EXH. CAK-4 (Apdx. C)
DOCKETS UE-19___/UG-19___
2019 PSE GENERAL RATE CASE
WITNESS: CATHERINE A. KOCH

BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, **Complainant,** **v.** **PUGET SOUND ENERGY,** **Respondent.**	**Docket UE-19____** **Docket UG-19____**

APPENDIX C (CONFIDENTIAL) TO THE THIRD EXHIBIT TO THE PREFILED DIRECT TESTIMONY OF

CATHERINE A. KOCH

ON BEHALF OF PUGET SOUND ENERGY

REDACTED VERSION

JUNE 20, 2019

Future of Metering Infrastructure
Corporate Spending Authorization (CSA)

November 1, 2013

For Internal Review Only

CONFIDENTIAL

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PUGET SOUND ENERGY

Date: November 1, 2013

To:

- *Phil Bussey (VP Customer Solutions)*
- *Roger Garratt (Dir Financial Planning & Strategic Initiv)*
- *Booga Gilberton (VP Operations)*
- *Margaret Hopkins (CIO)*
- *Lars Bergman (Director, Electric Operations)*
- *Harry Shapiro (Director, Gas Operations)*
- *Wayne Gould (Director, Contract Management)*
- *Kurt Palmer (Director, IT Infrastructure)*
- *Greg Zeller (Director Customer Care)*

From:

- *Jennifer Tada (Director Planning)*
- *Laura Feinstein (Manager, Smart Meter Technology)*
- *Veronica Dreher (Sr. Performance Analyst, Smart Meter Technology)*

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- *Tina Valdez,(Manager, Corporate Spending Initiatives)*
- *Bob Williams (Sr. Energy Res Planning Acquisition, FP&I)*
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- *Joe Beer (Chief IT Architect)*
- *Liz Norton (Dir Customer Solutions-Products & Services)*

Re: Corporate Spending Business Case Application – *Future of Metering Infrastructure—GATE 0: Feasibility Phase*

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1. Recommendation

PSE will evaluate the options and decide on a direction for managing its existing Automated Meter Reading (AMR) system as well as for a migration to Advanced Metering Infrastructure (AMI) technology over the next 10-15 years. The team is requesting $488,400[1] for a feasibility phase analysis to:

[1] See

AMR	Make a recommendation for how PSE will transition and manage its existing AMR system beyond 2016 when the L+G contract terms change.
AMI	Determine the feasibility of transitioning to AMI and making a recommendation for when and how PSE would begin to deploy the technology.

Key Questions Answered in "Feasibility" phase:

1) How will PSE manage its existing AMR system beyond 2016?
2) What combination of ownership, managed service, and/or contracting for AMR services makes operational and financial sense for PSE going forward?
3) What is a feasible timeframe for a transition to AMI technology?
4) Are operations leaders willing to sign on to AMI benefits and pursue the programs/projects necessary to realize these benefits?
5) What is the pace at which PSE would like to pursue an AMI technology transition?

2. Executive Summary

As 2014 nears, PSE has reached a point where planning for its metering system cannot be delayed. This CSA describes the drivers and plan for moving forward with further feasibility analysis in the first half of 2014:

OPERATING PSE's EXISTING AMR INFRASTRUCTURE: In 2014 PSE faces a critical decision in managing its [redacted] AMR contract with Landis + Gyr (L+G). PSE is contractually obligated to take over ownership and operation of its meter reading system on April 1, 2016. PSE has estimated that taking over ownership of this system –as planned contractually—would save the company between $3-10 million annually starting in 2016. However, determining the true costs, benefits and risks of any transition plan going forward requires further analysis and planning. Delaying this decision puts PSE core operations and financials at risk.

ADDRESSING CORE BUSINESS CHALLENGES WITH AMI TECHNOLOGY: Regardless of how PSE decides to manage its AMR assets, the company will continue to face challenges in its "meter-to-cash" process if it continues to rely on AMR technology. The "meter-to-cash" process is a fundamental business function and flawless execution relies on a metering system that provides timely and accurate energy use data for all of our customers. In 2012, PSE issued approximately $5M in bill adjustments to customers, mostly backbills, which also cost the company another $4M - $5M to process and resolve. The WUTC also continued to receive an unacceptably high number of customer complaints. AMR equipment lays at the foundation of many of these issues and infrastructure improvements are necessary to fundamentally address these challenges. This CSA, therefore, also details the potential benefits of a transition from AMR to AMI metering technology and asks for the resources to further investigate the feasibility of a transition.

INVESTING IN AMI TO ENSURE COMPETITIVENESS: Over the next 5-10 years PSE's customer and business needs will change. Today we do know, however, that PSE must pursue an infrastructure plan that provides the company with the strength and flexibility to adapt to customer needs. AMI is the key enabler in many new programs and services, such as distribution automation (DA) reliability enhancements, conservation voltage reduction (CVR), advanced outage notification and restoration verification, and prepay billing. This CSA demonstrates, that in order to realize these benefits, even several years from now, the company needs to start today in building out the necessary metering and communications infrastructure. Without early planning for AMI, PSE faces not only customer and operations risks, but the risk of technology obsolescence as its customer seeks the kinds of enhancements that AMI delivers.

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3. Business Opportunity & Benefits

The business opportunity that is presented in this CSA is to reduce cost and improve operations and customer service by; 1) Determining the optimal path forward for PSE in managing the AMR system,[2] and 2) determining the feasibility of transitioning the metering technology utilized from AMR to AMI over 10 years starting in 2016.

i. AMR Opportunity and Benefits

PSE has a contract for basic meter reading services with L+G through 2023. However, the company still faces significant decisions in the management of its AMR system over the next three years. Written into PSE's existing contract with L+G is an ownership transfer of the existing AMR system assets from L+G to PSE in April 2016. Even without choosing any new technology path, this means that PSE will either need to develop additional new operational and financial processes around its AMR system, or will have to embark on significant new contract negotiations with L+G or other vendor for a continuation of its managed service. Table 1 AMR Scenario Summary provides an overview of the paths PSE is asking to explore further and develop a recommendation on during the feasibility phase of this project.

Table 1 AMR Scenario Summary

	Asset Ownership	New [3] Operations	L+G Contract	Summary
1. Managed Service	L+G	L+G	Amended and/or renegotiated.	PSE re-negotiates its existing managed service contract with L+G to continue with the managed service agreement as is currently operated in 2014.
2. PSE Own & Operate	PSE	PSE	Executed as written.	PSE executes on its existing AMR contract as written and develops plans to own and operate all equipment and services currently managed by the L+G AMR contract.
3. Own Assets Contract Services	PSE	Vendor(s)	Executed as written. PSE may amend for contracted services.	PSE executes on its existing AMR contract as written and develops plans to own AMR assets and contracts for the operations portions of the L+G contract.
4. Status Quo	PSE	PSE + L+G	Executed as written. PSE may amend for contracted services.	PSE executes on its existing AMR contract as written and develops plans to own AMR network assets with a combination of PSE and outsourced operations.

