

**Table of Contents**

**I. Introduction..... 1**

**II. Overview of the IT Environment..... 3**

**III. IT Costs ..... 11**

    A. Summary ..... 11

    B. Cost Drivers for Incremental IT Costs..... 12

    C. Cost Savings and Efficiencies..... 16

**IV. Major IT Projects ..... 19**

    A. Cyber Security ..... 19

    B. 2020 Vision Strategy..... 22

**V. Qualifications..... 35**

**List of Exhibits ..... 36**

## I. Introduction

1 **Q. Please state your names and positions with Portland General Electric (PGE).**

2 A. My name is Cam Henderson. I am the Vice President of Information Technology (IT) and  
3 Chief Information Officer at PGE. My qualifications appear at the end of this testimony.

4 My name is Behzad Hosseini. I am the Director of IT Strategy and 2020 Vision. My  
5 qualifications also appear at the end of this testimony.

6 **Q. What is the purpose of your testimony?**

7 A. We explain the forecasted increase in costs for PGE's IT department and we describe the  
8 changing IT environment that accounts for much of this increase.

9 **Q. What activities or functions are you including as IT?**

10 A. IT consists of PGE departments responsible for developing, operating, and maintaining our  
11 computer, cyber, and communication systems. Because these systems are becoming  
12 increasingly important to all aspects of PGE's operations (with increasing scope, reliance,  
13 and uses) and because the security of these systems is becoming more critical, the demand  
14 for IT resources is forecasted to increase significantly in the near future.

15 **Q. How much do you expect operations and maintenance (O&M) costs<sup>1</sup> to increase by the  
16 2011 test year?**

17 A. From 2008 to 2011, we forecast that IT costs will increase from \$40.2 million to \$54.6  
18 million.<sup>2</sup> We explain the reasons for this increase in more detail below. Because these costs  
19 relate to all areas of PGE's operations, they are charged or allocated to appropriate areas and  
20 appear as part of each area's O&M costs. Since the majority of those costs relate to

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<sup>1</sup> Unless specifically indicated as capital costs, all costs in this testimony refer to O&M costs.

<sup>2</sup> This increase reflects a \$2.3 million reduction due to a proposed mechanism related to the 2020 Vision project described in Section IV, Part B, below. Absent this mechanism, IT costs are forecasted to increase to \$56.9 million in 2011.

1 corporate systems, whose costs are allocated rather than charged directly to the operating  
2 areas, we discuss IT as a whole in this testimony.

3 **Q. How is your testimony organized?**

4 A. In the next section, we provide an overview of the IT environment that leads to this cost  
5 increase. We then provide specific detail regarding the various aspects of the increase.  
6 Next, we describe two of PGE's largest IT projects, with costs to be incurred during 2011.  
7 The final section provides our qualifications.

## II. Overview of the IT Environment

1 **Q. Please provide a brief description of the current environment for IT.**

2 A. Computer information systems have become a critical component of almost every part of a  
3 company's operations, and PGE is no exception. Many aspects of our business have come  
4 to rely on complex, real-time information that needs to be available 24 hours a day, 365 days  
5 a year. Customers have come to expect this as well, and they expect that many of their  
6 requests should be handled over the web at their convenience. As the importance of these  
7 systems and the dependency of the business on them have grown, so have the security and  
8 regulatory requirements. Thus, PGE's IT department has grown significantly and is a much  
9 larger part of our operation, as are its costs. IT systems have expanded to almost every PGE  
10 operation, expanded their scope, and increased in complexity.

11 **Q. What are some of your more significant challenges moving into 2011 and beyond?**

12 A. The following is a list of some of the challenges we will face in the next few years:

- 13 • Increasing Security Requirements – Security and regulatory requirements have  
14 increased significantly for the IT department. The nature of online, real-time  
15 systems that can be accessed by our customers and suppliers have required  
16 stronger solutions in this area. Sarbanes-Oxley, FERC, NERC, WECC, and most  
17 recently, the new NERC Critical Infrastructure Protection (CIP) standards have  
18 caused us to devote thousands of labor hours within IT to address these  
19 requirements, and this trend will continue. We discuss this project in more detail  
20 in Section IV, Part A, below (Cyber Security).
- 21 • Replacing Old Systems – We have recently initiated a program, which we refer to  
22 as “2020 Vision,” to replace most of our major information systems over the next

1 five to six years. As we look at the changes anticipated in our industry over the  
2 next ten years and the types of information systems needed to support our  
3 operations, we know that most of our IT systems will need to be upgraded or  
4 replaced. Even if our business processes do not change, vendor support or  
5 technical advancements would require us to make significant investments in these  
6 systems. The 2020 Vision strategy involves implementing new systems that will  
7 be used across the enterprise wherever possible, in contrast to legacy applications  
8 that are typically department-specific. This will reduce the number of systems we  
9 have to support, establish common standards and business processes used across  
10 the company, better integrate data between systems, and allow us to further  
11 reduce the complexity of our IT operations. More importantly, we plan to use this  
12 as an opportunity to implement industry “best practices” and improve our  
13 business processes to gain further operating efficiencies. We discuss this project  
14 in more detail in Section IV, Part B, below.

- 15 • New Development and Monitoring Tools – We have invested in WebSphere,  
16 Interwoven, Tivoli Identity Management, OpenView, Remedy, and other tools to  
17 help us more efficiently develop and maintain systems, implement better system  
18 controls, share data across multiple applications, and monitor the operations of  
19 our data center. The use of consistent tools and standards across the department  
20 enables us to simplify the IT environment and more proactively and consistently  
21 manage the IT operations.
- 22 • Smart Grid – IT is currently involved in software development for new system  
23 processes associated with Advanced Metering Infrastructure (AMI) deployment.

1 In addition, IT will be a significant factor in implementing customer and system  
2 benefits after AMI deployment is complete (see PGE Exhibit 300, Section III).

