



California Energy Commission

Storage-Based Peaking and Ancillary Service Power Plants

May 26, 2011

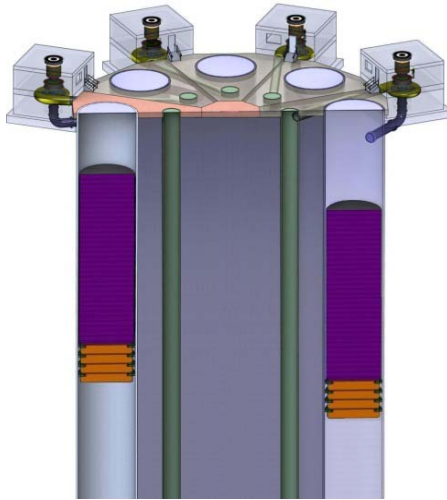
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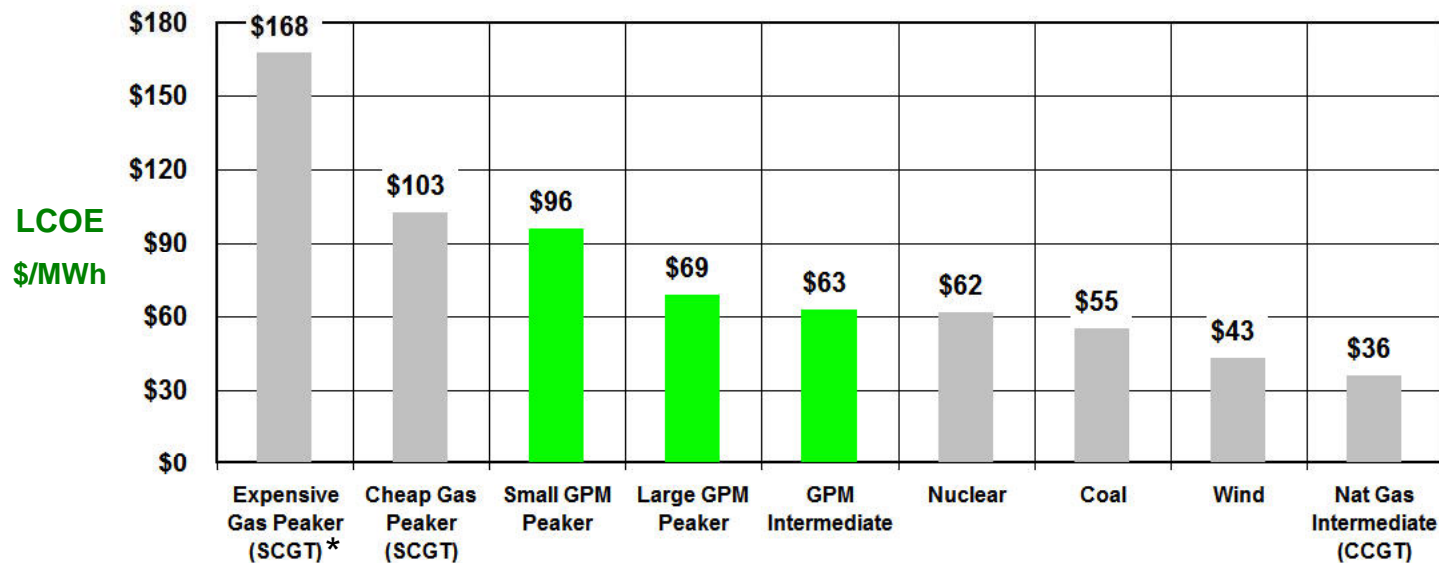
DATE May 26 2011

