



Western
Area Power
Administration

Boulder Canyon Project

February 9, 2017

Hoover 101
Phoenix, AZ



Agenda

- Introduction, Roles, Overview & Purpose
- Contracts & Energy Services
- Resource Planning
- Transmission Service
- Capacity & Energy Prescheduling
- Real-time Operations
- Settlement & Energy Accounting
- Rates
- Power Billing
- Next Steps, Important Dates, Points of Contact



Introduction

- Logistics
- Meeting Management
 - WebEx
 - Microphone
 - Questions
 - Breaks & Lunch



Roles and Responsibilities of WAPA

- Western Area Power Administration (WAPA) shall operate, maintain, replace, and repair the Federal transmission system (electric delivery) to deliver capacity and energy from Hoover Powerplant
- Schedule, deliver, and measure power to the Contractor
- Calculate costs, set rates and charges to recover costs
- Account for power deliveries, render bills, and maintain financial integrity of the project



Product Overview

- Long-term contingent capacity with associated firm energy
- Highly dependent on the elevation of Lake Mead
- If power is insufficient to support contractor capacity entitlements, each contractor capacity entitlement is reduced on a pro-rata basis to align with the available capacity at any given time



Purpose

- Implementation phase
- Preparation for successful October 1, 2017
- Provide contractor support & education
- Introduction to WAPA activities & processes
- Introduction to WAPA staff, points of contact
- Future learning opportunities



Customer Portal

- Planned to be made available for Contractors & Scheduling Entities to log in and view updated Hoover scheduling and accounting information
- Will also be used to accept separate capacity schedules required for static and dynamic sub-hourly energy scheduling
- More to come on portal as information becomes available
- Hope to provide “One Stop Shop” for Contractors & Scheduling Entities
- Feedback and ideas are welcome



Contracts & Energy Services

Patricia Weeks

Contracts & Energy Services
Lead



Contract Update

- Electric Service Contract (ESC)
 - Reallocation of 179 kW
 - Exhibit A and Attachment 1 & 2
- Implementation Agreement
 - Signature pages and Committee Member pages
- Benefit Arrangement Agreements (Native American Tribes only)
 - Benefit Partner (Economic Benefit)
 - Agreements signed NLT June 2017



Contracts Questions

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Resource Planning

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Resource Planning Engineer



Resource Planning

Overview

- What is the Hoover Master Schedule?
- Customer Portal
- What is the Resource Integration Exchange Program (RIE)?



Hoover Master Schedule

What is a Hoover Master Schedule?

- A 16-month forecast of Hoover Capacity & Energy on a Fiscal Year (FY) Basis
- Fiscal Year (FY) = Water Year (WY) 10/1 – 9/30

Why a Hoover Master Schedule?

Section 6.10 of the Electric Service Contract (ESC) requires WAPA to provide two drafts & a final Master Schedule to the contractors at specified dates:

- Draft 1 due on March 1st prior to the start of the new FY
- Draft 2 due on May 1st prior to the start of the new FY
- Final Master Schedule due on June 1st prior to the start of the new FY



Hoover Master Schedule (cont.)

What does a Hoover Master Schedule contain?

- Bureau of Reclamation 17-Month Operating Schedule for Hoover Powerplant
- Hoover Energy Entitlement Master Schedule for Current FY 2017
- Hoover Contract Schedule A & Schedule B Capacity for the Remainder of Current FY 2017
- Hoover Energy Entitlement Master Schedule for New FY 2018
- Hoover Contract Schedule A, Schedule B & Schedule D Capacity for the New FY 2018



Hoover Master Schedule (cont.)

Bureau of Reclamation 17 Month Operating Schedule for Hoover Powerplant:

HOVER DAM 17- MONTH OPERATING SCHEDULE FINAL																				
June 2016																				
Add New Task	Increment Month	CALENDAR YEAR		FISCAL YEAR																
		MONTH	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep		
		MAX	1558	1537	1549	1549	1554	1555	1572	1579	1576	1551	1518	1492	1482	1493	1514	1522		
		MIN	1558	1537	1549	1549	1156	1081	1380	1289	1176	1243	1226	1196	1482	1493	1514	1522		
UNIT A0	ANNUAL UNIT INSPECTION/GENERATOR LIFE EXTENSION ASSESSMENT	103					<3----->	-4>												
	UNIT BREAKER REPLACEMENT						<3----->	-4>												
UNIT A2	ANNUAL UNIT INSPECTION/GENERATOR LIFE EXTENSION ASSESSMENT	104					<3----->	-4>												
	UNIT BREAKER REPLACEMENT						<3----->	-4>												
UNIT A3	ANNUAL UNIT INSPECTION	86					<31----->	-21>												
UNIT A4	ANNUAL UNIT / TURBINE INSPECTION	85					<31----->	-21>												
UNIT A5	ANNUAL UNIT INSPECTION	92						<28----->	-15>											
UNIT A6	ANNUAL UNIT / TURBINE INSPECTION/ GENERATOR LIFE EXTENSION ASSESSMENT	98						<7----->	-15>											
UNIT A7	ANNUAL UNIT / TURBINE INSPECTION/ GENERATOR LIFE EXTENSION ASSESSMENT	97								<3----->	-2>									
	EXCITER REPAIR									<3----->	-24>									
	UNIT BREAKER OVERHAUL									<3----->	-24>									
UNIT A8	ANNUAL UNIT INSPECTION / OVERSTROKE	42							<19----->	-10>										
UNIT A9	ANNUAL UNIT/TURBINE INSPECTION	45								<3----->	-25>									
	COOLING WATER RING REPLACEMENT									<3----->	-25>									
UNIT N0	ANNUAL MAINTENANCE / RELAY MODIFICATIONS		<11----->	-17>																
UNIT N1	ANNUAL UNIT / TURBINE INSPECTION	95											<10-27>							
	SUMP PUMP FLANGE INSTALL & REMOVAL						<5-26>													
UNIT N2	ANNUAL UNIT INSPECTION	96											<10-27>							
	SUMP PUMP FLANGE INSTALL & REMOVAL						<5-26>													
UNIT N3	ANNUAL UNIT / TURBINE INSPECTION/ GENERATOR LIFE EXTENSION ASSESSMENT	103												<1-31>						
UNIT N4	ANNUAL UNIT INSPECTION	103												<1-18>						
UNIT N5	ANNUAL UNIT INSPECTION	102										<7----->	-7>							
	TURBINE REPLACEMENT/THRUST BEARING REFURBISHMENT								<9----->											
	COOLING WATER RING REPLACEMENT									<6----->	-31>									
	NERC / WECC TESTING										<7----->	-7>								
UNIT N6	ANNUAL UNIT / TURBINE INSPECTION	101										<7----->	-7>							
	NERC / WECC TESTING											<7----->	-7>							
UNIT N7	ANNUAL UNIT INSPECTION	103									<13----->	-6>								
UNIT N8	ANNUAL UNIT INSPECTION	103									<13----->	-6>								



Hoover Master Schedule (cont.)

