Utah Associated Municipal Power Systems

Morgan City

August 22, 2016

UAMPS
Utah Associated Municipal Power Systems

SMARTENERGY

UAMPS Overview

- An energy services interlocal that provides electric services on a non-profit basis to its members
- Organized to develop, finance and operate projects for generation, transmission and energy services
- 45 members in 7 western states
- Project-based organization which currently 16 separate projects
- Projects provide services more economically and efficiently by providing economy of scale
- Each project operates independent from one another under the UAMPS umbrella
- Not an "all requirements" provider
- Members determine whether to participate in projects based on their individual needs
- Member autonomy

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UAMPS Projects

Resources

- CRSP Project
  - Provo River
- Hunter Project**
- San Juan Project*
- Payson Power Project (Nebo)*
- Firm Power Supply Project
  - Pleasant Valley Wind
- IPP Project
- Natural Gas Project
- Veyo Heat Recovery Project*
- Horse Butte Wind Project*
- Pool Project
- Carbon Free Power Project

Transmission

- Central-St. George Project*
- Craig-Mona Transmission Project**

Service

- Resource Project
  - Resource Investigation
  - Energy Efficiency Programs
- Government & Public Affairs Project
  - Federal Issues
  - State and Local Issues
- Member Services Project
  - APPA Dues
  - IPSA Dues
- OSHA Training
- Battery Test Set
- Power Factor Test Set
- Pole Test Sets (3)
- Hazard Hamlet
- RP3
- Mutual Aid
- Mobile Generator
- Washington Generators
- Hurricane Generators

*Bonds-financed projects

**All bonds have been retired

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Morgan's Resource Portfolio

Hunter 2 Project

- First UAMPS project acquired in 1980
- Hunter 2 has been in commercial operation since June 1980
- Hunter 2 is a 446 MW coal fired generating unit located in Emery County, Utah
- Hunter 2 Project consists of 14.582% undivided ownership interest in the Hunter 2 unit providing 65 MW.
- Hunter 2 is jointly owned by PacifiCorp, UAMPS and Deseret Power
- Hunter 2 is operated by PacifiCorp pursuant to an Ownership and Management Agreement among the co-owners
- 23 Project Participants
  - Morgan's Entitlement Share is 0.6730% or 422 kW

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San Juan Project

- San Juan Project was acquired in 1994
- San Juan Unit 4 is a 533 MW coal fired generating unit located near Farmington, New Mexico
- San Juan Project consists of a 7.028% undivided ownership interest in San Juan Unit 4 providing approximately 35 MW
- Unit 4 has been in commercial operation since 1979
- Unit 4 was jointly owned by the Public Service Company of New Mexico; the City of Farmington, New Mexico; M-S-R Public Power Agency, California; the county of Los Alamos, New Mexico; the City of Anaheim, California; and UAMPS (California entities will exit at the end of 2017 due to the project restructuring.)
- 16 Project Participants
  - Morgan's Entitlement Share is 1.4286% or 500 kW

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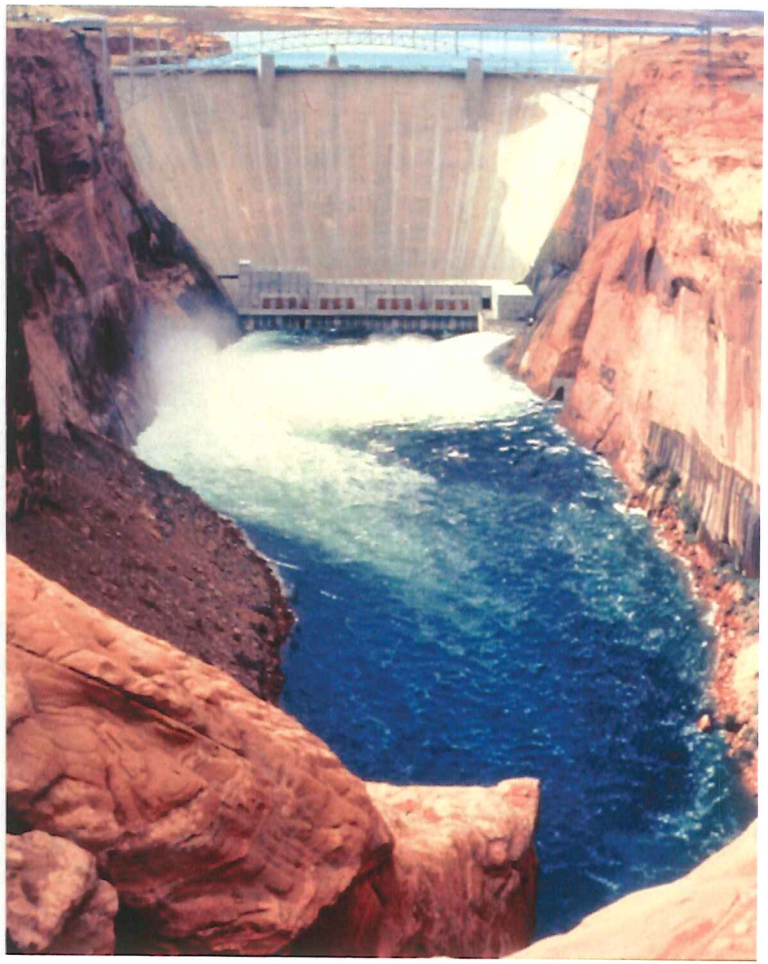
IPP Project

- The Intermountain Power Project (IPP) is owned by Intermountain Power Agency (IPA) and operated by the City of Los Angeles Department of Water (LADWP)
- IPP consists of two 900 MW coal fired generating units located in Delta, Utah
- Twenty-three of the UAMPS members (Utah Purchasers) entered into power sales contracts with IPA for an aggregate 14.040% entitlement (252.7 MW)
- Because the capability of IPP purchased by the members was in excess of their needs, they entered into an Excess Power Sales Agreement (EPSA) to sale their IPP power to four California Purchasers (LADWP, Burbank, Glendale and Pasadena)
- UAMPS' IPP Project administers for the benefit of the Utah Purchasers the call-back and put-back of IPP power
- 23 Project Participants
  - Morgan's plant entitlement share is 0.130%
  - Morgan's EPSA administration entitlement share is 0.9259%

CRSP Project

- The Colorado River Storage Project (CRSP) (officially referred to as *the Salt Lake City Area Integrated Projects*) is owned by the United States of America and operated by United States Bureau of Reclamation.
- One purpose of CRSP is the production of hydroelectric capacity and energy (output includes Glen Canyon Dam, Flaming George Dam and other smaller projects in Utah, Wyoming, Colorado and New Mexico).
- Western Area Power Administration (Western) is responsible for the marketing and transmission of the federal power in 15 western and central states. Each of the members have entered into an Integrated Contract for Electric Service with Western
- UAMPS acts as the single purchasing agent and schedules purchases of CRSP energy for the members
- 31 Project Participants
  - Morgan's Summer Entitlement Share is 1.9349% or 1,658 kW
  - Morgan's Winter Entitlement Share 1.9130% or 2,424 kW



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Horse Butte Wind Project

- The Horse Butte Project consists of UAMPS' right to purchase all of the output of a 57.6 MW wind generation.
- The Facility is located in Bonneville County, Idaho and consists of 32 Vestas V100 1.8 MW Wind Turbine.
- The Facility went commercial on August 2012.
- The size of the Facility may be increased up to 99 MW.
- UAMPS purchases all Facility output and environmental attributes pursuant to a Power Purchase Agreement with Horse Butte Wind I LLC.
- UAMPS prepaid the P99 output from the Facility for 20 years.
- UAMPS has an Early Buyout Option that may be exercised at years 5½, 7 and 9.
  - First Buyout February 2018
- 23 Project Participants
  - Morgan's Entitlement Share is 0.5260% or 303 kW

