

CURRENT HYDROPOWER ISSUES FOR OPMs

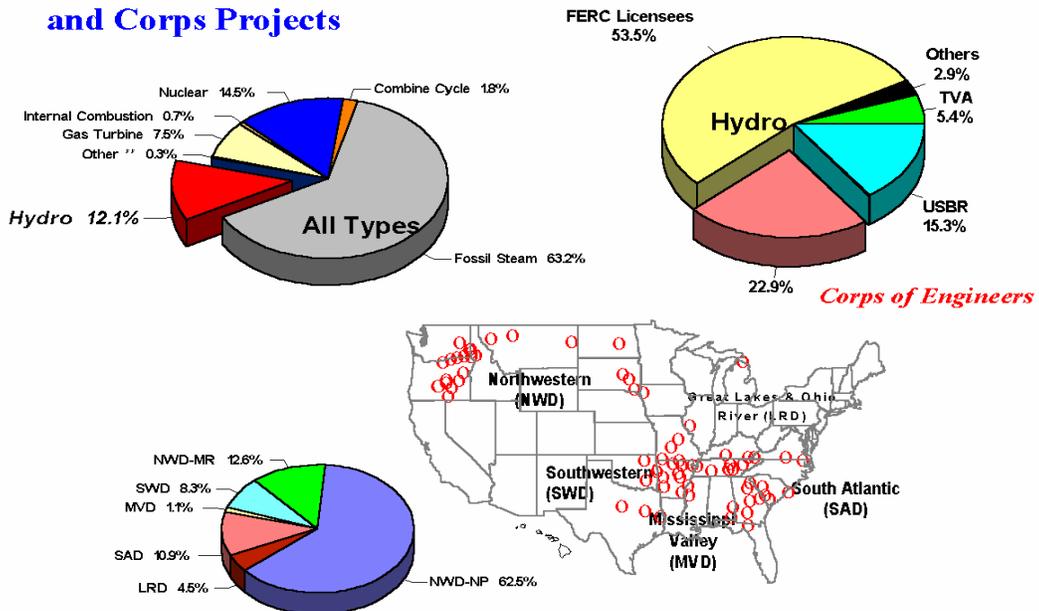
Operations Manager PROSPECT Course
7-11 August 2006

OBJECTIVES

- ◆ Students will have general knowledge of:
 - The HP Program and where it's headed
 - Direct Power Marketing Administration (PMA) and Customer Funding
 - Why it's important to build relationships with PMA and Customers?
 - Important areas to be aware of in HP
 - What are some of the things that can bite me?

Hydropower Program Overview

US Generation Capacities and Corps Projects



Corps of Engineers Hydropower

- ◆ Largest owner/operator of hydroelectric power plants in the U.S.
- ◆ Single largest producer of hydroelectric power in the U.S.
- ◆ 75 plants
- ◆ 350 generating units
- ◆ 20,750 Megawatts of installed capacity
- ◆ 70 billion kilowatt-hours a year
 - 7.3 Million homes (approx)
 - ◆ Ave home uses 9600 kilowatts in a year.

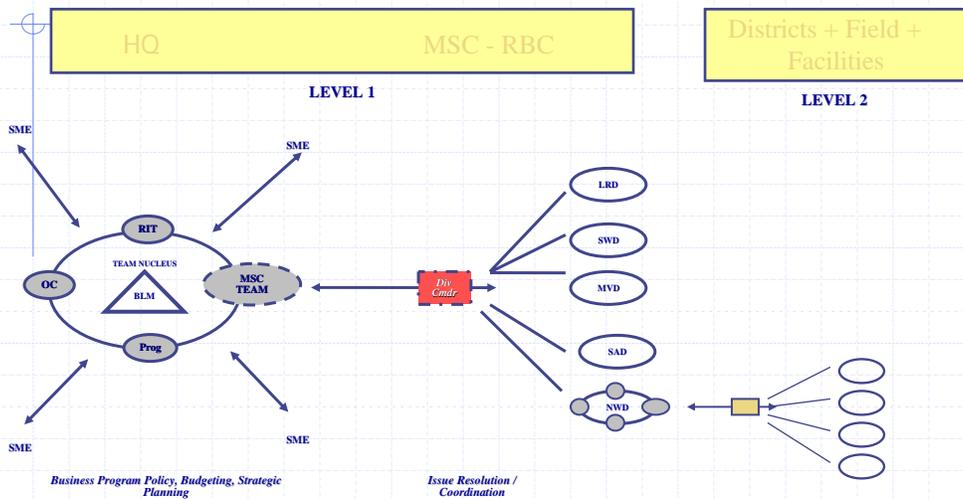
Corps HP Program Benefits

- ◆ Electricity at Lowest Sustainable Cost
 - Produced at 4/10ths of a cent per kW-Hr (gas plants cost 10X more).
- ◆ 70,000,000 MWh of Clean Power
 - Gas plants would produce 27,000,000 tons of Carbon Dioxide.
 - Coal plants would produce 77,000,000 tons of Carbon Dioxide.
 - Saves equivalent output of over 4,000,000 to 11,000,000 automobiles.
- ◆ Ancillary services
 - Maintains system reliability and grid stability

