<table>
<thead>
<tr>
<th>Topic</th>
<th>Presenter</th>
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<tbody>
<tr>
<td>APS Peak Demand and Energy Forecasts</td>
<td>Peter Ewen</td>
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<td>Financial Services Group Leader</td>
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<td>2009 Resource Plan</td>
<td>Brad Albert</td>
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<td>Director Resource Planning</td>
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<td>Renewable Energy</td>
<td>Barbara Lockwood</td>
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<td>Energy Efficiency</td>
<td>James Wontor</td>
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<td>DSM Department Leader</td>
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<td>Resource Markets and Procurement</td>
<td>Patrick Dinkel</td>
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<td></td>
<td>Director Resource Acquisition and Renewables</td>
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<tr>
<td>Roundtable Discussion and Wrap-Up</td>
<td>All Presenters</td>
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</tbody>
</table>
WHY UPDATE?

Recent economic growth trends worse than previously thought

Resource Plan reflects lower near-term demand levels than forecasts from Spring 2008

Load forecast evolves as new information becomes available

Long-term growth fundamentals remain consistent with prior forecasts
Excess housing inventory continues to grow

Construction jobs declining; net migration slowing

Office and retail building activity about to run out of steam

Outlook for job gains, new business investment weak

BUT . . . Affordability improving quickly
SINGLE FAMILY HOME VALUES

Phoenix

Market peak @ July 2006

Current value:
- 30% > 2000
- 40% < 2006

Source: Standard and Poor’s Case-Shiller Home Price Index
LONG-TERM OUTLOOK STEADY

Short-term volatility permanent feature of load growth and load forecasts

Peak demand and energy grow substantially over the next 20 years

Net in-migration is the largest single source of growth

Naturally-occurring efficiency gains offset some growth
RESIDENTIAL CUSTOMERS

Growth over Prior Year

- Actuals
- Sep 07 Forecast
- Mar 08 Forecast
- Sep 08 Forecast

ANNUAL SYSTEM PEAK LOAD (MW)

Weather Normalized

[Bar chart showing annual system peak load from 2000 to 2027, with data points for Sep-07, Mar-08, and Sep-08]
CONCLUSION

Near Term AZ Economic Growth Slower Longer

Energy and peak demand growth also slows
5 recessions in last 40 years; have seen this before

Long-Term Fundamentals Remain Positive

Growth typically returns with vigor
AZ desirability remains high; affordability recovering

Expect More Robust Growth in Customers,
Energy Demand to Return by 2012-13

Forecast and Resource Plan Will Change/Adapt
as New Information Becomes Available
2009 RESOURCE PLAN

BRAD ALBERT
Director Resource Planning
What type of energy infrastructure will be needed to power Arizona in 2025?

Consider that:

- APS customers will grow from 1.1 million today to 1.7 million in 2025
- Peak customer electric demand will grow from 7,300 MW today to 11,400 MW in 2025
- Key fuel and construction commodity prices remain volatile
- Climate legislation may add millions of dollars to customer costs and affect resource options
CUSTOMER NEEDS IN 2025
Growing Resource Needs

Energy Needs (BAU, prior to EE and DE) (GWhs)

Capacity Needs - Summer Requirement (MWs)
RESOURCE OPTIONS

**Baseload**
- Coal and Nuclear
  - Long lead-time to develop
  - Capital cost is $2,500 - $5,000/KW
  - Operating costs (capital and fuel) are relatively low and stable

**Intermediate**
- Solar
  - Development times are relatively short
  - Capital cost is $4,500 - $7,500/KW
  - Operating costs are low and stable

**Combined Cycle Gas**
- Development times are relatively short
- Capital cost is $1,300/KW
- Operating costs are moderate and volatile

**Peaking**
- Combustion Turbine
  - Development times are short
  - Capital cost is $1,000/KW
  - Operating costs are high and volatile

**Intermittent**
- Wind
  - Development times are short
  - Capital cost is $2,000 - $2,500/KW
  - Operating costs are low

**Energy Efficiency**
- Reduced consumption
  - Cost effective source of energy
  - Investment is initial rebate/incentive
  - Achieves energy conservation and reduces peak load
RESOURCE OPTIONS
Developing New Generation

- Nuclear
- Coal
- Gas CTs/CCs
- Solar CSP
- Energy Efficiency
- Market Purchases

Legend:
- Development, Permitting & Construction
- Commercial Service
WHAT IS RESOURCE PLANNING?