Firm Power Project

- The Firm Power Project was established to provide for the acquisition of firm power supplies from third parties
- The Firm Power Project agreements are master agreements that can accommodate multiple power supply transactions and provide flexible terms for the purchase and sale of firm capacity and energy
- UAMPS currently administers the Iberdrola Renewables Transaction to purchase 15.675 MW of wind generation from the Pleasant Valley Wind Energy Facility in Uinta County, Wyoming
  - 25 Year Power Purchase Agreement (expires 12-31-28)
  - 18 Project Participants
  - Morgan's Entitlement Share is 0.0358% or 14 kW

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Morgan's Load/Resource Portfolio

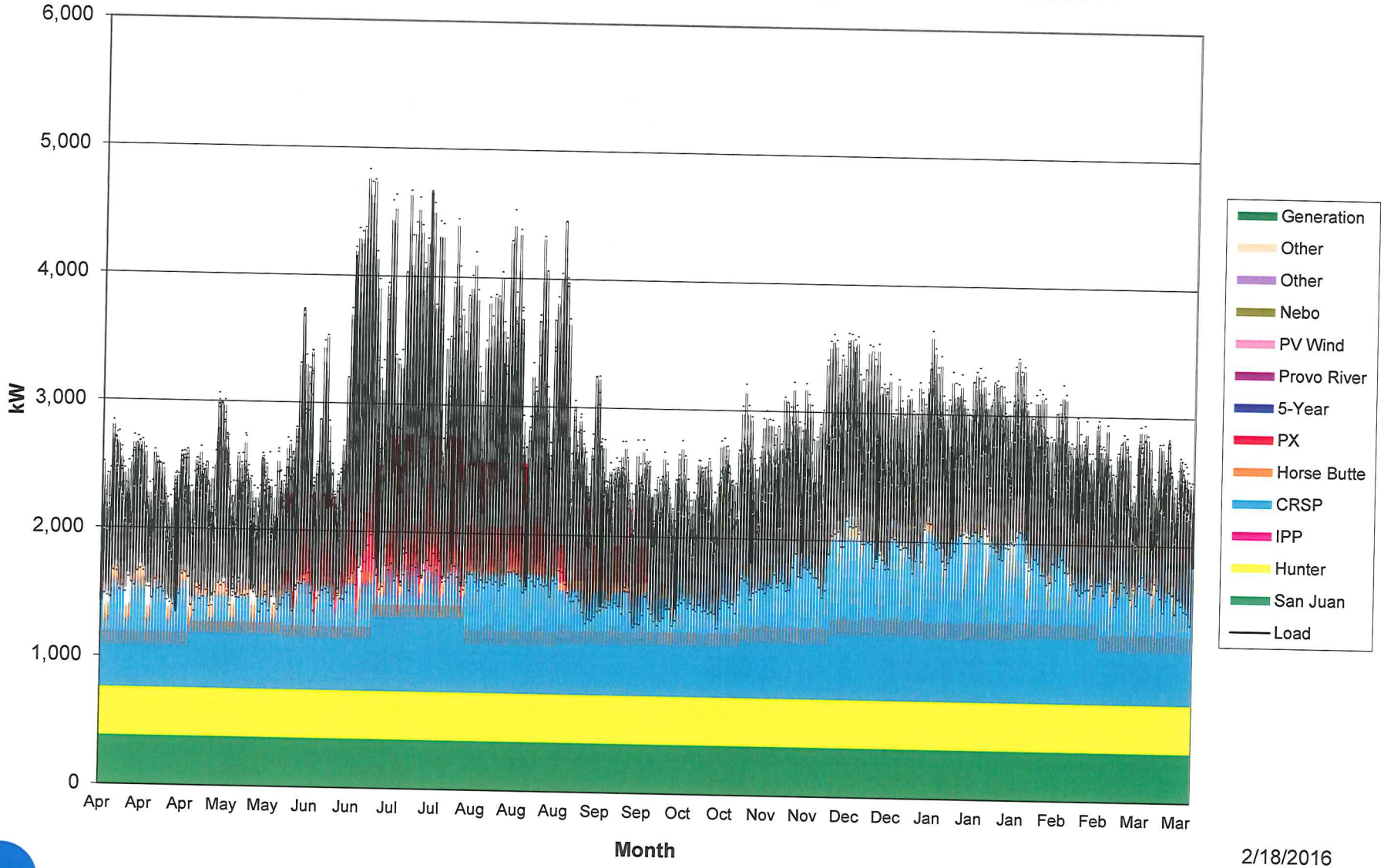
Month	Average kW						
	CRSP	Hunter	Horse Butte	IPP	San Juan	PX	PV Wind
Apr-16	601	377	99	0	383	0	1
May-16	581	377	89	0	383	0	1
Jun-16	652	377	85	0	383	332	1
Jul-16	752	377	80	0	383	489	1
Aug-16	795	377	87	0	383	445	1
Sep-16	707	377	79	0	383	319	1
Oct-16	879	377	86	0	383	0	1
Nov-16	970	377	112	0	383	0	2
Dec-16	1,044	377	107	0	383	0	2
Jan-17	1,039	377	116	0	383	0	2
Feb-17	1,010	377	97	0	383	0	2
Mar-17	898	377	120	0	383	0	2

Morgan

Forecasted Load to Resource Comparison and Shortage/Surplus Results

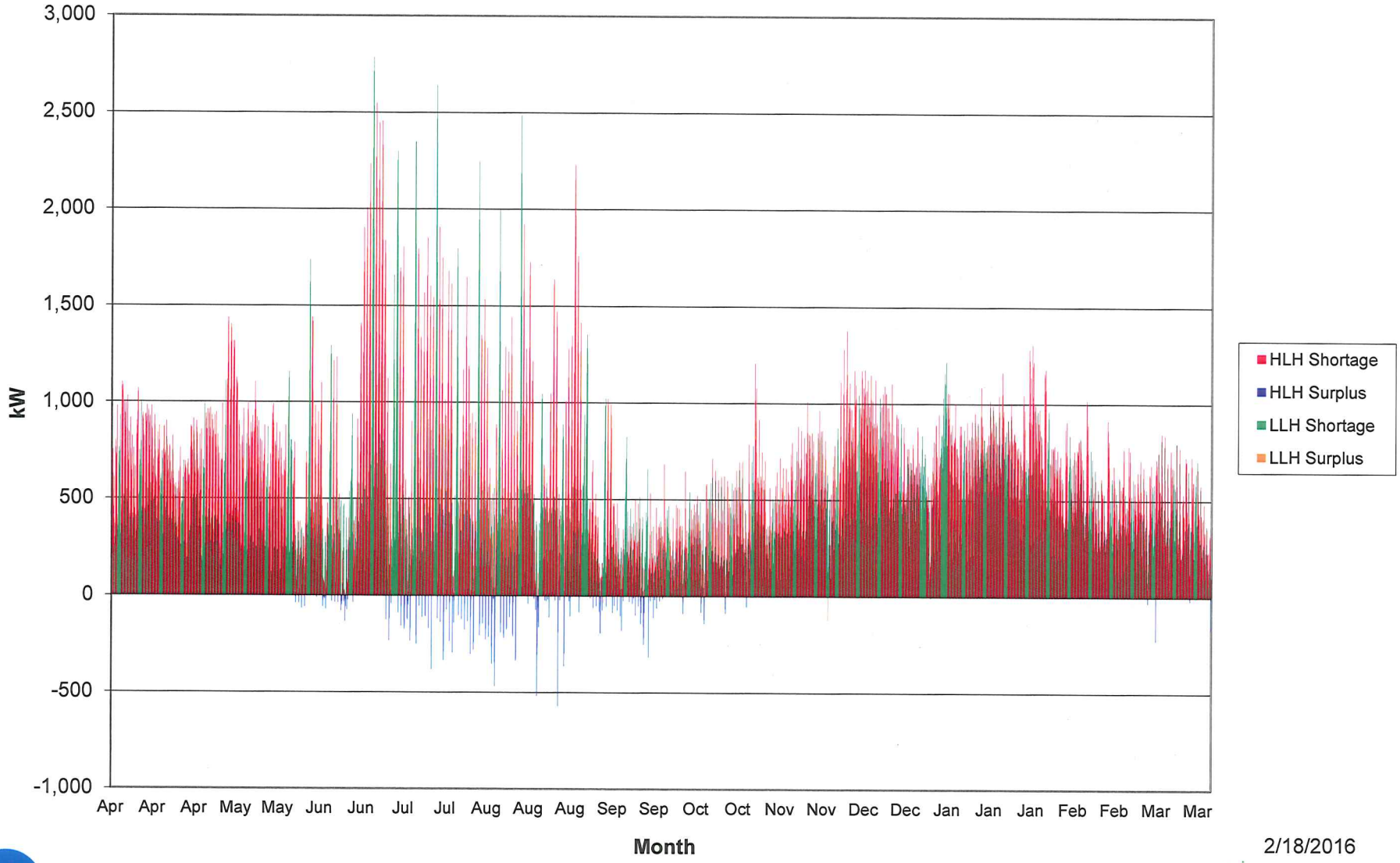
	Forecasted Load[3]		kW Average[1]				
			Forecasted	Forecasted	Shortage/(Surplus)[2]		
Month	kW Peak	kWh Energy	Load	Resources[4]	Flat	HLH	LLH
Apr-16	2,841	1,511,283	2,099	1,462	637	734	504
May-16	3,063	1,542,734	2,074	1,431	642	811	447
Jun-16	4,833	1,774,380	2,464	1,830	635	637	631
Jul-16	4,670	2,026,145	2,723	2,081	642	577	717
Aug-16	4,534	1,944,626	2,614	2,087	527	511	549
Sep-16	4,451	1,595,908	2,217	1,866	351	338	367
Oct-16	3,035	1,516,959	2,039	1,726	313	316	309
Nov-16	3,608	1,691,796	2,350	1,843	506	565	433
Dec-16	3,619	1,939,319	2,607	1,913	694	744	631
Jan-17	3,648	1,975,675	2,655	1,917	738	776	695
Feb-17	3,379	1,636,398	2,435	1,868	567	606	514
Mar-17	2,938	1,642,009	2,207	1,779	428	437	415
Year	4,833	20,797,232	2,374	1,817	557	586	519

