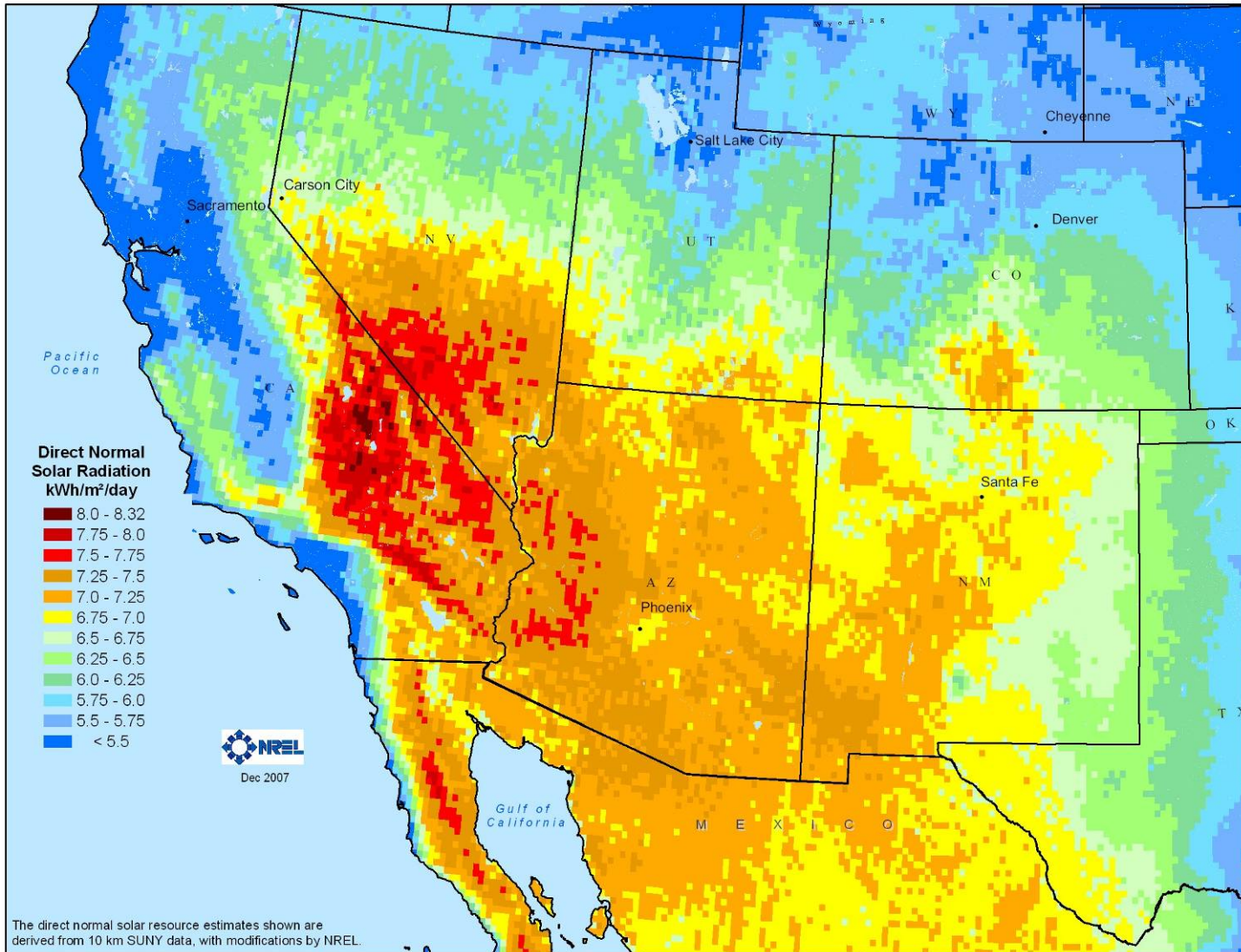


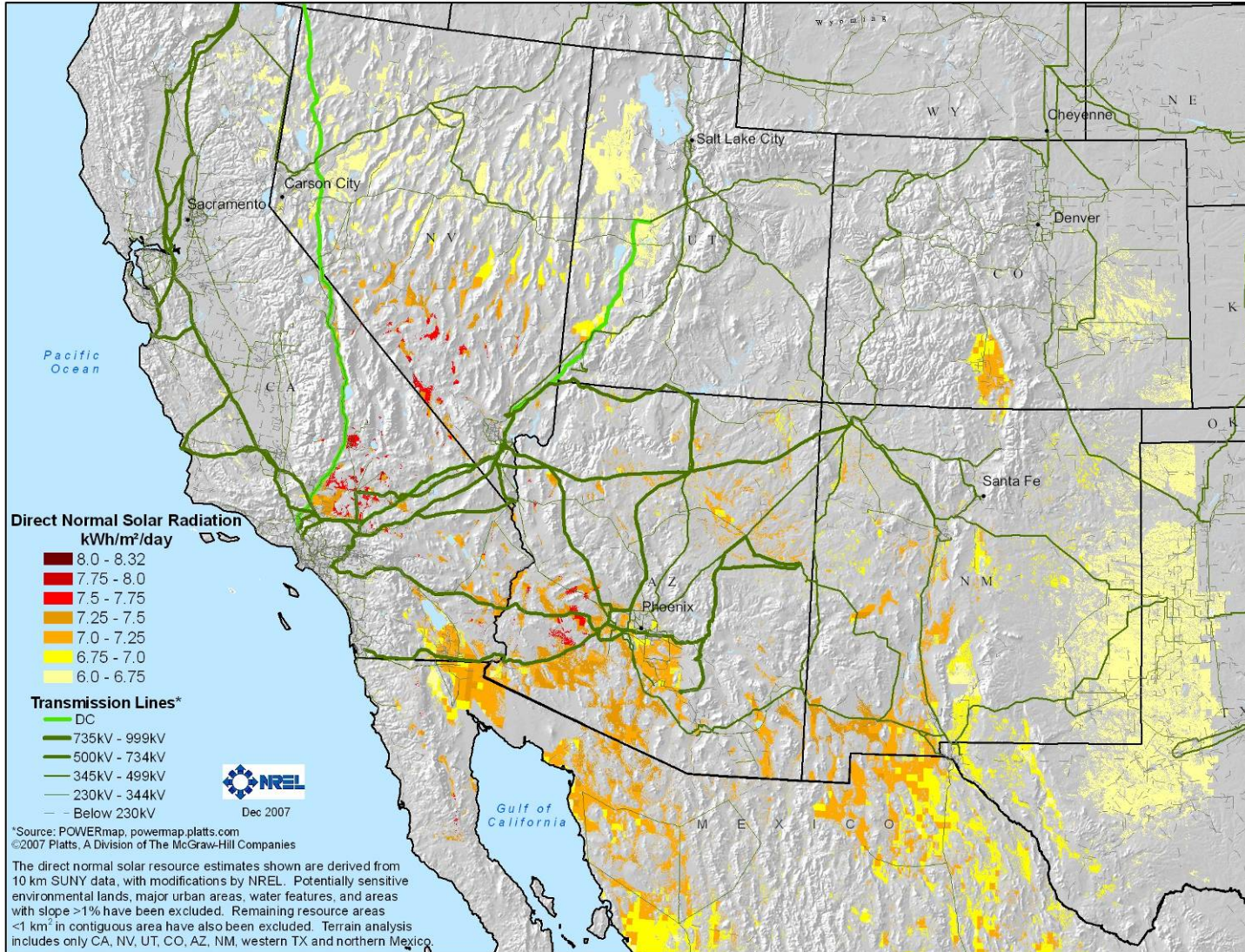
What is Concentrating Solar Power and why should the Congress care?