Input & Considerations

A vision for Arizona
- Stakeholder input
- ACC guidance
- Regulatory Requirements

Resource types

Energy need

Costs and rates

Resource Planning Process

Requirements considered
Timelines established
Resources evaluated

Resource Plan

2009

2025
MEETING CUSTOMERS’ ENERGY NEEDS

2009 Required Peak Capacity: 7,300 megawatts

- **Baseload**
- **Intermediate**
- **Peaking**

Renewable Energy
PROJECTED ENERGY MIX 2009

- 38% Coal
- 31% Natural Gas
- 27% Nuclear
- 2% Renewable
- 2% New EE
DEFINING ARIZONA’S ENERGY FUTURE

APS’s Energy Need in 2025

Additional resources needed by 2025: 20%

RES Energy: 15%
*Some resources to meet the RES have already been secured.

Energy from 2009 Resources: 65%

Projected increases 2009-2025

- APS Electricity Need (GWHs): 32,200 to 49,800
- APS Customers (millions): 1.1 to 1.7
- Arizona Population (millions): 6.3 to 10
CUSTOMER NEEDS IN 2025

Peak Load Day Comparison (MWs)

2025 Peak Capacity Required: 11,400 megawatts

Projected Growth of Peak Capacity Needs

Projected Growth of Baseload Capacity Needs
APS RESOURCE PLAN

Renewables
- Rapidly accelerates adoption of renewables
  - 1,650+ MW
  - Doubles the RES by 2015
  - 50% more energy than required by the RES through 2025

Energy Efficiency
- Seizes opportunity to partner with customers on energy future
  - 587 MW of energy offset
  - 3,100 GWHs
  - Substantial increase in annual customer incentives

Nuclear
- Carbon emission free baseload resource
  - 800 MW of 2022-23 capacity
  - 6,400 GWHs/year

Gas Combined Cycle Gas Combustion Turbine
- Limit natural gas consumption to within 10% of 2009 level
- Realigns resources more towards peaking role
  - 3,500 MW (about 70% replacing expiring contracts)
- Wholesale market or demand response opportunities
## APS RESOURCE PLAN - LOADS & RESOURCES

### 2009 - 2025

<table>
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<td>Load Requirements:</td>
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<td>1.</td>
<td>Peak Demand (prior to EE and DE)</td>
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<td>7,612</td>
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<td>Reserve Requirements</td>
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<td>1,643</td>
<td>1,736</td>
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<td>Total Load Requirements</td>
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<td>Purchases - Market Call Options</td>
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<td>650</td>
<td>650</td>
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<td>13.</td>
<td>Total Existing Resources</td>
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<td>8,972</td>
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<td>Future Planned Resource Additions:</td>
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<td>15.</td>
<td>Energy Efficiency *</td>
<td>25</td>
<td>55</td>
<td>86</td>
<td>124</td>
<td>159</td>
<td>194</td>
<td>230</td>
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<td>468</td>
<td>496</td>
<td>530</td>
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<td>Baseload Nuclear</td>
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<td>19.</td>
<td>Gas Combined Cycle</td>
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<td>Peaking Resources</td>
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<td>21.</td>
<td>Short-Term Market Purchases</td>
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<td>22.</td>
<td>Total Future Resource Additions</td>
<td>41</td>
<td>81</td>
<td>125</td>
<td>180</td>
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<td>489</td>
<td>637</td>
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<td>4,818</td>
<td>4,914</td>
<td>5,073</td>
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<td>23.</td>
<td>Total Resources</td>
<td>8,231</td>
<td>8,629</td>
<td>8,754</td>
<td>9,062</td>
<td>9,161</td>
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<td>11,254</td>
<td>11,669</td>
<td>12,015</td>
<td>12,363</td>
<td>12,714</td>
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</tbody>
</table>

* New Renewable Nameplate Capacity includes all future renewable resources plus any existing renewable resources in service after Jan 1, 2009. (Lines 8 and 17)

Note resources shown as their expected capacity contribution at time of system peak
- Existing resources exclude short-term market purchase or sale transactions
- New Renewable Nameplate Capacity includes all future renewable resources plus any existing renewable resources in service after Jan 1, 2009. (Lines 8 and 17)
PROJECTED ENERGY MIX 2025