Morgan Forecasted Load and Resources, April 2016 - March 2017



2/18/2016

Morgan Forecasted Load Compared to Resources, April 2016 - March 2017



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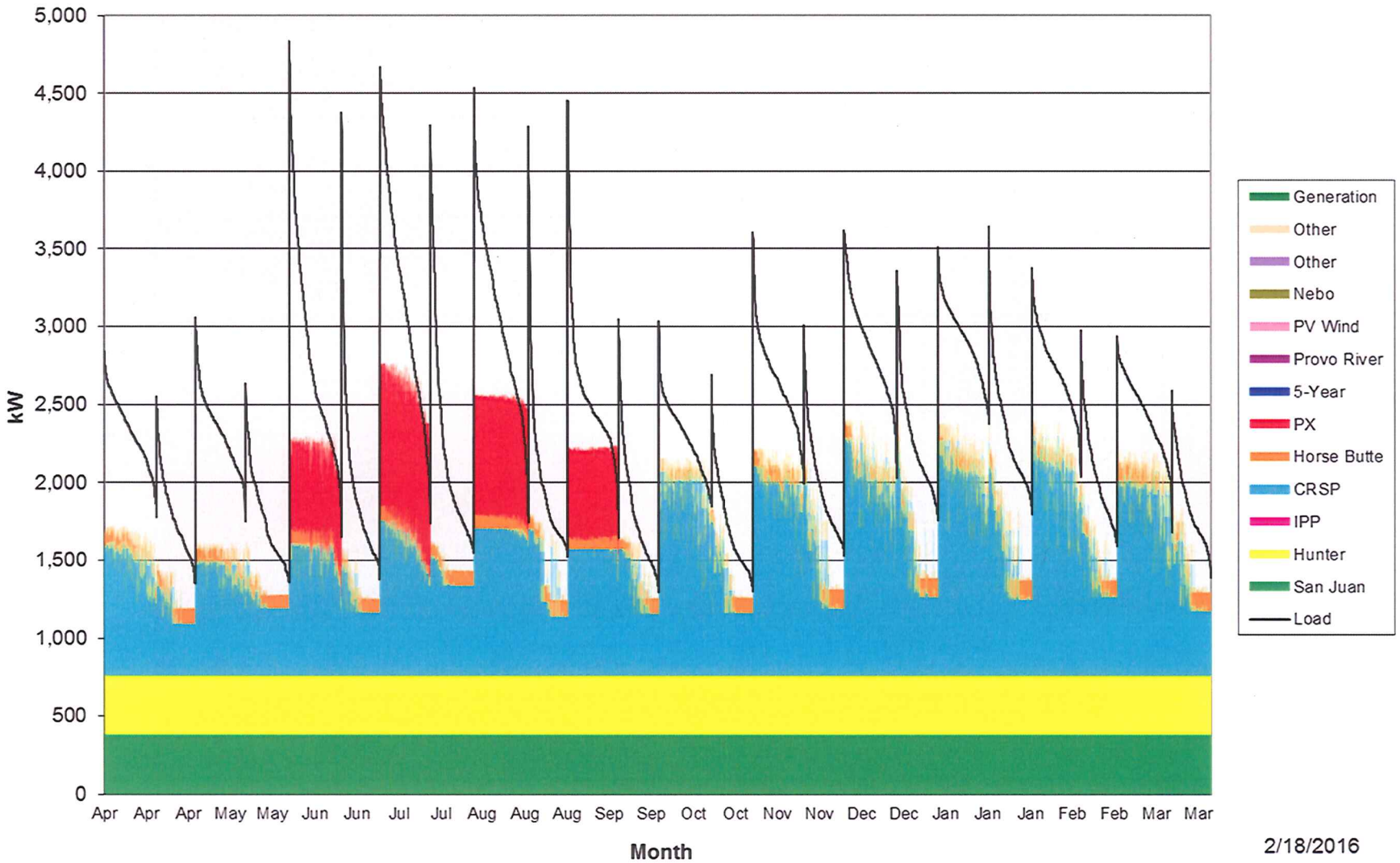

