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BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

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EXH. MTT-4

MARK T. THIES

REPRESENTING AVISTA CORPORATION

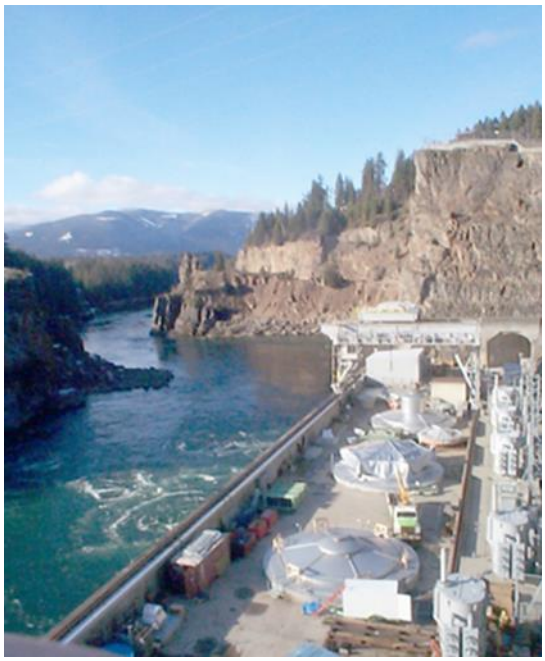
# Infrastructure Investment Plan

## March 2019

# INTRODUCTION

Avista Utilities serves approximately 388,000 electric and 355,000 natural gas customers in a 30,000 square mile service territory covering portions of Washington, Idaho and Oregon. In order to provide safe and reliable electric and natural gas service to our customers, the Company designs, builds, operates and maintains infrastructure systems that include our thermal and hydroelectric generating resources, electric and natural gas energy delivery systems, information and customer service systems, and general plant including fleet and operations and office facilities. This report, Avista's Infrastructure Investment Plan (Plan), summarizes the capital investments[1] required for maintaining, improving and expanding this infrastructure[2] to continue providing our customers with safe and reliable electric and natural gas service, at a reasonable cost, and with service levels that meet their expectations for quality and satisfaction. Though we frequently report out on many of the individual projects and programs that comprise our overall infrastructure plan, the purpose of this Plan is to summarize this information at an enterprise level and to achieve the following objectives:

- Improve transparency and visibility into Avista's capital planning and budgeting processes;
- Provide a comprehensive yet simplified summary of the drivers of capital investment and the plan for implementation, and
- Explain the need and timing of investments, viewed at the individual project level as well as the way in which these projects are integrated into enterprise-wide planning.



Additionally, the investments described in the plan are based on what we know about our business today, including the range of precision of future cost estimates, applicable laws, regulatory requirements, and the capabilities of current technologies.

[1] The capital or infrastructure investment values in this report are based on dollars spent, or planned to be spent, during the specific year, and are not the same as the dollars transferred to plant in service upon completion of a project or specific unit of investment. The planned level of spending in this report is as of a point in time. Plans can and will change through the course of the year and five-year planning cycle.

[2] In this report "Infrastructure" is defined as the physical, technological, and other systems and resources that enable the Company to provide safe, reliable and cost-effective service to our customers.

## Responsibility to our Customers

When Avista makes any capital investment, we have the obligation to demonstrate that the overall need, evaluation of alternatives, and the planned timing of implementation is prudent and in our customer's best interest. Whether the investment touches the customer directly, such as our customer service or metering systems, or indirectly, such as improving the capability and efficiency of our employees and internal work processes, each dollar we invest ultimately supports one purpose: to provide our customers with safe, reliable, and cost-effective energy services that meet their expectations for quality of service and value. We believe the investments summarized in this report satisfy this obligation, both when viewed at the level of the individual project, and as aggregated into an overall plan of investment.

## Avista Capital Investment Drivers

The infrastructure investments described in this report are organized by the classification of need for investment or "Investment Driver." The purpose is to create more clarity around the particular needs being addressed as well as to simplify the organization and understanding of our overall capital program. The Company's infrastructure planning processes are logically organized by departmental lines of business, such as natural gas, electric transmission, generation, and enterprise technology. This approach aligns specific projects and program initiatives with the planning, design, construction, and back-office resources required for their implementation and operation. But this can make it more difficult to understand the individual needs for each project without reading every project and program business case. Additionally, the use of investment driver categories helps the Company be more definitive and consistent in the way we characterize the needs being addressed by every investment. While we continue to manage our infrastructure investments by business lines, we believe the presentation by investment driver promotes greater transparency and visibility around why these investments are necessary and immediate in the timeframe planned. Collectively, the investments described in this report allow Avista to:

1. *Respond to customer requests for new service or service enhancements;*
2. *Meet our customers' expectations for quality and reliability of service;*
3. *Meet regulatory and other mandatory obligations;*
4. *Address system performance and capacity issues;*
5. *Replace infrastructure at the end of its useful life based on asset condition; and*

6. *Replace equipment that is damaged or fails, and support field operations.*

Later sections of this report provides an explanation of each of these drivers, as well as a summary list of specific capital projects and programs included under each driver.

## Avista's Key Planning Principles

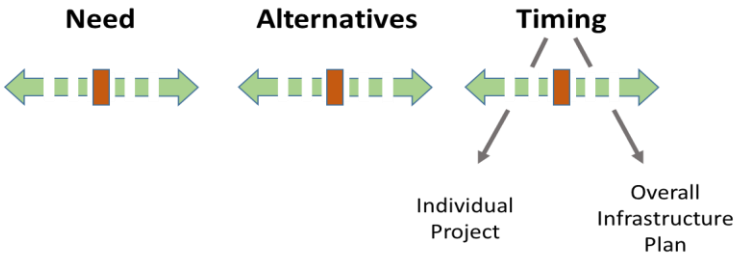
Avista's Infrastructure Investment Plan is comprised of a portfolio of projects and schedules that optimizes the overall demand for investment, the specifics of the projects and programs proposed for funding by each business unit, as well as a range of key planning principles that are listed below and which will be discussed in further detail throughout this report:

1. *Customer Service* - set investment priorities to ensure we continue to deliver safe, reliable, cost effective, and satisfactory service to our customers.
2. *Compliance* - achieve compliance with regulatory and legal requirements.
3. *Anticipate Investment Demands* – anticipate the need for increased investment and use flexibility in projects and programs to manage this upward pressure.
4. *Provide Consistent Funding Levels* – as much as possible, smooth our planned investment trajectory in order to avoid lumpiness in spending year to year.
5. *Manage Cost of Debt and Equity* – take advantage of opportunities to secure debt and issue equity on reasonable terms to moderate the rate impact associated with borrowing funds.

6. *Achieve Asset Objectives* – tailor our annual investments to move assets toward an optimum age or condition as identified in Company asset management plans, systematic programs or industry best practices.
7. *Optimize Resources* – optimize the use of Company labor, equipment and contract resources.
8. *Flexibility* – Maintain reasonable flexibility in the plan to accommodate variation in actual conditions that are unknown when the plan is developed.
9. *Constrain Spending* – deliberately constrain capital spending to an amount that is lower than the total capital requested by the Company's lines of business, without incurring imprudent risk, in an effort to foster creativity and innovation, keep prices lower for consumers, and to most efficiently allocate capital.

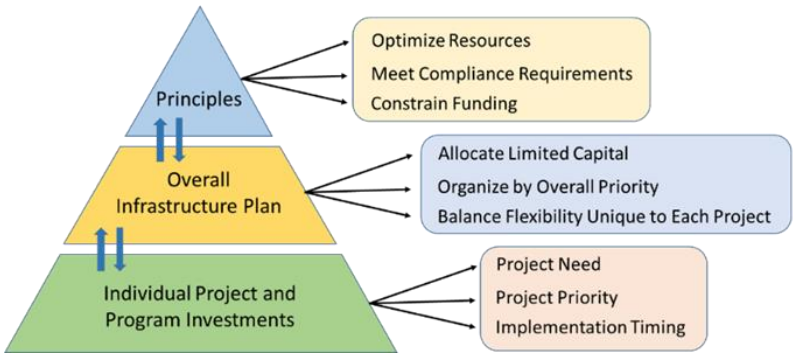
Balancing these planning principles represents a rationalization of the prudence of individual projects with that of our enterprise-wide plan of investment. Prudence at the project level is based on how the Company exercises good judgment in managing any degree of latitude it might have with in the decision-making process. Key decisions can be segmented into general categories of project need, the alternative selected, and the timing of implementation, as depicted in the diagram, below.

Key Elements of Decision Making for Infrastructure Investments
(Green Arrows Suggest Relative Degrees of Latitude in Decisions)




While a careful review of the decisions surrounding each project is fundamental, it has been more of a challenge to articulate how balancing these planning principles also drives our overall plan of investment, and in particular, the importance of making individual investments for eligible projects in the timeframe proposed. In this context, our objective is to better illustrate how individual projects, each with different combinations of flexibility related to need, alternatives, and timing, are "layered" into our five-year plan in a way that best balances our overall infrastructure planning principles. Said differently, although the Company may technically have the latitude to defer a particular project in a given year, the decision to do so, viewed in the context of the overall investment plan, may not be the prudent course of action in the management of our overall business.

The relationships between the individual infrastructure projects and programs, the overall infrastructure plan, and these planning principles is depicted in the adjacent diagram. In developing the plan, considerations at each level of the effort inform and influence one another as the plan is finalized. The result of the optimization of projects, plan, and principles, including the necessity to make these priority investments in the timeframe needed, demonstrates a reasonable balance of competing requirements to maintain the performance of our systems, and our prudent management of the overall enterprise in the interest of our customers.