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GPM Peaking Plants



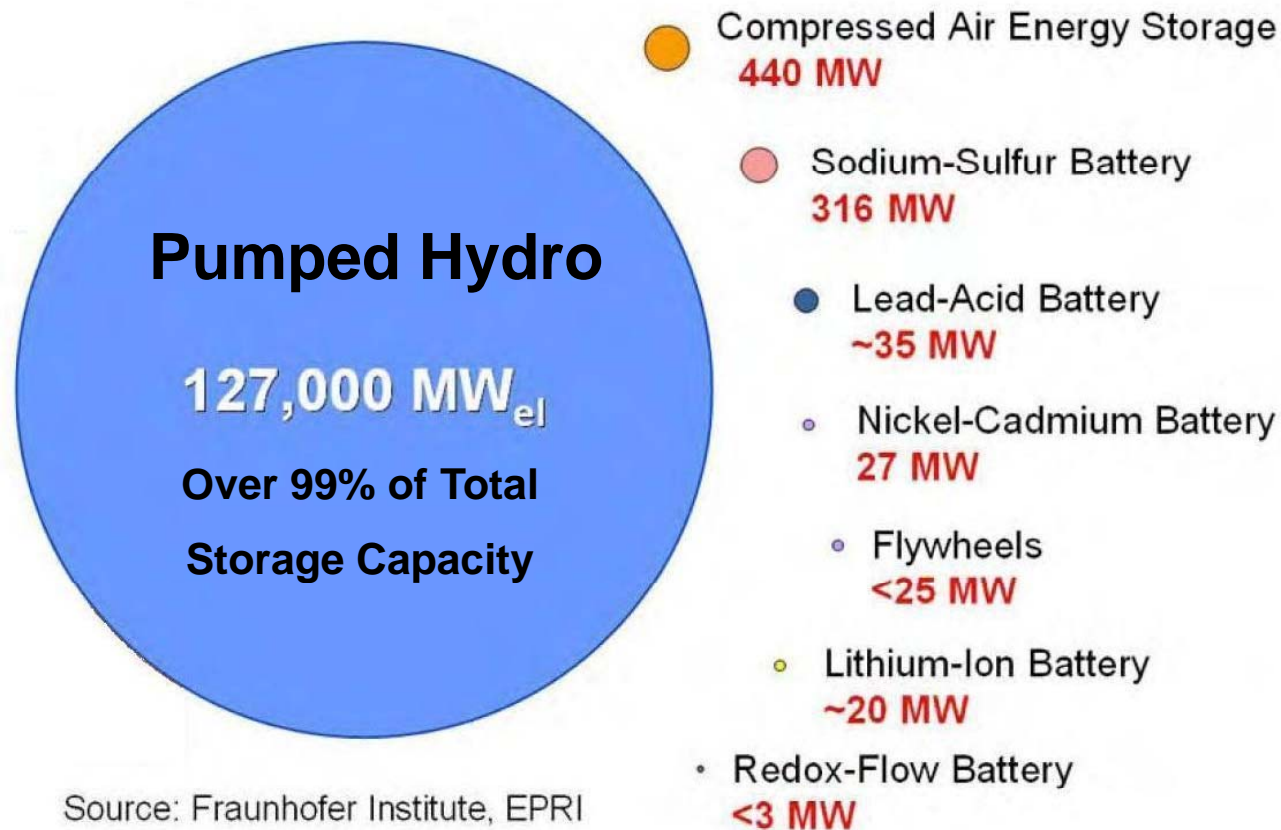
- To bring renewables to dispatchable generation status, we need much more energy storage
- With 250 GW of new generation required annually, about 12% of this or 30 GW will be new peaking power
- With gas turbines at about \$1,000,000/MW, this peaking power is a \$30 billion annual market