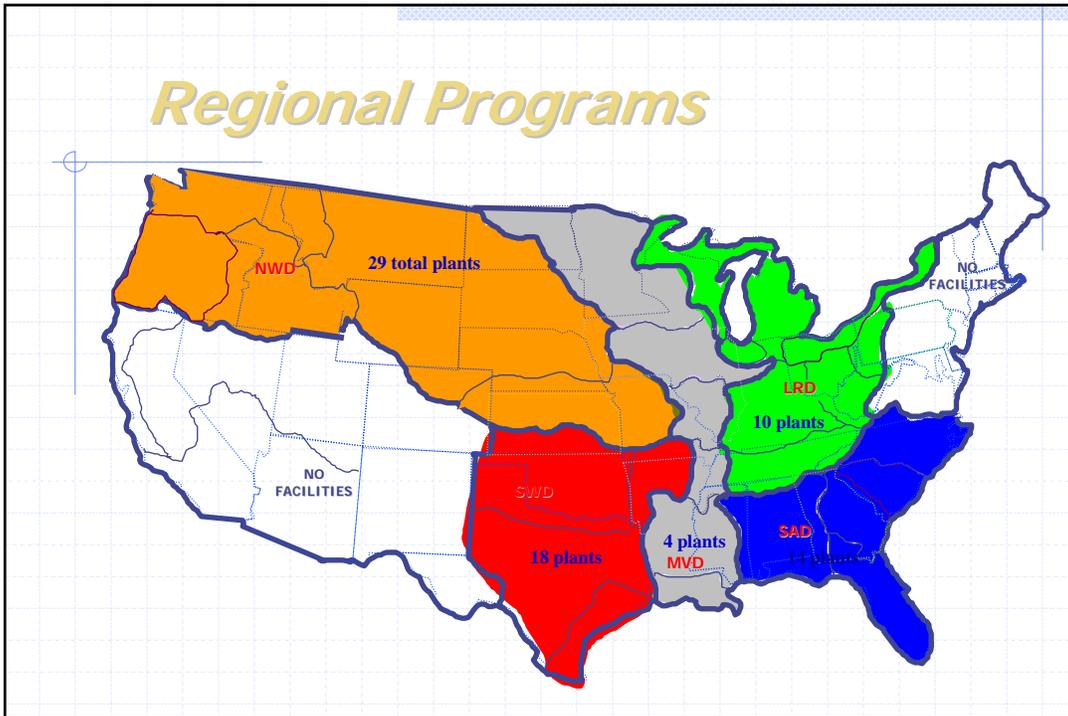
Hydropower Strategic Directions

- HP Community of Practice
- HP and Corps Strategic Plans
- PMA Direct and Customer Funding
- New relationships and what they mean to an OPM

Hydro Community of Practice



Regional Programs



One Community of Practice

"a group of professionals, informally bound to one another through exposure to a common class of problems, common pursuit of solutions, and thereby themselves embodying a store of knowledge."



HQ and Regional Business Line Managers

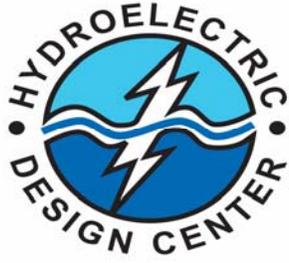
- ◆ National Business Line Manager - Kamau Sadiki
- ◆ Regional Business Center Business Line Managers:
 - SAD: Brian Sapp
 - SWD: Erik Nelson
 - NWD: Hiroshi Eto
 - POD: None
 - NAD: None
 - SPD: None
 - LRD: Jerry Brown
 - MVD: Jeff Artman
- ◆ You need to know who your District BLM is
- ◆ These folks, working with the OPM's, will be instrumental in the success of the Hydropower business line

HYDROPOWER ANALYSIS CENTER

Training
FERC Licensing
Economic Analysis
Generator Rewind
Power Impact Studies
Hydropower Planning
Energy & Capacity Evaluation
Water Supply Storage Reallocation
Turbine Efficiency Improvement & Uprate