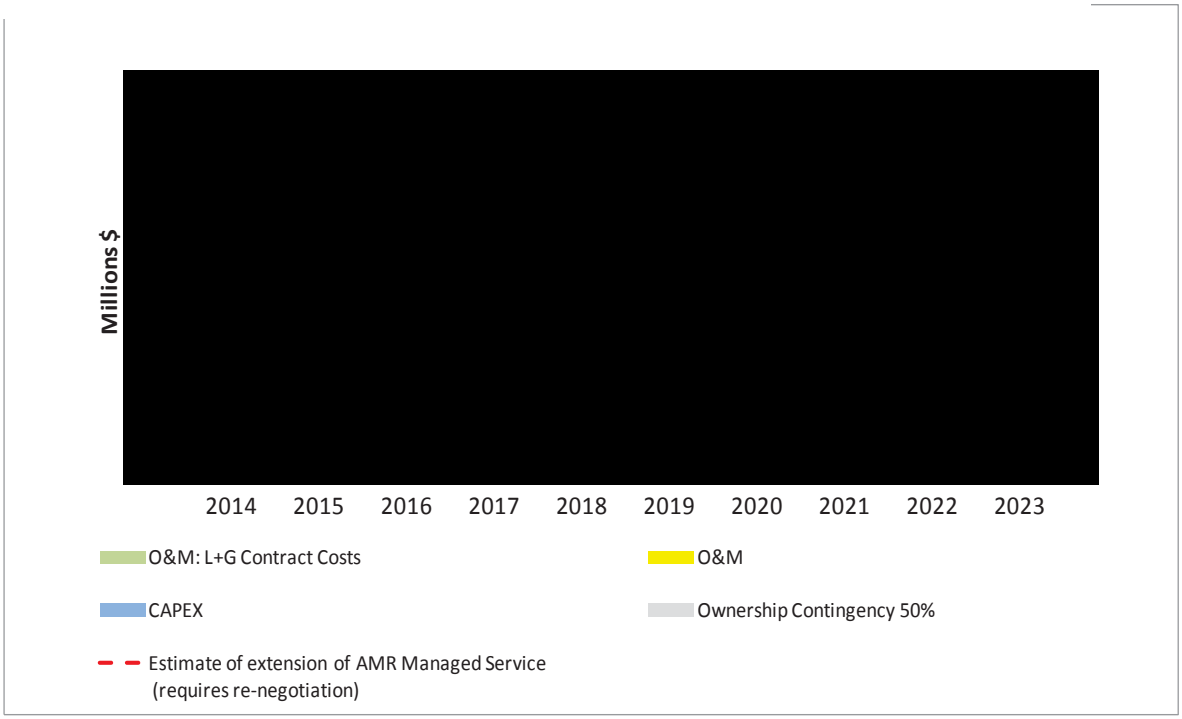
[2] The existing AMR contract specifies that PSE will take over ownership and will be responsible for operation of the AMR meter reading system on April 1, 2016. L+G will still provide basic read services. This transition is called the "Status Quo" scenario throughout this document.

[3] "New" Operations refer to areas currently outlined in the contract, including module and network maintenance, where PSE will have ownership responsibility post April 2016, as written in the existing contract.

The primary driver for determining the feasibility of the AMR ownership transition is a near and long term estimated reduction in overall costs (see Table 2). While PSE is slated to take ownership of AMR system assets in 2016, there are a number of paths PSE can pursue in managing the assets that it will acquire. As Figure 1 L+G Contract Costs + Estimated New Ownership Costs illustrates, PSE has done a preliminary analysis[4] of what the new cost structure would be going forward and is estimating that overall costs would be $3-10M lower. In the feasibility phase for which this CSA is requesting funding, PSE will solidify this analysis and make recommendations at the organizational and cost center level, about how PSE must plan for the ownership and management of these new assets.

Table 2 Total Estimated Costs by AMR Scenario (25 Year Total Cost of Ownership $M 2013)	
Continuation of AMR Managed Service[5]	[redacted]
PSE Own & Operate	N/A
Own Assets Contract Services	N/A
Status Quo AMR	[redacted]

Figure 1 L+G Contract Costs + Estimated New Ownership Costs



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[4] A discussion of this analysis and the alternatives considered can be found in Section 5
[5] These numbers are based on an estimate of what the continued managed service contract would cost and a formal request will need to be issued to L+G to determine the costs of a contract extension.

AMI Opportunity and Benefits

The primary driver for exploring the feasibility of AMI is the potential for AMI technology to drive down PSE's costs as well as delivering long term improvements to customer service, core meter reading operations and the ability to adapt to evolving customer needs. PSE chose the following scenarios in order to compare what is most clearly a "base case" represented by the "Status Quo" scenario, with the possibilities for deploying AMI:

Table 3 AMI Scenario Summary

Scenario	Overview	AMI Network	AMI Meters	L+G	New Vendor
1. Status Quo[6]	PSE will continue to leverage the existing L+G contract for meter reading services. In April 2016, PSE will assume ownership, operation and maintenance of all AMR equipment. L+G will provide meter reads through 2023.	None	None	Status Quo	None
2. Hybrid AMI	In April 2016, PSE will assume ownership, operation and maintenance of all AMR equipment. Utilizing the L+G 2-way technology, PSE will build out an AMI network from 2016-2018. Initial deployments of AMI will be based on business needs, followed by replacement for attrition and growth going forward.	Upgraded to 100% AMI 2016-2017	10 year deployment starting in 2016	Re-negotiated	None
3. Two Networks, Two Vendors	In this scenario PSE deploys 2 AMI networks: 1) L+G's Gridstream throughout the electric service territory and 2) A second vendor's technology over the gas service territory. Both will be built out over 2016-2017. Deployments of AMI meters will be the same as in the "Hybrid AMI" scenario.	Upgraded to 100% AMI 2016-2017	10 year deployment starting in 2016	Re-negotiated	Second Vendor
4. Full Deployment	This scenario installs a new two-way network with a new vendor and converts all meters to AMI over three years.	Fully Installed 2016-2017	3 year deployment.	Terminated in 2018	Yes
5. L+G Proposal	PSE will continue to utilize L+G as its meter reading service provider as is done today. L+G will build out an AMI network from 2014-2016. PSE will do initial deployments of electric AMI based on business needs and then continue to replacement for attrition and growth going forward. L+G will replace all gas endpoints by 2020.	Fully installed 2014-2016	10 Year deployment starting in 2014	Extended through 2028	No

[6] This is the same scenario as the AMR "Status Quo" scenario described in Table 1 AMR Scenario Summary

As Table 4 shows, the scenarios which PSE has estimated to have the greatest NPV are the "Two Vendors, Two Networks" and "Hybrid AMI" scenarios, which both assume that PSE will own and operate AMI network technology and replace AMR meters with AMI meters over a 10 year period. (The difference between the two scenarios is the cost of implementing and managing technology from two vendors vs. one vendor). During the feasibility phase, PSE will validate these benefits.

Table 4 Total Estimated Net Benefits of AMI (NPV over 25 years) ($M 2013)

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ii. Alignment within PSE

a) **Type of Initiative**-AMI has elements of emerging *and* existing initiatives.

- Existing—**AMR technology** lays at the foundation of PSE's "meter-to-cash" billing process and is a fundamental part of PSE's core operations today.