- 3 • Network Connectivity – As our dependency on information systems has grown,  
4 the need for data connectivity throughout the company has also grown. In  
5 response, we have implemented a microwave and fiber optic ring network  
6 connecting all of our major facilities throughout the region. The bandwidth  
7 requirements for this network have also grown as we send text, maps, engineering  
8 drawings, operating commands, video, and now voice over these connections.  
9 Further, PGE’s AMI and Energy Management System have added new  
10 requirements for redundancy and increased security for our network.
- 11 • Increasing Hardware and Software Maintenance – Over the past few years, we  
12 have consolidated most software maintenance into the IT budget and the software  
13 contracts are managed by our contracts management group. This has not only  
14 provided consistency in contract administration, but it has also enabled us to  
15 better control our costs. The consolidation has also shifted costs to the IT-specific  
16 budget but this change does not affect PGE’s overall costs.

17 **Q. How are you addressing these challenges?**

18 A. We are addressing these challenges in a number of ways, including:

- 19 • Using a centralized approach to IT
- 20 • Reducing the complexity of the IT environment
- 21 • Using proven technology
- 22 • Applying a preference for packaged application software whenever possible
- 23 • Leveraging our investment in software applications across the company

- 1           • Using integrated suites of products
- 2           • Managing IT as an enterprise asset
- 3           • Leveraging web technology

4   **Q. Please describe PGE’s centralized approach to IT.**

5   A. A centralized approach means that we concentrate the development, operations, and  
6   maintenance of the IT systems within a single functional group rather than allow each  
7   operating area to determine its own IT strategy. At PGE, we believe the centralized basis is  
8   a more cost effective solution and enables us to leverage investments and skill sets across a  
9   wider base. However, some IT operations at our generating plants are more decentralized.  
10   We have found that plant management systems are best supported by plant personnel who  
11   are responsible for the operation of the plant. Although decentralized, these plants still  
12   follow company standards for hardware, software, network connectivity, security, and other  
13   standards applicable across the entire company.

14   **Q. How are you reducing the complexity of PGE’s IT environment?**

15   A. In the past, many companies, including PGE, followed an IT strategy to select “best of  
16   breed” packages, regardless of the hardware platform, the computer language, or what  
17   database and operating system they used. As a result, we now support numerous hardware  
18   platforms, operating systems, databases, and programming languages. In order to simplify  
19   our IT requirements, we have developed a strategy to support three hardware platforms,  
20   three operating systems, and two databases. In addition, we are beginning to take steps to  
21   reduce the number of programming languages we support. To accomplish this, we are  
22   following a strategy of “fewer, deeper vendor relationships.” Oracle, IBM and Microsoft  
23   are our three primary vendors; each has some areas of unique solutions and sometimes all

1 three offer similar solutions. Competition between these vendors in overlapping areas helps  
2 keep our costs down. By using more of their products and services, we found that we have  
3 been able to negotiate better prices and build stronger working relationships. These  
4 improved relationships lead to tangible benefits of enhanced support and stronger  
5 commitment to the success of our operations.

6 Along with the consolidation of vendors, we have also developed a central group for  
7 managing hardware, software, and service contracts. Through consolidated purchasing,  
8 better negotiations and consistent monitoring of the contracts, we estimate we have saved  
9 more than \$1.5 million over the past three years.

10 **Q. Please explain your use of proven technology.**

11 A. Early adopters of technology often pay a premium for new technology or incur additional  
12 costs to debug and stabilize new products. As a general rule, we prefer to be a quick  
13 follower of new technology once it has been proven to be effective. This allows us to  
14 realize the benefits of new technology without incurring additional financial costs or  
15 reduced productivity. Examples of this are PGE's adoption of programs for server  
16 virtualization, identity management, WebSphere, and voice over internet protocol (VOIP).

17 Occasionally, because of the deep relationships with some of our vendors described  
18 above, we have found it advantageous to work with the vendor to jointly develop some new  
19 application features. This may occur when we have a business need that cannot be  
20 effectively accommodated with other solutions. In these cases, PGE benefits by having  
21 significant involvement from the vendor because it can help reduce our overall costs. Our  
22 experience with these types of projects has proven to be very beneficial.

23 **Q. Why do you have a preference for packaged application software?**

1 A. We prefer packaged software rather than custom-developed software for two reasons. First,  
2 costs can be lower because software companies recoup their development costs by selling  
3 the product to a large number of customers. Second, and more importantly, software  
4 companies have an incentive to update their products as the needs of the industry change,  
5 making it economical to add the additional functions and features that our customers or  
6 regulatory agencies may require.

7 Given the nature of our business and some of the unique requirements of our customers,  
8 there will always be some need for custom development. When this is necessary, we use  
9 common IT standards, development tools, and languages to minimize the skill sets required  
10 for this work. This allows our development personnel to be able to work on a variety of  
11 programs across the business.

12 **Q. What do you mean by leveraging your investment in software applications?**

13 A. By leveraging, we mean that we maximize the use of software products that we purchase.  
14 Where different parts of the business have similar information needs, we ask them to  
15 evaluate existing products that are already in use to determine if the existing products can  
16 meet their requirements. Doing so reduces software acquisition costs as well as the  
17 resources needed to support the applications.

18 Although we have not always done so in the past, our approach to implementing  
19 packaged software is to minimize the amount of custom changes we make to the  
20 programming code. This allows us to cost-effectively implement upgrades as necessary to  
21 take advantage of new features as well as new technologies offered by the vendors. While  
22 we may not acquire every version of a program, our intention is to always have a supported

1 version in place. We believe this is an economical way to extend the life of our software  
2 investment.

3 An example of this approach is Masterpiece, the financial system we are currently  
4 replacing. It is 26 years old and has been upgraded many times over the years, but now the  
5 vendor is phasing out its support. Although it is not likely that PGE will be able to use  
6 future systems for two-and-a-half decades, this example demonstrates our philosophy of  
7 maximizing the investments we make in software products.

8 **Q. Please explain suites of integrated products.**

9 A. The software market has changed over the past few years as Oracle, IBM, and Microsoft  
10 have been very aggressive in acquiring smaller software companies. As a result, they are  
11 each building bundled or integrated suites of products, often dedicated to specific industries  
12 such as ours. We now have the option of obtaining products that can support a number of  
13 different business functions that have the advantage of being built on the same platform  
14 using the same tools. More importantly, these vendors are taking responsibility for  
15 integrating these various modules, thus reducing the efforts of an individual business to  
16 share information between these systems. In addition, these companies work with hardware  
17 and database vendors to ensure that their products continue to operate on current, supported  
18 technology.