Bureau of Reclamation 17 Month Operating Schedule for Hoover Powerplant:

HOOVER DAM 17- MONTH OPERATING SCHEDULE FINAL								
June 2016								
CALENDAR YEAR		-----	-----	-----	-----	-----	-----	----->
FISCAL YEAR		-----	-----	-----	-----	<FY2017	-----	-----
MONTH		Jun	Jul	Aug	Sep	Oct	Nov	Dec
ESTIMATED GENERATION UPPER LIMIT (MW)	MAX	1558	1537	1549	1549	1554	1555	1572
ESTIMATED AVAILABLE CAPABILITY (MW)	MIN	1558	1537	1549	1549	1156	1081	1380
UNIT A0								
UNIT A1	ANNUAL UNIT INSPECTION/GENERATOR LIFE EXTENSION ASSESSMENT	103				<3-----	--4>	
	UNIT BREAKER REPLACEMENT					<3-----	--4>	
UNIT A2	ANNUAL UNIT INSPECTION/GENERATOR LIFE EXTENSION ASSESSMENT	104				<3-----	--4>	
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UNIT A6	ANNUAL UNIT / TURBINE INSPECTION/ GENERATOR LIFE EXTENSION ASSESSMENT	98					<7-----	---15>



Hoover Master Schedule (cont.)

Hoover Energy Entitlement Master Schedule for Current FY 2017

Current FY 2017 contractors will receive the usual monthly reports:

- Actual scheduled energy through Jan (draft 1) or Apr (final)
- Forecasted energy for the remainder of the FY



Hoover Master Schedule (cont.)

Hoover Contractor Capacity for Current FY 2017

Current FY 2017 contractors will receive the usual monthly reports:

- Forecast of capacity allocations for the remainder of FY 2017



Hoover Master Schedule (cont.)

Hoover Energy Entitlement Master Schedule for New FY 2018

Contractor

- Aqua Caliente
- Anza Elec. Coop
- Arizona Power Authority
- Augustine Band of Cahuilla Indians
- Bishop Paiute Tribe
- Cabazon Band Mission Indians
- CA Dept. of Water Resources
- Chemehuevi Indian Tribe
- City of Anaheim
- City of Azusa
- City of Banning

Scheduling Entity

- ACES Power
- Arizona Power Authority
- Augustine Band of Cahuilla Indians
- Bishop Paiute Tribe
- Cabazon Band Mission Indians
- California Dept. of Water Resources
- Chemehuevi Indian Tribe
- City of Anaheim
- City of Azusa
- City of Pasadena
- City of Riverside

Balancing Authority

- CAISO
- LADWP
- NVE
- SRP
- WALC

Contractor Available Energy

APA Total	Energy (MWh)	
October 2017	44,208	Available Energy
November 2017	47,545	Available Energy
December 2017	44,988	Available Energy
January 2018	48,568	Available Energy
February 2018	57,487	Available Energy
March 2018	70,895	Available Energy
April 2018	82,593	Available Energy
May 2018	71,196	Available Energy
June 2018	63,480	Available Energy
July 2018	61,376	Available Energy
August 2018	53,904	Available Energy
September 2018	53,173	Available Energy
Total	699,413	Available Energy

Contractor: Arizona Power Authority		
Scheduling Entity: SRP		
	Energy (MWh)	
October 2017	9,533	Available Energy
November 2017	10,212	Available Energy
December 2017	9,667	Available Energy
January 2018	10,239	Available Energy
February 2018	12,210	Available Energy
March 2018	15,058	Available Energy
April 2018	17,543	Available Energy
May 2018	15,122	Available Energy
June 2018	13,483	Available Energy
July 2018	13,036	Available Energy
August 2018	11,449	Available Energy
September 2018	11,294	Available Energy
Total	148,846	Available Energy

Contractor: Arizona Power Authority		
Scheduling Entity: ACES Power		
	Energy (MWh)	
October 2017	34,675	Available Energy
November 2017	37,333	Available Energy
December 2017	35,321	Available Energy
January 2018	38,329	Available Energy
February 2018	45,277	Available Energy
March 2018	55,837	Available Energy
April 2018	65,050	Available Energy
May 2018	56,074	Available Energy
June 2018	49,997	Available Energy
July 2018	48,340	Available Energy
August 2018	42,455	Available Energy
September 2018	41,879	Available Energy
Total	550,567	Available Energy



Hoover Master Schedule (cont.)

Hoover Contract Schedule A, Schedule B & Schedule D Capacity for New FY 2018

Contractor

- Aqua Caliente
- Anza Elec. Coop
- Arizona Power Authority
- Augustine Band of Cahuilla Indians
- Bishop Paiute Tribe
- Cabazon Band Mission Indians
- CA Dept. of Water Resources
- Chemehuevi Indian Tribe
- City of Anaheim
- City of Azusa
- City of Banning

Scheduling Entity

- ACES Power
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- Augustine Band of Cahuilla Indians
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- Chemehuevi Indian Tribe
- City of Anaheim
- City of Azusa
- City of Pasadena
- City of Riverside

Balancing Authority

- CAISO
- LADWP
- NVE
- SRP
- WALC

Contractor Available Capacity

Units	10/1/2017 HE 01 10/31/2017 HE 24
HVR A1	101
HVR A2	102
HVR A3	85
HVR A4	84
HVR A5	92
HVR A6	97
HVR A7	96
HVR A8	42
HVR A9	43
HVR N1	95
HVR N2	96
HVR N3	103
HVR N4	102
HVR N5	101
HVR N6	95
HVR N7	101
HVR N8	101
Total Available	1,536
Total Unavailable	0
Total Capacity	1,536

BA	Scheduling Entity	Contractor	10/1/2017 HE 1 10/31/2017 HE 24	
			Rd Up	Rd Down
WALC	ACES Power	Arizona Power Authority	127	126
SRP	SRP	Arizona Power Authority	170	169
Total			297	295



Hoover Master Schedule (cont.)

Customer Portal (as it pertains to Resource Planning)

- Contractors & Scheduling Entities can view & download Draft & Final Hoover Master Schedules
- View & download updated Hoover Master Schedules



Resource Integration Exchange Program

What is the Resource Integration Exchange (RIE) Program?

- The **voluntary** process of mutually agreeing to a firm monthly exchange of energy among individual participants of the Boulder Canyon Project, the Parker-Davis Project (P-DP) participants, and between the two projects.

Why an RIE Program?

- Attachment 4.IA of the Restated & Amended BCP Implementation Agreement requires WAPA to provide the multiproject benefits of exchange energy through resource integration of Western Area Lower Colorado (WALC) federal projects, inclusive of internal energy exchanges among the BCP participants, and among the P-DP participants.



Resource Integration Exchange Program (cont.)

How to Participate in the RIE Program

- Each contractor will receive a request form with Draft 1 of the Hoover Master Schedule on or before March 1st
- The Draft 1 Master Schedule allocation will be filled in for each contractor
- If the contractor decides to participate, the Proposed Allocation column is filled in and the form is returned to WAPA by the stated deadline
- The Proposed Allocation annual total can not exceed the Draft 1 Master Schedule allocation annual total
- The Proposed Allocation monthly energy can not exceed 100% load factor



Resource Integration Exchange Program (cont.)