Dr. Fred Morse
Senior Advisor, US Operations
Abengoa Solar

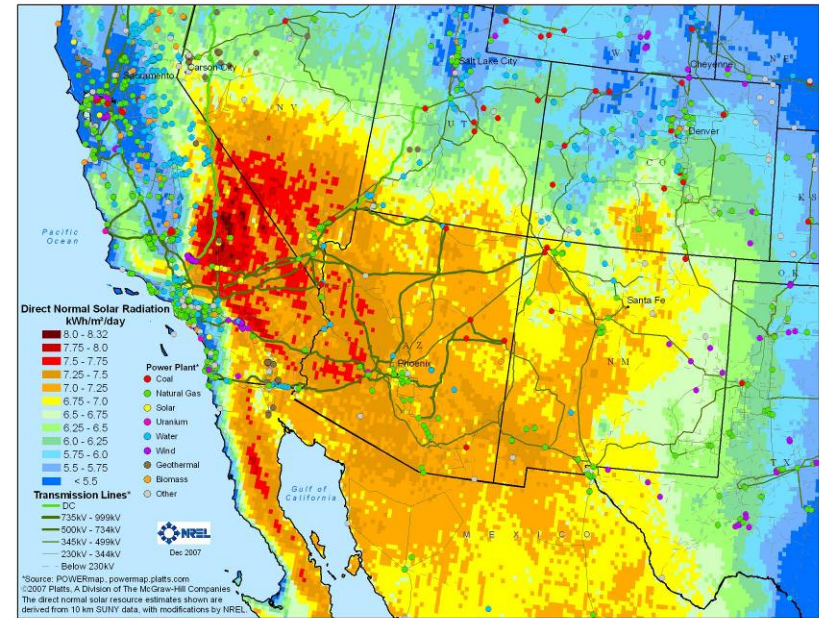
Presented at the Congressional Expo
Washington, DC
31 July 2008