19 This represents a fundamental change to the IT environment. As we discussed above, in  
20 the past, companies bought the best applications they could find and then worked to  
21 integrate them together. Now, we can purchase suites that are already integrated.

22 **Q. How are you managing IT as an enterprise asset?**

1 A. In the past, we managed IT resources by line of business. That is, projects were prioritized  
2 by the line of business and outside of that department, there was little visibility into the  
3 resources committed to implementing or supporting technology. As we have moved toward  
4 larger projects and more integrated solutions, we are managing IT as an enterprise-wide  
5 resource. Cross-functional teams of managers and officers review requests for IT services  
6 and help IT determine priorities for these investments. This helps IT stay aligned with  
7 PGE's strategic direction and helps ensure limited IT resources are assigned to the projects  
8 that provide the greatest overall benefit to the company.

9 **Q. What are the benefits of leveraging web technology?**

10 A. Web technology provides numerous benefits to our customers. Customer surveys give us  
11 high marks for the functionality of our customer websites and the self-service transactions  
12 that customers can complete without a PGE representative. We believe this is a cost  
13 effective way to enhance customer service. PGE is also successfully using this technology  
14 in building the internal systems that employees use to manage their business operation.

15 **Q. Please summarize the most significant aspects of the current IT environment.**

16 A. The most significant aspects are:

- 17 • Expanding IT scope as it becomes an increasingly significant part of all of PGE's  
18 operating activities;
- 19 • Increasing security requirements to protect PGE systems and critical  
20 infrastructure; and
- 21 • Increasing need to replace PGE's aging software systems with integrated  
22 enterprise systems.

**III. IT Costs**

**A. Summary**

1 **Q. How are PGE's total IT costs forecasted to change from 2008 to 2011?**

2 A. PGE forecasts that total IT expenses, including incurred charges and loadings will increase  
3 from \$40.2 million in 2008 to \$54.6 million in 2011. These costs consist of the following  
4 components:

**Table 1**  
**Total IT Costs (\$ Millions)**

<b>Category</b>	<b>2008 Actuals</b>	<b>2011 Test Year</b>	<b>Variance 2008 - 2011</b>
Direct Charges	13.8	17.7	3.9
Allocated Charges	26.4	40.7	14.3
Labor Adjustment	0.0	(1.5)	(1.5)
2020 Deferral Adjustment	0.0	(2.3)	(2.3)
<b>Total IT</b>	<b>40.2</b>	<b>54.6</b>	<b>14.4</b>

5 **Q. How are IT costs charged to the specific functional areas?**

6 A. As seen in Table 1 above, PGE's IT costs consist of two categories: directly charged and  
7 allocated. Directly charged costs relate to systems that apply to specific operating areas,  
8 such as production, transmission, or distribution. These costs are charged directly to  
9 specific expense ledger accounts related to those operations. Other IT work that is  
10 performed in the areas of voice, data, network, communications, the data center, and office  
11 systems are not directly related to one specific operating area. Instead, these costs apply  
12 broadly to all PGE activities and departments and are first charged to a balance sheet ledger  
13 account and then allocated to the expense ledger accounts of the various functional areas.

1 Labor charged to the balance sheet has labor loadings applied per PGE's loading and  
2 allocation policies, which are submitted annually to the OPUC Staff as an attachment to our  
3 Affiliated Interest Report. A summary of IT charges to each operating area by direct charge  
4 and allocation is provided as PGE Exhibit 601.

**B. Cost Drivers for Incremental IT Costs**

5 **Q. What are the reasons for the cost increases from 2008 to 2011 for IT as a whole?**

6 A. The primary drivers of this increase are cyber security; the replacement of aging IT systems;  
7 higher annual maintenance costs for software, hardware, and network infrastructure; AMI;  
8 and certain labor and labor-related costs.

*1. O&M Labor Costs*

9 **Q. Do you have any increases associated with new employees?**

10 A. Yes, but only minimally. As discussed in PGE Exhibit 500, we have significantly limited  
11 the increase in full time equivalent (FTE) positions as reflected in the 2011 test year  
12 forecast. For IT specifically, we forecast an increase of only 8.3 FTEs, which represents a  
13 1.0% annual average increase.

14 **Q. What types of positions do the incremental FTEs represent?**

15 A. We will require three FTEs for the AMI project for application development and  
16 communication support. We also need the following FTEs associated with cyber security:  
17 critical infrastructure protection analyst, security specialists, and identity management  
18 analysts. In addition, we need FTEs for data storage administration and desktop support.

19 **Q. Given the increase in FTEs, what is the total labor increase due to IT activities?**

20 A. The total labor increase from 2008 actuals to the 2011 forecast is approximately \$3 million,  
21 which also includes payroll escalation over three years for a labor-intensive operation and

1       reinstating O&M activities that were temporarily deferred for capital jobs. For more detail  
2       on PGE's total labor costs, see PGE Exhibit 500.

3       **Q. Please explain the O&M increase associated with reinstating O&M activities.**

4       A. From 2007 to 2010 PGE used personnel normally involved in O&M activities to supplement  
5       AMI and other development work. By 2011, when certain capital jobs will be completed,  
6       those employees can shift back to their regular duties, which include:

- 7           • A backlog of requested software functionality enhancements to existing  
8            applications.
- 9           • Lower priority vendor application software upgrades and patches.
- 10          • System and software patches to keep our software and operating systems at  
11          appropriate version levels to make sure we comply with vendor support  
12          agreements.
- 13          • Hardware vintage replacement.

14       **Q. Please explain the increase due to labor-related costs.**

15       A. As noted above, IT labor charged to voice, data, network, communications, and office  
16       systems that are corporate in nature are first charged to a balance sheet account and then  
17       allocated to operating expenses after having labor loadings applied (e.g., employee benefits,  
18       incentives, paid time off, and payroll taxes) per PGE's loading and allocation policies. From  
19       2008 to 2011, we forecast these loadings to increase approximately \$2.8 million based on  
20       increasing labor costs to the corporate IT systems and the overall increase to loaded costs,  
21       most significantly employee benefits, which are addressed in PGE Exhibit 500.

22       **2. O&M Non-Labor Costs**

**Q. What costs are you forecasting for 2011 related to the replacement of old systems?**

1 A. We project that these replacement costs will consist of \$3.8 million in development O&M  
2 and \$1.4 million in ongoing O&M. We discuss these costs and the 2020 Vision program in  
3 more detail in Section IV, Part B, below.