- Emerging— **AMI technology** can improve core meter reading operations by bettering network and read performance, increasing the availability of load profile data, and adding other data such as voltage, which is being used by PSE's CVR program. AMI enables several new customer and service applications such as pre-pay billing, remote disconnect/reconnect, advanced theft detection, and distribution automation.

b) **Type of Request**-A transition to PSE ownership of the metering system and a transition to AMI system would be *one of the largest infrastructure and customer initiatives* PSE has undertaken. Both of these efforts involve multifaceted projects which include new transaction elements such as Project, Purchasing, Construction, Operational Programs and New Products and Services. The projects would impact nearly every PSE customer and employee and utility stakeholder and would involve hundreds of millions of budgetary dollars over the project period.

c) **Implications for PSE**- Though a positive business case exists for both the AMR ownership transition and AMI, PSE will initially need to increase capital expenditures over the first 5 years to deploy AMI technology. Overall the company will experience greater efficiencies it its operations and will better be able to respond to customer needs.

d) **Business Unit Interactions and/or Dependencies**-The initial network upgrades, meter deployments, and customer program roll outs will require a significant amount of attention from teams across PSE, especially IT, engineering, electric and gas operations, procurement, system planning, and customer care. As with other enterprise projects at PSE, it is expected that most departments at PSE will be impacted.

e) **External PSE stakeholders Interactions and/or Dependencies**-PSE expects to continue a relationship with its existing meter read provider (L+G) but will also be engaging with other AMI vendors for products, services, meters, network equipment and software. In addition, with an upgraded AMI network PSE may have the opportunity to work with other neighboring utilities to achieve infrastructure synergies and open new market opportunities. As some of the advanced features and capabilities of the AMI technology are implemented, customer and stakeholder engagement will be critical to the success of the project.

f) **Describe the quantifiable market opportunity-** As PSE begins to adopt AMI technology, other utilities in the Puget Sound area are also looking to modernize their metering systems. Electric, gas and water utilities all rely on revenue meters to monitor and bill consumption on their systems and nearly all in the Puget Sound region have yet to implement significant amounts of remote meter reading technology. PSE has nearly 1.5 million customers, almost all of whom have water meters, which could potentially be read using PSE's AMI network.

g) **External Partners**-

- Landis and Gyr (L+G) – AMR electric meter, network and MDMS provider; AMI vendor
- Elster Solutions-AMR electric meter provider; AMI vendor
- Elster American-Gas meter provider
- SAP-Customer Information System (CIS)
- Itron-Energy Interval Service, AMI vendor
- GE-PSE OMS provider
- Additional external partners will be selected through a competitive proposal process.

iii. Business Case Evaluation Criteria:

Evaluation Criteria	Sub-Criteria	AMR v. AMI	Benefit Description
Safety	☒ EEI[7] & Employee ☐ Pipeline Integrity ☐ Customer & Public	AMI	*Increased automation such as remote disconnect, will decrease dangers for employees in the field. A PSE collections employee was robbed at gunpoint, there were 7 in person threats, and 231 collections employee injuries from 2009-2013.*[8]
Customer Experience	☒ High JD Power Metric ☐ Med JD Power Metric ☐ Low JD Power Metric	AMI	*AMI enabled OMS can deliver an estimated additional 2% reduction in outage minutes.*[9] *AMI is estimated to lead to a 35% reduction in credit write-offs in the electric only service territory when fully deployed.*[10]
Employee Engagement	☒ Employee Development ☐ Workforce Planning	AMR & AMI	*Ownership of AMI assets may increase opportunities for PSE employees. The introduction of new technology offers the potential for employees to develop new skills and increase engagement with modern technology.*
Performance Improvement	☒ Financial Improvement ☐ Operational Improvement	AMI	*Investment in AMI will reduce O&M expenditures and meter related billing issues while opening a number of opportunities for performance improvement initiatives.*
Value and Growth	☒ Go Big – Transformational!	AMI	*Providing meter reading services to overlapping electric utilities is potentially a $4.5M/year and overlapping water utilities could be a $17.2M/year revenue opportunity.*
Mandatory	☐ Regulatory Body ☐ Internal Audit Finding ☐ Business Continuity	N/A	*N/A*
Maintain	☒ Operational	AMR	*The performance metrics outlined in the AMR contract such as network and read performance will continue to be maintained.*

[7] EEI – Edison Electric Institute
[8] Docket UE- 131087 "Summary of Company Data Provided to Staff." PSE 2013
[9] PA Consulting estimate.
[10] 2013 PSE Remote Disconnect/Reconnect Business Case

4. Risks and Assumptions

i. Risk of Not Planning for an AMR Ownership Transition

Failure to Plan Risk - Regardless of whether PSE chooses an AMI upgrade path or continues with its existing AMR system, PSE will either need to plan for the AMR ownership transition occurring in 2016 or plan to renegotiate its contract to continue an AMR managed service. If PSE is to move forward with its existing contract, failure to plan for the transition puts PSE's ability to collect reads from the company's nearly 2 million meters (and 1.4 million customers) in jeopardy. It also puts the company in the position of having to make strategic decisions involving millions of annual budget dollars without sufficient analysis.

Asset Ownership Risk- Today L+G owns and operates all of PSE's meter network assets including the fixed AMR network and the AMR meter-modules. If PSE takes ownership of all of these assets, as is contractually specified, the company will be responsible for maintaining and purchasing this equipment going forward. Early estimates put the cost of maintenance at [redacted] annually. This CSA requests the funds to determine these costs further to provide more certainty. Regardless, owning these assets will require PSE to take on some level of asset management risk and the associated budget risk that comes with it.

ii. Risk of Not Planning for an AMI Technology Transition

Technology Dependency Risk: When PSE acquires ownership of the AMR system in 2016, the pain points and issues that the AMR system brings today will continue under PSE ownership just as they have under L+G ownership. The longer this AMR system is employed by PSE, the longer PSE will need to struggle with the issues that arise from:

- Gas Module Product Quality- PSE already has serious challenges with the quality of L+G gas communication modules, which have resulted in thousands of customer billing issues as well as regulatory intervention. Gas modules break under cold weather conditions and prevent the meter from registering usage. When discovered, this typically results in a retro bill to a PSE customer. Because L+G's AMR technology has no new customers and is not actively marketed, little, if any, investment is being done to improve the legacy product quality.

- Supply Chain Interruptions-PSE currently faces regular supply chain interruptions with its AMR vendor L+G. Electric meters and gas module delivery delays prevent PSE from energizing service or automating a meter read. Often, PSE storerooms are forced to maneuver to find legacy materials to substitute if a shortage occurs. Only one second source of supply exists for electric meters and no second source exists for modules and network equipment.

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- Network Performance-The AMR network is not resilient and lacks redundancy to collect many advanced meter reads. Meter data is often lost due to high levels of interference and lack of density of transceiver radios. Today, L+G's network performance is unable to deliver around 30% of demand reads for billing and around 20% of the customers enrolled in load profile service are unable to obtain regular 15 minute interval reads of their usage. Manual reads of meters top 60,000 monthly. PSE is unable to deliver interval read service to customers who enroll in the energy efficiency program due to this deficiency.

Financial Risk: One major benefit of replacing the AMR system early is the reduced cost of ownership of an AMI system compared to the AMR system. The longer this project is delayed the longer the delay in realizing the benefits of AMI. The commercial AMR gas modules have a failure rate above 14%. A large number of failures occur across other AMR components as well. With the average age of equipment increasing, PSE faces an increase in costs resulting from failures and maintenance in the 5-10 year timeframe. Maintenance costs for this equipment will grow as the equipment ages.