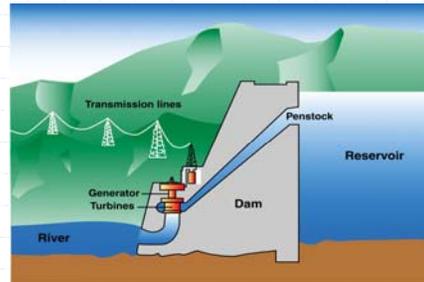
Website: <http://www.nwd-wc.usace.army.mil/PB/welcome.html>



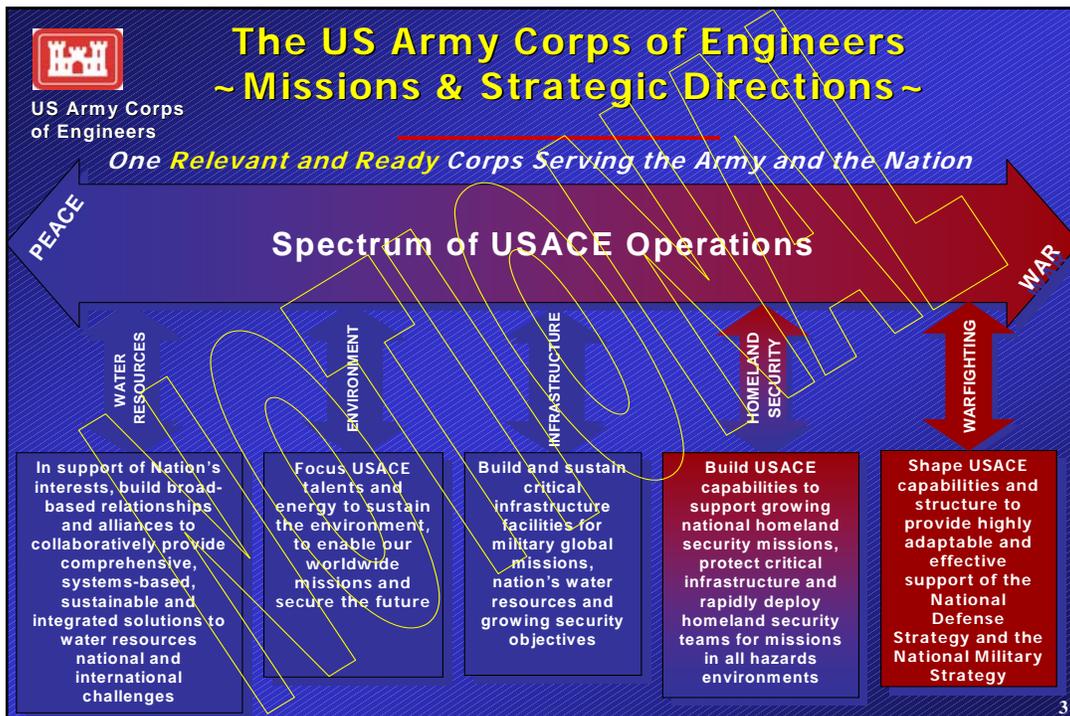
Leaders in Hydropower Engineering

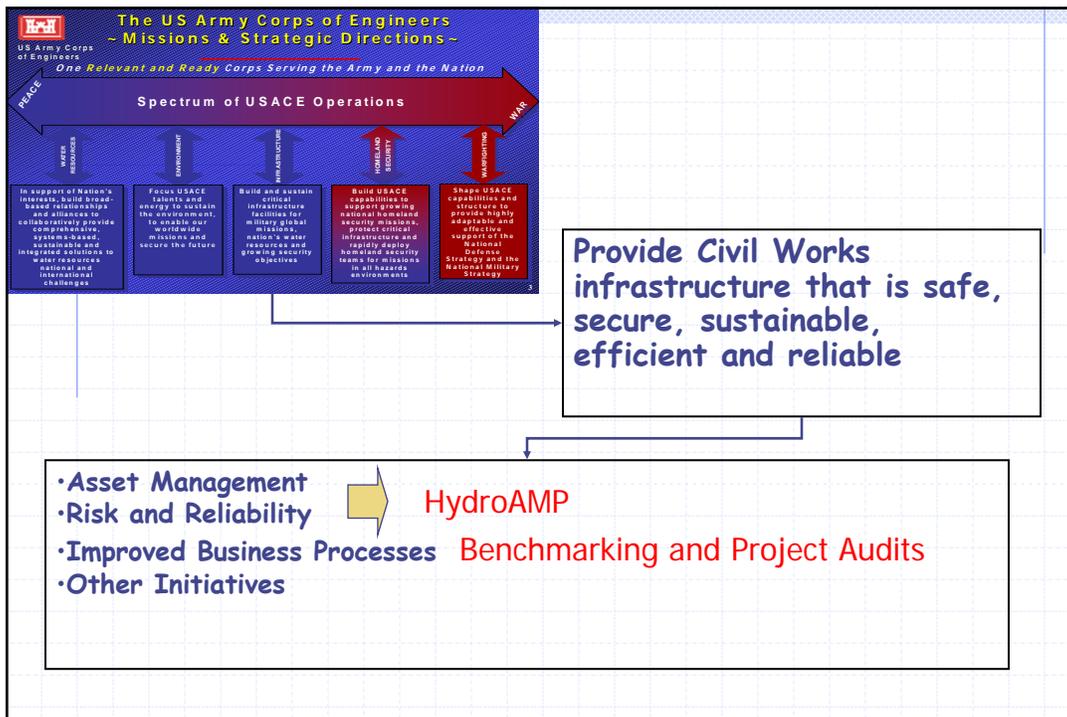
- Turbine and Generator Selection
- Switchyards and Transmission Terminations
- Powerplant Engineering and Design
- Cranes and hoists
- Powerplant rehabilitation
- Acceptance and performance testing
- Environmentally acceptable lubricants
- Troubleshooting