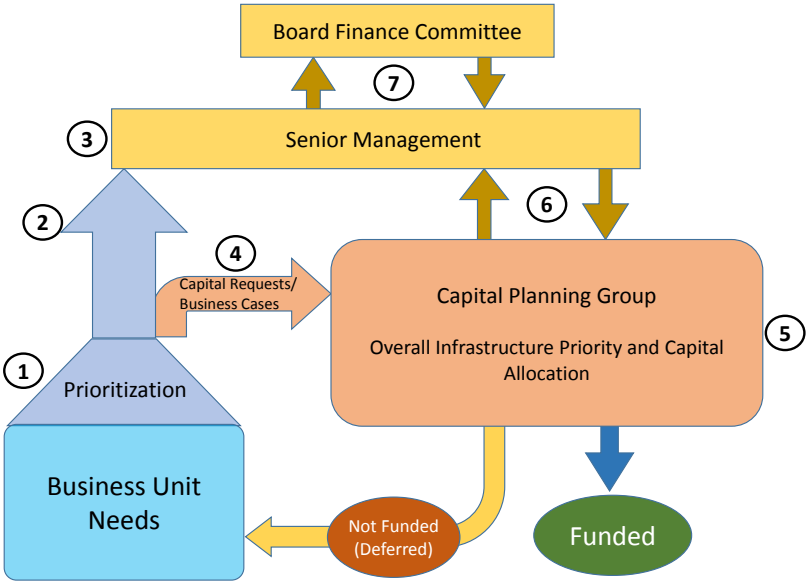


## Avista's Capital Planning Process

The Company's processes for determining the need for capital investment, establishing the annual funding limits, and the allocation of capital among the highest priority projects is mapped in the diagram below. A narrative explaining generally how the identification and prioritization process works follows the diagram.

### 1. Identifying, Vetting and Prioritizing Business Unit Needs

The foundation of the Company's infrastructure planning and capital budgeting process is the development of specific projects and programs by our employee subject matter experts based on identified needs required to meet our key business objectives. Projects proposed for funding are evaluated within each Business Unit[3] and a determination is made whether or not to recommend a project for funding and implementation in the five-year planning horizon. As described above, the need and timing of the project and the risk associated with not doing the project in the near-term is balanced against the constraint on the overall capital spending level imposed by senior management. This evaluation requires subject matter expertise, analyses, studies, policy and legal interpretations, and other materials that help document the necessity of the project, and factors influencing the immediacy of the timing for implementation. Projects sponsored by each Business Unit are prioritized by that group and a capital project Business Case summary is completed for each project that is recommended for funding. The Business Cases for each of the individual capital projects and programs within the six Capital Investment Drivers address what the project is designed to accomplish, why it needs to be done in the time frame proposed, as well as what the risks and consequences are of not timely completing the project.




### 2. Communicating the Overall Need for Investment

The demand for new investment determined in each Business Unit is shared in various forums with the Company's senior management to ensure that they understand factors

[3] Business unit examples include the transmission engineering group, electric operations, and the information technology group.

driving the current and expected need for investment, the time frame for the projects, and risks and consequences of not completing the projects.

### 3. Establishing the Level of Annual Investments

Avista's senior management assesses the overall demand for capital investment each year, and considering and balancing the key planning principles discussed above, determine the level of capital spending to be presented to the Finance Committee of the Board of Directors.[4] The Company's practice has been to constrain the capital made available for investment each year, such that not all of the prioritized projects and programs are funded as requested. Avista believes that holding capital spending below the level requested accomplishes several important objectives, including:

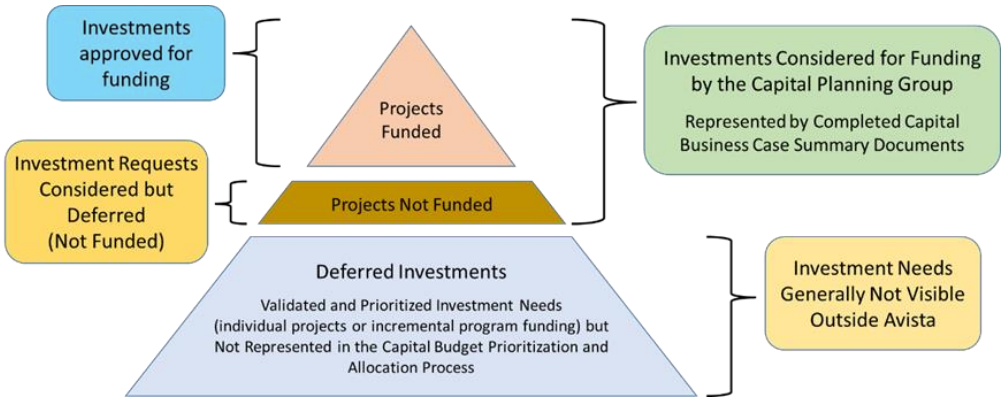
- ***Promotes Innovation*** - Encourages ways to satisfy the identified investment needs in a manner that may identify potential cost savings, defer implementation, or other creative options or solutions.
- ***Balances Cost and Risk*** – Captures customer benefits of deferring needed investments by prudently managing the cost consequences and risks associated with such deferrals.
- ***Efficiently Allocates Capital*** – Ensures that the highest-priority needs are adequately funded in the most efficient and effective way.
- ***Reduces Variability*** - Moderates the magnitude of year-to-year variability to avoid rate impacts, and more efficiently optimizes the number and cost of personnel necessary to carry out the capital projects.

Avista currently has chosen to stabilize the level of annual capital spending at $405 million in an effort to accomplish the objectives described above.

### 4. Narrowing the Capital Requests

In identifying and prioritizing the projects and programs to be recommended for funding (as described above) the directors or managers of each Business Unit pare down the number of projects or the funding level for programs based on the awareness that there is a constraint on the overall capital spending level. In this process they decide what specific investments can be deferred until a later point in time, with the intent to ensure this decision does not create excessive additional risk. While this practice promotes an efficient and orderly allocation of capital, it does result in an underrepresentation of the actual demand for capital facing the Company. This is because recommendations that make it to the final list of projects considered appear to represent the total demand for new investment when it is, in actuality, the constrained portion of the overall need. This relationship is depicted in the diagram below.

[4] The Finance Committee is presented with a five-year plan, but specifically approves only the first year of the plan.



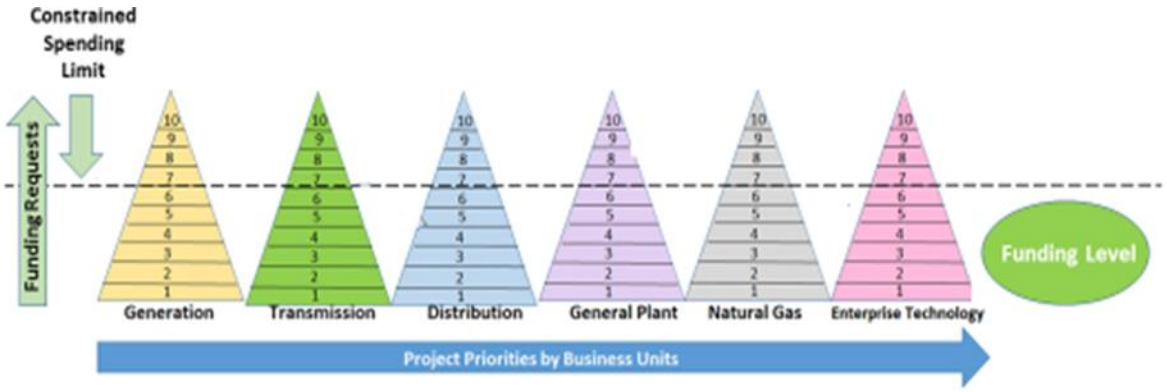

In other instances, the current requests for funding also underrepresent the actual demand due to internal limitations such as the capability of employee or contract resources to accomplish more capital work than has been recommended to the Capital Planning Group.

## 5. Prioritization and Capital Allocation Across Business Units

Avista has a standing committee, referred to as the Capital Planning Group[5], which has the responsibility for determining what capital investments proposed for funding in the current period will be deferred in order to reduce the planned capital spending to the constrained level established by Senior Management. Each director member of the group is intimately familiar with the infrastructure projects vetted, prioritized and approved in their Business Unit, and is generally familiar with projects and programs sponsored by their fellow directors.

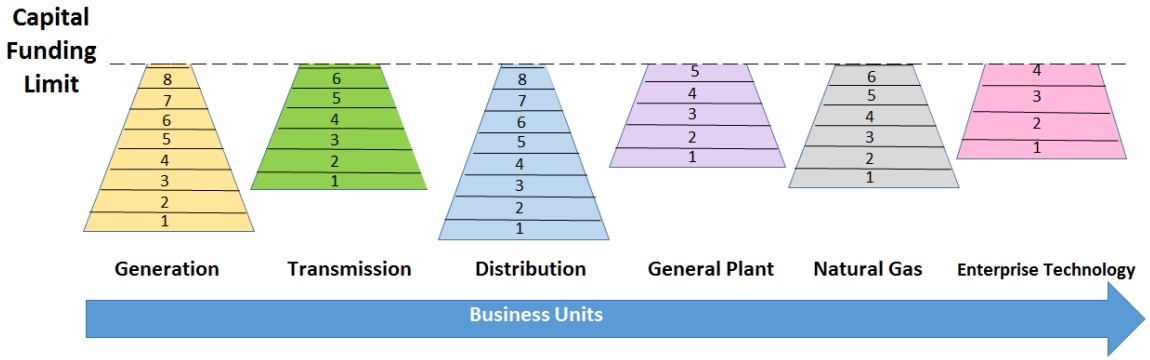
In the process of deciding which investments will be deferred, the Capital Planning Group convenes to discuss and agree on how to prioritize projects in the manner that most effectively allocates limited investment capital among identified Company-wide needs. In the conceptual diagram below, the pyramid shapes represent the prioritized projects sponsored for funding by each Business Unit in the Company. The numbered layers in each pyramid represent individual projects and programs organized from the highest (1) to the lowest (10) priority. In this depiction, the pyramids represent the aggregate capital funding level requested by the Business Units, and the dashed line represents the capital constraint that requires a portion of the prioritized projects to be "unfunded" and deferred.