- Solar energy comes in two flavors – diffuse and direct (beam)
- PV can use both components
- CSP can use only the direct because diffuse can not be effectively focused or concentrated
- So where is the direct solar energy found?





State	Land Area (mi ²)	Solar Capacity (MW)	Solar Generation Capacity GWh
AZ	13,613	1,742,461	4,121,268
CA	6,278	803,647	1,900,786
CO	6,232	797,758	1,886,858
NV	11,090	1,419,480	3,357,355
NM	20,356	2,605,585	6,162,729
TX	6,374	815,880	1,929,719
UT	23,288	2,980,823	7,050,242
Total	87,232	11,165,633	26,408,956



The table and map represent land that has no primary use today, exclude land with slope > 1%, and do not count sensitive lands.

Solar Energy Resource ≥ 6.0

Capacity assumes 5 acres/MW

Generation assumes 27% annual capacity factor

- Concentrating Solar Technologies can be used to “mine” this resource. They were covered by the previous speaker.
- Some of these technologies use curved mirrors to focus the sun’s rays and to make steam, others directly produce electricity.
- This steam is used to produce electricity via conventional power equipment.
- In multi-Megawatt plants, CSP provides the lowest cost solar electricity.
- Can provide bulk and/or distributed generation.



Parabolic Trough



Power Tower



Linear Fresnel



Dish Engine