The Hydroelectric Design Center is the US Army Corps of Engineer Mandatory Center of Expertise for hydroelectric power facilities and large pumping plants



<https://www.nwp.usace.army.mil/hdc>





Corps Strategic Themes

- Collaboration in a leadership or support role
- Sustainable, comprehensive and integrated solutions
- Innovative technologies and acquisition methods
- Ready, capable, flexible and deployable asset with a Global expeditionary presence
- Technical knowledge

Non-Appropriated Funding

◆ Preference Customer Funding

- Applies to SWPA, SEPA, WAPA regions.
- MOAs in effect with Corps, PMAs, and customers
- Authorized by WRDA 2000
- Customer provide funds directly to Corps for agreed upon hydropower activities
 - ◆ Each item has its own sub-agreement in most cases
- Customers are reimbursed through net billing and bill crediting with their PMA
 - ◆ Usually repaid within a few days

◆ Direct Funding

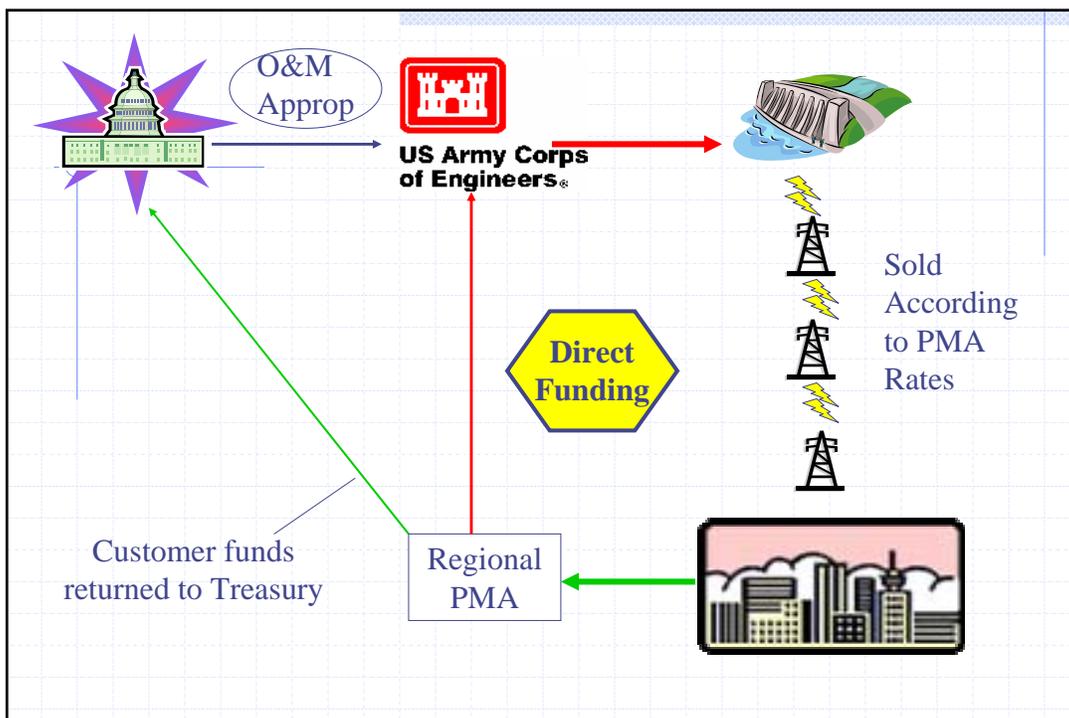
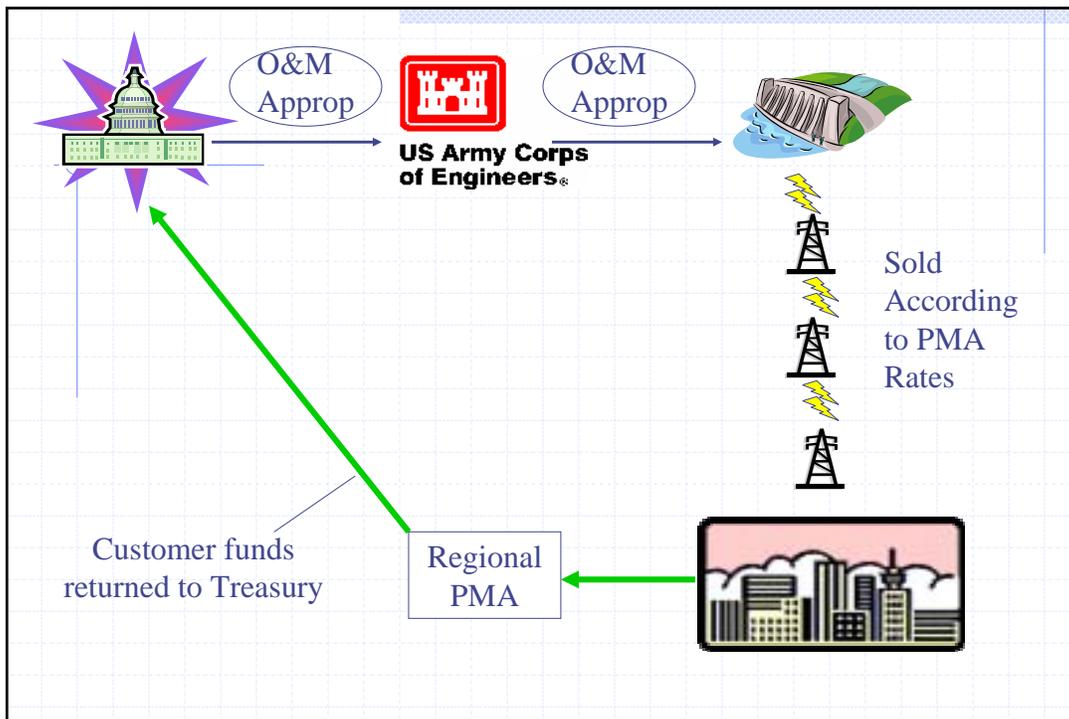
Non-Appropriated Funding