[5] The Capital Planning Group (CPG) is a group of Avista employee directors that represent all capital intensive areas of the Company. The CPG meets to review the submitted Business Cases and prioritize funding to limit the capital spend to the level set by senior management. After approval from senior management, the annual capital budget is sent to the Finance Committee of the Board of Directors to approve the capital budget amount. The CPG meets monthly to review the status of the capital projects and programs, and approves or declines new business cases as well as monitors the overall capital budget.




The Capital Planning Group evaluates and discusses the consequences of not funding the projects above and below the dashed line. Among a range of factors, the group considers the immediacy of the need for investment, the financial and other impacts of deferring projects, the efficient utilization of crews, safety, reliability, and partial funding versus an "all or nothing" approach. Based on this iterative and comparative assessment of the benefits and avoided consequences associated with funding or deferring projects or programs, the team adjusts the list of projects to be funded, as well as the amounts to be funded, to arrive at the best-balanced allocation of capital among priority needs across the business, as depicted in the diagram below.

***Final Allocation of Capital Across Priority Projects by Business Units***




In this "final" allocation, the projects with the highest Company-wide priority are recommended for funding. Some program requests are scaled back, and some programs and projects are deferred for later implementation. In the above example, the final allocation deferred two projects each in generation and distribution, while the number deferred in the other areas was substantially higher. This final allocation recommended by the Capital Planning Group reflects the need to fund the highest priority investments first, on a Company-wide basis, while taking care to ensure that the investments deferred will not result in excessive cost or risk.

## 6. Approval by Senior Management

Once funding is allocated to priority projects for the coming five-year period, the Capital Planning Group presents the plan to Avista's senior management who provide feedback and ultimately approve the infrastructure plan.

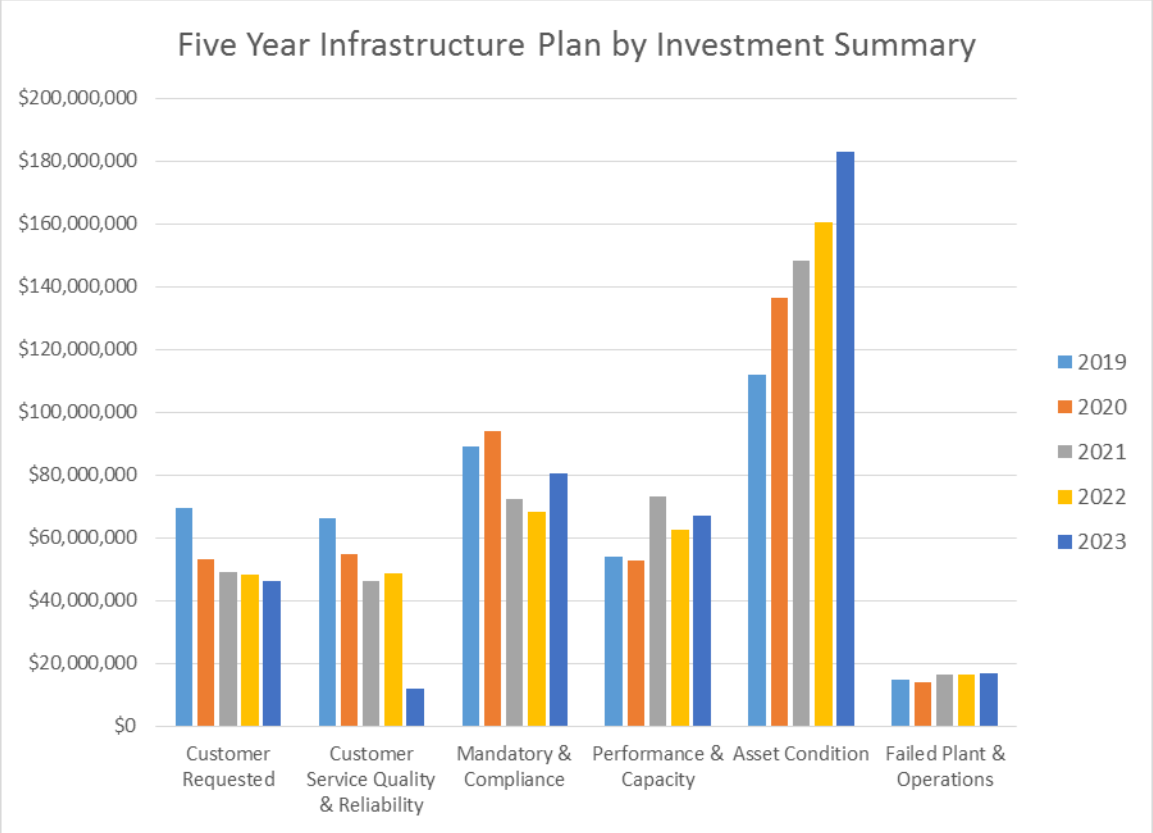
### 7. Approval of the Capital Investment Plan

Avista's senior management presents the proposed infrastructure investment plan and budget to the Finance Committee of the Board of Directors, which after discussion and the opportunity for amendment, establishes the funding level available for final allocation by the Company's Capital Planning Group. The status of the planned versus actual investment spending is reviewed with the Finance Committee at least twice each year.

## SUMMARY OF FIVE-YEAR CAPITAL PLAN

The Company has employed the process described above to develop its currently-authorized capital plan for years 2019-2023. Figure 1, below, shows planned annual investments for each year organized by investment driver category. As in prior planning cycles, the need for investments to replace end of life assets based on condition is the single largest driver.

*Figure 1 – Customer Service Quality and Reliability Investments Summary*



# CUSTOMER REQUESTED INVESTMENTS

This classification of infrastructure investments is defined as: ***"customer requests for new service connections, line extensions, transmission interconnections, or system reinforcements to serve a customer."*** The related capital construction activities historically have been limited to the electric and natural gas distribution systems but recently has significantly impacted Avista's substations and dedicated high voltage transmission lines. The annual level of these investments is driven almost exclusively by the level of customer demand we experience each year. Variation in the number of new connects is largely dependent on local economic conditions in both the housing and business sectors. Population growth rates in Avista's service territory range between one and three percent, with exceptions such as Coeur d'Alene and Post Falls, Idaho, and Liberty Lake and Pullman, Washington, where commercial business development is driving somewhat greater local population growth. Avista uses multiple factors including population growth, overall economic activity and building permit applications as the basis to forecast the number of customer connections expected in each year of the program. Further, the Company's experience with the average cost of installing new services is used to develop the annual budget based on the expected number of requests for new service. Because the Company must respond to requests for new services, it is ultimately the number of new connects we receive that drives the final investment made each year. In some cases, other capital projects and programs can be reprioritized in order make room for the additional investment without exceeding the overall capital budget limit for the year (e.g. $405 M), while in others, the spending authorization is increased to accommodate all the investments that need to be made in that year.

Avista is experiencing a significant increase in interest for interconnection agreements for renewable generation resources planned for our service area. The current budget will not reflect these potential costs until the project owners commit funding to build the required infrastructure, which usually occurs two years prior to the expected completion date. Once, and if, a project owner commits to moving forward, Avista will include the project cost in the budget, which, as noted above, may force a reprioritization of work already scheduled in the plan.

## Customer Requests for Electric Service Connections

Avista operates over 19,000 miles of distribution lines, including both overhead wire and underground cable systems. Though the bulk of electric loads are concentrated in urban areas, Avista's service territory includes many rural communities as well as agricultural, mining and forest product areas. Avista tracks the costs of customer requested electric service in the following six categories.

1) ***Electric Service Extension*** – the cost of installation labor, material, procurement, design and associated costs to extend electric primary and secondary wires and cables from Avista's distribution grid to the customer's point of service.
2) ***Meters*** – the cost to purchase and install electric meters including commercial and industrial class equipment.

3) ***Distribution Transformers*** – the cost to purchase and install overhead and pad mount transformer equipment.

4) ***Street Lights*** – the costs to purchase and install roadway street lighting.

5) ***Area Lights*** – the costs to purchase and install customer premise area lights.

6) ***Transmission & Substation*** – the costs to construct high voltage transmission lines and associated substation equipment.

The majority of these costs support the installation of new electric services, however, the forecast also includes one significant transmission line project investment (Rattlesnake Flat Wind Farm Integration) and a remaining minor investment in a customer-requested increase in substation capacity (Hallett & White Substation). Forecasted costs are summarized in the Table 1.

*Table 1 – Summary of Customer-Requested Electric Service Investments*[6]

| Business Case / Expenditure Request* | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| New Revenue - Growth | $57,664 | $50,703 | $48,938 | $48,284 | $46,098 |
| Area Light Minor Blanket | $725 | $684 | $697 | $687 | $676 |
| Distribution Line Transformers | $5,300 | $4,961 | $4,949 | $5,285 | $3,821 |
| Electric Meters Minor Blanket | $1,200 | $1,132 | $1,153 | $1,137 | $1,119 |
| Electric Revenue Blanket | $17,354 | $16,207 | $16,154 | $15,736 | $15,450 |
| Hallett & White Substation - Add Capacity | $300 | $0 | $0 | $0 | $0 |
| Network Transformers & Network Protectors | $700 | $660 | $673 | $663 | $653 |
| Street Light Minor Blanket | $1,400 | $1,321 | $1,346 | $1,326 | $1,306 |
| Rattlesnake Flat Wind Farm 115 kV Integration | $11,694 | $2,225 | $0 | $0 | $0 |
| Lind-Warden 115 kV Transmission Rebuild | $5,150 | $0 | $0 | $0 | $0 |
| Rattlesnake Flat 115 kV Wind Farm Project | $6,544 | $2,225 | $0 | $0 | $0 |
| Total | $69,359 | $52,928 | $48,938 | $48,284 | $46,098 |

*All dollars are shown in $ thousands

## Customer Requests for Natural Gas Service Connections

Requests for natural gas service connections include a mixture of new construction residential & commercial applications in addition to customers converting from other space heat sources including electric, oil, propane, and wood. Connection rate forecasts are based on the factors described above, in addition to forecasts of natural gas conversions from other fuel sources. Notably, the Company has experienced a significant

[6] The total investment cost of $69,359,000 for this investment driver represents the total investment cost for New Revenue Growth ($57,664,000) and the Rattlesnake Flat Wind Farm ($11,694,000). Individual budget line items under each of these two major projects roll up to the aforementioned totals.

increase in new natural gas connects resulting from a change in its line extension policy and combined marketing program that recently helped stimulate significant fuel conversion. That program has now terminated and Avista expects new service connections for natural gas to return to normative levels going forward.