Risk of Competition: Delaying the implementation of AMI technology will also reduce PSE's ability to adapt to an evolving customer service needs. As neighboring utilities implement AMI, PSE's distribution system will be less modernized and the company will be less able to offer enhanced reliability and new products and services to its customers such as advanced electric vehicle integration, time of use rates, energy information feedback, and enhanced billing and payment options.

iii. Risks Associated with the Recommendation

AMR v. AMI	Risk Description	Mitigation Plan	Risk Impact (H,M,L)	Risk Prob. (H,M,L)	Parties Involved	Phase Impacted
AMI	The **Product Quality** of the new technology is less well known.	The ability to do interim testing and validation, purchase product warranties, and choose multiple suppliers mitigates this risk.	H	M	Meter Engineering Operations, Purchasing	Feasibility, Design, Deliver Results
AMI	[redacted]					
AMI & AMR	**Budget Variance** could be significant due to the project size and complexity.	PSE can pilot the technology and has the option of delaying phases, portions of the project and can contract for managed/third party services.	H	M	Finance	Delivery Plan and Design
AMI & AMR	**Customer** rejection of the technology or program.	PSE is developing a customer engagement and opt-out strategy.	L	M	Customer Care, Corporate Com.	Design and Deliver Results
AMI	There is a risk that **regulators** may disapprove of a portion of the AMI investment.	PSE will engage regulatory staff and seek agreement before moving forward with deployments.	H	L	Regulatory	Feasibility
AMI	Standards are not mature and there is quality and pricing risk associated with **reliance on a single vendor's technology.**	A two vendor solution could address some of the challenges of maintaining competitive sourcing and service options.	M	M	IT Architecture Engineering Standards, Telecommunications	Deployment and Operational

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AMI & AMR	The various dependencies of this project create significant **project delivery risks**.	Early adoption of a programmatic approach to an AMI transition with effective project management can help identify critical dependencies and create realistic timelines.	L	H	Project Managmt.	

iv. Critical Success Factors for the feasibility phase

- **Stakeholder Engagement**-The team will need to ensure that all stakeholders are identified and have been engaged in developing the business cases.
- **Scenario Analysis-** Appropriate scenarios for both AMR and AMI should be narrowed down and identified for a recommendation and should have broad organizational support.
- **Financial Analysis-**PSE should develop a comprehensive financial analysis of recommended scenarios with stakeholder engagement and should be able to fully document and communicate the details of the analysis.
- **Benchmarking**- PSE should develop use cases, determine performance indicators and benchmark its operations and services against other utilities. This will help the company both understand its current performance level as well as what kinds of improvements and challenges can be expected if PSE moves forward with an AMR or AMI project.
- **Regulatory Acceptance-** PSE will need to identify and communicate any areas of either the AMR or AMI project that require regulatory engagement and acceptance
- **Strategic Direction-**The goal of the feasibility phase is to make a directional recommendation for both the AMR and AMI. By the end of the feasibility phase PSE should:

    - For AMR- Make a recommendation for an AMR transition.
    - For AMI- Decide on the timeframe for an AMI transition and make a recommendation for a deployment scenario for an RFP.

v. Conditions

Conditions for Planning –In order to advance onto the "Planning" phase PSE will need to:

1. Update the AMR and AMI business cases with additional information from RFIs
2. Have a roadmap for AMR/AMI that is supported by all business units.
3. Validate the business cases with operations managers/directors.
4. Deliver system requirements for AMI.
5. On board a technical consultant capable of helping PSE craft an RFP for AMI.
6. Establish an AMR/AMI transition project with an appropriate governance structure.

a. Regulatory-PSE should be prepared to discuss and document its business case for AMI for regulators.

Conditions for Implementation- There are no major roadblocks in preventing PSE from moving forward into the Planning stage. Before and during the project implementation, however, there will be additional conditions and dependencies for moving forward which include:

Table 5 Conditions for Implementation[11]

Project	AMR/AMI Need	Estimated Amount
MDMS v3 Upgrade-	For AMR this upgrade is needed to continue vendor support. For AMI this is requirement for data processing and storage.	[redacted]
SAP Remote-Disconnect Enablement	To enable AMI remote disconnect/reconnect capability).	[redacted]
SAP Prepay Module	To enable AMI prepay billing.	[redacted]
Workforce Management Solution (PCAD Replacement/Upgrade)	To manage the installation of AMR/AMI equipment	[redacted]

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[11] From 5 Year IT Project Portfolio (6/26/2013)

vi. Assumptions[12]

Table 6 Technical Assumptions		
	AMR	**AMI**
Electric Meter/Module Retirement Rate	0.41% (increases with forecast)	0.34%
Gas Module Exchange Rate	6%	0.31%
Gas Meter Retirement Rate	0.68%	0.68%
Gas Module Visit Rate	3%	0.3%
TOP Maintenance Rate	15%	15%
Collector/MCC Maintenance Rate	30%	30%
Network Equipment Failure Rate	1.3%	1.3%

[12] For a detailed list of assumptions, please see the AMI Smart Grid Model, "Costs" and "Quantities" tabs.

Table 7 Economic Assumptions		
	ARM	**AMI**
Discount Rate	7.77%	
Inflation	2.1% (Unless specified contractually)	
Electric Meter/Module Life	15 Years	20 Years
Gas Module Life	15 Years	20 Years
Network Equipment Life	15 Years	15 Years
Gas Meter Life	25 Years	25 Years
Stores Overhead	7%	7%
Equipment Pricing	Pricing provided by L+G in existing contract.	Provided by L+G and Silver Springs via budget proposals.

Other Assumptions

1. **Fuels**-In all scenarios considered, PSE looks comprehensively at deployments to both gas and electric customers.

2. **Format** -The financial model takes the form of a "Total Cost of Ownership" comparison. PSE choose this approach because it represented the most effective way to comprehensively account for and compare all costs associated with a base case scenario called "Status Quo" to the two potential AMI migration scenarios, "Hybrid AMI" and "Full Deployment.

3. **Time Period** - PSE chose to use a 25 year period for modeling costs and benefits because it fully encompasses a 10 year meter deployment period and a subsequent 15 year meter depreciation period.

4. **Inflation** - A 2.1% inflation rate was used throughout the model except for where more specific CPI data was available and appropriate (such as the Seattle Area CPI-U required for the L+G contract).

5. **Network Deployment**-In both scenarios an AMI Network is assumed to be deployed over 2016-2017. In the Hybrid AMI scenario, the L+G network that is not currently AMI compatible is upgraded in a one-for-one exchange. In the Full Deployment scenario, a complete Greenfield deployment of a new network is deployed.

6. **Contractual Commitments** – In both the Status Quo and Hybrid AMI scenarios, it is assumed that PSE will continue to work with L+G for its metering communications infrastructure. The Full Deployment scenario, assumes that PSE will choose a new vendor and terminate its existing contract with L+G.

vii. Real option/flexibility to the project

For any given AMI network technology today, PSE has only one vendor in the supply chain to purchase the network and head end software from because vendor networks are not currently interoperable. Standards in this space are maturing as are requirements for interoperability and vendors may have more interoperability to offer when PSE begins the AMI deployment in earnest. As systems become more interoperable, there will be greater flexibility in vendor choice. PSE may, however, choose from multiple meter and MDMS vendors for vendor diversity. The rate of deployment for any network or meter technology has some degree of flexibility to support alignment with PSE's business and customer needs.