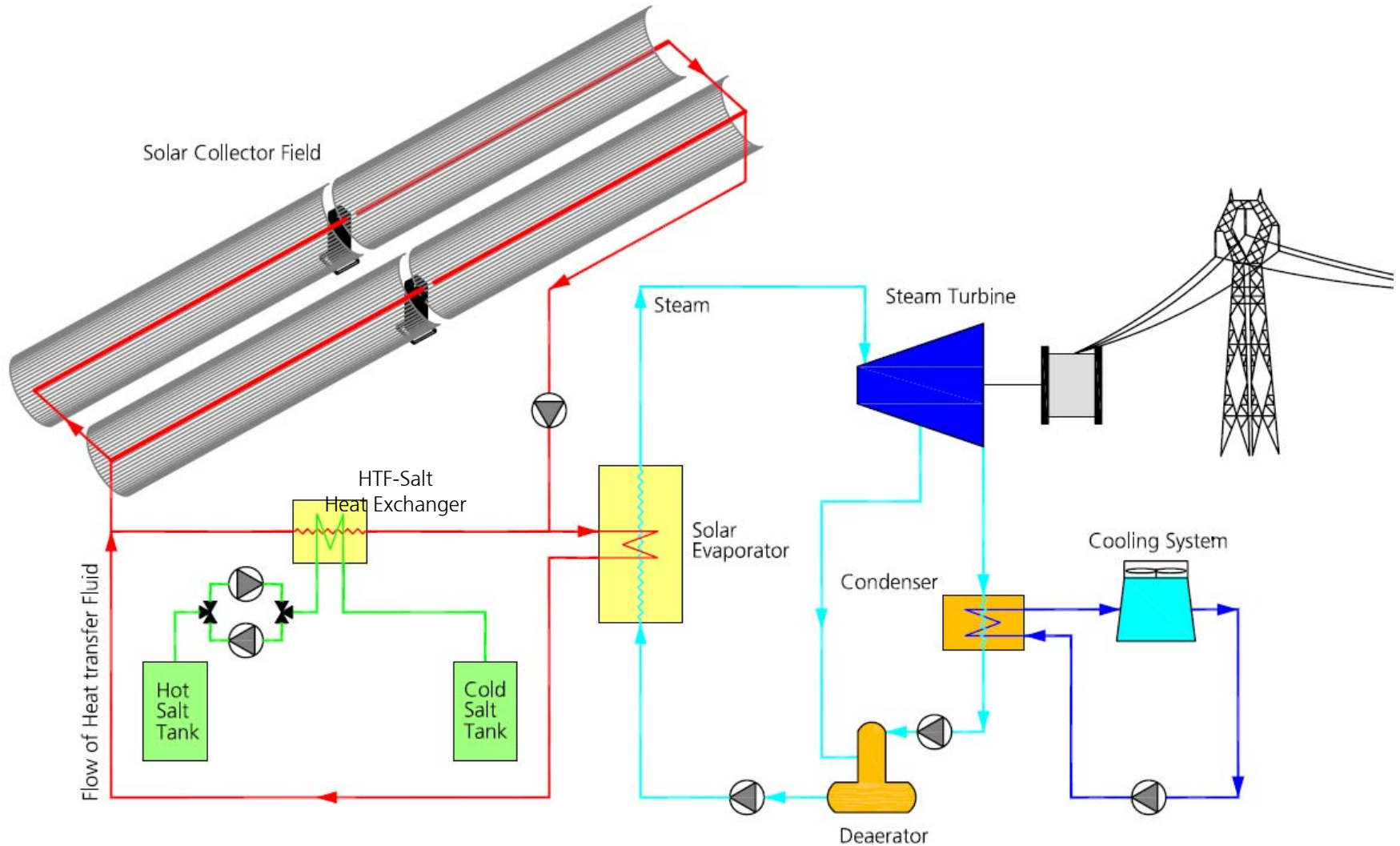


Concentrating PV

- **Necessity** – the utilities' other options (coal, nuclear or NG) have significant long term risks
- **Uniqueness** of thermal energy storage
- **Public opinion** favors solar
- **Favorable but still unreliable policies**, such as the RPS and the ITC (both of which are essential)

- **Utilities** – Growing fast where good DNI and policies exist.
- **Policy makers** – Generally lagging as evidenced by inadequate or unreliable policies at the federal and state levels
- **Investors** – Growing fast as evidenced by news articles and conferences but lagging wind and PV investments, held back by ITC uncertainty and today's financial market situation

- Utilities are familiar with **steam** generation
- Suitability for utility **scale** installations of 100MW or more
- Stable, known and decreasing costs and zero carbon emissions provide **hedge** against NG price volatility and carbon caps
- Other generation options have significant **risks**
- Ability to provide **firm dispatchable** output which is of **great value** to utilities







Molten-salt storage used at Solar Two

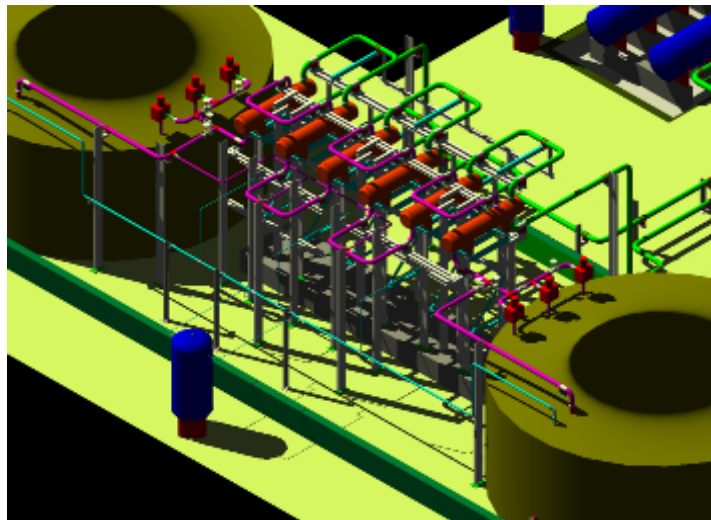


2 molten-salt storage systems under construction in Spain (one is our own demonstration system)