Avista tracks the direct costs to provide natural gas service, which includes labor resources, materials, design, permitting, and associated construction and administrative expenses. These costs are tracked in the four categories listed below.

1) **Service Extension** – cost of labor, material, equipment, including design and administrative costs to extend service from the gas network to the customer's point of service.
2) **Meters** – cost for service work to install and commission gas meter sets.
3) **Encoder Receiver Transmitter (ERT)** – costs to install these devices on existing natural gas meters to enable field data collection.
4) **Regulators** – cost associated with purchasing and installing meter-based pressure regulators.

Forecast costs for customer-requested natural gas service connections in the current five-year planning cycle, based on the expected number of requests and recent cost of service experience, are summarized in the Table 2.

*Table 2 – Summary of Customer-Requested Natural Gas Service Investments*

| Business Case / Expenditure Request* | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| **New Revenue - Growth** | **$30,685** | **$25,737** | **$23,966** | **$23,450** | **$23,072** |
| Gas ERT Minor Blanket | $1,976 | $1,684 | $1,099 | $1,121 | $1,143 |
| Gas Meters Minor Blanket | $1,875 | $1,784 | $1,321 | $1,333 | $1,346 |
| Gas Regulators Minor Blanket | $801 | $751 | $559 | $564 | $569 |
| Gas Revenue Blanket | $26,034 | $21,518 | $20,987 | $20,433 | $20,013 |

*All dollars are shown in $ thousands

## INVESTMENTS IN CUSTOMER SERVICE QUALITY & RELIABILITY

Customer Service Quality and Reliability programs and projects are those ***"investments required to maintain or improve the quality of services we currently provide our customers, to introduce new types of services and options based on an analysis of***

***customer needs and expectations, and to ensure we achieve our customer service quality requirements, and our electric system reliability objectives."***

New technology systems are driving constant change in our customers' service expectations and our ability to meet them. The quality and nature of our services must evolve quickly to keep pace with this change. Customers expect to interact and conduct an increasing variety of business transactions through their channel of preference, particularly online.[7] In this Country, smartphone use is nearly ubiquitous and advances in technology have created an expectation that information is easy to find, payments are easy to make, and communications are proactive, timely, and personalized. In an effort to keep pace with customer demands and quickly-evolving technologies, Avista will continue to provide customers with tools and resources to effectively manage their energy use, quickly access and understand their billing information, request needed services, and access real-time updates and details about service outages in their neighborhood, accessed from a computer or a smart phone application. We are also focused on meeting our customers' expectations and maintaining high satisfaction by providing them access to new products and services such as online requests for service and tracking, appointment scheduling, and mobile energy management for their home or business.

## Avista Service Quality Measures Program

In 2015, Avista implemented a Service Quality Measures program for tracking and reporting our performance in meeting a range of customer service benchmarks and service guarantees, as well as reporting on the annual reliability of our electric system.[8] Avista, like all utilities, has a constant focus on maintaining a high degree of reliability in the continuity of our service. Dependability is becoming an increasingly important aspect of service quality as our society becomes more electrically connected and reliant upon electronic technologies. For many years Avista has measured, tracked and reported on the reliability of our electric system, focusing on the number of outages and the duration of outages our customers experience on average each year.[9]

## Reliability in Asset Management

While the Company makes very few investments focused solely on service reliability, it is considered as a factor in nearly every investment we make in our electric assets. When

[7] "Channels" include person-to-person through our customer service contact center, our automated telephone system, e-mail, text, chat, postal service, and our customer website.

[8] The results for 2018 are attached in Appendix 1 in Avista's 2018 Service Quality Report Card.

[9] The average number of outages, known as System Average Interruption Frequency Index (or SAIFI), and the average outage duration time in minutes, known as System Average Interruption Duration Index (or SAIDI), are two industry-wide reported statistics of reliability performance.

we evaluate replacement strategies for varied types of assets based on age, condition or performance, the importance or value associated with its service reliability is considered in the analysis. Since the failure of some assets does not immediately impact our security, safety or reliability, they may be managed under the strategy known as "run to failure."[10] In other instances, the failure of an asset may result in an immediate and potentially severe impact to customer service reliability, or a prohibitive cost to replace it after it has failed in service. In these instances, Avista evaluates the customer benefit of replacing the asset at the end of its useful life, but prior to its likely failure, in determining the overall strategy for managing this asset. In most such cases, an increment of reliability value is included in the determination of the appropriate replacement strategy. The increment of reliability value considered is generally aimed at upholding our current level of service reliability, and the incremental cost component is embedded in individual projects. Though there is a direct reliability benefit from the timely replacement of an asset that has reached the end of its useful life, service reliability is not the primary driver. Accordingly, these types of asset replacements are included under the Asset Condition investment driver.

## Washington Advanced Metering Infrastructure Project (AMI)

Avista is in the process of deploying advanced metering infrastructure across its Washington service territory in an effort to keep pace with the evolving metering standard of the industry and to deliver a range of cost-effective benefits to our customers.

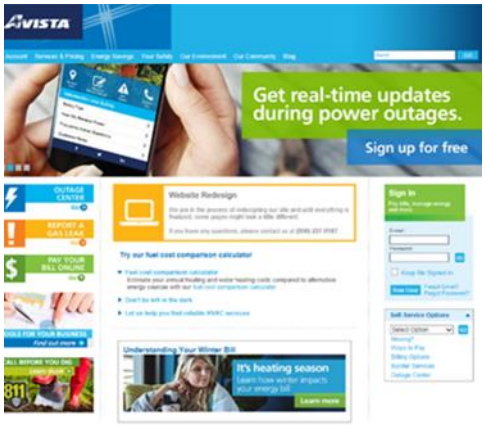
In 2016 and 2017, the Company installed supporting computer applications and communications systems, and in 2018, completed an initial deployment of electric advanced meters and natural gas advanced ERTs. The purpose of this initial deployment was to validate and refine our deployment processes, including our customer outreach and engagement efforts. Avista is planning to begin the full-scale deployment of advanced meters and ERTS in the third quarter of 2019, and to be completed with the Washington Project by 2021. Avista is currently planning to begin AMI deployment in its Idaho service territory near the close of its Washington deployment.

## Customer Facing Technology Systems

Companies today are expected to deliver fast, easy, personalized, and intuitive self-service through a variety of technology and communication channels. As an example, Forrester Research Inc. shows that the majority of consumers prefer to use a company's website to get answers to their questions rather than calling or sending an email. They further report that 77 percent of American consumers say "valuing my time" is the most

[10] Run to Failure strategies plan for the responsive replacement of an asset once it has failed in service.

important part of good online customer service.[11] Customers are looking for more than correct answers or quick response times. They want a consistent experience from their first interaction to the resolution of their issue. Gone are the days where customers would only compare you to your direct competitors. Today's customer compares you with all of the brands with whom they interact. The firm Accenture refers to this phenomenon as "liquid expectations."[12] As an example, even if Apple's products don't compete with yours, customers are comparing your website to Apple.com. Avista must ensure we can continue to meet the changing expectations of our customers in this rapidly evolving technology-enabled marketplace.




## Enterprise Security and Business Continuity

Among the activities supporting service quality and reliability for our customers is the Company's investments business process and data security, physical and cyber security of our operating facilities and infrastructure, and our ability to continue providing service in the event of any disruption to our business operations and processes. Included in business continuity is the capability to operate our generation resources in an automated mode to support customer loads, as well as the ability to transition mission-critical business processes to remote back-up centers in the event of a disruption at our central office facility.

A summary of the capital investments included in the Customer Service Quality and Reliability Investments driver are provided in the Table 3, below. The total dollar amounts in the table below represent the total of the investment associated with the individual Business Cases within this Investment Driver category. The Business Cases explain the need for the projects, the alternatives assessed, why the projects are necessary in this time frame, and address the costs, risks and/or consequences if the projects are not completed.

[11] Leggett, Kate, "Demands for Effortless Service Must Influence Your Customer Strategy," Forrester Research, June 10, 2014.

[12] "How to Meet Liquid Expectations in Digital Government," Accenture Consulting, 2015, https://www.accenture.com/_acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Dualpub_24/Accenture-Meet-Liquid-Expectations-Digital-Government-Seamless-User.pdf#zoom=50

*Table 3 – Customer Service Quality and Reliability Investments Summary*

| Business Case* | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Automation Replacement | $585 | $585 | $585 | $585 | $650 |
| Customer Facing Technology | $12,150 | $10,350 | $9,250 | $8,850 | $5,350 |
| Enterprise Business Continuity | $405 | $405 | $405 | $405 | $450 |
| Enterprise Security | $2,160 | $2,160 | $2,160 | $2,160 | $2,700 |
| Facilities / Storage Location Security | $340 | $340 | $340 | $340 | $1,200 |
| Generation, Substation & Gas Location Security | $330 | $330 | $330 | $330 | $1,400 |
| Idaho AMI | $0 | $2,500 | $30,000 | $36,000 | $0 |
| LED Change-Out Program | $585 | $585 | $585 | $0 | $0 |
| Telecommunication & Network Distribution location Security | $113 | $113 | $113 | $113 | $250 |
| Washington Advanced Metering Infrastructure Project | $49,350 | $37,293 | $2,316 | $0 | $0 |
| Total | $66,018 | $54,660 | $46,084 | $48,783 | $12,000 |

*All dollars are shown in $ thousands

## MANDATORY AND COMPLIANCE INVESTMENTS

Avista's Mandatory and Compliance investment driver is defined as: ***"investments required to comply with laws, rules, and contracts that are external to the Company (e.g. State and Federal laws, Settlement Agreements, FERC, NERC, and FCC rules, and Commission Orders, and etc.)."*** Avista operates within a framework governed by national, state and local laws, and a complex array of regulations, rules and ordinances. At the national level, the Federal Energy Regulatory Commission (FERC) regulates a range of natural gas and electric utility and energy-related activities. Avista operates its hydroelectric facilities under licenses granted by the FERC, which also regulates our activities in natural gas and electricity energy markets and electric transmission services. Under this federal regulatory umbrella, the North American Electric Reliability Corporation (NERC) oversees the operation of the country's interconnected electric grid. Regionally, the Western Electricity Coordinating Council (WECC) enforces the electric transmission reliability requirements in the western U.S. of which Avista is a part. Regulation of natural gas systems and operations is under the purview of the Federal Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA), which enforces protocols for the operation, maintenance, and inspection of natural gas pipelines. Beyond these

regulation-focused drivers, mandatory and compliance investments also reflect the many legal, contractual and operational agreements that govern nearly every aspect of the operation of the Company. A high-level description of some of the capital programs within this "investment driver" are provided below.