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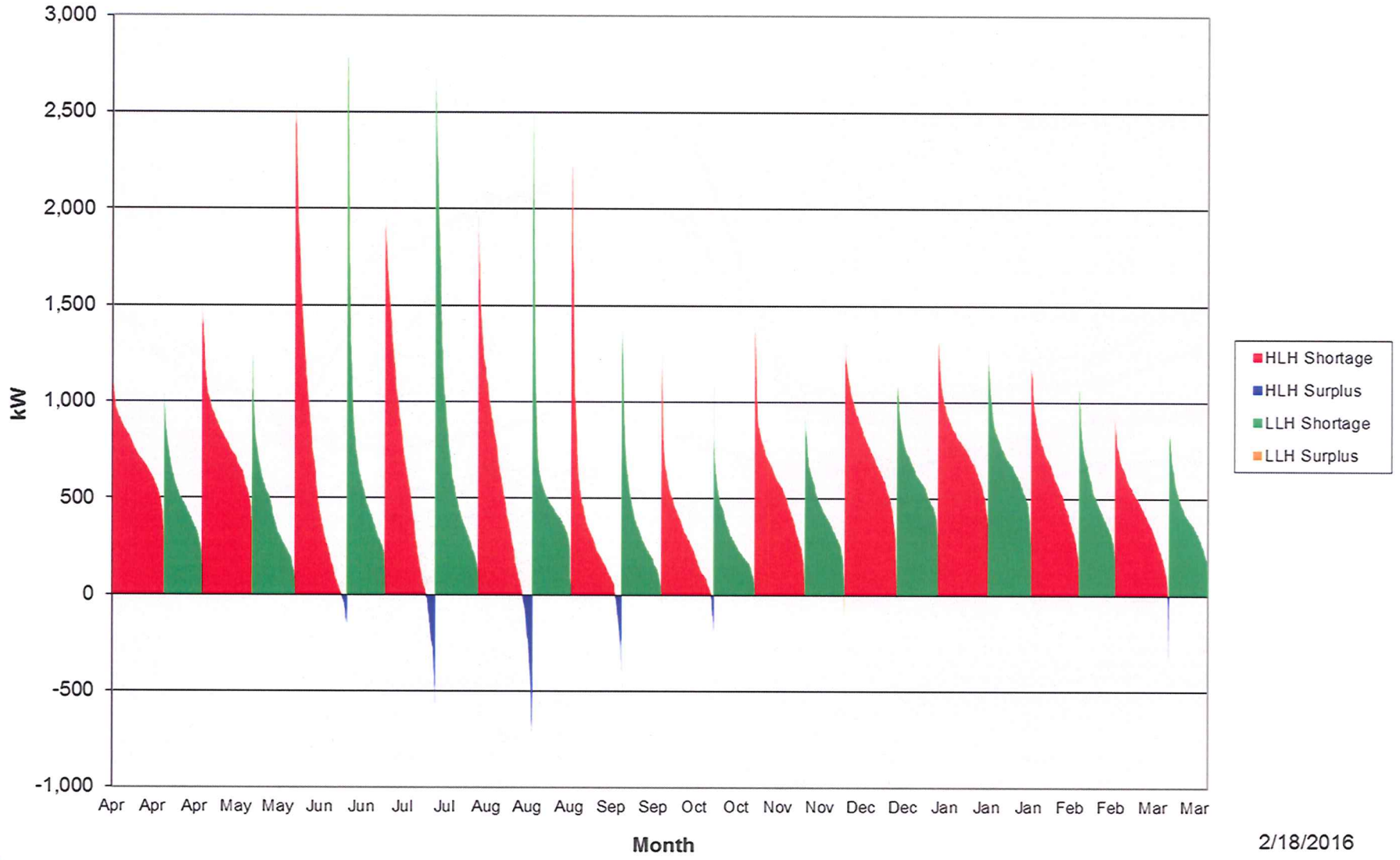
Morgan Forecasted Load Compared to Resources, April 2016 - March 2017



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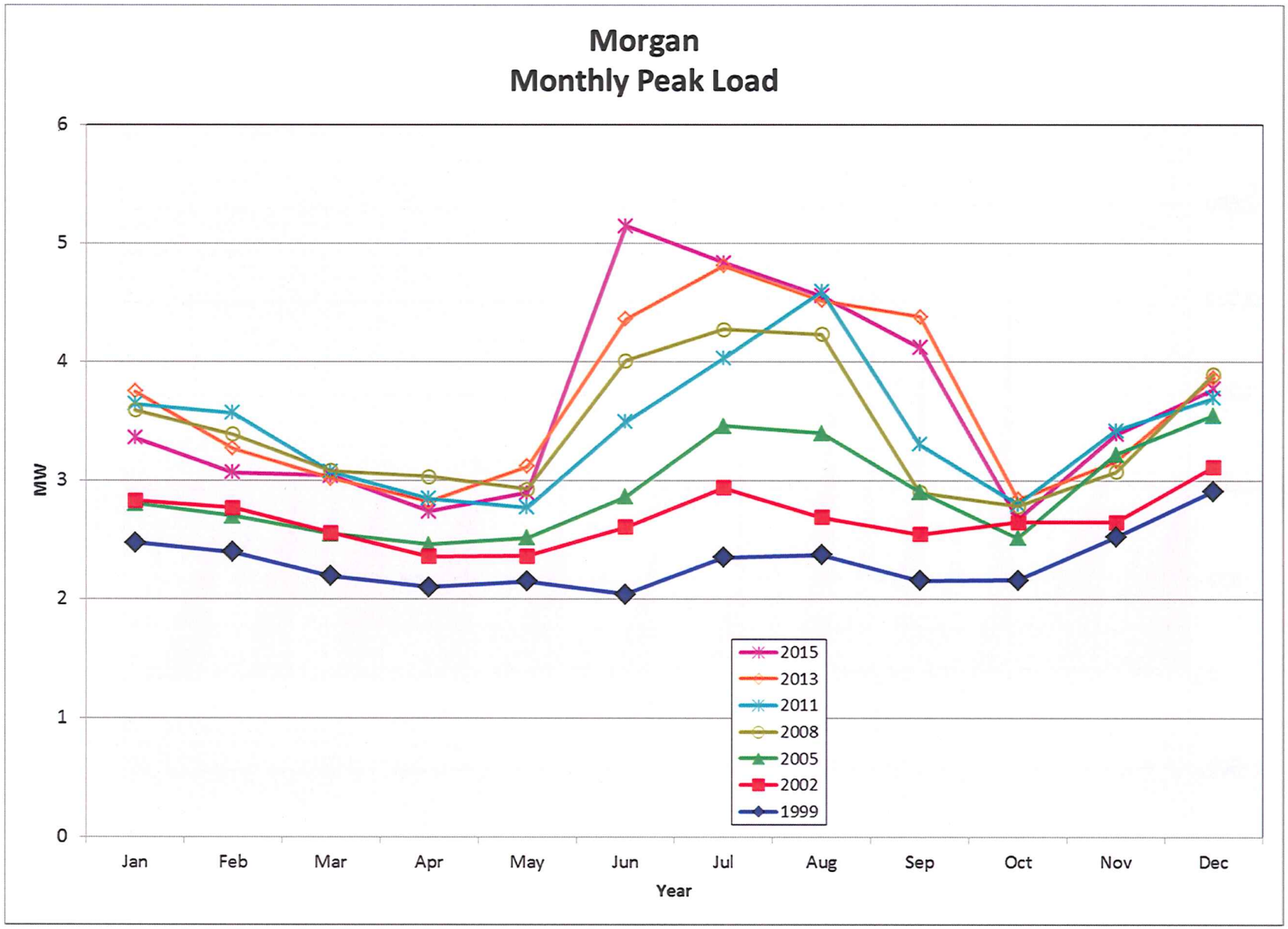
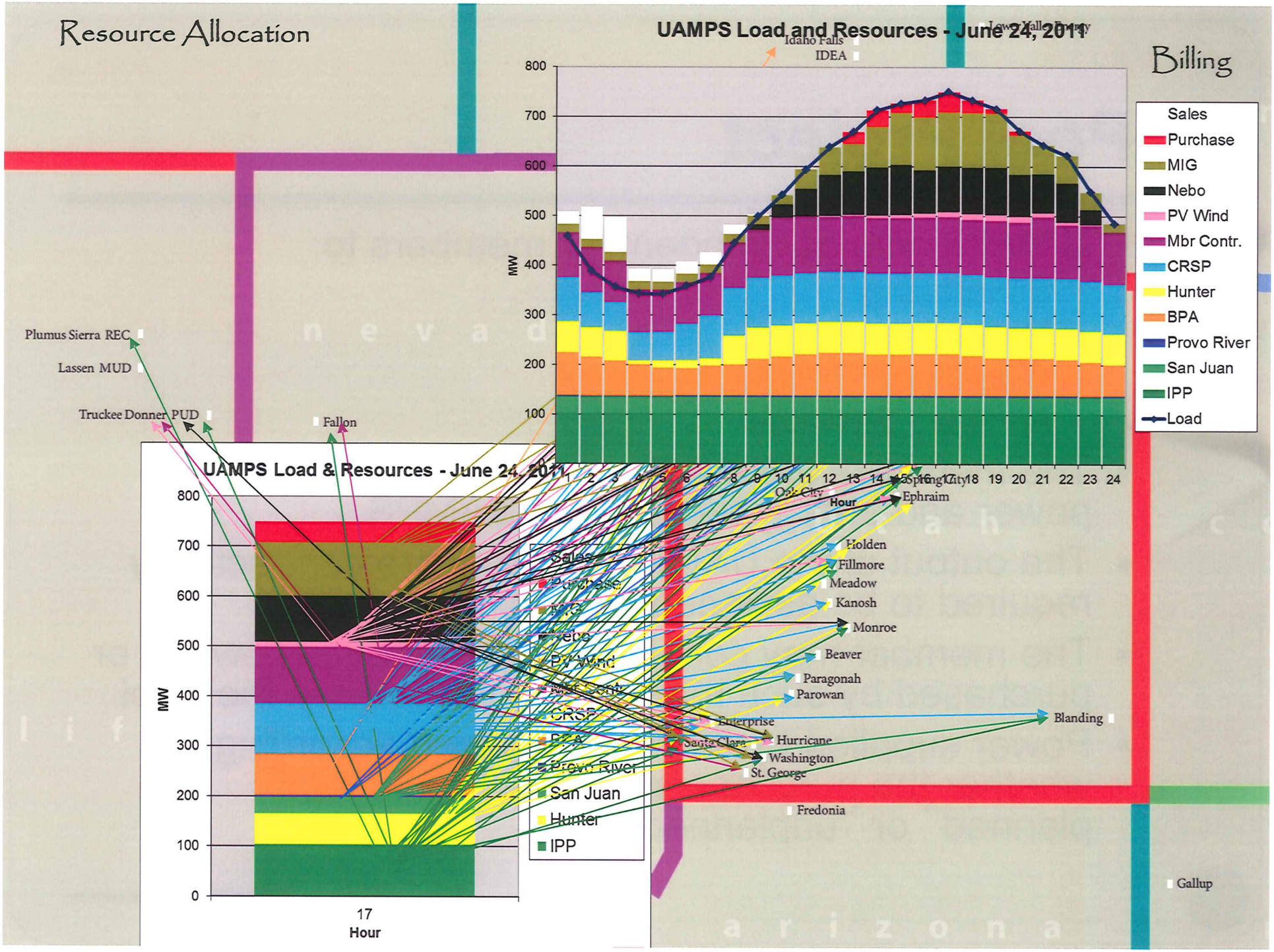