4 **Q. Please explain the increase in IT maintenance costs.**

5 A. Not including the maintenance costs discussed below in association with cyber security, IT  
6 maintenance costs are forecasted to increase approximately \$2.4 million from 2008 to 2011  
7 and consist of the following:

- 8 • \$230,000 for network maintenance of PGE's telephone and interactive voice  
9 response systems used by the Tualatin customer contact center and World Trade  
10 Center outage overflow facilities.
- 11 • \$71,000 for PGE's new Energy Management System.
- 12 • \$45,000 to perform an upgrade to the Gentrans Integration Suite, which is an  
13 electronic data interchange (EDI) tool that enables PGE to perform electronic  
14 transactions between PGE and transaction partners and is critical to PGE's cash  
15 flow. The vendor's software release cycle requires us to upgrade every other year  
16 as well as periodic patching of the software.
- 17 • \$157,000 for maintenance on data storage equipment due to general data growth.
- 18 • \$1.9 million associated with PGE's software applications including maintenance  
19 on new applications, higher rates on existing applications, and increasing scope  
20 on certain existing applications. Specific costs on approximately 100 applications  
21 are listed in confidential work papers to this testimony. The most significant  
22 portion of the overall cost increase is due to the number of products under  
23 maintenance and the price increases established by the vendors. Most software

1 maintenance fees are based on the number of people using the product. As we  
2 implement more systems that are used by an increasing number of users, costs in  
3 these areas increase. The same can be said about our hardware maintenance –  
4 new technology implemented throughout the company carries an increased  
5 maintenance cost.

6 **Q. By how much have non-labor costs increased as a result of cyber security measures?**

7 A. PGE forecasts an increase of approximately \$2.1 million for non-labor O&M costs when  
8 comparing 2008 actuals to the 2011 forecast. We describe these costs in more detail in  
9 Section IV, Part A, below.

10 **Q. How much of the increasing IT costs are due to AMI?**

11 A. PGE has identified \$553,000 in incremental non-labor costs associated with AMI as listed  
12 below. (Note: these costs were included in the UE 189 business case related to AMI and are  
13 incorporated in PGE's calculations of net AMI savings.) Specifically, the increased AMI  
14 costs are due to:

- 15 • \$78,000 for Oracle database maintenance.
- 16 • \$147,000 for data storage costs related to the increasing requirements of the meter  
17 data consolidator.
- 18 • \$71,000 for server hardware and software maintenance.
- 19 • \$108,000 for third-party-owned tower leases.
- 20 • \$126,000 for backhaul circuit leases, tower inspection fees, and tower climbing  
21 training.
- 22 • \$23,000 for additional maintenance on the World Trade Center (WTC) and  
23 Portland Service Center networks and the Regional Network Interface (i.e.,

1 routers and network gear to support the connections from our data center to the  
2 tower gateway base stations).

3 **Q. Are there any additional non-labor costs increases for IT?**

4 A. Yes. PGE forecasts approximately \$190,000 for additional leased communications circuit  
5 costs associated with 1) the Open Access Technology International application as used by  
6 PGE's Power Operations group, 2) the data connection between the Clackamas Training  
7 Center and WTC for business and training purposes, and 3) escalation on general circuit  
8 leases.

**C. Cost Savings and Efficiencies**

9 **Q. Has PGE implemented any programs to reduce IT costs?**

10 A. Yes. PGE has recently implemented several programs to reduce IT costs through contract  
11 management, virtual servers, reduced data-retention time periods, new data storage  
12 technology, and skipping some non-essential software releases.

13 **Q. What has PGE accomplished through contract management?**

14 A. PGE implemented this program several years ago in order to achieve cost savings through  
15 more beneficial terms in IT contracts. Specifically, we negotiated savings in the following  
16 areas:

- 17 • Discounts for IT contractors based on the number of contractors employed and the  
18 duration of their service.
- 19 • Caps on many of our IT software licenses and maintenance agreements.
- 20 • Discounts based on bundled purchases rather than individual and separate  
21 purchases.
- 22 • Consistent contract administration.

- 1           • Better tracking and reallocation of software licenses.
- 2           • Enterprise licensing agreements.

3   **Q. How much has PGE saved through Contract Management?**

4   A. By having a contract management group that actively negotiates and enforces PGE's  
5   technology purchases, we estimate that we have saved the following amounts from this  
6   program (based on specific discounts to individual contracts):

- 7           • 2006 – \$519,000
- 8           • 2007 – \$722,000
- 9           • 2008 – \$358,000
- 10          • 2009 estimated – \$641,000

11 **Q. Please describe the virtual server program.**

12 A. The process of server virtualization involves consolidating many stand-alone servers to one  
13 or more shared servers by use of specialized operating system software. This is a fairly  
14 recent innovation, for which PGE waited until it was a proven technology but then moved  
15 quickly to take advantage of the cost savings that it could afford.

16 **Q. How much has PGE saved through server virtualization?**

17 A. This approach has allowed PGE to reduce the need for additional Windows servers from 201  
18 down to eight, saving approximately \$1.5 million in hardware capital costs.

19 **Q. What did it cost to implement this program?**

20 A. The cost of the program is approximately \$350,000, leading to a net savings of  
21 approximately \$1.2 million.

22 **Q. Is it possible to virtualize all servers?**

1 A. No. Certain servers cannot be virtualized because the resource requirements are too large  
2 and others cannot be virtualized because the proprietary nature of some applications requires  
3 dedicated servers. For servers that were virtualized, PGE applied the process under the  
4 following conditions: 1) old servers became obsolete and needed to be replaced, or 2) new  
5 servers were required. This is an ongoing process and we expect more savings in the future.

#### IV. Major IT Projects

##### A. Cyber Security

1 **Q. Please describe PGE’s efforts toward cyber security.**

2 A. PGE has implemented a Security Roadmap to reduce our security and data risk while  
3 building our security capability and architecture to a level that is consistent with both current  
4 industry practices and regulatory requirements. The primary implementation of this project  
5 will begin in 2010 and continue through 2015. Total capital cost over the six years of the  
6 project is estimated at \$12.5 million. Beyond that, PGE will address emerging issues and  
7 compliance requirements as they arise.