FY 2018

**Boulder Canyon Project
Resource Integration Exchange Program
Customer Request Form**

1st Draft

Month	Master Schedule Allocation	Proposed Allocation	Difference
October-17	31,476	41,516	10,040
November-17	33,320	43,413	10,093
December-17	29,129	44,689	15,560
January-18	41,710	35,547	(6,163)
February-18	47,327	30,033	(17,294)
March-18	58,833	40,276	(18,557)
April-18	63,540	34,627	(28,913)
May-18	54,401	39,865	(14,536)
June-18	47,553	43,825	(3,728)
July-18	45,392	64,690	19,298
August-18	39,656	63,723	24,067
September-18	38,431	48,564	10,133
Annual Total	530,768	530,768	0



Resource Integration Exchange Program (cont.)

Stage 1 Exchanges

- A Stage 1 exchange is simply an exchange of energy within the respective projects (BCP with BCP contractors and P-DP with P-DP contractors)
- WAPA will make every effort to accommodate matching Stage 1 requests

Stage 2 Exchanges

- Once WAPA has matched Stage 1 requests to the maximum extent possible, an effort is made to find offsetting requests between BCP and P-DP contractors
- A Stage 2 exchange is an effort to further provide contractors added value
- The final revised allocations are reflected in the contractor's P-DP Exhibit A and/or the BCP Final Hoover Master Schedule



Resource Integration Exchange Program (cont.)

The RIE program only works if there are offsetting energy requests. For example:

- If a contractor wants to reduce their allocation in February and increase their allocation in June, there must be another contractor or contractors who are willing to do just the opposite in those same months
- It is rare that offsetting energy allocation requests match perfectly
- Therefore, partial energy exchanges are granted.
- Some contractors are denied their requests because there are absolutely no offsetting requests and some contractors choose not to participate at all



Resource Planning Questions

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Transmission Service

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for DSW, CRSP & RMR



Transmission Service

- WAPA offers three types of long-term firm transmission service
 - Non-OATT Firm Transmission Service (FTS)
 - Open Access Transmission Tariff (OATT), Point to Point Service (PTP)
 - OATT, Network Integrated Transmission Service (NITS)
- WAPA sells long-term firm transmission on a first come, first serve basis to wholesale customers
- Long-term transmission is defined as having transmission rights for a minimum of 12 consecutive months



Transmission Service

- FTS Provisions
 - No cap on the maximum duration of service
 - Minimum of one year of continuous service is required
 - Transmission agreements may terminate if certain circumstances arise and both parties agree
 - Agreements permit transmission to be reserved on a kilowatt basis
 - Transmission capacity is capped at the allocated amount of Hoover generation received
 - Revisions to capacity amount or change of delivery location may be submitted to Power Marketing for consideration
 - Transmission Agreement includes ancillary services



Transmission Service

- FTS Provisions (continued)
 - Transmission service is provided under Attachment K in WAPA's OATT
 - Modifications of receipt or deliver points is permitted only on a long-term basis (no redirects)
 - Rollover rights identified in the agreement
 - Transmission service billing is based upon reserved capacity amount



Transmission Service

- Point-to-Point Service
 - No cap on the maximum duration of service
 - A minimum of one year of continuous service is required
 - Termination is a set date; therefore, there are no “off-ramp” provisions in the agreement
 - Capacity reservations are in whole megawatts
 - \$3,500 non-refundable processing fee
 - Modifications to points of receipt or delivery can be done on either a real-time or long-term basis (This is also known as a redirect)
 - Transmission may be resold to a third party for any duration while the agreement is still active
 - Transmission customer submits request on the Open Access Same-time Information System (OASIS)



Transmission Service

- NITS:
 - No cap on the maximum duration of service
 - A minimum of one year of continuous service is required
 - Network customer must submit their annual load forecasts by March 15
 - Customer may remove network load with advance notice to WAPA
 - Capacity reservations are in whole megawatts
 - \$3,500 non-refundable processing fee
 - Billed on net average meter load



Transmission Service Table

Provision	FTS	OATT PTP	OATT NITS
Is Rollover Available?	Yes. Rollover is available by contacting Power Marketing reps.	Yes, provided the transmission service is a minimum of 5 years duration.	Yes. Customer submits its intent to renew NITS agreement within one of termination.
Is Redirect Available?	No. Changes can be made to an agreement, but require analysis.	Yes, customer may redirect its transmission anytime within the posted Business Practice time lines. Ideal for pre or real-time transactions.	No, however customer may designate a non-network resource with a very high level priority to serve network load.
Are there “Off-Ramps”?	Yes. Both parties must agree to it.	No. Once an agreement is signed customer is locked into transmission service for that duration.	Yes. A customer may notify Western that they want their network load to be withdrawn.



Transmission Service Table

Provision	FTS	OATT PTP	OATT NITS
Can I resell Transmission to 3 rd party?	No.	Yes.	No. NITS transmission is intended to serve load.
How am I billed?	Customer will be invoiced based upon capacity granted.	Customer will be invoiced based upon capacity granted.	Customer will be invoiced based upon usage at the time of the system peak.
Application Fee?	No.	Yes. \$3,500.	Yes. \$3,500.
Capacity reservation size?	Capacity may be reserved in kilowatts.	Capacity reserved must be in whole megawatts.	Capacity may be reserved in kilowatts



Transmission Questions

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Capacity & Energy Prescheduling

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(EMMO)



Capacity & Energy Prescheduling

- Available Capacity
- Hoover Energy (Target)
- Firming
- Scheduling
- Customer Portal



Hoover Capacity

- Capacity – The maximum level of electric power that can be supplied at a point in time, measured in Megawatts (MW) or Kilowatts (kW)
- Contingent Capacity
 - The aggregate of Schedule A, B, and D Contingent Capacity as listed in Attachment 1 to the ESC
 - Hoover's maximum rating is 2,074 MW when Lake Mead is full and all 17 units are operating optimally
- Available Capacity
 - Lower lake levels have reduced Available Capacity to the current rating of 1,610 MW; future lake levels will affect Available Capacity
 - Taking units out of service also reduces Available Capacity
 - Each contractor receives its share of Available Capacity based on their percentage of Contingent Capacity. Available Capacity fluctuates with what is available at any given time



Available Capacity

- Contractors Schedule A, B, & D Contingent Capacity Percentage is assigned to Scheduling Entities to schedule
 - A Scheduling Entity is assigned by each contractor and coordinates directly with WAPA on all scheduling matters
- Scheduling Entities will coordinate with WAPA on where they will schedule the percentages assigned to them based on host Balancing Authority (BA), Transmission Arrangements or other considerations
 - The term for these rolled up percentages will be “Scheduling Definition”
- Scheduling Definitions will be the basis for hourly Available Capacity which can be scheduled

Example:	%	BA:	SE:	SD:
Contractor A	25%	APS	SE1	50%
Contractor B	25%	APS	SE1	
Contractor C	25%	SRP	SE2	25%
Contractor C	25%	WALC	SE3	25%



Available Capacity - Rounding

- Total Hoover Available Capacity is scheduled in whole MWs equal to the plant output
 - Scheduling definitions based on kW shares need to be rounded to the nearest MW
- Currently, rounding is a minimal concern based on limited number of contractors and a minimum capacity share of no less than 2,000 kW
- Rounding was identified early on as a matter that would need to be addressed in the implementation of the new contracts
- Argonne National Labs coordination
 - Integerizer Product - Tracks the remainder from rounding and uses criteria such as amount of remainder and or the relative value of scheduling hours to decide how to correct for rounding differences
 - Used originally in WAPA's Sierra Nevada Region
 - Argonne is working on adapting for Hoover