◆ Direct Funding – BPA

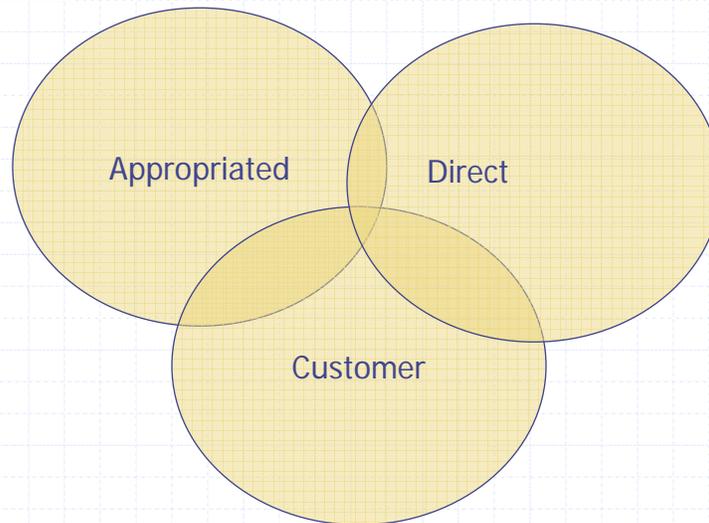
- Authorized by Energy Policy Act of 1992
- Funds all HP costs
 - ◆ Routine O&M (specific & joint) - approx \$137M for FY
 - ◆ Small capital - funding threshold of \$9.5M per yr
 - ◆ Large capital – Funded separately per sub-agreement

◆ Direct Funding – SEPA, SWPA, WAPA

- Proposed in last 3 legislatures through WDRA or Appropriation Bills
- Included in President's FY06 Budget – didn't make it
- Issues – Joint costs, Small capital
- Is not included in current version of WRDA!!!