### Clark Fork and Spokane River Hydroelectric Project License Compliance

Avista operates the Noxon Rapids and Cabinet Gorge projects under a 45 year license granted by the Federal Energy Regulatory Commission and the Spokane River projects under a separate 50 year license. Terms of these licenses were negotiated between Federal and State agencies, Native American Tribes, and a range of other stakeholders, and each includes hundreds of individual requirements aimed to protect, mitigate, and enhance environmental, wildlife, fisheries, recreational and cultural resources associated with the projects. State and Federal clean water, endangered species and other mandatory conditions are also part of each license. The expected capital investments required to comply with these license terms over the next five years are shown in the Table 4, below.

### Hydro Safety & Environmental Compliance

Avista promotes public safety at its hydroelectric facilities, including the installation and replacement of various warning signs, in-stream barriers, surveillance cameras, and warning systems designed to protect recreationalists and the general public. In addition to public safety, the Company is responsible for compliance with provisions of several environmental statutes[13] as well as FERC requirements for safety of the hydroelectric infrastructure itself (e.g. Long Lake Stability Enhancement). Investments expected to meet our hydro safety and other Clean Water Act requirements[14] over the next five years are shown in Table 4.

*Table 4 – Expected Hydro Licensing, Safety & Water Quality Investments*

| Business Case* | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Clark Fork Settlement Agreement | $17,019 | $19,867 | $14,667 | $5,070 | $4,113 |
| Environmental Compliance | $200 | $200 | $200 | $200 | $400 |
| Hydro Safety Minor Blanket | $50 | $55 | $50 | $55 | $50 |
| Long Lake Stability Enhancement | $500 | $500 | $500 | $10,000 | $11,000 |
| Spokane River License Implementation | $1,406 | $1,642 | $365 | $406 | $512 |
| Grand Total | $19,176 | $22,265 | $15,782 | $15,731 | $16,075 |

*All dollars are shown in $ thousands

[13] An example is the federal Clean Water Act.
[14] These requirements are in addition to our hydroelectric project license requirements.

## Compliance Investments in Electric Transmission

Avista operates 685 miles of electric transmission lines rated at 230 kV and 1,565 miles of line rated at 115 kV. A majority of these lines are designated as part of the national Bulk Electric Systems (BES), administered by the North American Electric Reliability Corporation (NERC). The objective of this oversight is to promote the reliability, resiliency, and adequacy of the interconnected transmission system throughout the United States. The responsibilities of NERC include developing standards for power system operation as well as monitoring and enforcing compliance with Operation and Planning Standards assigned to each utility, including Avista. In compliance with these standards, the Company annually completes planning studies on the long-term capability of its transmission system and identifies segments that are forecasted to not meet these mandatory standards.

Avista is also subject to NERCs Operations Standards, which unlike Planning for the future, focus on our ability to provide compliant load service today. When the Company identifies areas of potential non-compliance, we are required to develop responsive remediation projects, and to move forward with implementation.

The Company is also required by contract to make participating investments in its share of the Colstrip transmission line that carries energy from the Colstrip plant in eastern Montana to our customers in Washington and Idaho. A summary of Mandatory & Compliance investments in electric transmission is provided in Table 5.

*Table 5 – Electric Transmission Investments in the Mandatory & Compliance investment driver*

| Business Case* | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| CIP 14 v1 - High Impact Assets | $750 | $0 | $0 | $0 | $0 |
| CIP v5 Transition - Cyber Asset Electronic Access | $100 | $0 | $0 | $0 | $0 |
| Colstrip Transmission | $455 | $455 | $495 | $775 | $1,075 |
| Ninth & Central 230 kV Station & Transmission | $0 | $500 | $2,700 | $10,800 | $16,000 |
| Protection System Upgrade for PRC-002 | $1,389 | $1,325 | $425 | $300 | $0 |
| S Region Voltage Control | $700 | $0 | $0 | $0 | $0 |
| Saddle Mountain 230/115 kV Station Integration Phase 1 | $10,800 | $15,900 | $0 | $0 | $0 |
| Saddle Mountain 230/115 kV Station Integration Phase 2 | $500 | $1,550 | $8,700 | $0 | $0 |
| Spokane Valley Transmission Reinforcement Project | $1,850 | $5,200 | $0 | $0 | $0 |
| Transmission Construction - Compliance | $10,200 | $0 | $0 | $0 | $1,200 |

| Business Case* | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Transmission NERC Low-Risk Priority Lines Mitigation | $1,500 | $3,500 | $1,500 | $0 | $0 |
| West Plains New 230 kV Substation | $0 | $0 | $0 | $650 | $5,500 |
| Westside 230/115 kV Station "Brownfield Rebuild" Project | $6,500 | $6,500 | $6,500 | $0 | $0 |
| Total | $34,744 | $34,930 | $20,320 | $12,525 | $23,775 |

*All dollars are shown in $ thousands

## Required Investments in Natural Gas Infrastructure

Avista has several programs responsive to compliance with rules of the Pipeline and Hazardous Materials Safety Administration, including the mandatory inspection of pipelines, valves, cathodic protection systems,[15] and other above-ground infrastructure. In addition to inspection and maintenance of piping and operating facilities, the Company is required to replace a portion of its natural gas meters each year under its Periodic Meter Change (PMC) program. In addition to these regulatory requirements, Avista's natural gas facilities located in public street rights-of-way must be moved at the Company's cost when required by the reconstruction or improvement of state, county and municipal roadways. Avista is also engaged in programs focused on the orderly replacement of natural gas infrastructure that has reached the end of its useful life, but whose expedited replacement is a matter customer and public safety and regulatory compliance. These programs include the replacement of Priority Aldyl A piping and isolated steel pipe, as well as resolution of natural gas pipe overbuilds and high-pressure pipeline remediation. Expected investments required to meet these obligations are shown in Table 6.

*Table 6 – Natural Gas System Investments in the Mandatory & Compliance investment driver*

| Business Case* | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Gas Cathodic Protection Program | $600 | $600 | $600 | $700 | $700 |
| Gas Facility Replacement Program (GFRP) Aldyl A Pipe Replacement | $24,044 | $24,044 | $24,044 | $26,749 | $27,343 |
| Gas HP Pipeline Remediation Program | $50 | $2,000 | $2,000 | $3,000 | $3,000 |
| Gas Isolated Steel Replacement Program | $1,400 | $1,400 | $1,400 | $1,600 | $1,600 |
| Gas Overbuilt Pipe Replacement Program | $400 | $400 | $400 | $400 | $0 |

[15] Systems that prevent corrosion of steel piping.

| Business Case* | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Gas PMC Program | $2,750 | $2,750 | $1,200 | $1,200 | $1,200 |
| Gas Replacement Street and Highway Program | $2,700 | $2,700 | $3,000 | $3,000 | $3,000 |
| Total | $31,944 | $33,894 | $32,644 | $36,649 | $36,843 |

*All dollars are shown in $ thousands

## Other Mandatory Investments

Avista operates a portion of its facilities on lands owned by Native American Tribes, and must comply with specific permit requirements including recurring payments and easement renewals. The Federal Communications Commission (FCC) has required companies like Avista to move their private communications networks to a new frequency band, requiring the replacement of our radio communication system. And, like the natural gas programs described above, the Company is required to comply with mandatory terms of franchise and other agreements (e.g. Washington Department of Transportation – WSDOT Franchises), as well as the ongoing requirement to relocate our electric facilities, at our cost, when located in dedicated public rights-of-way that are subject to street and highway construction. Finally, Avista, like other utilities, must invest in mandatory programs that support the apprentice craft training of our employees, and to meet external requirements such as Payment Card Industry rules. The estimated cost of these other mandatory investments over the next five years is shown in Table 7.

*Table 7 – Other Mandatory Investments*

| Business Case* | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Apprentice/Craft Training | $54 | $54 | $54 | $54 | $60 |
| Elec Relocation and Replacement Program | $2,520 | $2,520 | $3,100 | $3,100 | $3,100 |
| Payment Card Industry Compliance (PCI) | $300 | $0 | $0 | $0 | $0 |
| Tribal Permits & Settlements | $250 | $250 | $250 | $250 | $250 |
| WSDOT Franchises | $100 | $100 | $100 | $100 | $250 |
| Total | $3,224 | $2,924 | $3,504 | $3,504 | $3,660 |

*All dollars are shown in $ thousands

A summary of the capital investments included under the Mandatory and Compliance Investment driver is provided in Table 8, below. The total dollar amounts represent the total of the investment associated with the individual Business Cases in this category. The Business Cases explain the need for the projects, the alternatives assessed, why the projects are necessary in this time frame, and address the costs, risks and/or consequences if the projects are not timely completed.