5. Financial Assumptions & Analysis

i. High Level Project Costs

The AMI request is over $1 billion dollars decision over 25 years. This is strategic decision which will commit the company to a course of action for the next three decades. This analysis includes three scenarios: 1) Landis + Gyr AMI Proposal, 2) Status Quo and 3) Hybrid deployment of AMI . The full deployment was not included in this analysis since it would require large capital investment in a short time span. The Two Networks is scenario is very similar to the Hybrid therefore it was not included. The summary of the results is as follows:

Table 8 Present Value of AMR and AMI Deployment Scenarios over 25 years ($Millions)

Each of the scenarios is different and has a different trajectory in capital versus O&M spending. With the Hybrid option the company would have a larger ownership in the process thereby assume more of the risk in the project. From financial perspective the Hybrid is the lowest cost option but the overall risk of each of the scenarios in implementation and pricing needs to be understood and evaluated. See the chart below for the timing of the cumulative present value of expenditures that would occur for the life cycle of the project and the financials for each of the three scenarios.

For more guidance on reporting financials refer to the attached Financial Analysis appendix.

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ii. Financial Summary

a) Q: Has this opportunity been approved by the executive officer(s) as a part of the 5-year Strategic Plan?

A: Funding for a portion of the AMR and AMI projects has been included as part of the 5-Year strategic plan.

b) Q: Have capital and O&M dollars already been allocated for this opportunity? If not, how will it be funded?

A: $50M has been allocated as for an AMR ownership transition and for the AMI network and meters between 2015-2017 in PSE's IT Capital 5-Year plan. In 2014, $30.8M O&M is in the existing IT budget.

Table 9 Allocations in the 5 Year Plan

	2014	2015	2016	2017	Total
AMR Transition	$0	$310k	$301K		$620K
AMI Network	$0		$10M	$10M	$20M
AMI Meters	$0	$10M	$10M	$10M	$30M
Total	$0	**$10.3M**	**$20.3M**	**$20M**	**$50.6M**

At the end of the feasibility analysis, it will be know what additional funds need to be allocated in order to begin the transition. This CSA is requesting a total of $488,400:

- $350K in internal O&M (labor costs already allocated).
- $138K for a consultant (funded from the operations budget).

Treasury Assumptions:

PSE has yet to decide on a path for moving forward with AMI and a transition to an AMR ownership model. Depending on the scenario PSE chooses, treasury assumptions will vary considerably and in some cases are not well known. Part of the goal of the 2014 GATE 2 Planning will be to determine the path that PSE must take and understand better the treasury and financing assumptions associated with this path forward.

Cost Center Budget Impacts- Should PSE decide to pursue ownership of its AMR system, the company will need to budget for large increases in its capital and O&M budgets in a number of affected cost centers. However, overall the company will also experience a significant decrease in the O&M is currently spends on the L+G contract. This means that PSE will have the ability to redirect funds internally to cover the costs of this transition.

O&M vs. CAPEX-Any investment in AMI technology, will require an significant increase in capital investment and O&M expenditures over 5-10 years, increasing company costs over the near to mid-term. The amount of capital and O&M varies significantly by scenario; the Full deployment

scenario requires the greatest capital expenditure over the next 5 years, while the L+G proposal requires the least. The Hybrid AMI and Two Vendors, Two Networks scenarios on the other hand, require a significant capital investment, but are projected to be the least cost over time.

Capital Leases and Imputed Debt- A scenario that involves a third party owning and operating fixed durable assets utilized by PSE (such as continuation of a managed service contract) will require PSE to have a capital lease. This will increase PSE's imputed debt and may have a material effect on PSE's credit ratings.

Counter Party Risk-Currently PSE utilizes L+G as its meter reading provider. L+G is a large market player, is privately held, but is owned by Toshiba and has $1.6B[13] in annual revenue. The ability of the technology provider to provide ongoing support is an important consideration for PSE. Stability and credit should therefore be important considerations to take into account for any contractual or technological commitments regarding metering operations.

Accounting Assumptions:

- Financing Options: PSE will fund this project through the Company's capital structure

- Ownership Transition Asset Base- Under the existing AMR contract, PSE will spend $1 to purchase L+G's field assets including all meter modules and network equipment. This would mean that PSE must own and account for 1.8 million new meter modules and 8K new pieces of network equipment. It also means that the company will be inheriting $20-$50+million in assets for the cost of $1, which may present a unique accounting and asset management challenge.

- New Equipment Purchases-Going forward, if PSE owns and maintains either AMR or AMI equipment, the company will also be responsible developing accounting practices for new equipment. While the company has made progress with researching the handling of gas and electric module purchases, there is still work needed to be done to be able to fully account for this new equipment.

[13] L+G Wikipedia entry, Oct 2013.

6. Analysis of Alternatives

b. Alternatives Analysis

Table 10 Scenario Pros and Cons

Alternatives	Risks (Cons)	Benefits (Pros)	Total Cost ($M)
Continuation of Managed Service	Technology Obsolescence, customer service challenges/laminations.	Technology and vendor operations are well known and understood.	[redacted]
Status Quo	Technology Obsolescence, customer service challenges/laminations, ownership transition.	Technology is well known and understood.	[redacted]
Hybrid AMI	Reliance on one vendor, integration of new technology.	Next generation of customer service benefits. Lowest cost.	[redacted]
Two Networks, Two Vendors	Integrating multiple vendors.	Next generation of customer service with increased flexibility.	[redacted]
Full Deployment	Budget overruns technological and financial flexibility.	All PSE customers will have access to AMI benefits in a near term timeframe.	[redacted]
L+G Proposal	Reliance on one vendor, integration of new technology, contractual commitment.	PSE can move forward with new technology with fewer large capital costs. Budget variance will be reduced.	[redacted]

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7. Regulatory Implications

AMR Regulatory Implications

PSE's AMR technology has been in place since 1999. Continued operations of this technology, either by PSE or third parties, does not present any new regulatory implications.

AMI Regulatory Implications

While regulatory requirements have spurred the development of AMI deployments in many states, in the northwest regulators have been relatively silent on the issue of smart grid and AMI deployment. PSE's AMR deployment came before the smart-grid was even discussed widely and was entirely justified with a business case focused on operations and cost savings. Similarly, the AMI business case is being developed to address real business and customer needs as well as PSE overall objective of developing a least cost strategy for ongoing operations. Nonetheless, there are a number of ways that the AMI business case will require engagement with regulatory and policy organizations.

8. Implementation Plan

Project Objectives and Approach

The overall project objective for this CSA is to decide on strategic director for the metering system that will provide a PSE with a solid business foundation over the next decades. Transitioning to AMR ownership would be a large and complex project at PSE and Implementing AMI as drawn out by any of the scenarios explored in this CSA, would be one of the largest projects undertaken at PSE. Once PSE enters the Design and Construction phases, implementation will require a "program" structure, with close executive oversight and multiple project management layers and work streams. In the initial feasibility phase, the leadership will come from Planning's, Smart Grid Technology team, who will facilitate the process of determining a path forward for managing PSE's AMR system, validating the AMI Business Case, and making a recommendation on an AMI deployment scenario. As

Appendix B- Resource Plan Details for Gate 0: Feasibility outlines, there is large group involved in coming to the recommendations needed for GATE 1.