Available Capacity - Notifications

- Scheduling Definition Available Capacity will be published as output capability as the plant changes
 - Scheduling Definition Available Capacity for month ahead planning will not be hourly but will show the round up and round down values for the applicable output capability scenarios
 - Scheduling Definition Available Capacity will be published hourly using Integerizer on a Pre-schedule basis
 - Pre-Schedule is the coordination of energy scheduling for the next day(s)
 - Output Capability changes in real time will also need to be published hourly
 - Options for Real Time Scenarios still being worked out
 - Reliability concerns must be balanced with maintaining the rounding correction fairness we are looking for from the Integerizer



Hoover Energy

- Energy – The amount of electricity generated and delivered during a specified period of time, Megawatt hours (MWh) or Kilowatt hours (KWh)
- Firm Energy – Energy sales with assured delivery pending unexpected/uncontrollable events

Firm Energy Examples:

- While Hoover’s firm energy obligation is 4,527,001 MWh annually, actual gross generation has averaged 3,821,442 MWh over the last 5 fiscal years
- Each contractor receives its Contractor Available Energy based on their percentage of Firm Energy as listed in Attachment 2 to the ESC
- Based on contractor request, WAPA will procure “firming energy” to fulfill its firm energy commitments, at the expense of the requesting contractor



Hoover Energy – Target Calculation

$$CAE = (P \times B) - A + M + C + D$$

CAE = Contractor's Available Energy for the applicable period

P = Contractor's percentage of total Schedule A, Schedule B, and Schedule D Firm Energy

B = Projected Hoover Firm Energy generation for the applicable period, including transformer and transmission line losses and projected integration with the Parker-Davis Project

A = Adjustments from previous month's accounting process including schedule deviation and M_L and S_L assessments

M = M_L and S_L return energy

C = Excess Energy for the applicable period available to the Contractor in accordance with Schedule C of the Contract

D = Contractor's requested Firming Energy purchase in accordance with subsection 6.9.4 of the ESC which are scheduled and accounted for separately from energy deemed to be from Hoover Powerplant



Hoover Energy – Target Requirements

- Monthly Energy Excursions
 - Scheduling Entities must take within +/- 2% of monthly Contractor's Available Energy
 - +/- 5% can be requested and will be granted or denied based on prevailing water conditions
- Sub-Monthly Energy Requirement
 - Bureau of Reclamation will divide months into 3-5 periods (Mon-Sun exclusive of first & last periods)
 - 1st period requirement is within +/- 2%
 - Subsequent periods requirement is +/- 5%
- Energy scheduled in excess of prescribed percentages will be billed at 10 times the forecast Energy & Capacity rate and will include applicable Lower Colorado River Basin Development Fund (LCRBDF) charges
- Energy not scheduled outside of prescribed percentages will be forfeited on a subsequent Target



Hoover Energy – Firming

Definition Section 5.34:

Firming Energy: Supplemental energy (with or without capacity) purchased by Western at the request of a Contractor to meet any deficiency in Firm Energy under Section 105 (a) (3) of the Hoover Power Plant Act of 1984, as amended by the Hoover Power Allocation Act of 2011.

Section 6.9.4:

Firming Purchases: At the request of the Contractor and at the Contractor's expense, Western shall purchase Firming Energy to meet that Contractor's Firm Energy deficiency. Such firming purchases shall be subject to a prior written agreement between the Parties that requires the Contractor to advance fund firming purchases and contains terms acceptable to both Parties. Under such agreements, Western shall make other purchases of capacity and/or energy to increase the Contractor's energy deliveries up to one-hundred (100) percent capacity factor of the Contractor's Contingent Capacity (Supplemental Firming Purchases) if requested by the Contractor. The price to the Contractor for Firming Energy and Supplemental Firming Purchases shall not include the LCRBDF Charge.



Scheduling (e-TAGs)

- All energy transactions are communicated in the form of an e-Tag for
 - Electronic means of communicating transactions
 - Contains description of where energy comes from (generator) and where it is consumed (load)
 - Transmission purchased to get from generator to load is also listed
 - Open Access Same Time Information System (OASIS)
 - Assignment Reference Number (A-Ref)
 - Entities listed as either parties to the transaction or providing reliability along the path
 - Purchasing/Selling Entity (PSE)
 - Balancing Authorities (BA)
 - Western Area Lower Colorado (WALC)
 - Transmission Provider (TP)
 - Scheduling Entities will be handling the details of this process



Scheduling (e-Tag Requirements)

- e-Tag requirements - section 7.9 of Metering & Scheduling Instructions(MSI)
 - DSWM01 (DSW Merchant) will be the PSE assigned to the Generator
 - e-Tag approval rights to monitor Available Capacity Usage
 - Physical segment 1 will be Mead230 to Mead230 with WALC as the TP
 - This transmission allocation will be equal to hourly Available Capacity and will be the basis for approval or denial by DSW Merchant
 - Physical Segment 2 will begin with Mead230 and then list individual transmission arrangements for delivery of Hoover Power



Scheduling Coordination

- Contractor's Available Energy can be scheduled up to Available Capacity hourly per Scheduling Definition on a Pre-schedule and Real Time/Hourly Basis
 - Static Energy Schedules will be submitted via e-Tag in up to 15 minute increments subject to standard e-Tag submittal deadlines
 - Less than full hour scheduling will require a separate capacity schedule
 - Dynamic Energy Schedules will be communicated via data link in the form of an energy request in up to 4 second increments
 - All dynamic schedules will require a separate capacity schedule
 - All dynamic schedules will require a projection of energy usage
 - A Dynamic type e-Tag adjustment will be submitted after the hour is over with the full hour integration of energy requests accepted by WAPA



Customer Portal

- Planned to be made available for Contractors & Scheduling Entities to log in and view updated Hoover scheduling and accounting information
 - Projected Available Capacity & Contractor's Available Energy out to the most current Master Schedule fiscal year(s)
 - Available Capacity by Scheduling Entity for current and pre-schedule days
 - Contractor's Available Energy by period for current and next month when published
 - Prior month accounting and billing reports
 - Annual accounting and other relevant data
- Will also be used to accept separate capacity schedules required for static and dynamic sub-hourly energy scheduling
- More to come on portal as information becomes available
- Hope to provide "One Stop Shop" for Contractors & Scheduling Entities
- Feedback and ideas are welcome



