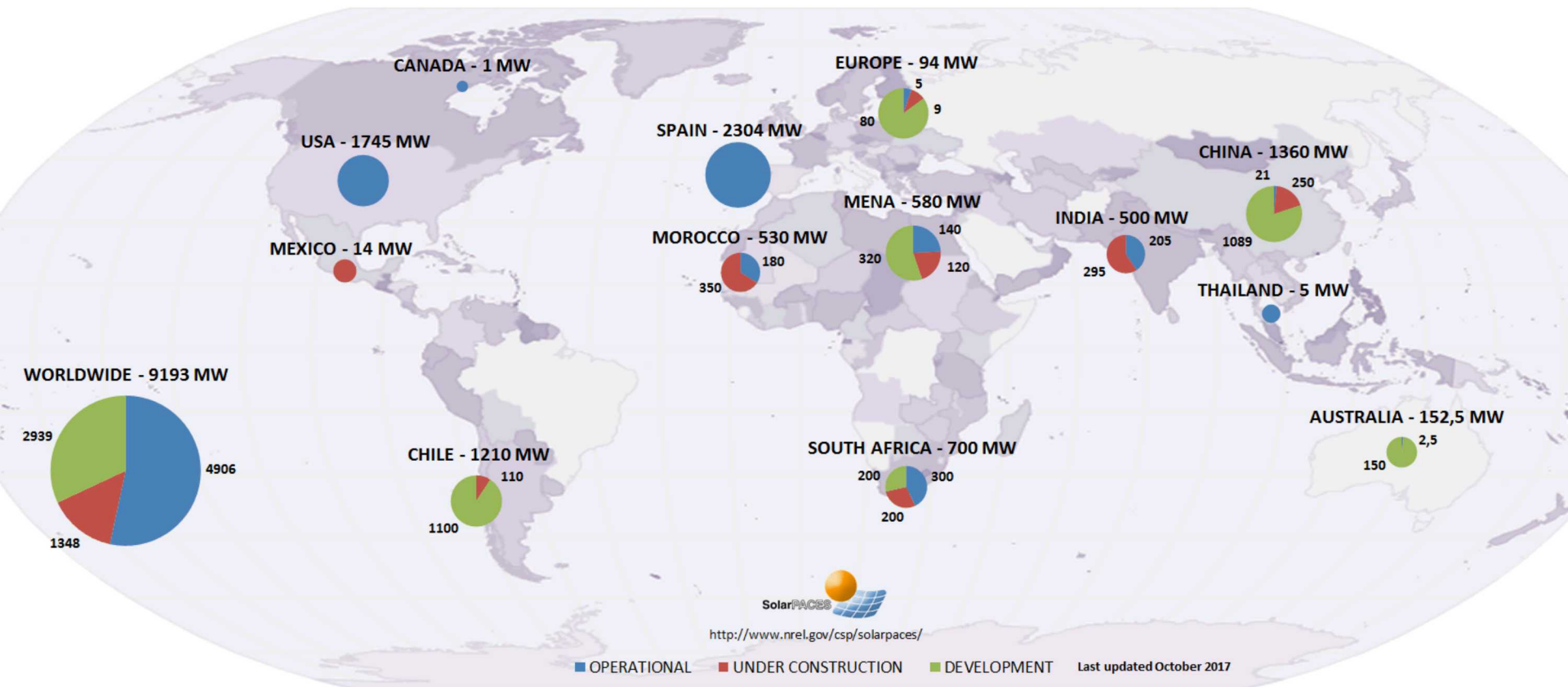


Gemasolar, molten salt, 19
MW_e, Spain, 2011



Crescent Dunes, molten salt,
110 MW_e, NV, 2015

Global CSP Capacity by Country through Oct. 2017



Actual and Projected Growth of CSP