* Credit Suisse Model, Assumes \$12.5 NG, 4-hr Operation

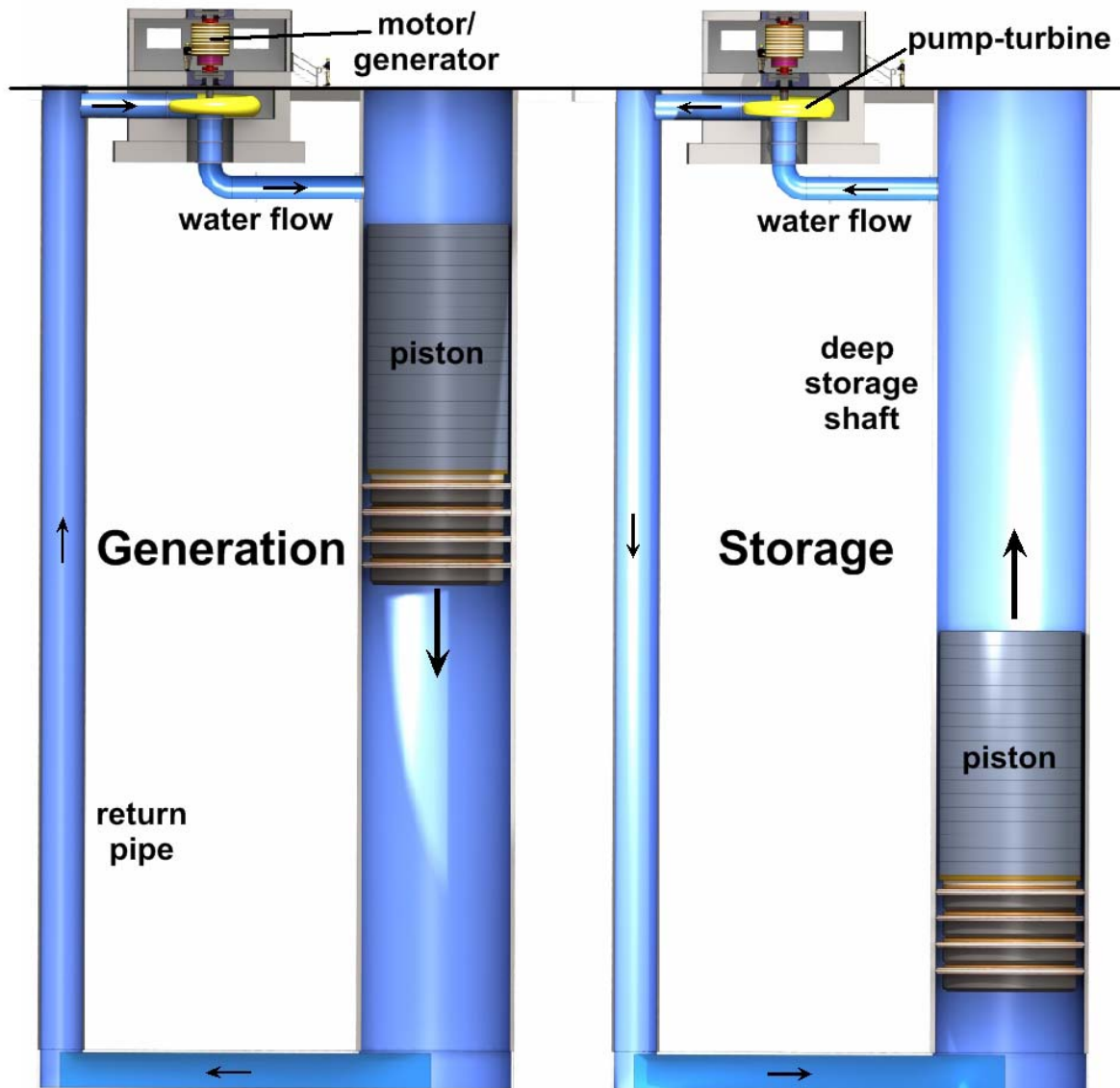
Energy Storage

Could match supply to demand...
...if far more storage were available.