8 **Q. Why are you implementing this project now?**

9 A. PGE employed Ernst & Young LLP in 2008 to perform a data security assessment, which  
10 indicated that our cyber security risk exposure is in need of significant reduction. In  
11 addition, based on cyber threats to the national infrastructure, there is a significant federal  
12 push to bring the utility industry as a whole into a security model similar to that of banking  
13 institutions and other industries considered to be “high risk.” Consequently, PGE faces  
14 significantly increasing regulatory requirements and guidelines provided by NERC, FERC,  
15 Department of Homeland Security, Sarbanes-Oxley, and the OPUC to address the growing  
16 number of threats and vulnerabilities such as viruses, worms, hacker sophistication, and  
17 potential terrorist activities.

18 **Q. What cyber security measures has PGE implemented in the past?**

19 A. In the past, PGE implemented security solutions for problems already identified on a per-  
20 need basis. This has resulted in ad-hoc processes and intermittent capabilities to protect

1 PGE assets. Although not an absolute “best practice”, it was typical of industry standards  
2 and served to keep costs lower for customers.

3 **Q. Why is this approach no longer adequate?**

4 A. The current approach is no longer adequate to support the emerging needs due to resource  
5 constraints and time spent on implementing and maintaining manual processes and  
6 solutions. Additionally, regulatory requirements are increasing the need to automate and  
7 proactively manage threats and risks.

8 **Q. What are the consequences of not implementing the proposed cyber security  
9 measures?**

10 A. By deferring this project, PGE would be subject to an increasing risk of data breaches, data  
11 loss, or compromised operations by hackers who could exploit vulnerabilities in PGE's  
12 cyber assets. We would also face financial penalties due to non-compliance with legal and  
13 regulatory requirements. In short, PGE cannot afford to defer this work.

14 **Q. By how much do you forecast non-labor O&M to increase in 2011 due to the cyber  
15 security project?**

16 A. We project that the program will require approximately \$2.1 million in non-labor O&M and  
17 consist of the following components:

- 18 • \$121,000 in contract labor to assist in building a risk management framework,  
19 documentation, templates, and training.
- 20 • \$145,000 for specialized security training for 15 application and coding  
21 developers.
- 22 • \$116,000 in contract labor for sensitive data clean-up and to configure and  
23 structure certain data sets to align with a new software tool used to implement

1 identity and access management to critical cyber assets and systems, including  
2 tracking and reporting of cyber access by employees and contractors.

- 3 • \$90,000 in contract labor for asset and file tagging, which provides classifications  
4 as to how they are to be protected.
- 5 • \$200,000 for software purchases (PGE is currently reviewing this cost to  
6 determine if it is more appropriately classified as capital).
- 7 • \$675,000 in contract labor to upgrade and configure identity and access  
8 management tools. These address risks associated with redundant or  
9 inappropriate user accounts plus access rights and privileges to certain data and  
10 critical applications. Expanding access management capabilities (beyond finance  
11 applications and Sarbanes-Oxley compliance-enabling software) is necessary  
12 based on the number of PGE employees and contractors plus FERC requirements  
13 that transmission, generation and trading activities remain partitioned. This will  
14 also provide centralized access control (i.e., for addition, modification, or  
15 termination of access) for all PGE cyber assets, which will increase the efficiency  
16 in audits pertaining to user access and associated reporting.
- 17 • \$200,000 in contract labor for security architecture review. This work is  
18 necessary because PGE will be implementing substantial technology updates over  
19 the next several years (see Section IV, Part B, below) and we need to ensure they  
20 are properly designed prior to implementation to avoid conflicting technologies.
- 21 • \$160,000 for audit services to test and ensure systems are secure and “hardened,”  
22 which means that the systems are functioning as intended but are secure in the  
23 most optimal way given current standards.

- 1           • \$375,000 for maintenance costs on software and hardware specifically applied to  
2           security requirements.

**B. 2020 Vision Strategy**

3 **Q. Please describe the 2020 Vision strategy.**

4 A. During the next 10 years, PGE is planning to implement a set of projects that collectively  
5 modernize and consolidate our technology infrastructure. The ultimate purpose of this  
6 program, which we call “2020” Vision, is to replace a multitude of existing software  
7 applications with fewer “enterprise” applications that provide integrated functionality for  
8 PGE’s operations.

9 **Q. How many applications do you plan to consolidate through the 2020 Vision project?**

10 A. PGE’s current projections are that we can achieve the following consolidations:

- 11           • Financial Management – reduce 11 current applications to 5 or fewer  
12           applications.  
13           • Asset and Work Management – reduce 68 current applications to 5 or fewer  
14           applications.  
15           • Timekeeping – reduce 8 current applications to 1 application.  
16           • Mapping and Design – reduce 29 current applications to 5 or fewer applications.

17 **Q. Why does PGE have so many applications in these areas?**

18 A. This situation is typical not only for electric utilities but for most companies; PGE is not  
19 unique. Historically, the market simply did not provide single solutions that could meet a  
20 company’s entire set of IT requirements. Instead, specialized applications were brought to  
21 market to meet specific needs. Operating areas within a company then chose those  
22 applications that most benefited them. Consequently, the common IT strategy since the  
23 1980s has been to purchase or develop the necessary software as individual requirements

1 arise (i.e., on a task- or department-specific basis), which leads to a patchwork of  
2 customized and separate applications.

3 **Q. What has changed in the IT environment to address this fragmentation and allow the**  
4 **degree of consolidation that you plan to achieve?**

5 A. As we mentioned earlier, the critical factor is that enterprise or system-wide applications  
6 have matured in the last few years to where it is now practical to implement them.  
7 Integrated solutions are now available from leading software vendors, which are focused  
8 specifically on the utility industry and support end-to-end, industry-standard processes.  
9 Instead of using processes designed around outdated software, PGE will be able to take  
10 advantage of built-in integrations provided by modern software applications that support  
11 standard, best-practice business processes.