High Level Schedule

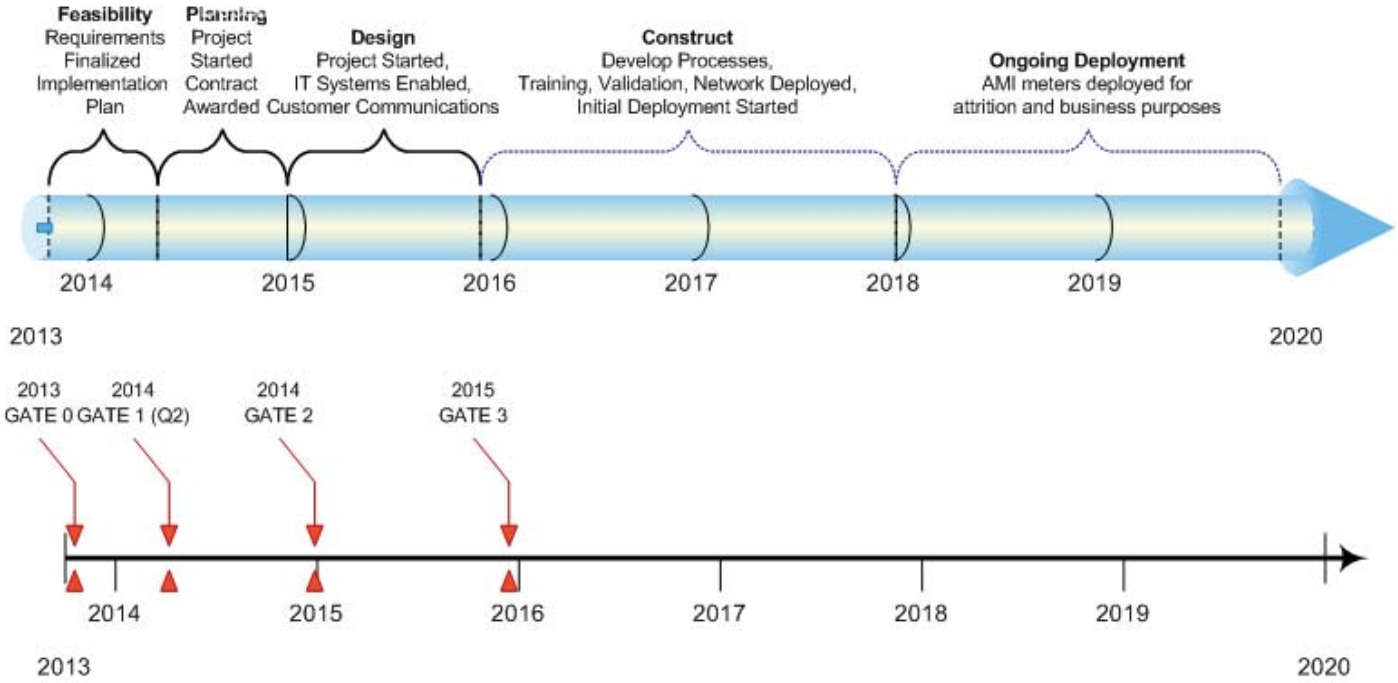

Table 11 Feasibility Phase Plan		
Time	**AMR**	**AMI**
Q4 2013	**Activities:** • Identify business owners for affected processes/areas. • Evaluate the options regarding in managing the existing AMR system, including the planned ownership transition, contract re-negotiation and other strategies and decide on high level strategy. • Complete the identification of all processes and procurement areas affected by ownership transition. ✓ **Goal:** Statement of Work (SOW) developed and RFI Issued	**Activities:** • Further integrate AMI business case development into the Meter-to-cash work stream. • Business owners further develop business case for specific AMI benefit areas to inform a recommended AMI deployment scenario. • Meter engineering finalizes meter requirements • Obtain RFI's from additional vendors as needed to validate financial assumptions. ✓ **Goal:** AMI meter requirements document finalized. Consultant on boarded.
Q1 2014 **GATE 1**	**Activities:** • Obtain bids from potential vendors to manage the outsourced scope. • Decide on a strategy for completing the transition to include in-sourcing or out-sourcing the affected processes in coordination with PSE business owners. • Negotiate pricing with L+G for post-2016 services (required by current contract). ✓ **Goal:** Make a recommendation for a AMR transition and submit for Gate 1 (Planning) Approval.	**Activities:** • Continue to finalize the AMI strategy and work towards a recommended scenario. • Finalize network and software requirements for AMI. • Benchmark with peer utilities for requirement and performance levels. ✓ **Goal:** Make a recommendation for a deployment scenario for the RFP and submit for Gate 1 (Planning) Approval. Deliver AMI requirements document.
Q2 2014	**Activities:** • Initiate transition planning: • Submit any RFPs for any outsourced work. • Develop a resource plan. • Develop a budget • Identify training requirements • Develop new processes and standards.	**Activities:** • Develop RFP • Begin discussing AMI plans and capabilities with customers and regulators.
Q3 2014	**Activities:** • Complete transition planning. ✓ **Goal:** Deliver a transition plan for AMR.	**Activities:** • Finalize bidder list. ✓ **Goal:** Finalize and issue RFP
Q4 2014 **GATE 2**	**Activities:** • Assign Project Manager • Execute on transition plan. ✓ **Goal:** Submit for Gate 2 Funding.	**Activities:** • Obtain and evaluate bids from vendors. • Evaluate a strategy for implementing AMI to include operations, ownership, contracting, etc. ✓ **Goal:** Submit for Gate 2 Funding.

2015	• Develop project and change management plans. • Negotiate and establish any contracts with third-party vendors. • Develop new processes and work practices for in-sourced activities. • Hire and train internal staff on new processes that are in-sourced. • Develop IT capabilities required for any in-sourced processes. • Work with finance and accounting to plan for the financial impacts of the ownership transition and addition of new capital procurement. • Update assumptions in AMI business plan to reflect ownership transition strategy. • Prepare 2016 budget requirements to include module and network component replacement/growth costs. • Obtain Gate 3 (Design) approval and authorization to move toward Gate 4 (Construct) for 2015.	• Develop project and change management plans. • Select and finalize contracts with AMI vendors. • Develop new processes and work practices for AMI capabilities. • Begin executing on hiring and training plans. • Complete IT system integrations to support meter-to-cash processes and other AMI capabilities associated with initial deployments (SAP Module). • Finalize AMI system architecture. • Develop specifications and operational work practices for AMI equipment. • Perform end-to-end test trials to validate system capabilities. • Continue discussions with customers and regulators on AMI plans and capabilities. • Prepare 2016 budget requirements and forecast 5 year budget requirements. • Obtain Gate 3 (Design) approval and authorization to move toward Gate 4 (Construct) for 2015.
2016	• Perform detailed coordination with L+G for any processes that will change with the ownership transition. • Continue to hire and train internal staff on new processes. • Go-live with IT systems required for ownership transition. • Finalize the terms of any new contracts and establish reporting/management for vendors. • Stabilize and review accomplishments; identify course corrections.	• Complete the processes and work practices in support of the project deployment plan. • Continue executing on hiring and training plans. • Execute on the project deployment plan • Begin deploying network and validating coverage. • Implement meter system and validate system capabilities.

Major Milestones – Gate Submission

This CSA is requesting funding to proceed to the "Feasibility" phase with a target completion timeframe of April 2014.