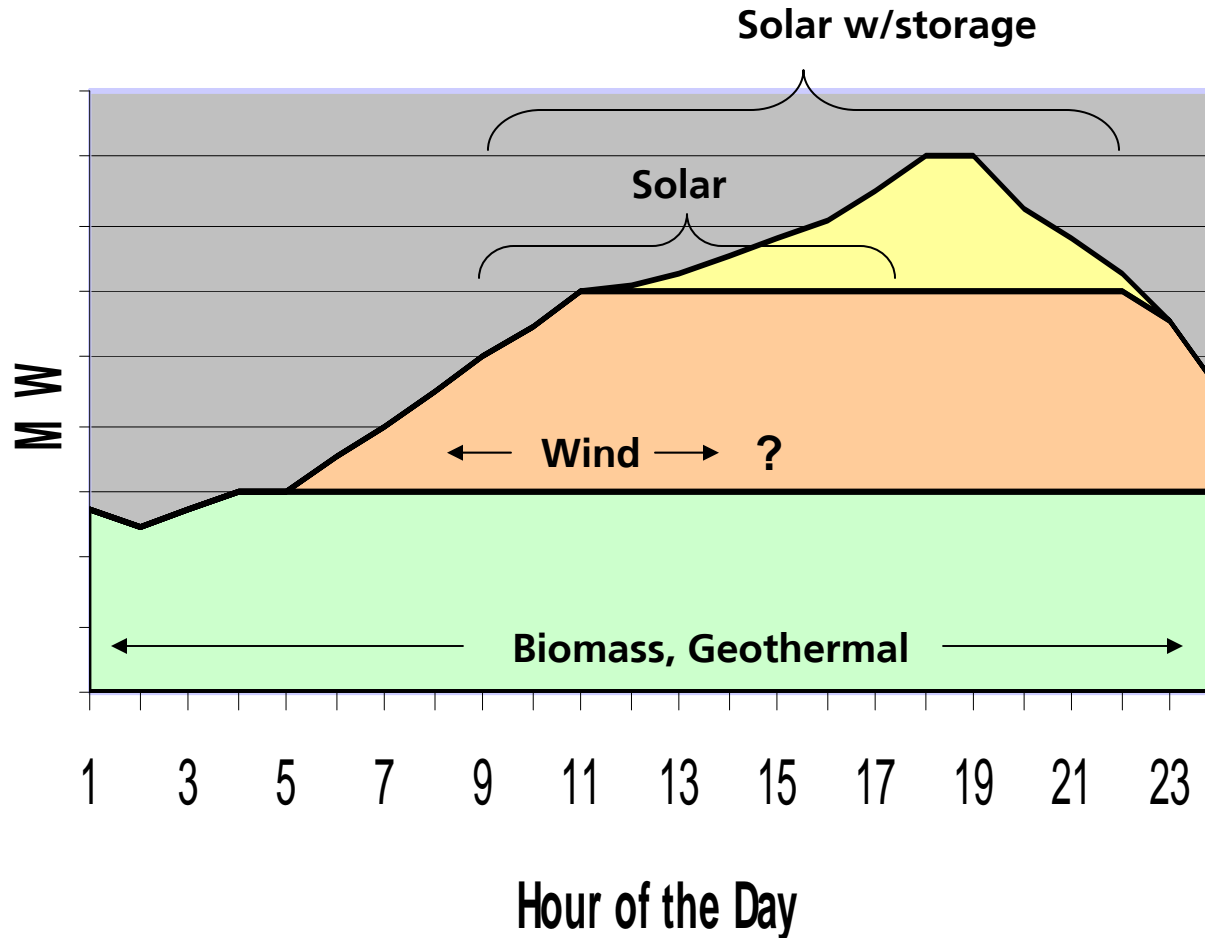
Spain – 7hrs @ 50MWe

APS – 6 hrs @ 250 MWe

- ~4 times as big
- 4 sets of tanks



Trough plant requires the addition of oil/salt heat exchangers



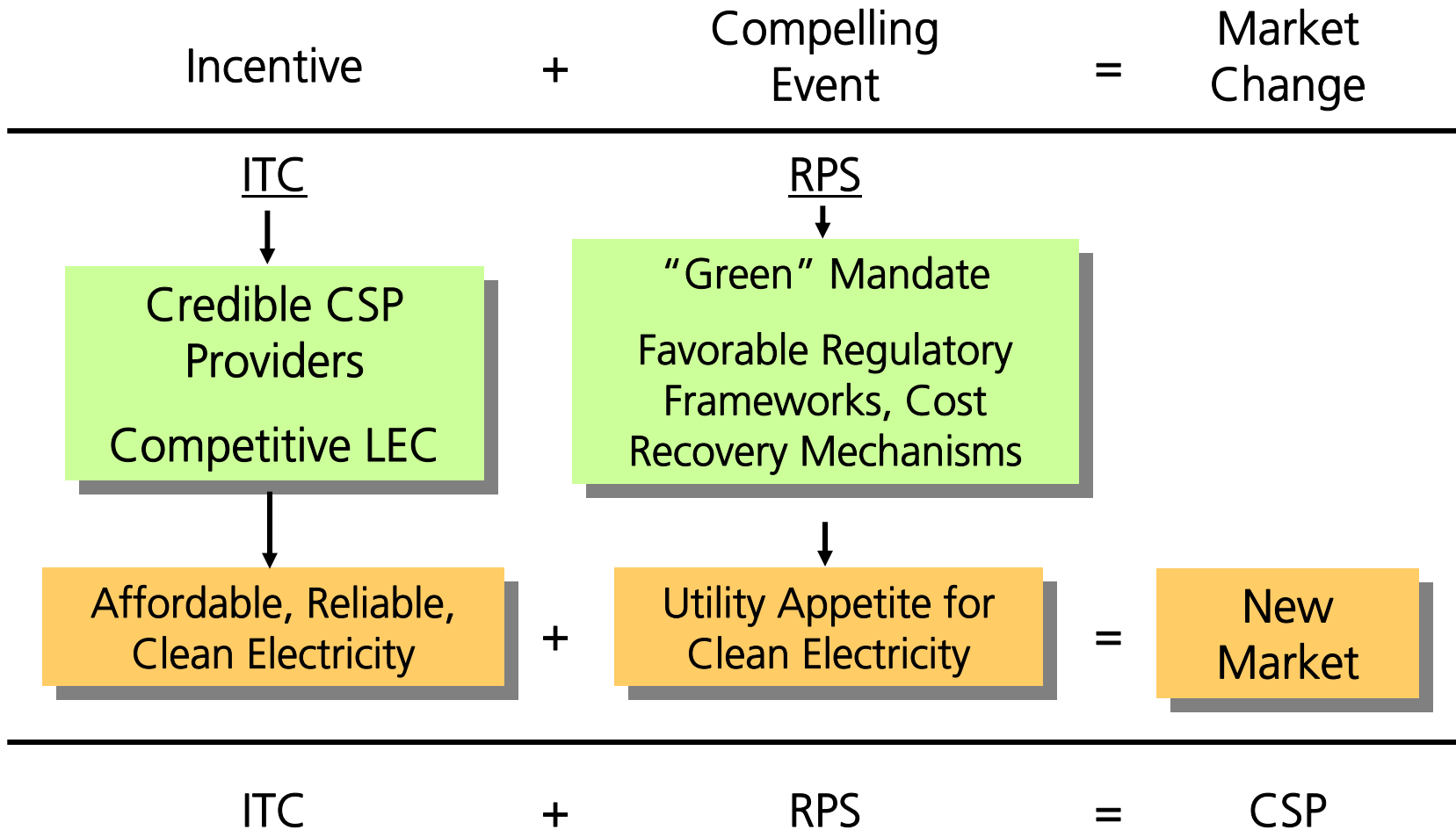
- Large, multi-national corporations are now involved in every part of chain
 - Project and Technology Developers
 - Utilities and Independent Power Producers
 - Engineering and Construction Companies
- Quality counterparties reduce overall CSP project risk
 - Large balance sheets
 - Power and construction expertise
 - Strategic technology deployment

- Very large domestic resource potential
- Carbon free electricity
- Potential for cost reduction
- Economic benefits will result from its development
- Increased public awareness and support of the benefits of clean energy