Morgan
Monthly Peak Load
MW
6
5
4
3
2
1
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Year
2015
2013
2011
2008
2005
2002
1999

Pool Project

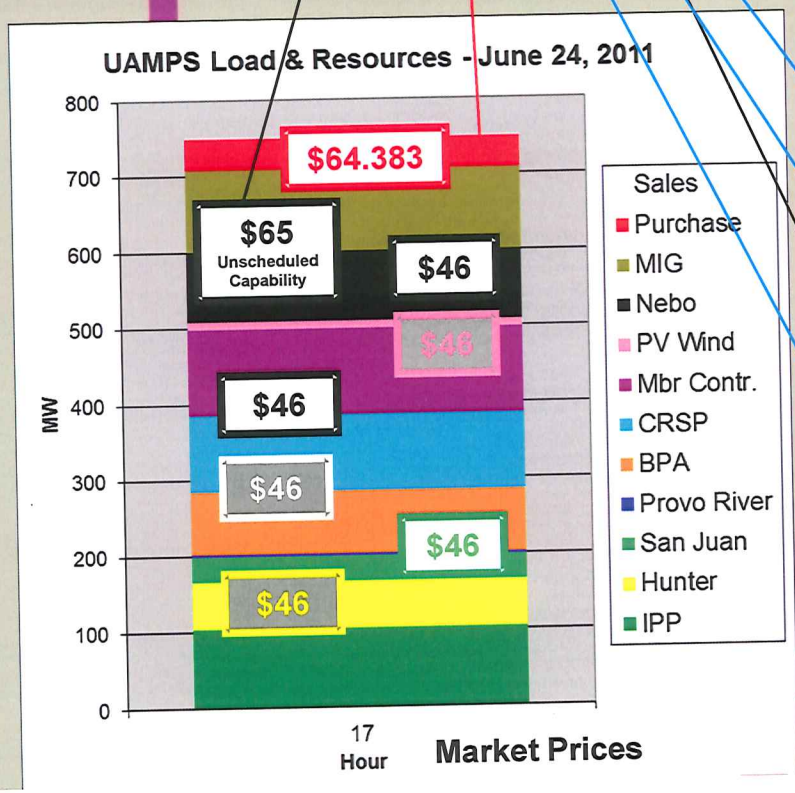
- UAMPS acts as an agent for members to:
  - Scheduling
  - Marketing
  - Wheeling
  - Ancillary Services
- The members are not required to purchase their power and energy needs from UAMPS
- The output of the UAMPS projects are contractually required to be assigned to the pool
- The member may consign power resources owned or purchased by such member for inclusion in the Pool
- Power supplied by the Pool is priced according to whether the purchase/sales are "all-in cost", planned" or "unplanned"


Resource Allocation
UAMPS Load and Resources - June 24, 2011
Billing
Idaho Falls
IDEA
Sales
Purchase
MIG
Nebo
PV Wind
Mbr Contr.
CRSP
Hunter
BPA
Provo River
San Juan
IPP
Load
MW
Hour
Plumus Sierra REC
Lassen MUD
Truckee Donner PUD
Fallon
UAMPS Load & Resources - June 24, 2011
Spring City
Ephraim
Holden
Fillmore
Meadow
Kanosh
Monroe
Beaver
Paragonah
Parowan
Enterprise
Santa Clara
Hurricane
Washington
St. George
Blanding
Fredonia
Gallup

Sales to Unplanned Pool

(All-In Pool Net Shortage)

Weighted Average = $60.785



Lower Valley Energy

Billing

Idaho Falls
IDEA

Burley
United Electric Co-op

Raft River REC

Logan
Hyrum
Brigham City
Weber Basin WCD
Morgan
Kaysville
Bountiful
Murray
Heber L&P
Eagle Mountain
Lehi
Central Utah WCD
Springville
South Utah Valley ESD
Payson
Fairview
Price
Mt. Pleasant
Spring City
Oak City
Ephraim
Holden
Fillmore
Meadow
Kanosh
Monroe
Beaver
Paragonah
Parowan
Blanding
Enterprise
Santa Clara
Hurricane
Washington
St. George
Fredonia
Gallup

Plumus Sierra REC
Lassen MUD
Truckee Donner PUD
Fallon

Resource Challenges and Changing Utility Industry

Resource Challenges

- San Juan Project
  - UAMPS successfully worked with PNM and the other San Juan owners to implement SIP in lieu of FIP to address ongoing environmental issues.
    - Federal Implementation Plan (FIP) would have required Selective Catalytic Reduction (SCR) on all four Units (September 2016)
    - State Implementation Plan (SIP) required Selective Non-Catalytic Reduction (SNCR) (January 2016)
      - SIP requires:
        - The installation of SNCRs on Units 1 and 4
        - The permanent retirement of Units 2 & 3 by end of 2017
  - Installation of SNCR equipment was completed in 2015 on Unit 4
  - Two of the Unit 4 California owners will exit the project at the end of 2017 due to restrictions under California legislation on coal-fired related assets

Resource Challenges (cont.)

- San Juan Project (cont.)
  - New coal contract with Westmoreland at significantly better pricing than previous arrangements with BHP Biliton
  - UAMPS intends to participate in the project through the end of the current coal supply contract and project participation agreement ending 2022
  - Bonds mature at the end of 2024
- Hunter Project
  - FIP requiring SCRS to be installed by August 2021 on Hunter Units 1 and 2 and Huntington Units 1 and 2
    - Due to regional haze/proximity to Class I Areas
  - Currently working PacifiCorp to evaluate appeals processes

Resource Challenges (cont.)