- 32% Nuclear
- 24% Coal
- 21% Natural Gas
- 16% Renewable
- 7% New EE
BENEFITS OF THE APS RESOURCE PLAN

Accelerating Renewables

Total Renewable Energy (non-distributed)

RES Target (non-distributed)
Projected Impact of Future CO₂ Legislation

Projected Emissions "All Gas Default" Plan

APS Resource Plan

12.9 MM ton gap

Assumed Allowance Allocation

BENEFITS OF THE APS RESOURCE PLAN

Mitigates Carbon
BENEFITS OF THE APS RESOURCE PLAN
Maintains 2009 Natural Gas Consumption

Total System Natural Gas Consumption (millions of mmBTUs per year)
BENEFITS OF THE APS RESOURCES PLAN

**Accelerates**
Realizing opportunities for renewables
- Driving Arizona and regional markets
- Increasing APS experience
- Advancing technology

**Capitalizes**
Energy efficiency capitalizes on low cost resources and partners with APS customers

**Mitigates**
Risks of CO₂ Legislation
- Customer price risks

**Maintains**
Natural gas consumption
- near 2009 levels
MEETING CUSTOMERS’ ENERGY NEEDS

APS Transmission

* Transmission path lends itself to use by wind as an energy only resource
NEXT THREE YEARS — ACTION PLAN

Increase Renewables
Procurement of renewables
About 450 MW of renewables planned to be in service between 2013 and 2016

Empower Customers
Ramp up energy efficiency investments
Expand distributed energy

Baseload Planning
Work to maintain baseload options

Monitor Markets
Observe markets for prospective opportunities
APS RESOURCE PLAN

Increasing Capital Commitment

Cumulative Capital Spending ($ billions)

- Renewable Generation
- Transmission
- Conventional Generation

Year:
- 2009
- 2011
- 2013
- 2015
- 2017
- 2019
- 2021
- 2023
- 2025
Partnering for Arizona’s Energy Future

State/Federal Government
Arizona Energy Strategy

Customers
Embrace efficiency measures
Install/host distributed energy
Participate in demand response

Corporation Commission
Guide Arizona’s energy future
Acknowledge APS Resource Plan
Address cost issues

Resource Plan

Commodity Markets
Energy Markets

APS
Plan for customer energy needs
Secure necessary resources
Reliably serve customers

Regional Entities
Wall Street
RENEWABLE ENERGY

BARBARA LOCKWOOD

Renewable Energy Manager
Renewable Energy Standard (RES)

Energy based requirement
2% of retail sales in 2009
Increasing to 15% by 2025

Distributed Energy required as a percentage of total
15% in 2009 increasing to 30% 2012
1/2 residential; 1/2 non-residential

2009 Implementation Plan and Funding
Total funding of $78.4 MM
Customer incentives of $55 MM
## APS RENEWABLE GENERATION

### Current Portfolio

Current Capacity Contracted -> 500 megawatts (MW) – enough for over 125,000 homes

<table>
<thead>
<tr>
<th>Projects Online</th>
<th>Capacity</th>
<th>Type</th>
<th>Status</th>
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<tr>
<td>1. Aragone Mesa</td>
<td>90 MW</td>
<td>Wind</td>
<td>In operation</td>
</tr>
<tr>
<td>2. Salton Sea</td>
<td>10 MW</td>
<td>Geothrmal</td>
<td>In operation</td>
</tr>
<tr>
<td>3. Prescott Airport</td>
<td>3.5 MW</td>
<td>Solar</td>
<td>In operation</td>
</tr>
<tr>
<td>4. STAR Center (and other AZ sites)</td>
<td>2.0 MW</td>
<td>Solar</td>
<td>In operation</td>
</tr>
<tr>
<td>5. Saguaro</td>
<td>1 MW</td>
<td>CSP</td>
<td>In operation</td>
</tr>
<tr>
<td>6. 27th Ave Landfill</td>
<td>3 MW</td>
<td>Biogas</td>
<td>Under development</td>
</tr>
<tr>
<td>7. Snowflake White Mt.</td>
<td>15 MW</td>
<td>Biomass</td>
<td>In operation</td>
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<tr>
<td>8. Solana</td>
<td>280 MW</td>
<td>CSP</td>
<td>Under development</td>
</tr>
<tr>
<td>9. High Lonesome</td>
<td>100 MW</td>
<td>Wind</td>
<td>In construction</td>
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<tr>
<td>10. City of Glendale Landfill</td>
<td>3 MW</td>
<td>Biogas</td>
<td>Under development</td>
</tr>
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</table>