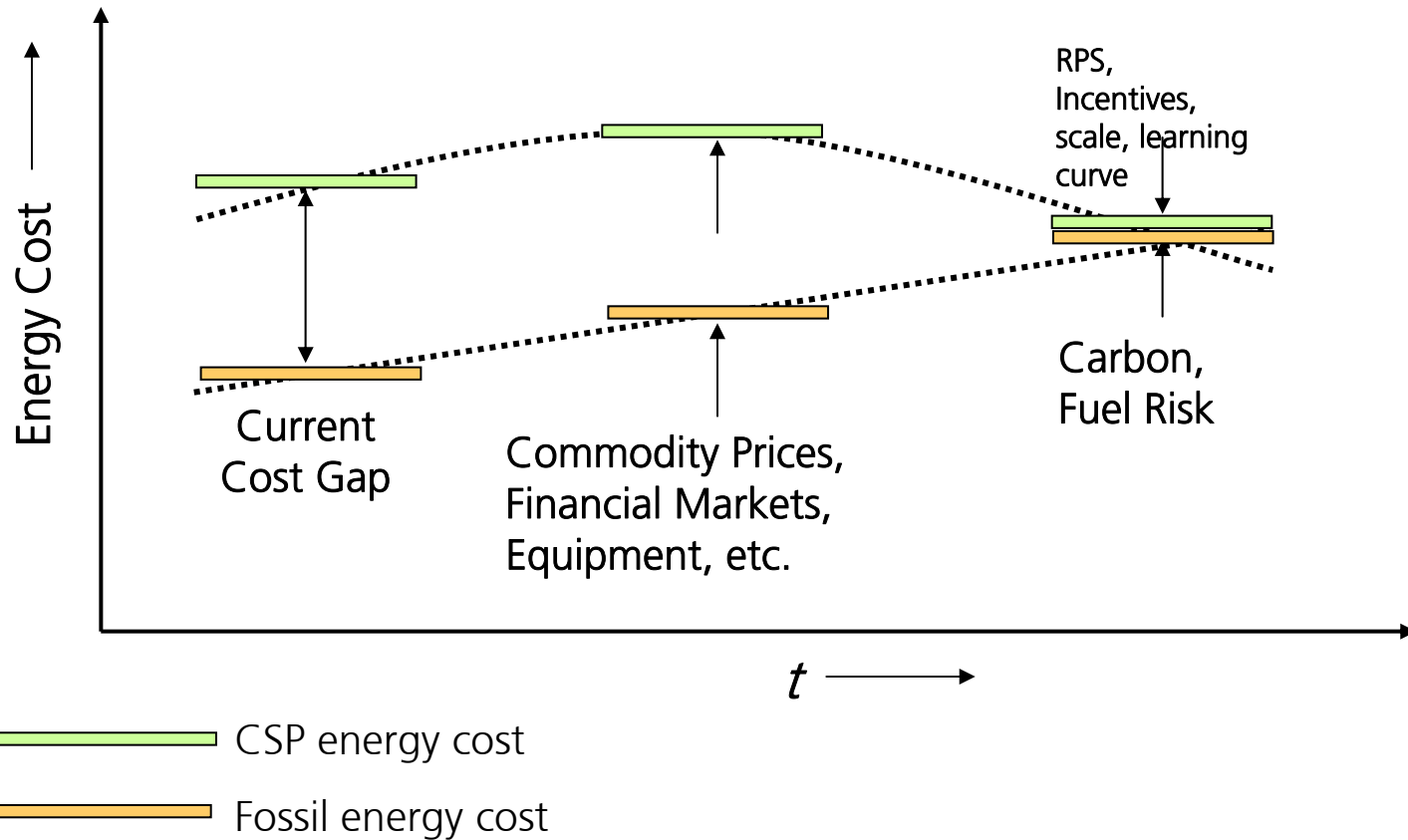
- Scalable
- With a good Power Purchase Agreement, the return on investment can be adequate to encourage main-stream equity and favorable debt financing terms.
- Once debt is paid, operates with no fuel – has potential of becoming a “clean cash cow”.