12 **Q. What, specifically, are you proposing to implement and over what period?**

13 A. The 2020 Vision program is intended to be ongoing through the year 2020. Currently, we  
14 have mapped out the first three phases that span the first seven years and consist of the  
15 following:

- 16 • Phase 1 – begun in 2009, will be completed in 2011, and comprised of:
  - 17 ○ Financial Systems
  - 18 ○ Supply Chain
  - 19 ○ Enterprise Asset Management (EAM) for thermal plants and selected  
20 distribution assets
  - 21 ○ Upgrade to Distribution Work Management system
  - 22 ○ Upgrade to Human Resource systems
  - 23 ○ Hardware and infrastructure in support of these projects
- 24 • Phase 2 – begin in 2011, will be completed in 2014, and comprised of:

- 1           ○ Geographic Information System (GIS) and graphic work design tools
- 2           ○ Mobile Workforce Management (MWM)
- 3           ○ Outage Management System (OMS)
- 4           ○ Implementation of an additional module to our Human Resource system
- 5           ○ Hardware and infrastructure in support of these projects
- 6           • Phase 3 – begin in 2013, will be completed in 2016, and comprised of:
  - 7           ○ Document Management System upgrade
  - 8           ○ Distribution Asset Management
  - 9           ○ Distribution Work Management
  - 10          ○ IT Work and Asset Management
  - 11          ○ Hardware and infrastructure in support of these projects

12 **Q. Why is PGE proposing to implement this program now?**

13 A. There are numerous reasons to implement 2020 Vision now:

- 14           • Current technology obsolescence – Many of the systems that PGE plans to replace
- 15           have been in service for many years and are either no longer supported by the
- 16           vendor or will not be supported in the near future. When systems are no longer
- 17           supported, upgrades and enhancements are no longer provided by the vendor to
- 18           meet new requirements, patch security threats, or fix bugs. At that point, PGE
- 19           would have to perform this work in-house at significant cost and risk.

20           For example, PGE’s financial system is 26 years old, the vendor is no longer

21           making enhancements, and we need a system that can accommodate the

22           International Financial Reporting Standards (IFRS) that are currently expected to

23           be required by 2012 (i.e., 2014 but with two prior years of detail). PGE can incur

24           additional costs to upgrade these legacy systems with the new requirements but

1 this means we would not have ongoing vendor support as the technology and user  
2 requirements continue to change.

- 3 • Operational efficiencies through process improvement – inefficient and redundant  
4 processes will be identified and improved, thereby increasing operational  
5 efficiency. Examples of benefits include:
  - 6 ○ Elimination of manual processes, reduction of redundant work, improved  
7 workflow, and more efficient reconciliation. In addition, PGE expects to: 1)  
8 have a more effective capital and O&M budgeting process, 2) have enhanced  
9 ability to forecast multiple scenarios and analyze data, 3) capture PGE’s  
10 financial commitments and expected cash flows automatically, and 4)  
11 strengthen our internal controls by automating current manual controls.
  - 12 ○ Optimization of resources across maintenance, construction, and inspection  
13 groups. Currently, resource assignments are assembled manually and  
14 dispatched by individual workgroups, limiting the ability for workforce  
15 leveling or resource optimization across the organization. A fully integrated  
16 work and asset management system, built on standard business processes, will  
17 reduce the amount of manual reconciliation and handling required for  
18 scheduling and dispatch. In addition, it will enable PGE to compare and  
19 contrast similar work activities by crew or region.
- 20 • Improvements in customer service – Customer information can be connected to:  
21 1) the assets associated with providing electric service (i.e., transformers, poles,  
22 wires, meters, etc), and 2) the PGE resources responsible for building,  
23 maintaining, and repairing those assets. For example, an Asset Management  
24 system that is fully integrated with GIS and Outage Management applications, in

1 conjunction with our Smart Meters, can create a foundation for future projects to  
2 allow customers to access their service information and the status of restoration  
3 efforts in real-time.

4 Currently, there is no intelligent connectivity model for PGE’s distribution  
5 system and outages are determined via “roll ups” of circuit maps. This results in  
6 additional time spent diagnosing the outage, incomplete knowledge of the outage  
7 boundaries and affected customers, and less than optimal crew dispatching for  
8 restoration efforts.

- 9 • Improved asset utilization – Currently, PGE does not have the means for a  
10 consistent asset management strategy or process, across organizations and  
11 individual work groups, to determine how best to utilize our assets. Because  
12 departments independently conduct narrowly scoped work on the same assets,  
13 without a holistic view of the work required, some re-work and revisits to any  
14 given asset may occur. With up-to-date technologies and standardized processes  
15 PGE can benefit from “just in time” inventory and we will have more accurate  
16 information to identify when critical assets need replacing rather than use a time-  
17 based replacement strategy.
- 18 • Smart grid connectivity – With PGE’s current fragmented systems, smart grid  
19 data will not be available across applications and cannot be fully utilized.  
20 Consequently, PGE’s current technology will become a bottleneck to realizing  
21 future smart grid potential. By implementing the 2020 Vision program, with  
22 process improvement and standardization, PGE can use real-time, smart grid  
23 information to optimize PGE’s power delivery system (e.g., transformers and  
24 other assets) and realize more dependable and more rapid outage identification.

- 1           • Knowledge transfer – Much of PGE’s knowledge of operational practices resides  
2           within the individuals currently performing the work. Over the next five to ten  
3           years, we anticipate that a significant percentage of our IT workforce will retire.  
4           The effort required to migrate work processes from legacy applications to new  
5           systems offers a unique opportunity to address how we capture process  
6           knowledge and train new employees, so that as much as possible, our historical  
7           contexts, policies, and ways of working will not be lost in the labor transition.
- 8           • Time to complete – Because the systems will take up to seven years to fully  
9           implement and given the needs/benefits identified above, PGE believes it is  
10          inappropriate to delay the program beyond the current schedule.

11 **Q. What would it cost to delay the project?**

12 A. Based on the last four years of historical costs, PGE estimates that without implementing the  
13 proposed projects, the cost of maintaining and upgrading PGE’s existing systems over the  
14 next five years will be approximately \$44 million. This would maintain current  
15 functionality and business processes and provide little or no additional business value, while  
16 at the same time would:

- 17           • Leave PGE unable to respond to increasing demands for real-time information,  
18           changing customer needs, and increasing regulatory requirements;
- 19           • Impair PGE’s ability to pursue business process improvement efficiencies;
- 20           • Require continued significant investment in IT integrations of disparate systems  
21           in an attempt to provide the seamless flow of data across applications, such as the  
22           data required for and provided by the Smart Grid;
- 23           • Put PGE at risk of losing valuable knowledge currently embodied in long-time  
24           employees’ understanding of how to work across disparate information systems;

- 1 • Weaken PGE’s ability to attract and retain new talent to replace retiring workers;
- 2 • Inhibit PGE’s ability to leverage the capabilities of Smart Grid technologies
- 3 currently being implemented; and
- 4 • Be analogous to paving cow-paths rather than investing in a modern freeway
- 5 system.