![Map of APS Renewable Generation Projects](image)
APS RENEWABLE GENERATION – WIND

Aragonne Mesa
- 90 MW wind
- Began operation Dec 2006
- Long term contract
- 40 miles SW of Santa Rosa, NM

High Lonesome
- 100 MW wind
- Begins operation mid-2009
- Long term contract
- 55 miles SE of Albuquerque, NM
Snowflake White Mountain Power
- 24 MW biomass near Snowflake, AZ
- Began operation April 2008
- Long term contract
Solana Generating Station

- Concentrating Solar Power (CSP)
- Thermal energy storage ensures solar production at peak demand
- 2,700 parabolic trough collectors covering 3 square miles
- 280 megawatts – enough for 70,000 homes
- Abengoa Solar will own and operate
- Largest solar plant in the world if operating today
2008 Results
Energy: 587 GWh,
2% of Sales (Retail billed)

RES Requirement
RENEWABLE ENERGY INCENTIVE PROGRAM

- Solar and Non-Solar technologies
- Residential and Non-Residential
- Production Based Incentives (PBI) and Up Front Incentives (UFI)
- $55MM funding for 2009
Program cumulative as of 12/31/2008:

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<th>Category</th>
<th>Value</th>
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<td>Capacity installed (MW)</td>
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<td>Installs (Count)</td>
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<td>Incentives paid</td>
<td>$21.6 million</td>
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Reservations pending as of 12/31/2008:

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<td>Capacity (MW)</td>
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<td>Count</td>
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<td>2009 Commitments</td>
<td>$14 million</td>
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Distributed Energy

Cumulative MW 2008 2012
Cumulative # of Installs 2,412 41,396

RES Requirement

2008 2012
Cumulative MW 9 110
Cumulative # of Installs 2,412 41,396
RESOURCE ACQUISITION ACTIVITY

2008 Renewable Generation RFP
Issued June 2008
32 entities; 51 proposals
Ongoing assessment

Distributed Energy RFP
Issued August 2008
12 entities; 22 proposals
Ongoing assessment

Upcoming Small Generation RFP
Pre-release notification – February 16, 2009
RFP release – late-March 2009
Target 2 to 4 small projects
Technical Studies and Research

Distributed Renewable Energy Operating Impacts and Valuation Study
Managed by RW Beck
Completed and filed in early 2009

PV Performance Studies
Evaluate in-field system performance

Distributed and smart grid technology integration 2009 R&D Programs
ASU: Arizona Solar Market and Analysis Tool (AzSMART)
DOE-US Solar: Thermocline Thermal Storage
Large Scale Renewable Projects

3 Year Extension of Production Tax Credit

DOE Loan Guarantees

Treasury Department Grants in lieu of Tax Credits

Federal, State, Local Grants

Energy efficiency and conservation block grants - $6.3B

State energy program grants - $3.1B

Federal facilities grants - $8.7B
ENERGY EFFICIENCY

JAMES WONTOR
DSM Department Leader
Energy Efficiency (EE) Topics

Update on Current EE Programs
EE in Resource Plan
Future Plans for Achieving EE Savings
CURRENT EE PROGRAMS

Residential

Consumer Products Program
CFLs

Existing Home HVAC Program
Rebates (SEER)
Quality install
Duct test & repair

New Construction Program
Energy Star Homes

Low Income Program
Bill assistance
Weatherization

Non-Residential

Solutions for Business Program
Rebates, Training, and Information to encourage installation of high efficiency cooling, lighting, motors, and refrigeration in:

Large Existing Facilities
Small Businesses
Schools
New Construction

Energy Information Services Program
Subscription service to analyze hourly load data and help customers manage energy usage
Program-to-Date: 2005-2008

Lifetime Energy Savings (net) = 5,300 GWh
Peak Demand Savings (net) = 80 MW
Net Benefits to Customers = $156 million
Customer Savings on Bills = over $500 million
(over lifetime of measures installed)
CO2 Savings = 3 million tons
EE IN RESOURCE PLAN