Prescheduling Questions

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Real-time Operations

Kim Clark

WALC Reliability & Balancing

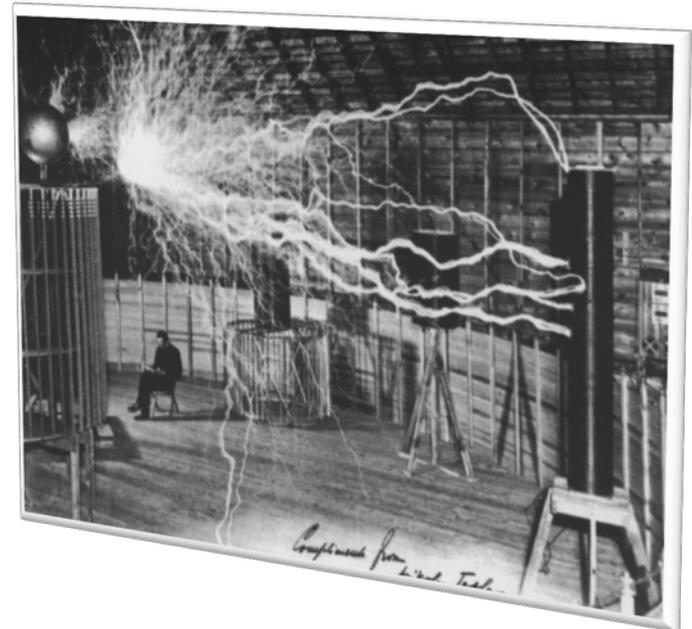
Craig Halber

Transmission Scheduling



Overview

- Balancing Authority Role
- Bureau of Reclamation Coordination
- Available Capacity Changes
- Static Scheduling
- Dynamic Scheduling
- Ancillary Services

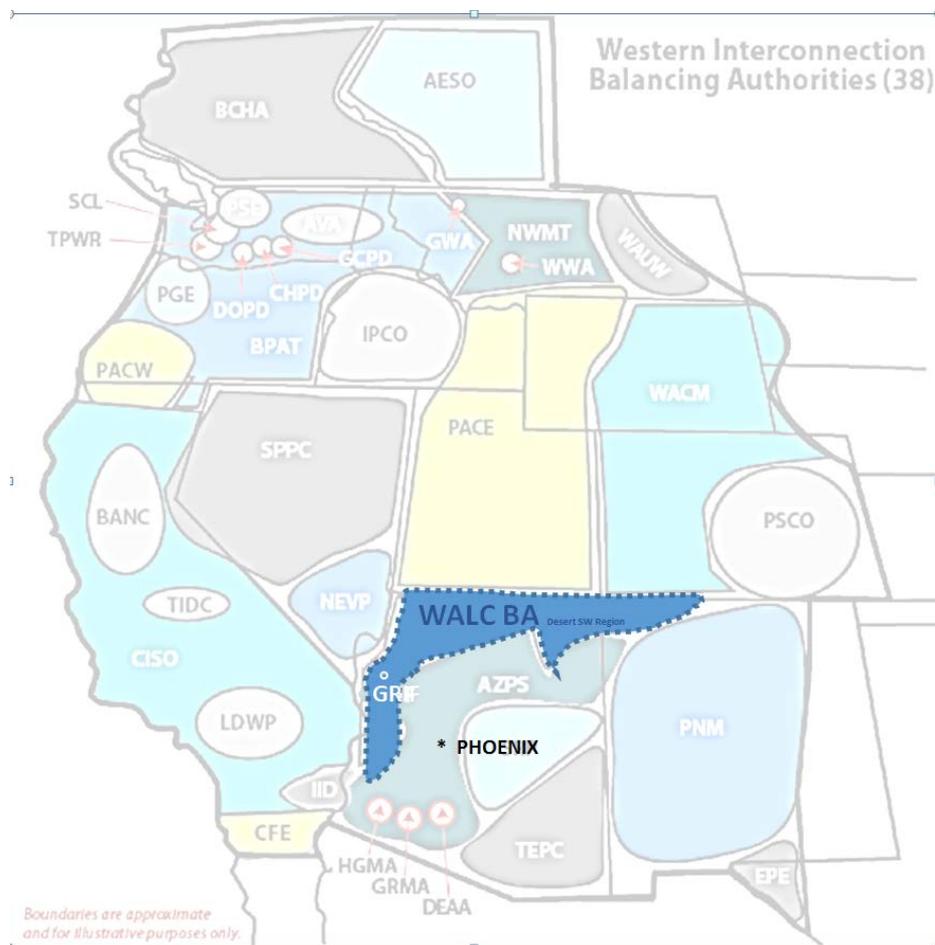


Balancing Authority Role

- Western Area Lower Colorado (WALC) Balancing Authority (BA)
 - BA areas are defined by metered boundaries
 - WALC's area includes areas in Arizona, Nevada, California and New Mexico
- Meet NERC/WECC/NAESB/FERC/DOE/SRSG Reliability & Balancing Standards
- Implement Operating Procedures and WAPA Agreements in Real-Time



Balancing Authority Role



Bureau of Reclamation Coordination

- Planned & Unplanned Outages & Returns
- Rating Changes
- Capacity & Generation Scheduling
- Automatic Generation Control
- Lake levels & water release issues
- Emergency Operations
- NERC Compliance & Reporting



Available Capacity Changes

- Available Capacity is affected by Unit Outage and Rating changes
- Planned outages
 - Transmission or generation related
 - Outage notices comply with the Peak Reliability Outage Coordination Procedure
- Unplanned Outages
 - Real-time notifications
 - Capacity and energy schedule changes
- Rating Changes



Static Scheduling

- Normal type e-Tag per Interchange Standards
- Energy Schedules
- Capacity Schedules
 - Separate capacity schedules required for sub-hourly schedules
 - Must have sufficient firm transmission
- Capacity & Energy Schedules must not exceed Available Capacity
- Sum of tagged energy determine deliveries
- Communication with WALC TSS Dispatch
- Adjustments & Curtailments



Dynamic Scheduling

- Dynamic type e-Tags
- Capacity Schedules
 - Hourly changes per Metering Scheduling Instructions
- Energy Schedules
 - Dynamic energy requests and accepted values
 - Integration of Accepted Energy is e-Tag delivery
 - Must have sufficient firm transmission
- Dealing with failures & interruptions
- Communication with WALC AGC Dispatch



Dynamic Scheduling (cont.)

- Establishing a Dynamic Schedule
 - Dynamic Schedules may be established by first requesting WAPA to perform an evaluation
 - WAPA will evaluate the project after funding is received
 - If the Contractor and WAPA agree, WAPA will implement the project to establish the dynamic



Ancillary Services

- Operating Reserve – Spinning
 - Generation **synchronized** to the system and fully available to respond in accordance with applicable regulatory standards and requirements
 - Provided through hourly scheduled capacity
- Operating Reserve – Supplemental
 - Generation **capable of being synchronized** to the system that is fully available to respond in accordance with applicable regulatory standards and requirements
 - Provided through hourly scheduled capacity subject to Metering Scheduling Instructions



Ancillary Services (cont.)