Worldwide Energy Storage Capacity (MW)

Gravity Power Module



- Modular, underground pumped storage
- High efficiency (75-80%)
- Low cost
- No emissions
- No continued water use
- Excellent dynamic response
- Flexible siting
- Fast permitting
- Fast construction
- Patents Pending

GPM Products Planned

- **Ancillary Services GPM**

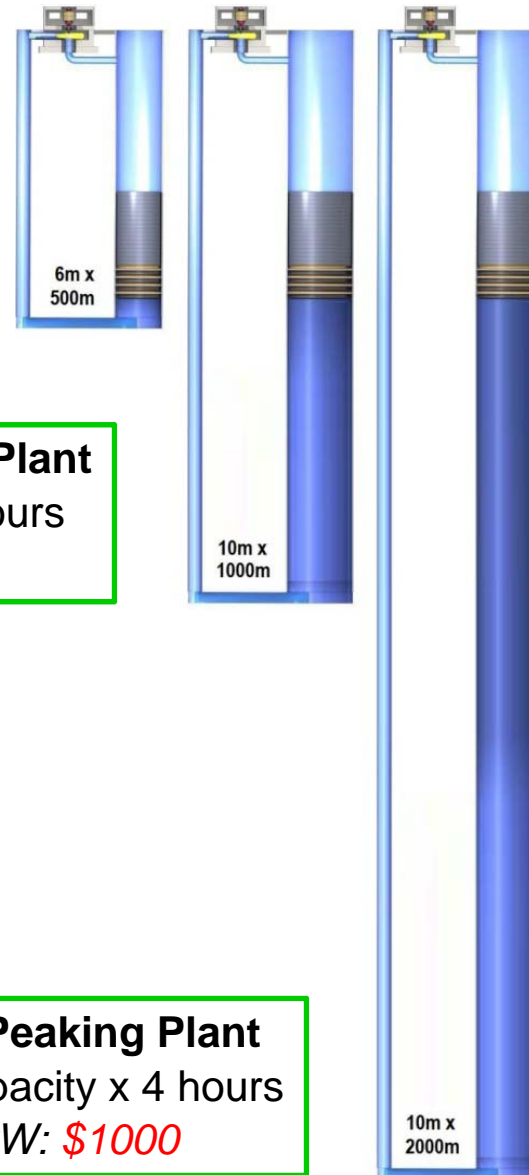
- 25MW capacity x 20 minutes
- *Cost/kW: \$1,000*