Gate Submission - Milestone Description	Milestone Description	Estimated Completion Date	Estimated Total Gate Cost
Ideation	Alternative analysis and business case.	11/1/2013	$250k
Feasibility	Continued flexibility with the L+G contract. Business unit sponsorship. Project plan & governance.	4/1/2014	$488,400 (O&M)
Planning	RFP Developed and Issued.	12/31/2014	$500k
Design	Contracts awarded. Implementation, process and procurement plans in place. IT systems established.	12/31/2015	$1-10M
Construct	AMR ownership transition. Initial network/meter deployment followed by gradual transition throughout PSE service territory.	2016-2025	$110.10M
Close Out	Project Close out	2025	N/A

Resource Plan

Has a Project Manager been assigned to the project? If yes, please identify.
Yes, [redacted]

Is there a resource plan with named resources identified?
Yes, for the 2014 efforts see

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Appendix B- Resource Plan Details for Gate 0: Feasibility.

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Is recruitment currently underway for any key roles? If yes, please identify.
No, recruitment is awaiting approval and budget allocation.

Exit Strategy

Exit Condition	Exit Strategy
O&M Budget Reduced/Eliminated	• PSE can renegotiate with L+G using its existing resources to continue providing managed services for its AMR system as is currently established.
Capital Budget Reduced/Eliminated	• PSE may be able to defer any portion of the ownership transition or AMI deployment. The project timeline is highly flexible.
Contract Termination	• Today PSE has a contractually defined transition plan in place, should either PSE or L+G decide to terminate all or part of its contract. Such plans should be in place for any new contracts with other vendors. • PSE should also ensure equipment and software compatibility as well as secure licenses/rights to allow the company to continue to utilize/operate existing equipment for business continuity.
Product/Service does not meet expectations.	• PSE should have contractually specified product/service quality agreements with vendors and the company should have plans for testing and phasing in technology in order to ensure any major issues can be fleshed out before technology is more fully deployed. • PSE should also have alternative sources of supply.

Contributing Team Members

Contributing Team Member	Organization
[redacted]	[redacted]

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9. Endorsement Sign-Off

Endorsement	Title	Date	Signature
[redacted]			

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10. Appendix A - Financial Analysis Details

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FINANCIAL ANALYSIS FOR STATUS QUO AMR

Assumptions

($ in Millions)	Total Cost	2014	2015	2016	2017	2018	2019+	In 5-yr Budget?
CAPEX								
Meter capital	$679	$7	$11	$18	$21	$22	$600	
Network Substation Capital	$55	1	1	1	2	2	50	
Total CAPEX	**$ 735**	**$ 8**	**$ 12**	**$ 19**	**$ 23**	**$ 23**	**$ 650**	
O&M								
AMR Metering Costs	$291	$5	$5	$9	$10	$9	$254	
L&G	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	
Disconnection	$490	$15	$15	$16	$16	$16	$411	
Voltage Reduction	($205)	$0	($0)	($1)	($1)	($1)	($202)	
Outage	$687	$21	$22	$22	$23	$23	$576	
Total O&M	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	
Total	**$ 2,588**							
WACC	7.77%							

Financial Projections

Summary Financial Results		2014	2015	2016	2017	2018	2019-+	Total
Net Income		$0	$1	$2	$3	$4	$480	$490
EBITDA		$1	$2	$5	$8	$10	$1,513	$1,539
Incremental Rate Impact		2.4%	2.4%	2.1%	2.0%	N/A		
Total NPV Cost	$ 1,040							
Cost to Customer PVRR	$ 1,254							
*Assumes Perfect Regulation								

Income Statement		2014	2014	2015	2016	2017	2018+	Total
Revenue Requirement		$77	$81	$72	$73	$76	$3,369	$3,748
Expenses:								
O&M		72	74	64	62	61	1,520	1,853
Depreciation		0	1	1	2	2	460	466
Other Taxes		4	4	4	4	4	337	356
Taxes		0	0	1	1	2	259	264
Operating Expenses		$76	$79	$70	$69	$70	$2,576	$2,938
Operating Income		1	1	3	4	6	794	809
Interest		0	1	1	2	2	313	320
Net Income		**$0**	**$1**	**$2**	**$3**	**$4**	**$480**	**$490**
Ratebase		8	19	37	58	78		
Return on Ratebase		7.77%	7.77%	7.77%	7.77%	7.77%		
ROE		9.8%	9.8%	9.8%	9.8%	9.8%		
EBITDA								
Operating Income		1	1	3	4	6	794	809
Add back Depreciation		0	1	1	2	2	460	466
Add back Taxes		0	0	1	1	2	259	264
EBITDA	**$0**	**$1**	**$2**	**$5**	**$8**	**$10**	**$1,513**	**$1,539**
Cash Flow								
Operating Income	-	1	1	3	4	6	794	809
Add back Depreciation	-	0	1	1	2	2	460	466
Add back Deferred Taxes		0	0	0	1	1	84	87
Less: Tax Benefit of Income		0	0	0	1	1	110	112
Operating Cash Flow	**$0**	**1**	**2**	**4**	**6**	**9**	**1,228**	**1,250**
Capital Expenditures		(8)	(12)	(19)	(23)	(23)	(649)	(734)
Net Cash Flow	**$0**	**(7)**	**(10)**	**(15)**	**(16)**	**(15)**	**579**	**516**

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FINANCIAL ANALYSIS FOR HYBRID AMI

Assumptions

$ in Millions	Total Cost	2014	2015	2016	2017	2018	2019+	In 5-yr Budget?
CAPEX								
Meter capital	$963	$7	$11	$50	$55	$52	$788	Partial
Network Substation Capital	$81	$1	$3	$12	$16	$2	$48	
Total CAPEX	**$1,044**	**$8**	**$14**	**$62**	**$71**	**$54**	**$836**	
O&M								
AMI Metering Costs	$274	$4	$5	$6	$6	$6	$246	
L&G	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	
Disconnection	$433	$15	$15	$16	$15	$15	$356	
Voltage Reduction	-$324	$0	$0	-$1	-$2	-$2	-$320	
Outage	$703	$21	$22	$22	$22	$23	$593	
Total O&M	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	
Total	**$2,248**							
WACC	7.77%							

Financial Projections

Summary Financial Results	PV	2014	2015	2016	2017	2018	2019-+	Total
Net Income		0	1	4	7	9	13,833	13,854
EBITDA		$1	$3	$11	$20	$26	$2,112	2,173
Incremental Rate Impact		2.3%	2.4%	2.1%	2.1%	N/A	0.000%	
Total NPV Benefits/(Costs)	$ 982							
Cost to Customer PVRR	$ 1,249							
*Assumes Perfect Regulation								

Income Statement		2014	2014	2015	2016	2017	2018+	Total
Revenue Requirement		76	81	74	77	82	3,397	3,787
Expenses:								
O&M		72	74	59	52	50	860	1,166
Depreciation		0	1	3	5	6	667	681
Other Taxes		4	4	4	5	6	425	447
Taxes		0	1	2	4	5	355	367
Operating Expenses		76	79	67	65	67	2,307	2,662
Operating Income		1	2	6	11	15	1,090	1,125
Interest		0	1	2	4	6	431	444
Net Income		**0**	**1**	**4**	**7**	**9**	**660**	**681**
Ratebase		8	21	80	146	192		
Return on Ratebase		7.77%	7.77%	7.77%	7.77%	7.77%		
ROE		9.8%	9.8%	9.8%	9.8%	9.8%		
EBITDA								
Operating Income		1	2	6	11	15	1,090	1,125
Add back Depreciation		0	1	3	5	6	667	681
Add back Taxes		0	1	2	4	5	355	367
EBITDA		**1**	**3**	**11**	**20**	**26**	**2,112**	**$2,173**
Cash Flow								
Operating Income	-	1	2	6	11	15	1,090	1,125
Add back Depreciation	-	0	1	3	5	6	667	681
Add back Deferred Taxes		0	0	1	2	3	94	100
Less: Tax Benefit of Income		0	0	1	2	2	151	156
Operating Cash Flow		**1**	**2**	**9**	**17**	**22**	**1,700**	**1,751**
Capital Expenditures		(8)	(14)	(62)	(71)	(54)	(816)	(1,024)
Net Cash Flow		**(7)**	**(12)**	**(53)**	**(54)**	**(32)**	**884**	**727**