*Table 8 – Mandatory and Compliance Investments Summary*

| Mandatory & Compliance* | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Grand Total | $89,088 | $94,013 | $72,250 | $68,409 | $80,353 |

*All dollars are shown in $ thousands

# PERFORMANCE & CAPACITY INVESTMENTS

Energy delivery systems are analogous to transportation systems, where the carrying capacity and classes of roadways are comparable to the transfer capacity of electric circuits or natural gas pipelines. Unlike transportation systems, however, where too many vehicles simply results in slower traffic, when the use on energy facilities exceeds the designed capability it is often manifested as stress and damage to equipment, overall system instability, and failures that result in customer service interruptions. Avista has established limits on the performance of its energy facilities as guided by industry accepted practices, and as prescribed by internal policies, procedures, and standards. The investment driver that addresses investments required to meet these standards is defined as: ***"a range of investments that address the capability of assets to meet defined performance standards, typically developed by the Company, or to maintain or enhance the performance level of assets based on need or financial analysis."*** Avista has grouped 32 projects and programs under this investment driver, represented in four functional groups: 1) Electric Energy Delivery; 2) Natural Gas Delivery, and 3) Information Technology Systems, and 4) Office and Operations Facilities.

Electric and natural gas delivery facilities are subject to complex limitations that include such examples as limits on voltage, temperature, or pipeline pressure. Some infrastructure such as large generating stations, electric transmission lines, and natural gas pipelines, must be operated within performance limits established by federal and state regulatory authorities. The supporting computer hardware, software, networks, and telecommunication systems have physical limitations generally described in terms of computer memory, refresh times, or the capacity to transmit voice and data over computer and telecommunication networks. Other infrastructure affected by performance or capacity issues are associated with construction tools, fleet, and the administrative offices and operations facilities used by our employees.

## Electric Energy Delivery Systems

Investments in Avista's electric energy delivery systems related to performance and capacity issues share the common need to remedy circumstances where current system capacity is insufficient to meet future demand. How do we determine these acceptable capacity limits? Virtually all electric energy delivery projects or programs have a direct or indirect link to the National Electric Safety Code (Code). The Code represents the collective engineering and operating knowledge for electric utility systems with special emphasis on transmission, substation, and distribution systems. Though Avista develops and maintains multiple internal standards guiding the design, construction, and operation of electric distribution facilities, each standard is linked to the Code, which has a significant bearing on our practices and decision-making strategies. In addition to meeting capacity needs and

standards, Avista also considers opportunities to improve the performance of our systems for customers and save them money.

Performance & Capacity investments in energy delivery systems are more focused on electric distribution and substation infrastructure rather than electric transmission. This is because the significant investments Avista makes in its electric transmission system related to Performance & Capacity issues are typically driven by the federal transmission planning and operations requirements described in the summary of Mandatory & Compliance investments, above. An exception is the project to add breakers to the Cabinet Gorge 230 kV bus. The electric energy delivery projects currently represented in the Performance & Capacity investment driver are included in Table 9.

*Table 9 – Electric Energy Delivery System Performance & Capacity Investments*

| Business Case* | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Cabinet Gorge 230 kV Add Bus Isolating Breakers | $0 | $100 | $1,500 | $0 | $0 |
| Downtown Network - Performance & Capacity | $1,125 | $1,125 | $1,125 | $1,125 | $2,000 |
| Segment Reconductor and Feeder Tie | $2,415 | $2,415 | $2,416 | $2,415 | $5,000 |
| Substation - New Distribution Station Capacity Program | $9,000 | $8,600 | $11,150 | $14,150 | $14,150 |
| Total | $12,540 | $12,240 | $16,191 | $17,690 | $21,150 |

*All dollars are shown in $ thousands

## Natural Gas Delivery Systems

Like electric upgrades and replacements, Natural Gas Delivery system investments are also driven by performance and capacity standards. Avista plans for upgrades to its natural gas distribution system based on continuous system capacity modeling in conjunction with its Integrated Resource Plan (Natural Gas IRP). Primary natural gas planning principles are described below.

**Winter Design Degree Day** – Avista plans for prolonged cold temperatures ranging from minus 10 to minus 25 degrees Fahrenheit where the combination of space and water heating, and other end uses of natural gas are combined to determine the pipeline capacity required to adequately serve the load. As demand increases on a capacity-constrained system, customers near the edge of the distribution network can lose their service as the pressure drops below levels needed to serve the load. These systems require reinforcement capacity investments in order to meet design day loads.

**Urban Commercial Zones** – Most of our natural gas systems are "radial" in nature, particularly in rural areas, meaning there is only one pipeline source available to serve a given distribution area. A service disruption in these radial systems can result in a service outage for customers "downstream" of the incident. In urban zones, however, to help support volume and pressure demands, it may be cost effective to "network" gas pipelines (i.e. provide more than one pipeline source to serve a given area). In these networks, valve isolation systems are designed to allow for planned pipe replacements and to isolate pipe sections away from the area where the service has been disrupted. Computer modeling of the system is used to evaluate and identify instances when pipeline networking and reinforcement are cost effective in meeting the service needs of customers.

Capacity issues on the natural gas distribution system require a combination of monitoring current use patterns and also forecasting future demand. This balancing act is a common theme for nearly all Avista infrastructure planning, determining how to best serve today's customers while planning to cost-effectively meet future needs in an orderly manner. Individual Performance & Capacity projects, referred to as "reinforcements" are listed in Table 10, below.

In addition to individual capacity projects, the Company is also investing to meet capacity needs in its gas telemetry systems, mandatory Operator Qualification training program, and is also making joint investments to improve the capacity of its Jackson Prairie Natural Gas Storage Facility. Avista owns a one-third share in this facility located in Chehalis, Washington, which is operated by Puget Sound Energy. Avista is obligated to pay its share of the infrastructure investments that address repairs, replacements, and capacity and performance upgrades needed to maintain safe and reliable operations. The five-year outlook for natural gas reinforcement projects and programs related to Avista's Performance & Capacity investment driver is shown in Table 10.

*Table 10 – Natural Gas Performance and Capacity Investments*

| Business Case* | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Gas Cheney HP Reinforcement | $3,000 | $3,000 | $3,000 | $0 | $0 |
| Gas Operator Qualification Compliance | $60 | $60 | $60 | $60 | $60 |
| Gas Pullman HP Reinforcement Project | $0 | $0 | $100 | $2,400 | $0 |
| Gas Reinforcement Program | $1,000 | $1,000 | $1,000 | $1,000 | $1,000 |
| Gas Schweitzer Mtn Rd HP Reinforcement | $0 | $0 | $0 | $100 | $1,500 |
| Gas Telemetry Program | $200 | $200 | $200 | $200 | $200 |
| Gas Warden HP Reinforcement | $0 | $100 | $5,900 | $0 | $0 |
| Jackson Prairie Joint Project | $2,152 | $2,228 | $2,160 | $2,220 | $2,187 |
| Total | $6,412 | $6,588 | $12,420 | $5,980 | $4,947 |

*All dollars are shown in $ thousands

## Electric Generation Infrastructure

Like our electric and natural gas energy delivery infrastructure, the Company continuously evaluates needs for performance and capacity improvements to its electric generation fleet, and well as opportunities to add incremental capabilities that are cost effective for our customers. The Performance & Capacity investments for the current five-year planning cycle include our service agreement for our combined-cycle generating station at Coyote Springs, upgrade to the 98 year old hydroelectric unit at Upper Falls, added back-up generation capacity for two of our hydroelectric stations, and an upgrade to metering, telemetry and controls, as shown in Table 11.

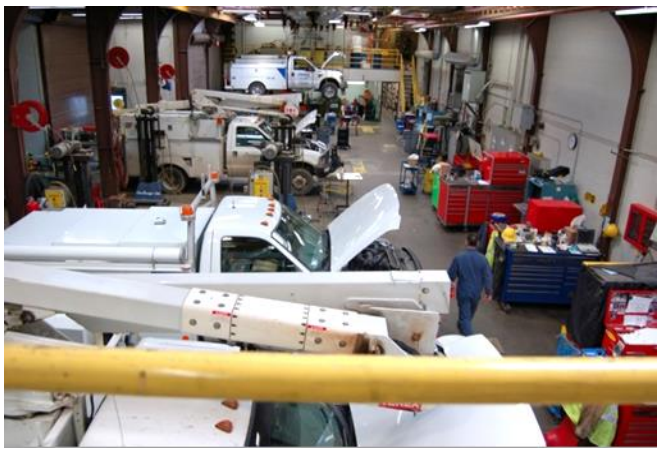
*Table 11 – Electric Generation Resources Performance and Capacity Investments*

| Business Case* | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Coyote Springs Long Term Service Agreement (LTSA) | $1,825 | $1,825 | $1,825 | $1,825 | $0 |
| Resource Metering, Telemetry, and Controls Upgrade | $1,080 | $1,136 | $0 | $0 | $0 |
| Upper Falls and Monroe Street Permanent Backup Generator | $0 | $100 | $650 | $0 | $0 |
| Upper Falls Unit Upgrade | $0 | $1,078 | $2,560 | $0 | $0 |
| Total | $2,905 | $4,138 | $5,035 | $1,825 | $0 |

*All dollars are shown in $ thousands

## Office and Operations Facilities

Support systems including office facilities, warehouses, equipment and material storage yards, and construction operation centers are vital to our ability to deliver service to our customers. Avista's facilities group is continuously evaluating the ongoing operations, maintenance and capital needs of our facilities and developing responsive plans that allow us to effectively serve our customers in a cost-effective manner. In recent years, several of these evaluations have pointed to the need to replace aging facilities, based in part on asset condition,[16] but also to meet growing performance and capacity needs brought about by the growing



[16] Many of the Company's offices and operations centers are in excess of 50 years old and are in need of substantial refurbishment or replacement based on end-of-life asset condition.

numbers of customers we serve and the changing demands of our business. A primary example of this need is our central office and operations facilities in Spokane. The Company began locating fleet and storage facilities at this site in the early 1950s and completed and placed in service our central office building in 1959. Various improvements and expansions were made to these facilities as needed in the early years of service, but the Company recognized the need for more substantial redevelopment of these facilities in the last decade. These have included investments in the HVAC systems of the main office, energy efficiency investments, addition of office and service center space, equipment and material covered storage and expansion of the storage yards, and development of a needed central warehouse and fleet facilities. Avista is currently developing a centralized parking facility for employees in response to overflow parking that now extends well beyond designated parking in the adjacent railroad right of way and into adjoining neighborhoods. Other examples include development of a secure and centralized 24-Hour Operations Facility, redevelopment of the Ross Park storage building (built in 1910) and the Company's service Operations Center in Sandpoint. A summary of these investments is provided in Table 12.