The Future of HP Funding

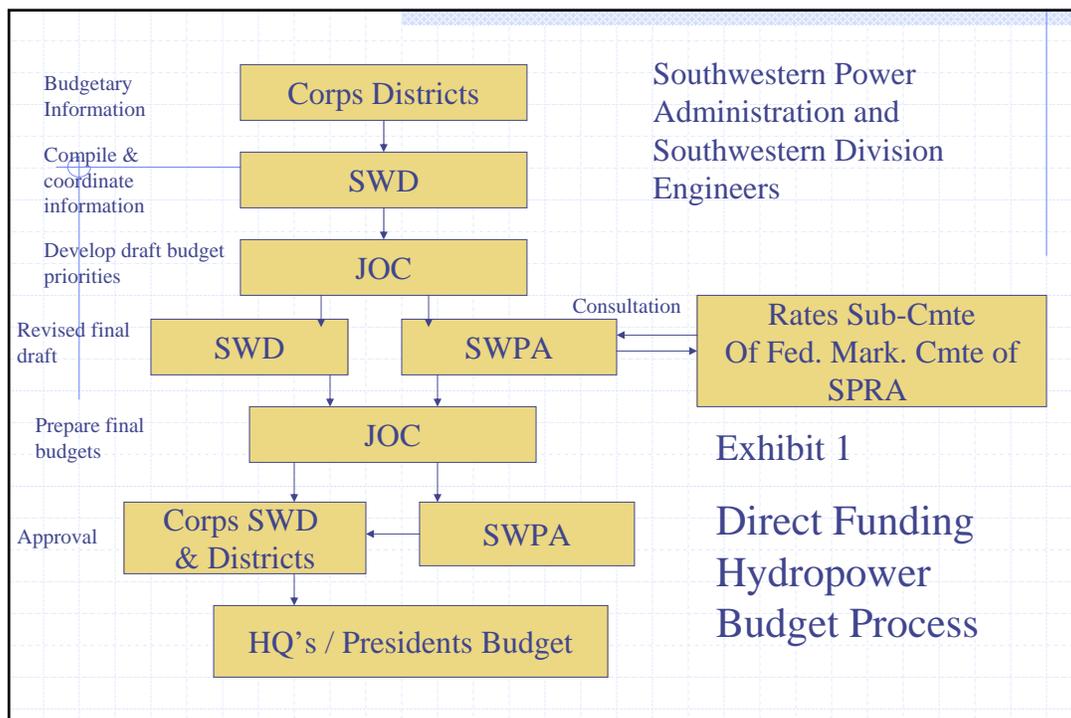


Changes Driven by Customer & Direct Funding

- ◆ Performance plans will have PMA and customer input
- ◆ Budget meetings in the May/June timeframe
- ◆ Will have significant impacts on all your funding
- ◆ Hydropower funds will NOT be able to be moved to other business lines such as recreation, etc
 - Can only be used for hydropower
- ◆ Will need 5 year work plans – at least
- ◆ Funds will probably not have the high expenditure goals
 - In fact, could get rewarded for saving money
- ◆ Funding will probably not come all at once
- ◆ Joint funding – in or out?
 - Where will the non-hydropower portion of joint come from?

New relationships and what they mean to an OPM

- ◆ Relationships with PMA's and Customer groups will be key to your success in this business line
- ◆ Being on the same page with them will be essential
- ◆ Working together we can make this hydropower "team" a model for the future
- ◆ Efficiencies and execution in our program will ensure their trust
- ◆ Trust will ensure future support and funding



New Initiatives

- ◆ Hydropower Equipment Exchange
- ◆ Developing a national “Toolkit”: Program Plan and strategic guidebook for the “Hydro Community of Practice” for the future.

Measuring Performance

- ◆ Drivers
- ◆ Performance measures
- ◆ OMBIL and Hydropower

Performance Metrics Drivers

- ◆ **Government Performance and Results Act (GPRA)**
- ◆ **OMB Program Assessment Rating Tool (PART)**
- ◆ **Commander's Critical Information Report**
- ◆ **PMA performance measures – mainly BPA for now**
- ◆ **Performance-based budgeting**

Measuring Performance

- ◆ **Maintain reliable hydroelectric generation at Corps multi-purpose reservoir projects**
 - **Forced Outage Rate – Goal < 2%**
 - **Peak Season Availability – Goal 100%**
 - **Annual availability – 98%**
- ◆ **All current measures are reliability and efficiency based**
- ◆ **Performance-based budgeting will be discussed later**

OMBIL and Hydropower

- ◆ Data for entry into ranking system directly out of OMBIL
- ◆ OMBIL data not used as much in the budget process for FY 08
- ◆ Entering data into OMBIL accurately still very important
- ◆ Standardizing input is very important
 - Unavailable vs Standby

Programming, Budgeting, and Executing

- ◆ Business Line Budgeting
- ◆ Performance-based budgeting
- ◆ Major Rehab
- ◆ FEM

Alignment of CW Strategic Plan Objectives, Performance Measures & Budget Ranking Criteria

<u>Program Objectives</u>	<u>Performance Measures</u>	<u>Ranking Criteria</u>
1. Invest in hydropower rehabilitation projects when the benefits exceed the costs.	- Remaining BCR (project specific measure).	- Remaining BCR. - Annual Net Benefits.
2. Future: Invest in environmentally sustainable hydropower infrastructure improvements where economically justified.	- To be developed in the future.	- Unit Life Extension. - Restored Generation Capacity of De-Rated Unit.
3. Provide reliable power. 4. Provide peaking power. 5. Maintain capability to provide power efficiently.	- Forced Outage Rate (FOR). - Physical condition/failure risk index.	- FOR. - Peak Season Availability. - Avg Unit Age. - Units De-Rated.