- IPP Project
  - IPA is working with the all Purchasers to modify the Power Sales Contracts in order to repower the coal fired units to natural gas
- CRSP Project
  - Post 2024 Marketing Plan
    - Process began December 16, 2015
    - Western held a number of customer meetings throughout the marketing area
    - Western proposal to determine the possibility of a 2% new customer pool
    - Western determination of insufficient resource to offer a 2% new customer power pool therefore the proposal has been withdrawn
    - Further determination
      - Insufficient energy resources to continue current customer allocations
      - Current allocations do not correlate with present seasonal allocations will require some adjustments
    - Western proposes a 40 year contract term beginning in 2024
      - Western to offer firm allocation for 20 years
      - Reevaluate last 20 years term at a later date once availability more definite

Resource Challenges (cont.)

- CRSP Project (cont.)
  - Long Term Experimental Management Plan (LTEMP) Environmental Impact Statement (EIS)
    - Comment deadline was May 9, 2016
    - Serious concerns with incomplete data that was included with draft
    - Concerns with favoring sediment values over other values in the system below Glen Canyon Dam
    - Too early to determine the content and value of the numerous comments offered
    - Final EIS to be issued in December 2016
    - UAMPS comments directed to the failure to protect hydropower generation at the expense of preserving and enhancing sediment

Resource Challenges (cont.)

- HBW Project
  - Filed for a take permit for bald and golden eagles with the Fish & Wildlife Services (FWS)
  - FWS put together NEPA documents (Environmental Assessment) to analyze the environmental impacts of issuing take permit
  - Take permit anticipated to be issued in first quarter of 2017

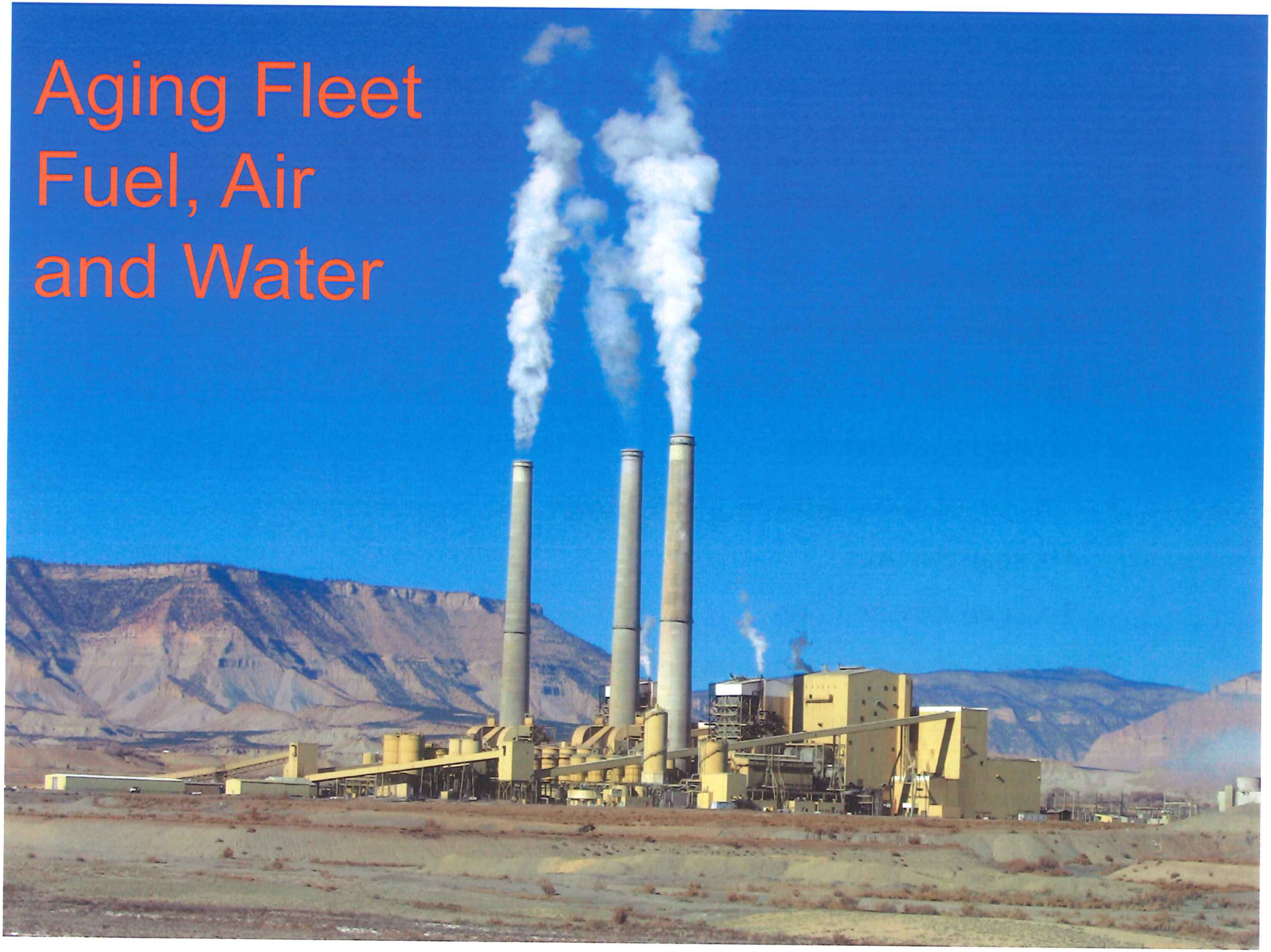
Regulation Challenges

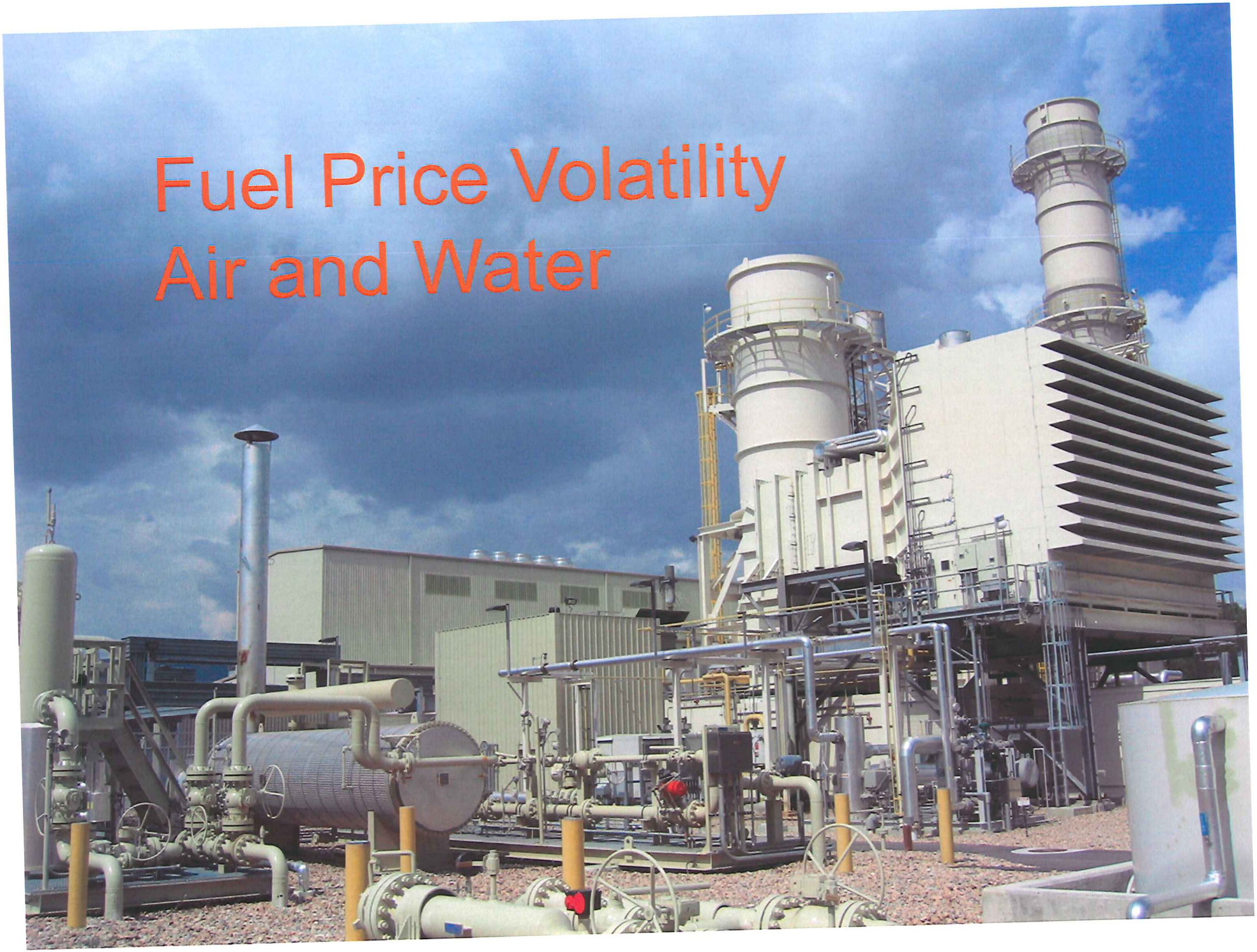
- Regulatory Laws
  - Federal Power Act
  - Clean Air Act of 1970
    - 111(b) – New Source Performance Standards
    - 111(d) – Clean Power Plan
    - Regional Haze Rulings
  - Endangered Species Act of 1973
  - Migratory Bird Treaty Act of 1918
  - Bald & Golden Eagle Protection Act of 1940
  - Clean Water Act of 1972