*Table 12 – Office and Operations Facilities Performance and Capacity Investments*

| Business Case* | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Campus Repurposing Phase 2 | $8,700 | $5,800 | $0 | $0 | $0 |
| Central 24 HR Operations Facility | $0 | $200 | $6,000 | $4,500 | $0 |
| Ross Park Building Renovation | $200 | $0 | $0 | $0 | $0 |
| Sandpoint Service Center | $0 | $0 | $0 | $1,500 | $6,000 |
| Total | $8,900 | $6,000 | $6,000 | $6,000 | $6,000 |

*All dollars are shown in $ thousands

## Information Technology Systems

The Company's many information technology systems support the range of primary business functions such as meter reading, billing and payment processes, financial reporting, energy trading, our customer service call center and website, as well as wide ranging critical work processes, both internal and customer facing. Investments of this type in the current planning cycle include Enterprise and Control Network Infrastructure, Enterprise Data Science, Enterprise Technology Modernization and Operational Efficiency, Facility Driven Technology Improvements, Financial and Accounting Technology, Land Mobile Radio and Real-Time Communications, Legal and Compliance Technology and Human Resources Technology.

The Energy Imbalance Market is a multi-disciplinary effort (though very enterprise technology dependent) to enable Avista to participate in the

energy imbalance function of the California Independent System Operator. Being a part of this function has become a necessity for cost-effective energy trading, and will allow the Company to better serve our electric customers, long term.

In more recent years, centralized computer monitoring and control of our electric grid and natural gas system, along with necessary communications, remote operations and security systems, have become integral to their safe and reliable operation. This trend is accelerating as the industry takes steps to promote and adopt more "non-wires" distributed energy resources, energy storage, and direct consumer interaction. These changes are transforming the electric grid from an energy supply conduit to an integrated energy services system. Current specific investments of this type include the Digital Grid Network Expansion and the Energy Resources Modernization and Operational Efficiency projects. Table 13 lists the current five-year investments associated with Avista's enterprise technology infrastructure.

*Table 13 – Enterprise Technology Performance and Capacity Investments*

| Business Case* | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Digital Grid Network Expansion | $3,822 | $3,793 | $3,296 | $2,772 | $2,584 |
| Energy Delivery Operational Efficiency & Shared Services | $2,450 | $2,450 | $2,450 | $2,450 | $3,900 |
| Energy Imbalance Market | $0 | $1,400 | $7,000 | $1,000 | $0 |
| Energy Resources Modernization & Operational Efficiency | $1,634 | $1,634 | $1,634 | $1,634 | $1,800 |
| Enterprise & Control Network Infrastructure | $6,933 | $6,933 | $7,433 | $6,933 | $10,085 |
| Enterprise Data Science | $1,520 | $1,520 | $1,820 | $1,520 | $1,820 |
| ET Modernization & Operational Efficiency - Technology | $1,752 | $1,752 | $1,752 | $1,752 | $2,400 |
| Facilities Driven Technology Improvements | $150 | $270 | $270 | $270 | $300 |
| Financial & Accounting Technology | $1,775 | $750 | $1,450 | $1,350 | $750 |
| Human Resources Technology | $522 | $600 | $415 | $500 | $500 |
| Land Mobile Radio & Real Time Communication Systems | $2,250 | $2,500 | $5,768 | $10,500 | $10,520 |
| Legal & Compliance Technology | $413 | $310 | $310 | $338 | $310 |
| Total | $23,221 | $23,912 | $33,599 | $31,019 | $34,969 |

*All dollars are shown in $ thousands

A summary of the planned capital investments for each year in the five-year planning cycle for the Performance and Capacity investment driver is provided in Table 14, below. The total dollar amounts represent the total of the investment associated with the individual Business Cases within this Investment Driver category. The Business Cases explain the need for the projects, the alternatives assessed, why the projects are necessary in this time frame, and address the costs, risks and/or consequences if the projects are not completed.

*Table 14 – Performance and Capacity Investments Summary*

| Performance & Capacity* | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Grand Total | $53,977 | $52,878 | $73,244 | $62,514 | $67,065 |

*All dollars are shown in $ thousands

## INVESTMENTS BASED ON ASSET CONDITION

Assets of every type degrade with age, usage and other factors, and must be replaced or substantially rebuilt at some point in order to ensure we continue to deliver reliable and cost effective service. Projects or programs in this category of need are defined as: ***"investments to replace assets based on established asset management principles and systematic programs adopted by the Company, which are designed to optimize the overall lifecycle value of the investment for our customers."*** The replacement of assets based on condition is essentially the practice of removing them from service and replacing them at the end of their useful life. Across the utility industry[17], and likewise for Avista, the replacement of assets based on condition often constitutes the largest portion of the infrastructure investments required each year. The bulk of Avista and the nation's energy delivery systems were constructed in the period after World War II and generally into the 1970s[18] when economic growth and expansion fueled the construction of a vast new energy infrastructure.[19] The average age of the nation's major infrastructure, including energy systems, has increased over the last

[17] "In their 2015 "State of the Electric Utility" survey, Utility Dive asked 433 U.S. electric utility executives about the three most pressing challenges for their utility. Old Infrastructure took the top spot at 47%. (T&D Investment Considerations Supporting the Future Electric Grid. Osmose. 2016. http://osmose.com/newsletter-2015-q2-td-investment-considerations.).
Petition of PECO Energy Company For Approval Of Its Electric Long Term Infrastructure Improvement Plan And To Establish A Distribution System Improvement Charge For Its Electric Operations. Docket No. P-2015-2471423.
Case 12-E-0201, Proceeding on Motion of the Commission as to the Rates. Charges, Rules and Regulations of Niagara Mohawk Power Corporation d/b/a National Grid for Electric Service; Five Year Transmission and Distribution Capital Investment Plan, FY17-FY21.

[18] This cycle of utility investment ended as early as the 1960s for some utilities and through the early 1980s for others such as Avista.

[19] Powering a Generation: Power History #3. http://americanhistory.si.edu/powering/past/h2main.htm.

30-40 years.[20] Our Company, like the rest of the nation, has stepped up the level of investments needed to accommodate the orderly replacement of the facilities built during this period of expansion, and that have already reached or are approaching the end of their useful life.[21] In a survey of 433 U.S. electric utility executives who listed their top three most pressing challenges, 47% listed "old infrastructure," with the next infrastructure issue reported as "Grid Reliability" (17%) and Smart Grid Deployment (16%).[22] These infrastructure investments are required to uphold the capability of our generators, operations facilities, overhead wires and poles, and underground pipes and cables, among other assets.

At Avista, our aim is to optimize the value of each particular asset group over their service life. When we say "optimize" we aim to achieve the lowest possible lifecycle cost that allows us to meet a variety of important performance objectives, such as electric system reliability, and the efficient use of employee crews. Avista's efforts to achieve the optimized value of its many assets has been aided by the recent application of developing asset management standards, approaches and analytical tools. To this end, an asset management system supports decisions on what assets we should build or purchase, the type of maintenance program needed to support each asset, how factors such as system reliability are considered in asset life, cost and performance decisions, and when and how an asset should be rebuilt or replaced.

## Systematic Infrastructure Management Programs

When Avista's asset management group has conducted studies of the lifecycle practices of individual or groups of assets, that analysis is essentially evaluating a systematic and proven practice already in place that governs the inspection, repair, and replacement of that infrastructure. "Systematic" programs are based on the Company's experience, insight, expertise, manufacturers' recommendations, industry standards, and best practices. Usually based on regular inspections and assessment of asset condition and performance, these are accompanied by a responsive programmatic plan for maintenance and replacement. Examples include: inspection and maintenance cycles for individual turbines and generators, buildings and internal mechanical systems, such as HVAC and enterprise technology applications and systems. Avista has a great depth of experience and insight when it comes to the management of

[20] Failure To Act: The Economic Impact of Current Investment Trends in Electricity Infrastructure. American Society of Civil Engineers. 2011.
This Chart About Power Lines Says a Lot About How the US Electricity System is Changing. Vox Media. 2014.

[21] Seattle City Light Strategic Plan 2013-2018.
From Growth to Modernization: The changing capital focus of the US utility sector. Deloitte Development, LLC. 2016.

[22] Why Utilities are Rushing to Replace and Modernize the Aging Grid: State of the Electric Utility 2015. Utility Dive.

its investments, which is embedded in its "systematic" practices for each type of asset. This experience ranges from literally more than a century of operating history with individual turbine-generator units, to inspection and condition-based management programs, familiarity and adoption of industry best practices, implementation of manufacturers' maintenance and replacement guidelines, the use of conventional engineering and financial practices and analyses, and the development of new and innovative ways to extend the service life and lifecycle value of certain assets.[23] The Company continues to rely on a range of these proven systematic programs for managing key asset groups across our business.

Accordingly, asset management analysis of the Company's infrastructure is the application of analytical methodologies to existing systematic business processes or programs with the goal of assessing whether an existing program can be improved in a way that creates incremental and sustainable financial value for our customers. In some instances, the limited potential for incremental gain does not warrant an asset analysis and the systematic program is maintained. For those programs that do merit further evaluation, the group identifies asset management plans that will be developed in future work.

## Capital Projects and Programs Based on Asset Condition

The capital projects and programs included under Asset Condition represent the largest portion of the Company's annual capital spending by investment driver (36%). Because of the size of this group, we have summarized the investments by the following types: (1) Energy Infrastructure, (2) Infrastructure Management, (3) Service Operations, and (4) Enabling Infrastructure.