Performance-Based Ranking Criteria

- ◆ Annex IV in Budget EC 11-2-187
- ◆ FY 08 Handled different than FY 07
 - Requirement to avoid legal, treaty or ESA violation in BY
 - Requirement to avoid public safety item at project
 - Requirement to avoid forced facility closure
 - Funding to restore regionally critical unit in Forced Outage status
 - Funding to restore de-rated capacity
 - Funding to improve the condition or reduce failure risk of a critical power component under the HydroAMP condition assessment
 - ◆ Numeric code for condition improvement of critical power train component
 - Funding to extend unit life
 - Justification / funding argument
- ◆ What you do not see is as much statistical analysis such as availability rates, forced outage rates, etc

Performance-based Programming

Program Increments (O&M, General):

- ◆ Level 1 – Initial Increment – critical “must have” items
 - 75% of FY 07 PRBUD
 - Public/Worker Life Safety.
 - Court Orders, Legal (ESA, CWA, Etc.); Treaty.
 - Avoid Forced Facility Closure.
- ◆ Level 2 – Additional O&M – necessary but not critical
 - Critical items that did not make the 75% included in level 1
 - Funding to restore regionally critical unit in forced outage status
 - Funding to restore de-rated capacity
 - Funding to improve the condition or reduce failure risk of a critical power component under hydro-amp condition assessment methodology
 - Funding to extend the life of the generating unit
- ◆ Level 3 – 5
 - O&M requirements that do not specifically meet the requirements above

Ranking Criteria

Specific Information Provided:

- ◆ Regional Ranking & Budget Increment
- ◆ Account (GI, CG, O&M)
- ◆ Total BCR (CG)
- ◆ RB/RC (CG)
- ◆ Annual Net Benefits (CG)
- ◆ Peak Season Availability
- ◆ Average Unit Age
- ◆ Number of Units De-Rated
- ◆ Life Safety, Legal; Closure Items
- ◆ Benefit from Life Extension & Capacity Restoration Items

Inherent Ranking Considerations:

- ◆ Balance Among Missions
- ◆ Watershed System Perspectives
- ◆ Regional Role of Project
- ◆ Consequences of Lost Service
- ◆ Consequence of Violations
- ◆ Probability of Failures
- ◆ Stakeholder Input & Support
- ◆ Agency Commitments
- ◆ Workforce Capability Needs
- ◆ Other Priority Enhancing Needs Captured in Remarks

FY 08 Hydropower Budgeting

- ◆ FY 07 Fund projects to level that Power Marketing Agency, along with power customer groups, agree
- ◆ Used less funding levels
- ◆ OMBIL information not included in packages
- ◆ More coordination with power customer groups
- ◆ More coordination with Power Marketing Agencies

Major Rehab Program

- ◆ Study costs out of Civil O&M
 - Can cost \$1.5M
- ◆ Construction General (CG) funding
 - Can be \$100M-150M
- ◆ Complete rehab of power plants
- ◆ Switchyards included (if managed by CoE)
- ◆ Problem:
 - No new starts
 - Will all hydropower funding be removed from appropriations process?
- ◆ Some PMA's are willing to fund

President's Advance Energy Initiative

- ◆ Short term 5 Year plan
- ◆ Longer term National initiative
- ◆ Situational Awareness

FEMS

- ◆ We operate and **maintain** power facilities
- ◆ Preventative Maintenance (PM)
- ◆ Could move to predictive maintenance
- ◆ Breakdown maintenance
- ◆ This is the tool (maximo) to track your efforts
- ◆ Done correctly, will be tool to use in any A-76 studies
- ◆ Can be sold as the tool to defend jobs
- ◆ Tool to use toward Asset management – BPA likes

Facility Inspections

- ◆ Facilities Instructions, Standards and Techniques (FIST) Manuals
- ◆ Bureau of Reclamation manuals which pertain to the O&M of hydroelectric equipment
- ◆ Corps moving toward using this tool
- ◆ Can be found at www.usbr.gov/power/data/fist_pub.html

Ensuring a Capable Workforce

- ◆ HP training program
- ◆ Knowledge management
- ◆ Mentoring
- ◆ Cross training
- ◆ Good hiring practices

