

GCDAMP Knowledge Assessment: Status & Trend

Resource Topic:	Hydropower and energy
Preparer(s):	WAPA: Craig Ellsworth, Shane Capron, Clayton Palmer, Dave Welker, Chrystal Dean; Reclamation: Paul Davidson and Nick Williams; GCMRC: Lucas Bair; CREDA: Leslie James; UAMPS: Cliff Barrett; SRP: Jenika Raub; SEAHG chair: Ben Reeder; CRC: Peggy Roefer;
Version Date:	2/14/2017

Resource Characteristic	Specific Measure	Status	Trend	Confidence	Rationale: Status/Trend	Rationale: Confidence	Recommendations
Electric generation (energy production)	MWh generated/year	Significant Concern	Deteriorating	High	Increased bypass for HFEs reduces the MWh/yr.		Make sure to consider hydrology and water use and how they affect resource characteristics. Make sure these resources are considered when planning for changes in water use. Move forward on cost/benefit analysis on adding generation on the bypass tubes.
Electric generation (energy value)	Market Price/MWh generated/year	Moderate Concern	Deteriorating	High	Increased bypass for HFEs reduces the MWh/yr. HFEs moves water between months sometimes to lower value months. Lower power production coincideing with low market prices and firming power costs. If power prices increase, firming costs will increase but we won't be able to reduce restrictions.		
Electric generation (capacity)	Marketable MW/peak power month (Jul/Aug)	Significant Concern	Deteriorating	High	Monthly volumes recommended in LTEMP moves water from Jul/Aug.		Increased experimentation could interfere with power production (particularly the testing of Low Summer Flows (LSF), possibly testing of TMFs).
Electric generation (capacity)	Capital investment (\$) in new powerplant capacity construction	Significant Concern	Deteriorating	High	Monthly volumes recommended in LTEMP shift releases from Jul/Aug. Such operational changes reduce or "flatten" capacity and consequently can require additional generating resource construction by customers to meet utility load. This is where the capacity cost impact in LTEMP comes from. However, it isn't WAPA's cost or investment, it's a cost incurred by power customers to meet their own power needs.		Describes the need to build additional capacity or acceleration of building timelines
Load following capability	Annual MW available above/below WAPA customer demand	Moderate Concern	Deteriorating	Low	LTEMP downramp rate allows to follow load better. Monthly volumes recommended in LTEMP moves water from Jul/Aug. Allowable daily fluctuations improve in shoulder months but restricted in winter power months and summer power months if volumes end up to be lower. LTEMP analysis suggests a net decline in load following capability in power months (JJA, DJ) due to a decrease in allowable daily fluctuations.	LTEMP didn't separate out the change in load following alone. WAPA could look at this further.	
Emissions	Changes in emissions to compensate for energy losses resulting from changes in operations at Glen Canyon Dam (tons of CO2, SO2 and NOX emissions/year)	Moderate Concern	Deteriorating	High	Bypass for HFEs increases power production via other means (see LTEMP analysis).	LTEMP did model using AURORA which included all generation types used in the western grid.	Keep the analysis updated past LTEMP. Move forward on cost/benefit analysis on adding generation on the bypass tubes.
Net firming purchases	\$/year	Significant Concern	Deteriorating	High	Monthly volumes recommended in LTEMP moves water from power months to shoulder months. HFEs move water between months and increase bypass. Impacts of changes to load following capability (see previous row).		Experiments are non-reimbursable but this is still an economic impact.

HYDROPOWER and ENERGY

Hydro-mechanical equipment	\$/year (O/M and replacement)	Moderate Concern	Deteriorating	High	Use of bypass tubes for HFEs requires additional and unanticipated maintenance	Confidence is high based on modeling probability for events requiring use of bypass tubes and past experience with maintenance activities following use of bypass.	Component of Basin Fund. Is this booked to Maintenance or the Program?
----------------------------	-------------------------------	------------------	---------------	------	--	--	--