- Regulation
 - Regulation service, including ramping up or ramping down, is provided dynamically by WAPA in response to a digital control signal



Real-time Operations Questions

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Craig Halber

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(602) 605-2888



Settlement/Energy Accounting

Rose Statler

Public Utilities Specialist

Settlements Technical Lead



Settlement/Energy Accounting

Overview

- Interaction with Settlements
- Customer Portal
- Capacity & Schedule Checkouts
- Unloaded Synchronized Generation (S_L) & Motoring (M_L)
- Monthly Accounting Report
- Deemed Delivered Report
- Annual Energy Accounting Report



Settlement/Energy Accounting

- The Settlements department is the office which contractors will interact with for all things after-the-fact
- Perform Energy & Capacity Schedule Checkouts
- What is a Schedule and Capacity Checkout?
 - Verification that what you believe you have scheduled in both capacity and energy is what was really tagged/scheduled on an hourly basis
 - Schedule checkouts are done in Mountain Standard Time regardless of contractor's time zone
- Why?
 - To keep the contractors aware of their scheduling totals throughout the month
 - To give time to address and research any found discrepancies
 - To inform contractors of any period or monthly excursions from the Target
 - To enhance the month end accounting process
- Produce monthly & annual energy accounting data



Customer Portal

- Using the planned customer portal we envision that contractors will be able to:
 - Agree to or dispute energy & capacity schedule values
 - View, download &/or print monthly energy accounting reports
 - View, download &/or print annual energy accounting reports
 - View, download &/or print generation data
 - View, download &/or print other pertinent data
 - More to come on the portal as information becomes available
 - Feedback and ideas are welcome



Timetable of Energy & Capacity Schedule Checkouts

- Daily – Dynamic Energy Schedule
 - Contactor/Scheduling Entity, using the customer portal, agrees to or disputes the dynamic accepted values
 - Ensure e-Tag matches the accepted values and make adjustments to e-Tags if necessary (7 day limit on dynamic e-Tag adjustments)
- Weekly – Energy & Capacity Schedule checkouts
 - Contactor/Scheduling Entity, using the customer portal, agrees to or disputes the month to date Energy & Capacity schedules
- Monthly – Energy & Capacity Schedule checkouts
 - Contactor/Scheduling Entity, using the customer portal, agrees to or disputes monthly Energy & Capacity schedules



Timetable of Energy & Capacity Schedule Checkouts (cont.)

- In the event the customer portal is not available Settlements will **continue current practice**
 - Check daily and inform contractors/scheduling entities of any mismatches between the tag and accepted energy schedule for dynamic schedules
 - Distribute reports weekly which contain month to date energy and capacity schedule details for each contractor/scheduling entity and request confirmation
 - Distribute reports monthly which contain month-to-date energy and capacity schedule details for each contractor/scheduling entity and request confirmation



Unloaded Synchronized Generation and apportionment (M_L & S_L)

- Definitions
 - S_L - Unloaded Synchronized Generation: The difference between scheduled Synchronized Generation and Loaded Synchronized Generation
 - M_L – Motoring: Total of the generating units in a motoring mode
- Apportionment
 - Apportioned to each contractor as required by the ESC, Exhibit D
 - Applies to contractors whose scheduled capacity profile differs from the energy profile
 - Contractors who schedule dynamically
 - Contractors who schedule sub hourly
- General Definition:
 - Monthly Capacity Scheduled – Monthly Energy Scheduled = Reserves
 - Contractor's Reserves / Total Reserves * Total M_L or Total S_L



Monthly Energy Accounting

- Includes:
 - Target Energy
 - Energy Delivered
 - Delta between the Target Energy and Energy Delivered
 - % Over or Under Target
 - Overrun Megawatts subject to the 10 times charges,
 - Over Deliveries of energy outside 2% or up to 5%, if approved, of the Target Schedule
 - M_L Assessments & Returns
 - Returns are the assessments from 2 months past
 - S_L Assessments & Returns
 - Returns are the assessments from 2 months past
 - Underrun Deviations
 - Energy within the -2% or up to -5% if approved
 - Overrun Reductions
 - Energy over the Target Schedule
 - Total Adjustments for next month's Target Schedule
 - $-(M_L \text{ assessments} + S_L \text{ assessments}) + \text{Underrun Deviation} - \text{Overrun Reductions}$



Deemed Delivered Report

- Includes:
 - Total Schedule A, B and D Energy delivered
 - M_L & S_L assessments from 2 months prior
 - M_L & S_L returns from 2 months prior
 - Net Deemed Delivered
 - Total Schedule A, B and D Energy delivered + M_L & S_L assessments from 2 months prior - M_L & S_L returns from 2 months prior
 - Net Deemed Delivered total is reported to Power Billing and will show up on your monthly invoice
 - More information in the Power Billing section of this presentation



Annual Energy Accounting Report

- Summarizes the Monthly Accounting Report for the entire fiscal year
- Calculates and accumulates the fiscal year deviation
 - For the project and by each contractor
- Includes all items on the Monthly Accounting Report and the following items not on the Monthly Accounting Report
 - Plant generation by month
 - Transformer losses by month
 - Redistribution of underruns by month
 - Contractor's prior years deviation and current year deviation
 - Hourly generation, M_L , S_L , energy & capacity schedules per contractor



Annual Energy Accounting Report (cont.)

- Draft Report will be available within 6 weeks after the end of the fiscal year
- Contractor will have up to 4 weeks to review the draft
- Final Fiscal Year End report will be available within 4 weeks after the contractor's review period or after the last contractor's comments are received, whichever ever comes first
- Upon issuance of the final report, deviations will be reported to EMMO for use in future Target distributions



Energy Accounting Questions

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Rates

Kevin Schaefer

Rates - Public Utilities Specialist



Base Charge & Rates

- Regulations, Orders & Procedures
- Timeline & Customer Participation
- Electric Charges
- Other Charges
- Important Dates



Regulations, Orders & Procedures

WAPA's rate development adheres to strict regulations, orders and procedures for the annual rate process:

- 10 CFR 903 - describes public participation in power and transmission rate adjustments and extensions
- DOE Order RA 6120.2 - establishes financial reporting policies, procedures and methodology for all Power Marketing Administrations
- 10 CFR 904 – applies specifically to the BCP charges for the sales of power
- ESC and Amended and Restated Implementation Agreement – details BCP's contractual obligations and procedures on a variety of issues



Timeline & Customer Participation

A few notes...

A formal 90-day public process is conducted annually with transcribed public information and comment forums; notices are published in the ***Federal Register***

- Every 5th year, the rate schedule (which includes the base charge) must be approved by the Secretary of Energy and Federal Energy Regulatory Commission (FERC)
- WAPA updates its base charge annually with Deputy Secretary of Energy approval during interim years and FERC is notified for informational purposes only



Timeline & Customer Participation

Feb – Informal Customer Meeting

Review preliminary base charge calculation in an informal setting; answer any questions and concerns before the public process

Mar thru May – Public Process (FRN initiates 90-day process)

Public Information Forum: March

Formally discuss preliminary base charge

Public Comment Forum: April

Formal public comments and questions

Aug – Base Charge Complete:

Sec. of Energy or Dep. Sec. approves; FERC approves or is notified; final FRN moves forward to be published

Sep thru Oct – Process Finalized:

Contractors receive final FRN and electric charge information; base charge becomes effective Oct 1st



Electric Charges

A few notes....

- BCP is a generation only power system with no associated transmission service
- Since BCP does not receive Congressional Appropriations, all costs are expensed and recovered annually through the **base charge** (annual revenue requirement)



Electric Charges (cont.)