- **Intermediate Peaking Plant**

- 40MW capacity x 4 hours
- *Cost/kW: \$1,900*

- **Eventual Peaking Plant**

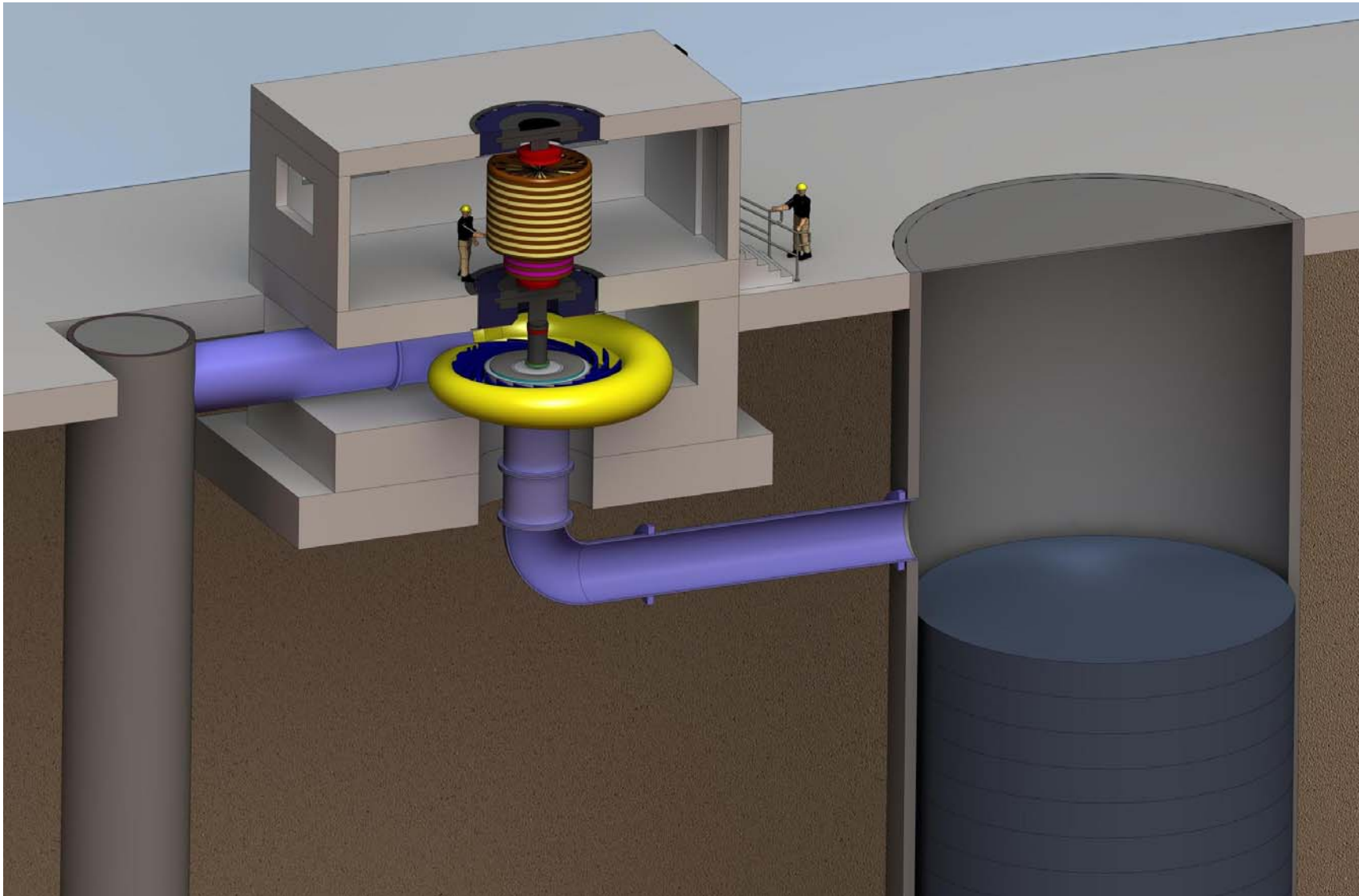
- 150MW capacity x 4 hours
- *Cost/kW: \$1000*