Savings by 2025:
- 587 MW
- 3,100 GWh

2 times savings vs current funding

Cost of delivering EE expected to rise from 1 cent/Lifetime MWh to nearly 6 cents/LT MWh

Average annual funding level is 3 times current level ($75M vs $25M)
Criteria:
Are there enough participating customers to achieve the savings?
Is the cost to achieve the savings lower than the cost of other resources?
Are non-participating customers better off from this level of EE savings?
Is the level of DSM funding necessary to achieve savings acceptable on customer bills?
Does APS have a financial disincentive from achieving this level of EE savings?
DSM PROGRAM SPENDING

Annual DSM Funding

Pre-Portfolio
Current Portfolio
Resource Plan

$M

$100
$80
$60
$40
$20
$0


$20 $40 $60 $80 $100

$
PLANS TO ACHIEVE INCREASED LEVEL OF EE SAVINGS

- Enhance and expand existing programs
  - Direct Install
    - Pay higher % of incremental costs and raise caps
    - Home Performance audits
    - Bundle measures in “whole house” approach

- Develop new programs
  - 2nd Tier New Construction program
  - Manufactured housing program
  - Additional consumer products: clothes washers, insulation, shade screens, window upgrades
  - Refrigerator recycling program
  - Pool pumps and timer program
  - Commercial cooking program
IMPACT OF FEDERAL ECONOMIC STIMULUS BILL

What can funds be used for?
Weatherization
Home and business EE retrofits
New construction

Will funds flow to utility programs?
Or be controlled by states?

Will funds complement or compete with utility programs?
Pay a higher share of incremental costs?
SUMMARY

Current programs have achieved significant results in past 4 years

Resource Plan includes significant increase in MWh savings from EE programs in future

Ability to achieve this level of savings dependent on:
Adequate customer participation in difficult economy
Cost to implement EE programs
Equitable financial treatment for lost sales

Action plans being developed for new and existing programs to increase savings from EE programs
RESOURCE MARKETS AND PROCUREMENT

PATRICK DINKEL
Director Resource Acquisition and Renewables
INTEGRATION OF PLANNING AND PROCUREMENT

Planning
- Analyze energy needs
- Evaluate potential resource fit
- Assess potential risks
- Develop plan

Procurement
- Evaluate market solutions
- Assess and mitigate risks
- Secure preferred resource
- Manage long-term agreements

Operations
- Integrate and operate resources/services
- Manage risks
- Optimize resource performance

Information sharing and coordination
PLANNING AND PROCUREMENT CAN BE INTEGRATED IN DIFFERENT MANNERS

Deciding factors:
How specific is the resource plan?
When does utility commit to PPA/construction?
When does commission approve and grant cost recovery?

Answers drive:
Resources considered by utility
Flexibility of procurement process
Ability for utility to commit to projects
Interest and commitment of the market
KEYS TO OPTIMAL RESOURCE ACQUISITION

- Comprehensive resource plan that provides guideposts and considerations
- Engagement with market
- Nimble procurement activities
- Honest, robust consideration of resource alternatives – during planning and procurement
- Focus on commercial success rate
- Efficient process for evaluation and approval
- Rigorous contracting and contract management
THE ENERGY MARKETPLACE

 Owners/Merchants
 Developers
 EPC Contractors
 Vendors

 Lenders/Investors
 - Provide financing, IF there is an assurance of satisfactory project cash flow

 Utility
 - Identify need
 - “Buyer” meeting obligation to serve customers

 Regulators
 - Oversight, approval and recovery

• Market provides opportunities / solutions
• Screening of vendors and technologies, and managing commodity risk in contracts and approval process is required for project success
• No deal until:
  • PPA/Asset purchase agreement
  • Regulatory approval
  • Financial close

PPA or Asset Purchase
RENEWABLE RESOURCES COST VOLATILITY

CSP  20%

Geothermal  66%

Wind  65%
APS has managed the timing and scope of multiple solicitations to match the market and customer needs.
APS PREFERRED APPROACH

- Resource plan identifies needs, risks and options
- Flexibility in procurement approach and timing
  - Commission support for resource plan
  - Signals support for procurement
- Seek approval of significant resource acquisitions
FOLLOW-UP QUESTIONS?

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