Power Repayment Study: WAPA's official record used to calculate the annual base charge for purposes of repayment of assets (Required under DOE Order RA6120.2)

- Tracks and/or calculates OM&R Expense, Revenue, Carryover, Principle and Interest, and Capacity and Energy rates
 - Capacity and Energy rates are for comparison purposes only

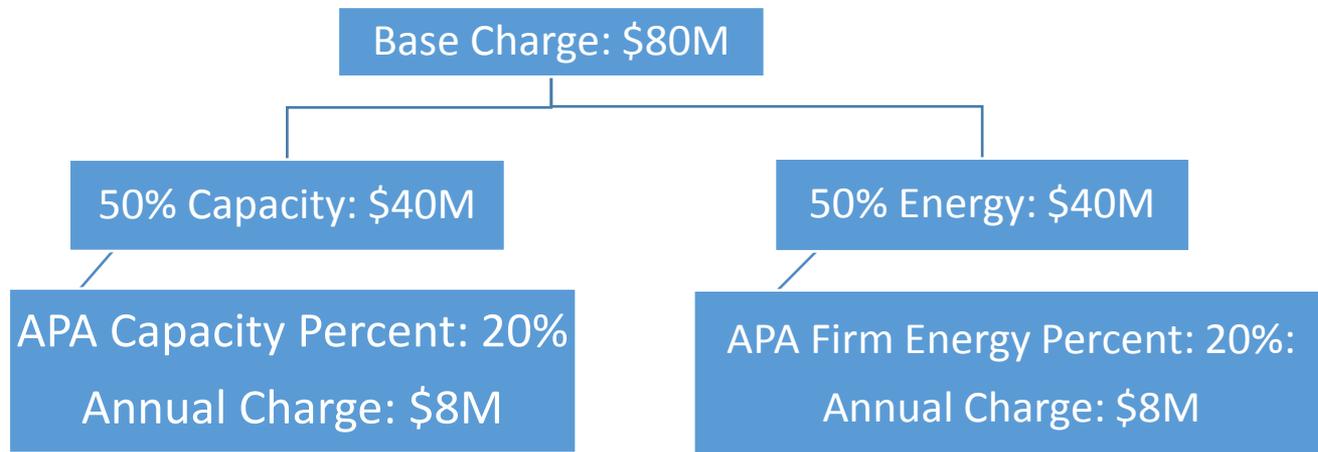
Formula: Expenses – Carryover – Other Revenue = Base Charge



Electric Charges (cont.)

Charge Spreadsheet: Breakout of Contractors monthly charge for capacity and energy based on their proportionate share of the base charge

Ex:



Other Charges

LCRBDF Contribution Charge:

- Arizona - 4.5 mills/kWh
- California/Nevada – 2.5 mills/kWh

Transmission:

- Parker-Davis & Intertie rates are developed separately
- Billed in Advance of Service



Important Dates

- Rates 201/Informal Customer Meeting – Feb 15, 2017
- Anticipated FRN Publication Date – Feb 28, 2017
- Tentative Public Information Forum – Mar 28, 2017
- Tentative Public Comment Forum – April 25, 2017



Base Charge & Rates Questions

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Scott R. Lund

Rates Manager

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(602) 605-2442



Power Billing

Beth Kozik

Power Billing & Accounting Supervisor



Power Billing

- Transmission Bill
- Boulder Canyon Energy Services Bill
 - Issue Date
 - Due Date
 - How to make payment
 - Contact Information
 - Charges



Power Billing

- If you have transmission with WAPA, there will be two separate bills:
 - Prepayment bill for transmission service
 - Boulder Canyon Project (BCP) Energy Service (ESC) bill that includes **(a)** capacity and energy base charges, **(b)** Lower Colorado River Basin Development Fund (LCRBDF) charge on energy deemed delivered, **(c)** transmission charges with a credit for the prepayment, and **(d)** Overrun charges (if applicable)
- Prepayment bills for transmission are issued the 1st of the month prior to the service month, and are due by the 25th of that month.
- Bills for the ESC are issued by the 3rd business day of the month following the service month, and are due 20 days from the date the bill is issued.
- Due dates will change to the next business day if the calculated date is a weekend or Federal holiday
- WAPA prefers to send all bills electronically via email and will be validating customer email addresses later this year
- Remittance instructions are included on both bills
- Contact information is included on both bills



Power Billing – Sample Prepayment Bill

U.S. Department of Energy
Western Area Power Administration
PO BOX 6457
PHOENIX, AZ 85008-6457
Bill for Collection

Payer: ABC Company
1234 West First Street
Phoenix, AZ 85001
Customer #1234
Project N/FGPD PREPAY-ABC

Bill Description:

<u>INVOICE DATE</u>	<u>DUE DATE</u>	<u>Invoice Number</u>	<u>Agreement Number</u>
01 NOV 2016	25 NOV 2016	91234	16-DSR-56789

<u>Line Number</u>	<u>Description</u>	<u>Amount</u>
1	Parker Davis Transmission Prepayment for December 2016	\$1,430.00
	Intertie Transmission prepayment For December 2016	\$1,610.00

Please Reference the Invoice Number

U.S. Department of Energy
Western Area Power Administration
FILE #4185, P.O. BOX 301509
ACH = ABA 051036706 ACCT # 312003 or EFT = ABA 021030004 Acct # 89001602
Los Angeles, CA 90030-1509

For questions regarding this invoice contact:
Accounts Receivable (602) 605-2525



U.S. Department of Energy
Western Area Power Administration
PO BOX 6457
PHOENIX, AZ 85008-6457
Bill for Collection

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1234 West First Street
Phoenix, AZ 85001
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Power Billing – Sample Power Bill

Page 1 provides the invoice total, point of contact and remittance information.

Department of Energy



Desert Southwest Region

615 SOUTH 43RD AVENUE
PHOENIX, AZ 85009

TO: ABC COMPANY 1234 WEST FIRST STREET PHOENIX, AZ 85001	VENDOR NO.: 1234 BILL NUMBER: GG1234A1216
SERVICE FURNISHED FOR: DECEMBER 2016	
ISSUE DATE: January 03, 2017	
TOTAL AMOUNT DUE: \$3,673.50	
DUE DATE: January 23, 2017	
AMOUNT PAID:	
Remit Electronic Payments To: NEW YORK FEDERAL RESERVE BANK WESTERN AREA POWER ADMINISTRATION ABA 021030004 / ACCT# 89001602	Make Remittance Payable To: US DEPARTMENT OF ENERGY WESTERN AREA POWER ADMINISTRATION FILE # 4185, P.O. BOX 301509 LOS ANGELES, CA 90030-1509 Tax ID:84-0743678
ACH PAYMENTS: RICHMOND FEDERAL RESERVE BANK ABA 051036706 / ACCT# 312003	
For Billing Inquiries and Address Changes Contact: Charis Schaefer Phone:602-605-2758 Email:cschaefer@wapa.gov	
In accordance with the Debt Collection Improvement Act of 1996, when payment is not received by the due date, interest, administrative fees, and penalties will be assessed according to the terms set forth in your agreement. If terms are not provided for in the agreement, the interest and penalty rates will be determined by Treasury at the time the debt was established.	

CUSTOMER COPY



Power Billing – Sample Power Bill (cont.)