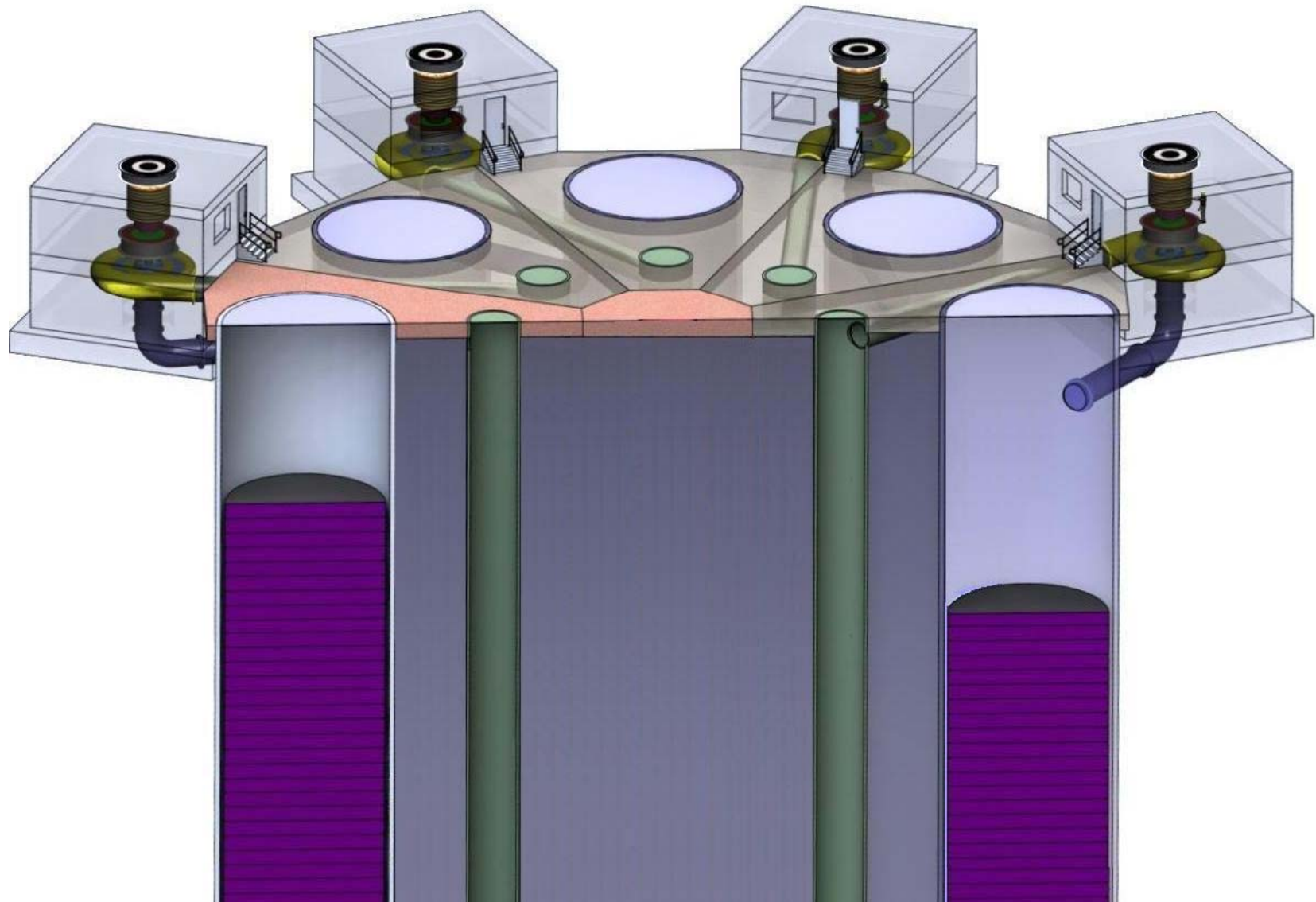
150MW GPM



http://www.youtube.com/watch?v=_Nwf5gCdbP0