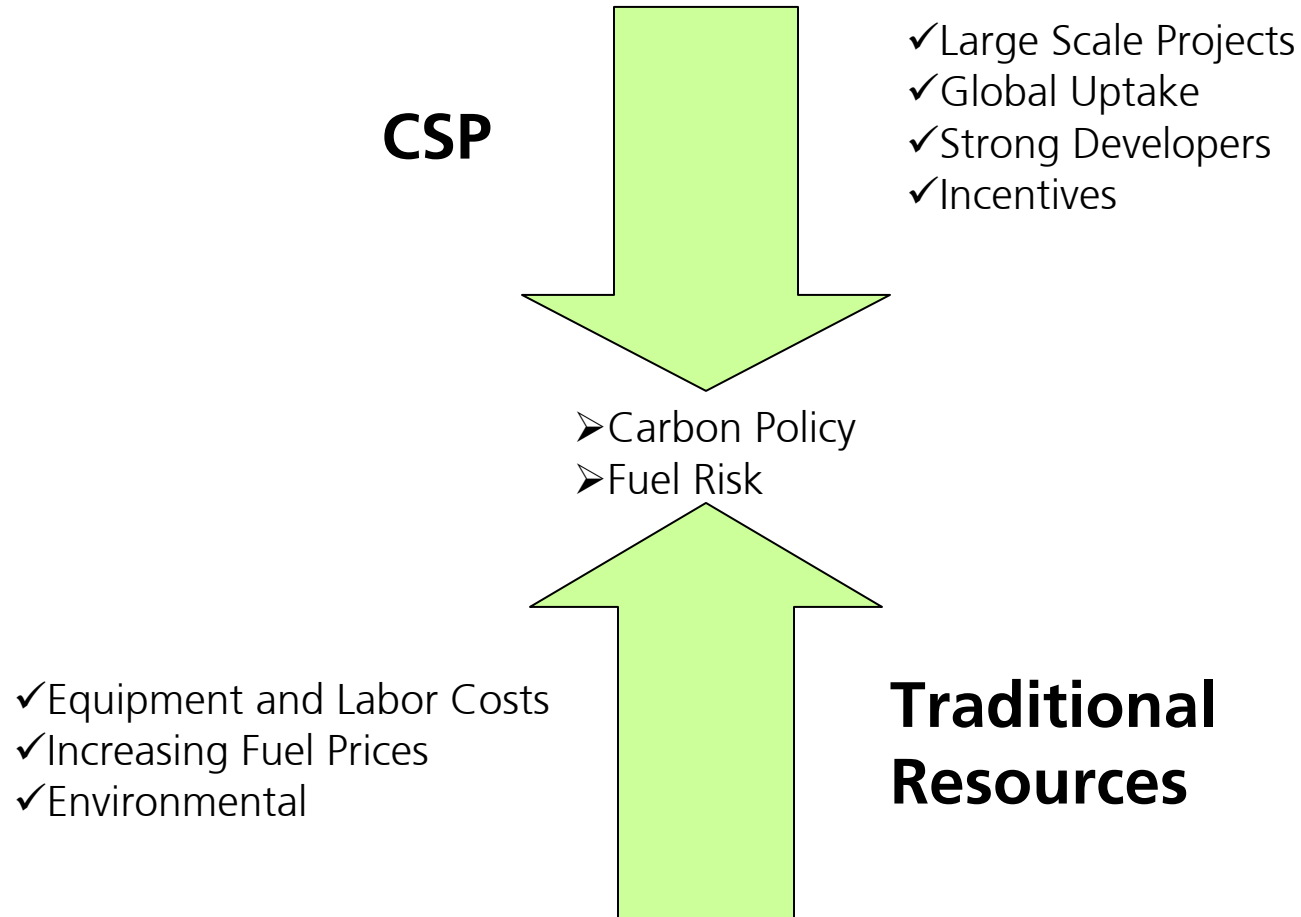
- Over 400 MW in reliable operation, most for about 20 years
- Over 4,800 MW under contract
- Those 4,800 MW will bring about \$20 billion in investments and create over 26,000 jobs
- That will not happen unless the Federal ITC is extended for eight years. SB 3335 must pass this week.

- **US Congress** – Seems unable to do the right thing regarding extending the 30% ITC for 8 more years.
- **Cost** - Relatively high cost of electricity but gap is closing fast
- **Transmission** – Inadequate or not available, slow and costly to build and the queue system is broken
- **Land** – Need access to good sites and each ownership type has its own challenges
- **Permitting** - Slow and costly
- **Environmental** – Growing concern over access to the desert regions needed for CSP



- “Good” carbon policies needed
- Feed-in Tariffs at state level deserve consideration
- Land access policies needed
- Transmission policies needed
- State property and sales tax exclusions needed





- Carbon limits are coming – will partially or totally close the cost gap
- CSP can scale up fast without critical bottleneck materials making it a good response option
- Price for CSP power is in commercial range and costs will come down with increased capacity and will fall below natural gas in the next few years
- Many technologies options add certainty to cost reduction projections
- DOE's CSP R&D program will continue to grow in size and value
- Economic development and environmental benefits will drive state support
- In a very few years, the CSP market in the SW US can grow to 2-4 GW per year

- CSP is a Unique Renewable Technology
 - Large resource
 - Ability to store energy to fit utility need
 - Near-term potential for cost competitiveness
- The Market is Rapidly Developing
 - Utilities interest in CSP is growing
 - Large credible, financially stable developers
 - Real (financiable, buildable and reliable) projects
- Policy Decisions will Maintain Momentum or Kill CSP
 - Long term ITC extension - if not extended this option will not happen
 - Supporting state policies

- What is CSP?
 - CSP is proven and operating utility scale solar that has the potential to power the SW and, with new transmission, much of the rest of the US
- Why should Congress care?
 - Has the potential to quickly provide very large amounts of clean energy at prices lower than fossil based generation
 - Creates non-outsourcable jobs, stimulates local economies, provides firm dispatchable power and reduces carbon emissions

Fred Morse
Senior Advisor, US Operations,
Abengoa Solar
and
Chairman, CSP Division, SEIA

236 Massachusetts Avenue, NW, Suite 605
Washington, DC 20002
Tel: +1-202-543-6601
FredMorse@MorseAssociatesInc.com