6 At the end of the five years, however, PGE would still need all the functionality that the  
7 2020 Vision project will provide, which means we would still have to replace the old  
8 systems.

9 **Q. How much does PGE expect the full 2020 Vision implementation to cost?**

10 A. As noted above, 2020 Vision consists of three initial phases, which include both capital and  
11 O&M costs (development and ongoing). A summary of the software included in these  
12 phases is provided as PGE Exhibits 602 and 603 and summarized in Table 2 below. Costs  
13 for phase 1 are fairly current, whereas costs for phases 2 and 3 are based upon assumptions  
14 reflecting today's environment, (i.e., known technologies, sequencing requirements, current  
15 regulatory environment, cost of outside services, etc.), which are subject to potentially  
16 changing conditions throughout the next 10 years.

Table 2  
Summary 2020 Vision Costs (\$ Millions)

Phase	Capital	Development O&M
Phase 1 (2009-2011)	42.5	4.5
Phase 2 (2011-2015)	56.8	9.3
Phase 3 (2013-2016)	22.4	5.2
<b>Totals</b>	<b>121.6</b>	<b>19.0</b>

17 **Q. What is PGE doing to manage this project effectively?**

1 A. Typically in IT projects everywhere (not just PGE or utilities), cost overruns can be  
2 attributed to lack of clarity about requirements and scope, poor estimates, or technical risks.  
3 To ensure success of this initiative, we are: 1) putting strong governance policies in place for  
4 early identification and mitigation of risks, 2) managing a common high-level schedule to  
5 ensure coordination between individual projects, and 3) tightly managing scope for the  
6 defined projects. As we complete the design stage of each project, we will refine cost and  
7 labor estimates to account for clarified requirements to ensure scope, schedule, and costs are  
8 still aligned with expectations.

9 **Q. How do you know the cost estimate is valid?**

10 A. As noted above, enterprise solutions are now available from leading software vendors. The  
11 programs already exist and do not require development or major customization. Instead, the  
12 primary IT effort will be to configure the programs to PGE's specifications and to perform  
13 integrations as necessary. The corresponding business effort required is to fully define  
14 business processes and metrics that will be mapped to the new systems, and to participate  
15 throughout the implementation life-cycle to ensure delivery of the agreed scope. We worked  
16 with implementation consultants who specialize in this type of integration work to estimate  
17 probable professional services costs, which we plan to leverage to complete the project.

18 **Q. What method did you use to determine which integration consultants and software**  
19 **systems to employ?**

20 A. At the start of the process, PGE issued a request for cost opinion, which asked  
21 implementation consultants to submit initial estimates for the overall project path, including  
22 integration services, as described above. Based on those estimates, we issued a request for  
23 proposal (RFP) and selected an integrator for PGE's new financial system (phase 1 project).  
24 In addition, we are currently in the RFP process for selecting an integrator for the enterprise

1 asset management assessment (also phase 1 project). In this way, we have a roadmap for the  
2 overall program, but we select software and integration consultants for individual  
3 components as we proceed through the designated phases.

4 **Q. Which components and capital costs are specifically included in the 2011 test year**  
5 **forecast?**

6 A. The 2011 forecast includes the components and capital costs as summarized in Table 3  
7 below.

**Table 3**  
**2020 Vision Capital Costs in the 2011 Forecast**  
**(\$ Millions)**

<b>Phase 1</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>Total</b>
EAM Foundation	3.21	4.53	6.29	14.03
Financial System	1.90	16.61	5.60	24.11
Infrastructure and Program office	0.10	3.10	1.13	4.33
<b>Totals</b>	<b>5.21</b>	<b>24.24</b>	<b>13.02</b>	<b>42.47</b>

8 **Q. How are the capital costs included in rate base?**

9 A. Because all the phase 1 projects are expected to close before December 31, 2011 (each  
10 component has individual jobs that are projected to close at specific times from late 2010  
11 into 2011), their revenue requirement is based on average rate base similar to any other new  
12 plant-in-service.

13 **Q. What capital costs do you forecast for the subsequent phases?**

14 A. We forecast the following capital costs (see PGE Exhibit 602 for a summary by project):  
15 • Phase 2 – \$56.8 million to be incurred between 2011 and 2015  
16 • Phase 3 – \$22.4 million to be incurred between 2013 and 2016

17 **Q. Over what period are you proposing to depreciate and/or amortize these assets?**

1 A. Because total 2020 Vision capital costs are projected to equal approximately \$121.6 million  
2 and because we expect these programs to be in service for many years, PGE is proposing 10-  
3 year lives for the associated software costs. This treatment is similar to our customer  
4 information system, which was included in our UE 115 rate case and approved by  
5 Commission Order No. 01-777.

6 **Q. What development O&M costs are associated with the 2020 Vision program?**

7 A. For 2011, PGE forecasts that we will incur approximately \$3.7 million in development  
8 O&M costs, consisting of \$2.9 million for phase 1 and \$700,000 for phase 2. During the  
9 relevant implementation period (2011 through 2016), we forecast a total of approximately  
10 \$17.5 million in development O&M costs for all three phases.

11 **Q. Why is this O&M required?**

12 A. Large IT projects typically involve several stages of activity that are classified as either  
13 capital or development O&M. The initial stage of analyzing and planning the project is  
14 recorded as O&M costs. Because PGE has not previously undertaken an IT project of this  
15 magnitude, we plan to rely more on third-party consultants – with expertise in the  
16 governance of large-scale software implementation – to provide guidance in scoping,  
17 scheduling, cost estimates, process evaluations, and planning documentation in advance of  
18 software installation and configuration. These costs must be considered O&M. After those  
19 activities are complete, then designing, developing, and testing of the software and all of its  
20 components are recorded as capital costs. Subsequent to these activities, PGE will incur  
21 additional O&M for certain implementation costs (such as development of business process  
22 training and post-implementation user support), data migration, and closing activities (e.g.,  
23 retirement of the old system). In addition, certain project office costs for the program  
24 cannot be capitalized based on GAAP.