Peaking Plant

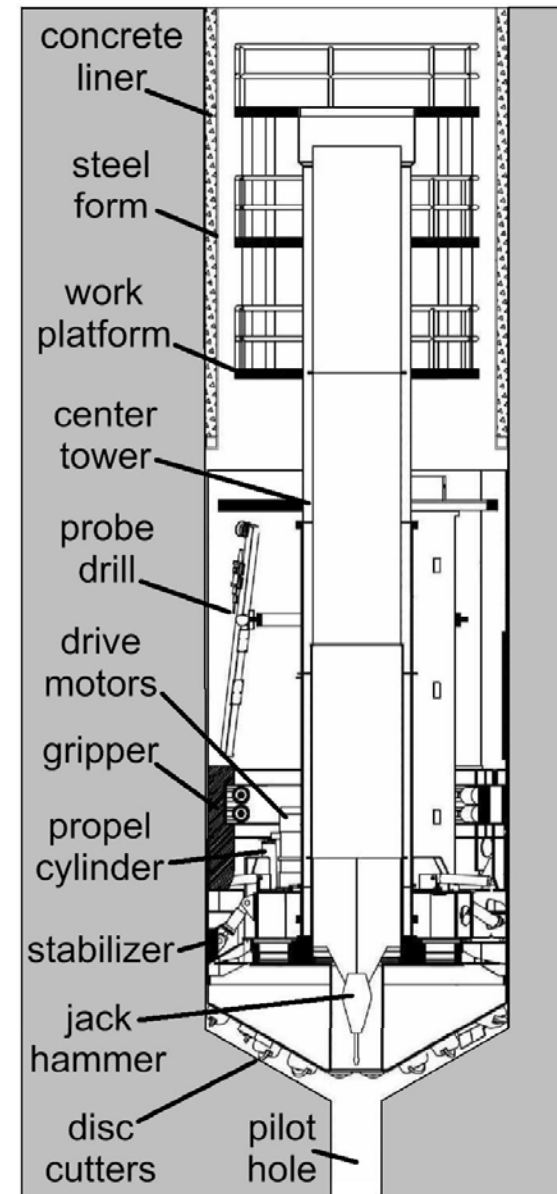
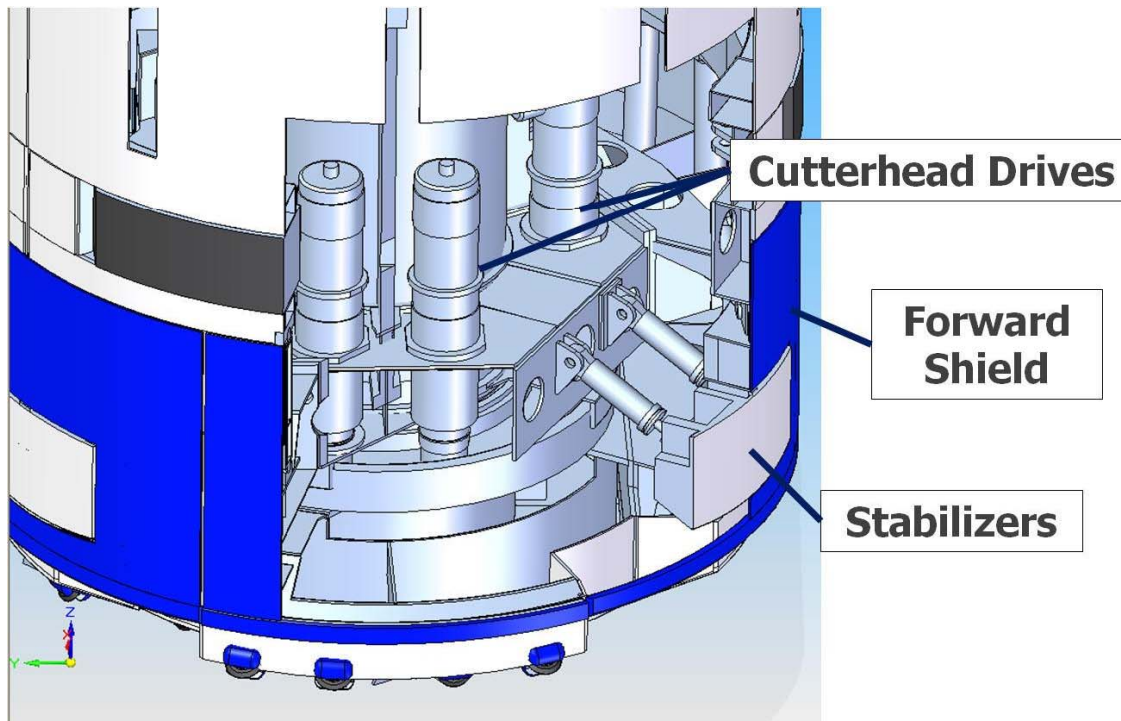