Market Challenges

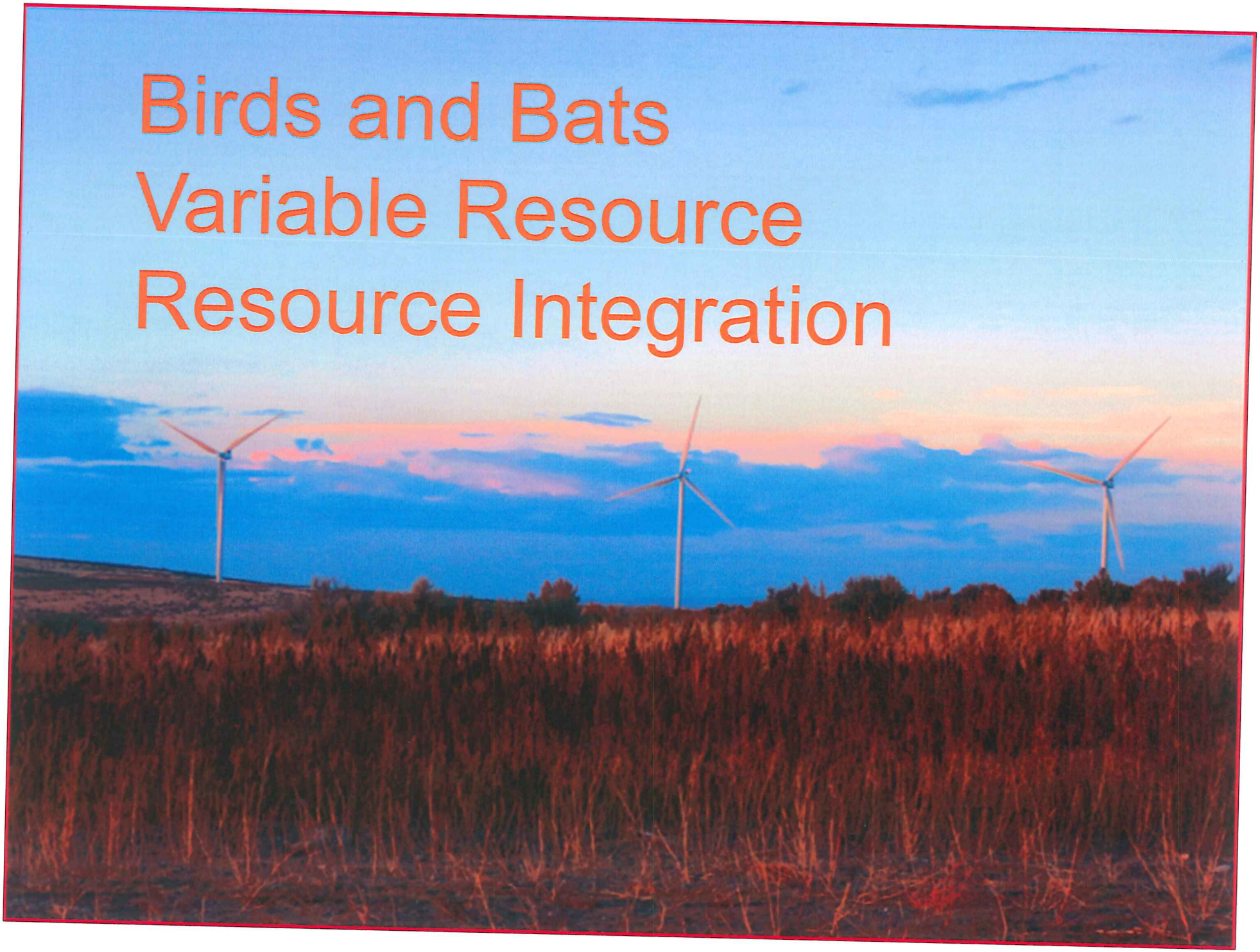
- Load growth
  - Approximately two percent per year
- Distributed Generation (i.e. rooftop solar)
- Changing Markets
- Future of Coal fueled generation
  - Clean Air Act
  - Clean Power Plan
- Future of natural gas fueled generation
  - What is the end-goal for C02 reduction
  - Fuel price volatility
- Replacement Capacity