Department of Energy

Page 2 provides a subtotal
of the services



Desert Southwest Region

615 SOUTH 43RD AVENUE
PHOENIX, AZ 85009

TO: ABC COMPANY
1234 WEST FIRST STREET
PHOENIX, AZ 85001

VENDOR NO.: 1234
BILL NUMBER: GG1234A1216

SERVICE FURNISHED FOR: DECEMBER 2016

BILL ISSUE DATE: January 03, 2017

CHARGES FOR ELECTRIC SERVICE

TRANSMISSION CHARGES	\$1,430.00
TRANSMISSION CREDITS	-1,430.00
BOULDER CANYON PROJECT MONTHLY CHARGES	3,673.50
TOTAL AMOUNT DUE	\$3,673.50

TOTAL AMOUNT DUE: \$3,673.50

DUE DATE: January 23, 2017

In accordance with the Debt Collection Improvement Act of 1996, when payment is not received by the due date, interest, administrative fees, and penalties will be assessed according to the terms set forth in your agreement. If terms are not provided for in the agreement, the interest and penalty rates will be determined by Treasury at the time the debt was established.

CUSTOMER COPY



Power Billing – Sample Power Bill (cont.)

Page 3 provides the service details

ABC COMPANY
17-Jan-2017 7:23

1234

Page 3 of 3

CONTRACT NO.: 16-DSR-12345 BCP ENERGY SALE
DELIVERY 1234A-DP

	ENERGY (KWH)	RATE	DEMAND (KW)	
(a) Monthly Base Capacity Charge				2,975.00
(a) Monthly Base Energy Charge				381.00
(b) Lower Colorado River Basin Development Fund Charge for previous month's energy	127,000	0.0025 California and Nevada (0.0045 Arizona	571.50)	317.50
(d) Energy Overrun penalty at 10 times rate	8,890	.00982 x 10		873.00

CONTRACT NO.: 16-DSR-56789

DELIVERY 1234A-DP1 FIRM TRANSMISSION SERVICE

(c) Parker Davis Firm Transmission		1.43	1,000 KW	1,430.00
(c) Credit for Transmission Prepayment				(1,430.00)

This sample is using Parker Davis transmission at the current rate.

If Intertie transmission is needed the current rate is \$1.61.

NOTE: Lower Colorado River Basin Development energy (b) will not appear on the first bill for October Service. This energy value is billed one month in arrears because the checked out energy values are not available by the third of the month.



Page 1 provides the invoice total, point of contact and remittance information.

Department of Energy



Desert Southwest Region

615 SOUTH 43RD AVENUE
PHOENIX, AZ 85009

TO: ABC COMPANY
1234 WEST FIRST STREET
PHOENIX, AZ 85001

VENDOR NO.: 1234
BILL NUMBER: GG1234A1216

SERVICE FURNISHED FOR: DECEMBER 2016
ISSUE DATE: January 03, 2017
TOTAL AMOUNT DUE: \$3,673.50
DUE DATE: January 23, 2017

AMOUNT PAID:

Remit Electronic Payments To:

NEW YORK FEDERAL RESERVE BANK
WESTERN AREA POWER ADMINISTRATION
ABA 021030004 / ACCT# 89001602

ACH PAYMENTS:
RICHMOND FEDERAL RESERVE BANK
ABA 051036706 / ACCT# 312003

Make Remittance Payable To:

US DEPARTMENT OF ENERGY
WESTERN AREA POWER ADMINISTRATION
FILE # 4185, P.O. BOX 301509
LOS ANGELES, CA 90030-1509
Tax ID:84-0743678

For Billing Inquiries and Address Changes Contact:

Charis Schaefer
Phone:602-605-2758
Email:schaefer@wapa.gov

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CUSTOMER COPY

Page 2 provides a subtotal
of the services

Department of Energy



Desert Southwest Region

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PHOENIX, AZ 85009

TO: ABC COMPANY
1234 WEST FIRST STREET
PHOENIX, AZ 85001

VENDOR NO.: 1234
BILL NUMBER: GG1234A1216

SERVICE FURNISHED FOR: DECEMBER 2016

BILL ISSUE DATE: January 03, 2017

CHARGES FOR ELECTRIC SERVICE

TRANSMISSION CHARGES	\$1,430.00
TRANSMISSION CREDITS	-1,430.00
BOULDER CANYON PROJECT MONTHLY CHARGES	4,446.50

TOTAL AMOUNT DUE: \$4,446.50

DUE DATE: January 23, 2017

CONTRACT NO.: 16-DSR-12345 BCP ENERGY SALE
DELIVERY 1234A-DP

	ENERGY (KWH)	RATE	DEMAND (KW)	
(a) Monthly Base Capacity Charge				2,975.00
(a) Monthly Base Energy Charge				381.00
(b) Lower Colorado River Basin Development Fund Charge for previous month's energy	127,000	0.0025 California and Nevada (0.0045 Arizona	571.50)	317.50
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CONTRACT NO.: 16-DSR-56789

DELIVERY 1234A-DP1 FIRM TRANSMISSION SERVICE

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Power Billing Questions

Beth Kozik

Power Billing & Accounting Supervisor

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(602) 605-2835



Questions



Next Steps

- Interest in Further Education
 - Hoover 201, 301 Sessions
 - One-on-ones
- Rates 201 & Processes
- Master Schedule
- Future Meetings/Important Dates



Important Dates

- Feb 15, 2017 - Rates 201/Informal Customer Meeting
- Feb 28, 2017 - Anticipated FRN Publication Date, Rates
- March 1, 2017 – 1st Draft of Master Schedule
- Mar 28, 2017 - Tentative Rate Public Information Forum
- April 25, 2017 - Tentative Rate Public Comment Forum
- May 1, 2017 – 2nd Draft of Master Schedule
- Early May 2017 – Meeting to finalize RIE & Master Schedule
- Jun 1, 2017 – Final Draft of Master Schedule



Important Dates

- July 2017 – MSI Implementation Meeting
- Mid-Sep 2017 – October Transmission Prepayment Invoice issued
- Mid-Sep 2017 – Update to Master Schedule & Contractor Available Capacity
- Sep 29, 2017 – Preschedule for Day 1 of New Contract
- Early Oct 2017 – October Transmission Invoice payment due
- Nov 3, 2017 – October Capacity & Energy Invoice issued
- Nov 23, 2017 – October Capacity & Energy Invoice due



Points of Contact

Contracts & Energy Services: Patricia Weeks, weeks@wapa.gov

DSW Resource Planning: Xavier Gonzalez, xgonzalez@wapa.gov or Tina Ramsey, ramsey@wapa.gov

Transmission Business Unit: John Steward, steward@wapa.gov

DSW EMMO: John Paulsen, paulsen@wapa.gov

WALC Operations: Kim Clark, kclark@wapa.gov, Craig Halber, halber@wapa.gov

DSW Settlements: Rose Statler, rstatler@wapa.gov or Tina Ramsey, ramsey@wapa.gov

DSW Rates: Kevin Schaefer, kschaefer@wapa.gov or Scott Lund, slund@wapa.gov

DSW Power Billing & Accounting: Beth Kozik, kozik@wapa.gov

DSW Vice President of Power Marketing: Jack Murray, jmurray@wapa.gov

General inquiries: POST2017BCP@wapa.gov