1 For each phase of the 2020 Vision program, these activities are necessary for successful  
2 completion. Consequently, based on the overall size of the project, the number of systems  
3 being replaced, and the time period necessary to fully deploy these systems, development  
4 O&M costs can be significant.<sup>3</sup>

5 **Q. Is PGE incurring any development O&M costs prior to the test year?**

6 A. Yes. As listed in PGE Exhibit 603, PGE expects to incur approximately \$1.6 million in  
7 development O&M costs for 2020 vision in 2009 and 2010.

8 **Q. How much of the development O&M costs have you incorporated into the test year  
9 forecast?**

10 A. PGE proposes to incorporate one-fifteenth of the 2011-2016 development O&M costs in the  
11 test year forecast and then defer any actual costs incurred over this amount into a regulatory  
12 asset between 2011 and 2016. Beginning in 2016, we propose to amortize the regulatory  
13 asset over 10 years. In this way, the regulatory asset will:

- 14 • Accumulate costs during the project development period, which will coincide  
15 with the accumulation of 2020 Vision capital costs; and
- 16 • Amortize costs over 10 years beginning in 2017, which will coincide with  
17 amortization of 2020 Vision software that will have closed to plant by the end of  
18 the project.

19 **Q. Why are you proposing this mechanism?**

20 A. We do so for two reasons. First, these represent prudent and necessary costs that, given their  
21 overall magnitude, should be spread over the life of the project, including both the  
22 development period and amortization period. Second, this will significantly reduce the rate

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<sup>3</sup> Specific details on components of development and ongoing O&M for 2020 Vision are included in work papers to this testimony.

1 impact of these costs as compared to including them in test year forecasts as they are  
2 expected to be incurred.

3 **Q. In addition to 2020 development costs and their associated mechanism, do you also**  
4 **expect ongoing O&M in 2011 associated with this project?**

5 A. Yes. We forecast that PGE will incur approximately \$1.4 million in ongoing O&M in 2011  
6 for 2020 Vision. We propose, however, to include the average of the 2011 and 2012 levels  
7 of ongoing O&M in the 2011 revenue requirement (i.e., approximately \$1.6 million).

8 **Q. What is the reason for this proposal?**

9 A. Because 2020 Vision is a large, multi-faceted program, its scope increases each year for  
10 several years and the ongoing O&M will correspondingly increase during that period.  
11 Given that these are also prudently incurred O&M costs, this treatment will simply afford  
12 PGE the opportunity to recover the increasing O&M for 2011 and 2012. Additional  
13 increases can be addressed in subsequent rate cases.

14 **Q. What is the ongoing O&M cost expected to cover?**

15 A. The ongoing O&M for 2011 represents maintenance agreements for phase 1 software and  
16 hardware. The primary components of this are \$470,000 for the financial system software  
17 maintenance, \$560,000 for the Enterprise Asset Management system software maintenance,  
18 and \$343,000 for hardware/infrastructure maintenance. The software maintenance gives  
19 PGE the rights to future upgraded versions of the software and, in general, costs about 20%  
20 of the initial license purchase cost of the software. Maintenance for hardware/infrastructure  
21 also covers requirements for disk space, data backup, supporting applications, and database  
22 support. These costs increase to \$1.7 million in 2012 as we begin to add maintenance  
23 agreements for phase 2 software and hardware.

1 **Q. What are your ultimate recommendations regarding IT costs in the 2011 test year**  
2 **forecast?**

3 A. We propose that the Commission issue an order approving PGE’s 2011 test year revenue  
4 requirement, which includes the following related to IT:

- 5 • \$42.5 million in capital costs associated with phase 1 in average rate base.
- 6 • \$1.2 million in development O&M costs with the difference between \$1.2 million  
7 and actual incurred costs to be deferred into a regulatory asset. More specifically,  
8 each year from 2011 until 2016, PGE will include \$1.2 million for development  
9 O&M in base rates and defer the difference between the \$1.2 million and actual  
10 annual incurred costs. We forecast that the regulatory asset will be \$2.5 million  
11 for 2011 and accumulate to approximately \$11.6 million, which will then be  
12 amortized over the next ten years, beginning in 2017. The regulatory asset is  
13 included in PGE’s test year rate base.
- 14 • \$1.6 million for ongoing O&M to reflect the increase in scope from 2011 to 2012.

**V. Qualifications**

1 **Q. Mr. Henderson, please provide your qualifications.**

2 A. As vice president of PGE for Information Technology, I am responsible for the  
3 infrastructure, operations and system development of all information systems. This includes  
4 developing a strategic plan for information technology and implementing enhanced project  
5 management and methodology. I joined PGE in 2005 after serving as Chief Information  
6 Officer at Stockamp & Associates since 2003. Previously, I spent eight years as senior IT  
7 manager for Willamette Industries, Inc. and was named vice president and chief information  
8 officer in 1998. I received a bachelor's degree in management from Harding University in  
9 Searcy, Ark., and an MBA from the University of Texas. I am also a Certified Public  
10 Accountant in Oregon.

11 **Q. Mr. Hosseini, please state your educational background and experience.**

12 A. I earned a Bachelor degree in Finance and MBA from Portland State University, where I  
13 teach courses in Management, Finance, and Information Technology. I have also taught  
14 Management and Human Resources courses for the University of Phoenix and the Utility  
15 Management Certificate course for Willamette University. I currently work as the Director  
16 of Information Technology Strategy at PGE. Prior to this, I held leadership positions in the  
17 Human Resources, Organizational Development, Finance and Accounting, Business  
18 Decision Support, and Distribution departments at PGE. Additional experience includes  
19 retail sales management, restaurant management, as well as consulting work for a variety of  
20 clients.

21 **Q. Does this complete your testimony?**

22 A. Yes

**List of Exhibits**

<b><u>PGE Exhibit</u></b>	<b><u>Description</u></b>
601	Summary of IT Costs by Operating Area
602	2020 Vision – Capital Costs by Year
603	2020 Vision – Development O&M Costs by Year