Advanced Shaft Excavation

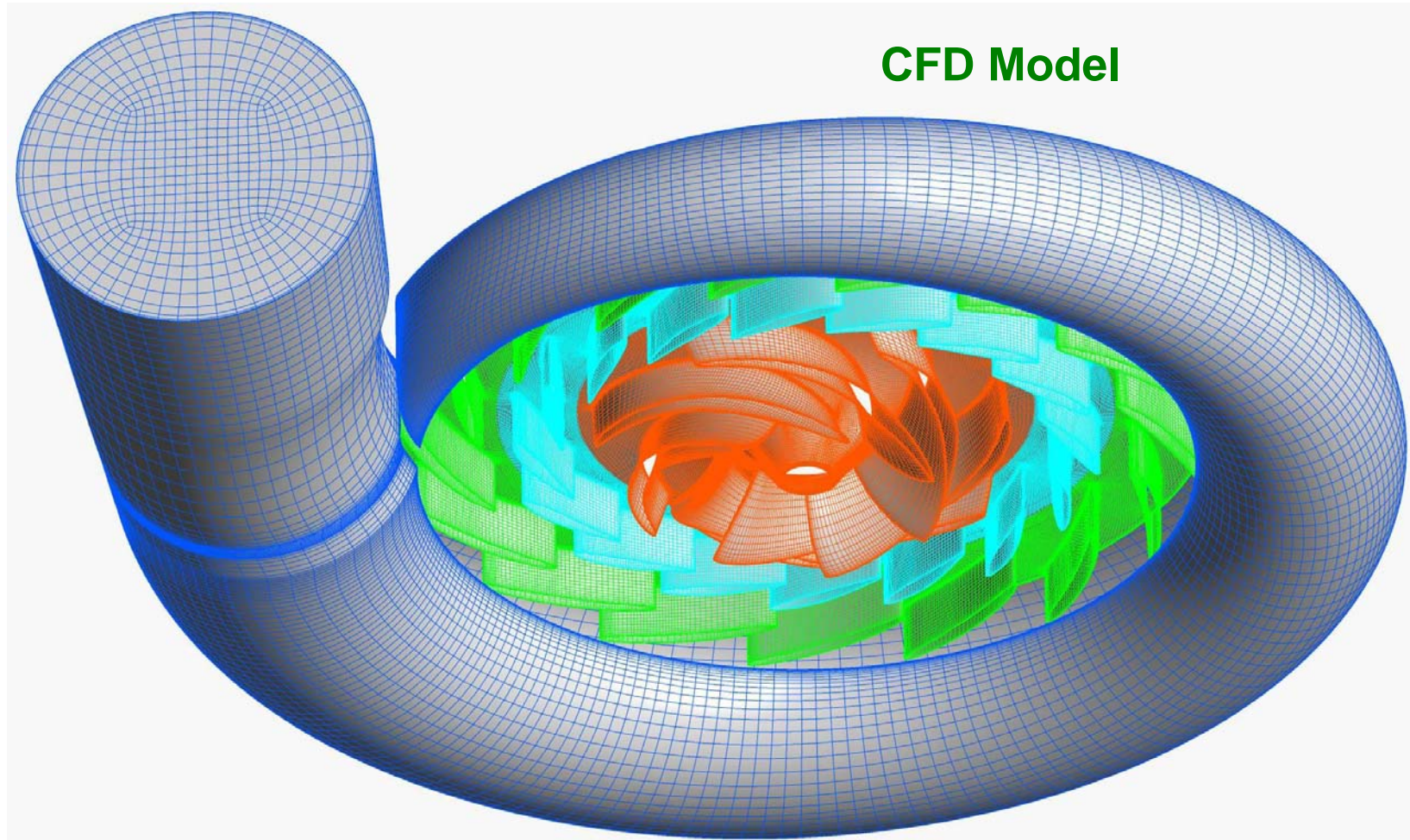
■ Collaborators:

The Robbins Company






Brierley and Associates



Pump-Turbine



Company Milestones

	2009	2010	2011	2012	2013
Start-up, Series A funding					
GPM System Design					
Commercial Demo Contract					
Scale Prototype Complete					
Commercial Demo Complete					

Early-Stage Target Markets

- **South Africa**
- **Middle East**
- **Manhattan**
- **Texas**
- **India**
- **Mexico**

Team

- **Tom Mason, CEO**
 - **Former EVP of Calpine**
 - **Responsible for 92 power plants**
- **David Anthony, Board of Directors**
 - **21Ventures/Quercus Trust**
 - **Portfolio of >40 cleantech companies**
- **Jim Fiske, Founder and CTO**
 - **Serial inventor**
- **Chris Grieco, Executive VP**
 - **Extensive experience in Renewable Energy**



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