Leadership

- ◆ Power plant manager is key member of project leadership team
- ◆ Need to promote quality leaders
- ◆ Budgets, schedules and people
- ◆ Need strong communication skills
- ◆ Can't continue to promote for technical reasons only

Potential Problem Areas

Safety

- ◆ Hazardous Energy Control program
 - Lock out/Tag-out
 - Safe clearance program
- ◆ Confined Space program
- ◆ Hearing Conservation
- ◆ Arc Flash Protection
 - Flash resistant clothing
- ◆ Crane Safety

ERGO Program

- ◆ Having current spill prevention plans
 - The Dalles spills got ASA(CW) attention
 - ◆ 54 page comprehensive review report
 - Numerous recommendations
 - Strategic planning in this area is a necessity
- ◆ Important part of project Environmental Management System (EMS)
 - EMS implementation should be complete
 - Peer reviews
 - On going system management



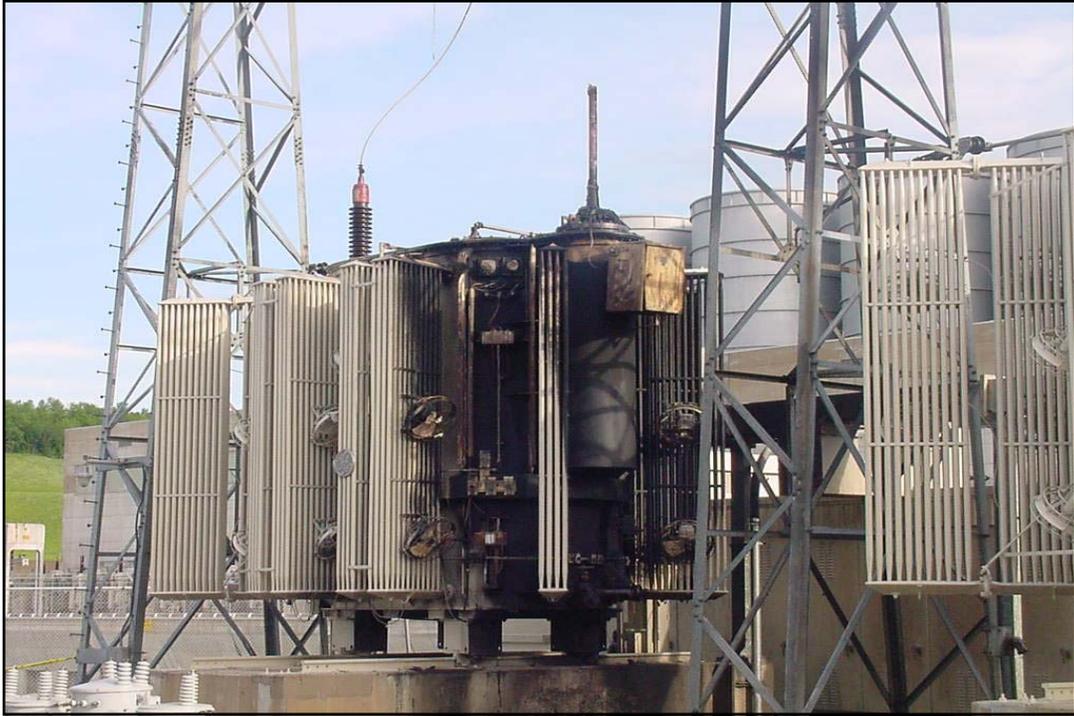
NERC – Compliance Enforcement Program

- ◆ Maintenance Issues
 - Relay test plans, Governor Droop, Voltage regulator protection, Power System Stabilizers, Synchronizer
- ◆ Verification of Unit Capability curves
- ◆ Facility Review
 - Requirement to verify ratings and coordination of all power train components every 5 years
- ◆ System Restoration
 - Black Start capability – test 1/3 of units every three years
- ◆ Reporting Requirements
 - OMBIL
 - Unit interruption reports

Equipment Failures

- ◆ Type “U” bushings on equipment
 - Prone to violent failures
 - Contain PCB's
- ◆ Transformer failures
- ◆ The Dalles was significantly sited for not doing enough Preventative maintenance
- ◆ Lack of Non-deferrable funding has created a situation where the potential of failures has increased





Planning for the Future

- ◆ Staffing to meet future needs
 - Hiring qualified employees
- ◆ Clearly communicate needs
 - Within CoE
 - PMA
 - Customers
- ◆ Equipment replacements
 - Can't wait for major rehabs
- ◆ Could/Should be very solid program in future

Key Take Aways

- ◆ Leadership in the business line will be key to project success
- ◆ Understanding performance measures and making sure you understand them
- ◆ PMA funding will stabilize your funding, but reduce your project flexibility
- ◆ Building good relationships with PMA and customers groups will be important

QUESTIONS??