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FINANCIAL ANALYSIS FOR LANDIS & GYR AMI

Assumptions

$ in Millions	Total Cost	2014	2015	2016	2017	2018	2019+	In 5-yr Budget?
CAPEX								
Meter capital	$768	$7	$11	$33	$37	$41	$639	
Network Substation Capital	$37	$1	$1	$2	$1	$1	$31	
Total CAPEX	**$805**	**$8**	**$13**	**$35**	**$38**	**$42**	**$670**	
O&M								
AMI Metering Costs	$163	$4	$5	$5	$3	$4	$142	
L&G	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	
Disconnection	$433	$15	$15	$16	$15	$15	$356	
Voltage Reduction	($324)	$0	($0)	($1)	($2)	($2)	($320)	
Outage	$703	$21	$22	$22	$22	$23	$593	
Total O&M	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	
Total	**$3,349**							
WACC	7.77%							

Financial Projections

Summary Financial Results	PV	2014	2015	2016	2017	2018	2019-+	Total
Net Income		$0	$1	$3	$4	$6	$10,833	$10,847
EBITDA		$1	$3	$7	$12	$16	$1,614	$1,652
Incremental Rate Impact		2.2%	2.3%	2.4%	2.5%	N/A	0.000%	
Total Costs	$ 1,234							
Cost to Customer PVRR	$ 1,497							
*Assumes Perfect Regulation								

Income Statement		2014	2014	2015	2016	2017	2018+	Total
Revenue Requirement		$73	$78	$85	$90	$97	$3,902	$4,325
Expenses:								
O&M		69	71	74	73	74	1,908	2,270
Depreciation		0	1	1	2	3	497	505
Other Taxes		3	4	4	5	6	381	403
Taxes		0	1	1	2	3	274	282
Operating Expenses		$72	$76	$81	$83	$87	$3,060	$3,460
Operating Income		1	2	4	7	10	842	865
Interest		0	1	2	3	4	333	342
Net Income		$0	$1	$3	$4	$6	$510	$524
Ratebase		$8	$20	$53	$88	$126		
Return on Ratebase		7.77%	7.77%	7.77%	7.77%	7.77%		
ROE		9.8%	9.8%	9.8%	9.8%	9.8%		
EBITDA								
Operating Income		$1	$2	$4	$7	$10	$842	$865
Add back Depreciation		0	1	1	2	3	497	505
Add back Taxes		0	1	1	2	3	274	282
EBITDA	$0	$1	$3	$7	$12	$16	$1,614	$1,652
Cash Flow								
Operating Income	-	$1	$2	$4	$7	$10	$842	$865
Add back Depreciation	-	0	1	1	2	3	497	505
Add back Deferred Taxes		0	0	1	1	2	75	78
Less: Tax Benefit of Income		0	0	1	1	1	116	120
Operating Cash Flow	**$0**	**$1**	**$2**	**$6**	**$9**	**$14**	**$1,298**	**$1,329**
Capital Expenditures		(8)	(13)	(35)	(38)	(42)	(609)	(745)
Net Cash Flow	$0	($7)	($10)	($29)	($29)	($29)	$689	$585

11. Appendix B- Resource Plan Details for Gate 0: Feasibility[14]

	Staff	Hours	Effort	Notes
Customer Care				
Project Lead	[redacted]	240	6 weeks	Part time project management for 3-4 months
Project Sponsor	[redacted]	4	3-4 hours	Executive direction
Billing and Payment	[redacted]	200	1 week/FTE	Process mapping billing and payment.
Collections	[redacted]	40	1 week	Process mapping credit/collections.
Total Hours		484		
Cost		**$ 38,720**		
Customer Initiatives and Continuous Improvement, Competitive Intelligence				
Executive Direction	[redacted]	8	4 hours/FTE	Executive direction
Analyst	[redacted]	40	1 week	Help in quantifying JD Power benefits
Management Support	[redacted]	40	20 hours/FTE	Directional support
Total Hours		88		
Cost		**$ 7,040**		
Electric and Gas Operations				
Executive Direction	[redacted]	8	4 hours/FTE	Executive direction
Analyst	[redacted]	160	80 hours/FTE	Process mapping operational capabilities
Meter Engineer	TBD	80	80 hours/FTE	Process and work practice development
Management Support	[redacted]	40	20 hours/FTE	Directional support
Total Hours		208		
Cost		**$ 16,640**		

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[14] The labor rate is $80/hr for internal, $200/hr external.

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	Staff	Hours	Effort	Notes
Smart Grid Technology, Planning and Analysis				
Executive Direction	[redacted]	20	40 hours/FTE	Executive direction
Analyst	[redacted]	560	5 months/.7 FTE	Project Lead
Technical Consultant	TBD	480	3 months	Technical requirements and RFP advisor
Project Manager	TBD	160	3 months 1/3 FTE	PM for project following RFP
Management Support	[redacted]	800	5 months 1/3 FTE	Directional support
Total Hours		1,540		
Internal Cost	Internal	**$ 123,200**		
Consultant & PM Cost	External	**$ 128,000**		
IT/Meter Technology				
Executive Direction	[redacted]	80	8 hX 5 month/FTE	Executive direction
Chief Architect	[redacted]	40	8 hX 5 month/FTE	Smart Grid Architecture
IT Architect	[redacted]	60	12 h X 5 month/FTE	Network Architecture
IT Security	[redacted]	120	12 h X 5 month/FTE	Network/Hardware/Data Security
Meter Analyst	[redacted]	480	6 weeks	MDMS/Application Integration/ Data Mapping/Analysis
SAP Analyst	[redacted]	180	FICO/AP (40hrs) Equip. Track. (40hrs) Mater. Man (80hrs), Forms (20hrs)	SAP sandboxing and estimation
Gen. Management Support	[redacted]	160	8 X 5 month/FTE	Directional support/SAP
Total Hours		1,120		
AMR Consultant	**External**	**$ 10,000**		
Internal Cost		**$ 89,600**		

	Staff	Hours	Effort	Notes
Planning & EES				
Executive Direction	[redacted]	8	2 weeks	Executive direction
Engineer	[redacted]	20	20 hours	Quantifying CVR customer benefits
Engineer	[redacted]	80	2 weeks	DA requirements
Total Hours		108		
Cost		**$ 8,640**		
Procurement				
Executive Direction	[redacted]	8	8 hours	Executive direction
Buyer	TBD	320	2 months	RFP Development
Contract Admin	[redacted]	320	2 months	Contract Negotiation
Total Hours		648		
Cost		**$ 51,840**		
Finance Accounting				
Executive Direction	[redacted]	4	4 hours	Executive direction
Manager Accounting	[redacted]	20	20 hours	Accounting Assumptions
Financial Planning	[redacted]	160	2 weeks	CSA Process
Total Hours		184		
Cost		**$ 14,720**		
	Internal	**$ 350,400**		
	External	**$ 138,000**		
	Total	**$ 488,400**		

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