Aging Fleet Fuel, Air and Water




Fuel Price Volatility
Air and Water

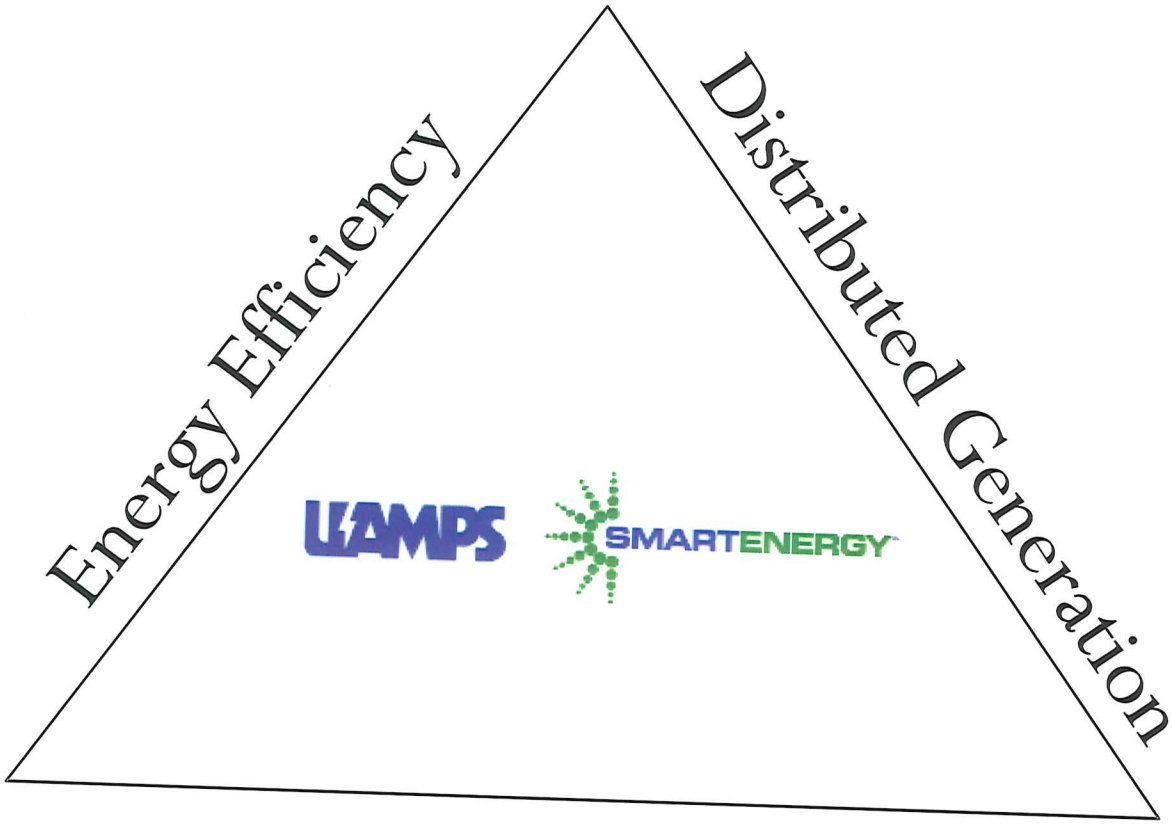
Birds and Bats
Variable Resource
Resource Integration



Distributed Resources

- Capital Investment
- Stranded Costs
- Power Quality
- Revenue Impact

Carbon Free Power Project

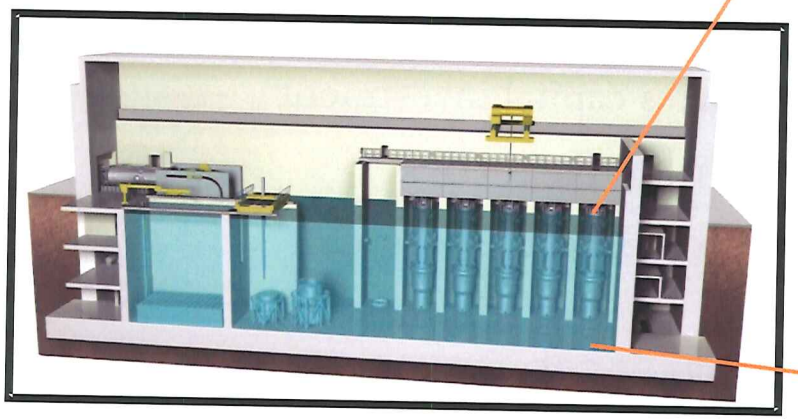


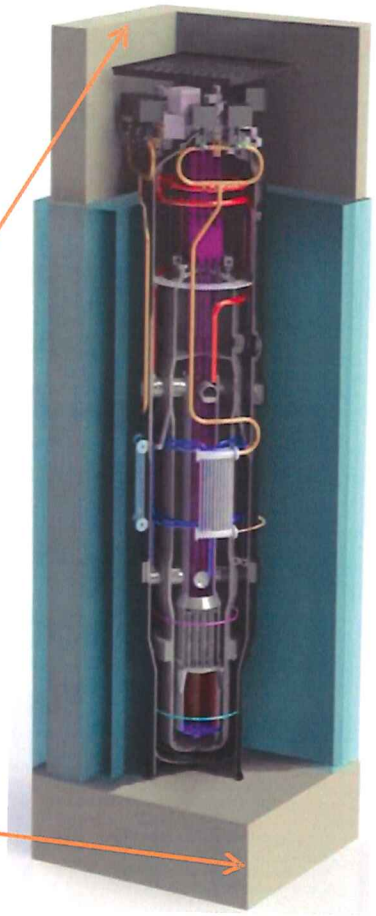
Carbon Free Power Project

- Need for a reliable replacement for carbon dioxide emitting generation sources
  - Energy Efficiency
    - Customer satisfaction with correct incentives
    - Customer makes capital investment
  - Rooftop solar or other distributed generation
    - Feed-in tariff with Member (local utility) or UAMPS
    - Customer makes capital investment
  - NuScale Modular Reactors
    - Baseload with flexibility resource
    - Safety
    - Scalable with load following capability

What is a NuScale Power Module?

- A NuScale Power Module (NPM) includes the reactor vessel, steam generators, pressurizer and ***containment*** in an integral package that eliminates reactor coolant pumps and large bore piping (no LB-LOCA)
- Each NPM is 50 MWe and factory built for easy transport and installation
- Each NPM has its own skid-mounted steam turbine-generator and condenser
- Each NPM is installed below-grade in a seismically robust, steel-lined, concrete pool
- NPMs can be incrementally added to match load growth - up to 12 NPMs for 600 MWe gross (~570 net) total output





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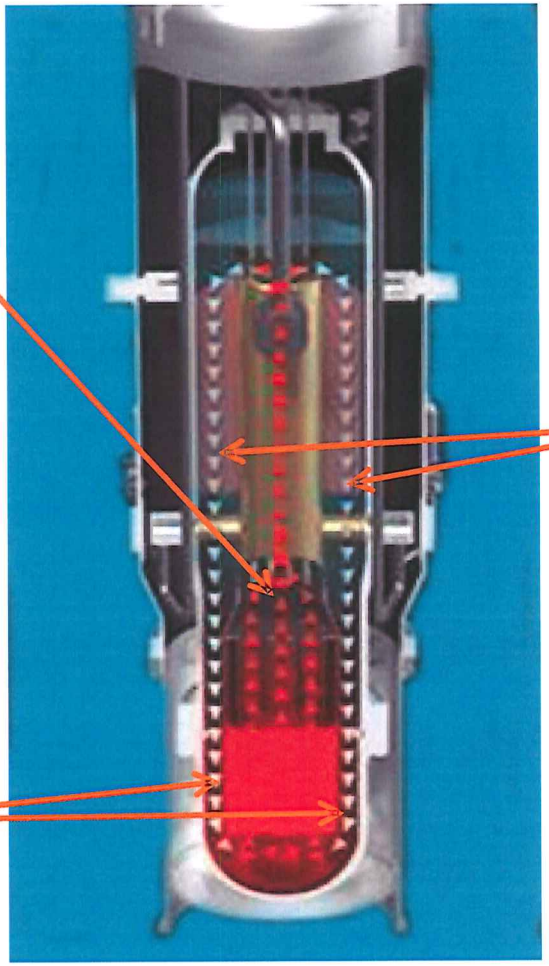
Coolant Flow Driven By Physics

Convection – energy from the nuclear reaction heats the primary reactor coolant causing it to rise by convection and natural buoyancy through the riser, much like a chimney effect



Conduction – heat is transferred through the walls of the tubes in the steam generator, heating the water (secondary coolant) inside them to turn it to steam. Primary water cools.

Gravity – colder (denser) primary coolant "falls" to bottom of reactor pressure vessel, cycle continues

NuScale SMR

- Less Volatile Regulation
- Cost
- Safety
- Scalable
- Load and Resource Integration

CFPP Informational Meeting scheduled for September 13th at the Hilton Salt Lake City Center

UAMPS SMARTENERGY

UAMPS and Its Members

- UAMPS partnership with its members provide tremendous value to utilities. Not only in the opportunity learn from each other's best management practices but to achieve economies of scale with regard to investing in generation resources and to stay abreast of changing technology and its impact on our systems.
- As examples:
  - Distributed Generation Taskforce
  - Municipal Tool Kit Workshops
  - Annual Member Conference

Questions

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