**1. Energy Infrastructure** - Capital projects and programs in this category represent direct investments to electric generating stations, transmission facilities, substations, and distribution system, as well as natural gas regulation, distribution and metering, as listed in Tables 15 – 17, below.

*Table 15 - Generating Resources Investments based on Asset Condition Replacements*

| Business Case* | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Base Load Hydro | $1,034 | $1,034 | $1,034 | $1,034 | $1,149 |
| Cabinet Gorge - Replace Headgates | $0 | $0 | $0 | $0 | $2,200 |
| Cabinet Gorge Gantry Crane Replacement | $1,314 | $0 | $0 | $0 | $0 |
| Cabinet Gorge Station Service | $1,750 | $675 | $0 | $0 | $0 |
| Cabinet Gorge Unit 1 Governor Upgrade | $0 | $0 | $560 | $0 | $0 |
| Cabinet Gorge Unit 2 Field Pole Refurbishment | $0 | $0 | $1,501 | $0 | $0 |
| Cabinet Gorge Warehouse Replacement | $0 | $0 | $130 | $2,025 | $0 |
| Cabinet Gorge Water Mitigation | $0 | $0 | $1,010 | $7,310 | $0 |

[23] Innovations to extend life such as our distribution pole stubbing practices.

| Business Case* | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Colstrip Units 3 & 4 Capital Projects | $3,500 | $11,100 | $8,800 | $3,000 | $3,900 |
| Generation DC Supplied System Update | $840 | $840 | $841 | $900 | $840 |
| HMI Control Software | $500 | $860 | $925 | $0 | $0 |
| Little Falls Intake Gates Replacement | $0 | $2,000 | $2,200 | $0 | $0 |
| Little Falls Plant Upgrade | $4,500 | $600 | $0 | $0 | $0 |
| Little Falls Spillway Flashboard Replacement | $0 | $223 | $3,100 | $6,100 | $0 |
| Long Lake Plant Upgrade | $5,270 | $9,600 | $8,600 | $9,700 | $9,500 |
| Long Lake Replace Plant Emergency Generator | $0 | $75 | $651 | $0 | $0 |
| Monroe Street Generator Excitation Replacement | $0 | $0 | $94 | $650 | $182 |
| Noxon Rapids Generator Step-Up Bank C Replacement | $0 | $0 | $0 | $1,005 | $2,406 |
| Noxon Rapids Spillgate Refurbishment | $3,040 | $4,519 | $5,929 | $5,930 | $5,930 |
| Outage Management System & Advanced Distribution Management System (OMS & ADMS) | $0 | $0 | $0 | $11,000 | $10,000 |
| Post Falls Station Redevelopment Program | $0 | $0 | $0 | $6,000 | $22,000 |
| Regulating Hydro | $3,179 | $3,180 | $3,180 | $3,180 | $3,500 |
| Total | $24,927 | $34,706 | $38,553 | $57,834 | $61,607 |

*All dollars are shown in $ thousands

*Table 16 - Electric Transmission, Substation and Distribution Investments based on Asset Condition Replacements*

| Business Case* | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Distribution Grid Modernization | $10,000 | $10,000 | $10,000 | $12,000 | $12,800 |
| Distribution Minor Rebuild | $8,900 | $8,900 | $10,000 | $10,000 | $10,000 |
| Distribution Transformer Change Out Program | $1,200 | $1,200 | $1,200 | $0 | $0 |
| Downtown Network - Asset Condition | $1,710 | $1,710 | $1,710 | $2,800 | $2,800 |
| Primary URD Cable Replacement | $750 | $750 | $750 | $750 | $3,000 |
| Substation - Station Rebuilds Program | $14,625 | $23,150 | $15,802 | $19,850 | $15,750 |
| Transmission - Minor Rebuild | $1,659 | $1,659 | $1,659 | $1,659 | $1,843 |
| Transmission Major Rebuild - Asset Condition | $2,475 | $7,550 | $15,000 | $15,100 | $17,500 |
| Wood Pole Management | $10,500 | $10,500 | $11,000 | $11,500 | $15,000 |
| Total | $51,819 | $65,420 | $67,122 | $73,659 | $78,693 |

*All dollars are shown in $ thousands

*Table 17 - Natural Gas System Investments based on Asset Condition Replacements*

| Business Case* | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Gas Deteriorated Steel Pipe Replacement Program | $1,000 | $1,000 | $1,000 | $1,600 | $1,600 |
| Gas ERT Replacement Program | $200 | $200 | $200 | $200 | $270 |
| Gas Meter Shop Conversion | $0 | $0 | $3,000 | $0 | $0 |
| Gas Regulator Station Replacement Program | $800 | $800 | $1,000 | $1,000 | $1,000 |
| Total | $2,000 | $2,000 | $5,200 | $2,800 | $2,870 |

*All dollars are shown in $ thousands

**2. Infrastructure Management** - Investments in this category of asset-condition based capital replacements include software and hardware applications, communications systems, operating devices and equipment, and capital service contracts that support energy infrastructure operations. These individual programs are listed in Table 18.

*Table 18 - Infrastructure Management Investments based on Asset Condition*

| Business Case | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Atlas | $1,800 | $1,800 | $1,800 | $1,800 | $0 |
| Cabinet Gorge Unit 3 Protection & Control | $2,286 | $500 | $0 | $0 | $0 |
| Cabinet Gorge Unit 4 Protection & Control | $901 | $1,650 | $400 | $0 | $0 |
| Data Center Compute and Storage Systems | $1,692 | $1,692 | $2,192 | $1,692 | $3,220 |
| Endpoint Compute and Productivity Systems | $4,480 | $4,480 | $4,480 | $4,480 | $4,652 |
| Energy Delivery Modernization | $1,225 | $1,225 | $1,225 | $1,225 | $2,025 |
| Enterprise Communication Systems | $2,020 | $2,020 | $2,520 | $2,020 | $2,848 |
| Environmental Control & Monitoring Systems | $900 | $900 | $900 | $900 | $1,000 |
| Fiber Network Lease Service Replacement | $900 | $1,000 | $3,000 | $3,000 | $2,500 |
| Total | $16,204 | $15,267 | $16,517 | $15,117 | $16,245 |

*All dollars are shown in $ thousands

**3. Service Operations** - The capital investments in this classification include the facilities required to support company operations and work processes, and are listed below in Table 19.

*Table 19 - Service Operations Investments based on Asset Condition Replacements*

| Business Case* | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| New Dollar Road Service Center | $4,000 | $0 | $0 | $0 | $0 |
| New Pullman Service Center | $0 | $0 | $4,000 | $3,500 | $0 |
| Noxon & Clark Fork Living Facilities | $750 | $0 | $0 | $0 | $0 |
| Structures and Improvements/Furniture | $1,500 | $2,700 | $2,700 | $2,700 | $3,000 |
| Total | $6,250 | $2,700 | $6,700 | $6,200 | $3,000 |

*All dollars are shown in $ thousands

**4. Enabling Infrastructure** - The capital investments in this classification include communication systems, transportation and heavy equipment as well as a range of information technology hardware and software systems relied upon by the Company to provide service, and to enable wide-ranging business processes. These programs are listed in Table 20.

*Table 20 - Enabling Infrastructure Investments based on Asset Condition Replacements*

| Business Case | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Capital Tools & Stores | $1,980 | $1,980 | $1,980 | $1,980 | $3,400 |
| Fleet Services Capital Plan | $6,930 | $6,930 | $6,930 | $6,930 | $7,700 |
| Kettle Falls Fuel Yard Equipment Replacement | $4,999 | $9,999 | $7,000 | $0 | $0 |
| Total | $13,909 | $18,909 | $15,910 | $8,910 | $11,100 |

*All dollars are shown in $ thousands

Table 21 provides a summary of the capital investments for the Asset Condition Investments driver.

*Table 21 - Summary of Investments based on Asset Condition Replacements*[24]

| Asset Condition* | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Energy Infrastructure | $79,497 | $102,125 | $110,875 | $134,293 | $143,170 |
| Infrastructure Management | $16,204 | $15,267 | $16,517 | $15,117 | $16,245 |
| Service Operations Infrastructure | $6,250 | $2,700 | $6,700 | $6,200 | $3,000 |
| Enabling Infrastructure | $13,909 | $18,909 | $15,910 | $8,910 | $11,100 |
| Offset to Budget | -$3,148 | -$2,497 | -$1,794 | -$3,831 | $9,330 |
| Grand Total | $111,962 | $136,505 | $148,208 | $160,689 | $182,846 |

*All dollars are shown in $ thousands

The total dollar amounts in the tables above represents the total of the investments associated with the individual Business Cases within this category. The Business Cases explain the need for the projects, the alternatives assessed, why the projects are

[24] The line item titled "offset to budget" represents an adjustment that is varied over time to bring the total expected spend to the authorized level of $405 million.

necessary in this time frame, and address the costs, risks and/or consequences if the projects are not completed.

## FAILED PLANT & OPERATIONS INVESTMENTS

The Failed Plant and Operations investment driver is defined as: ***"requirements to replace assets that have failed and which must be replaced in order to provide continuity and adequacy of service to our customers (e.g. capital repair of storm-damaged facilities). Also includes investments in natural gas and electric infrastructure that are performed by Avista's operations staff."*** Avista responds to various types of equipment failures each year resulting from a range of factors, some of which result in service outages for our customers. These failures are caused by wind and other storm events, traffic accidents, third party damage to natural gas and buried electric cables, and failure due to asset age and condition. In addition to replacing assets that have failed, Avista's operations staff performs a wide range of limited capital infrastructure work that does not rise to the level of a project or program. This work includes the need to reconfigure, replace, repair, and upgrade electric and natural gas facilities for a variety of reasons. For example, electric distribution systems are protected by a network of fuses. Changes in customer demand and load additions prompt revisions to the system of 'coordinated fusing' in order to properly protect equipment from line faults. Customer requested projects may also provide the opportunity to cost-effectively repair or replace distribution equipment where the cost is not attributable to the end-use customer, but which is necessary to maintain service or to meet our design standards. Avista Failed Plant & Operations programs address operating issues such as equipment failure, operator safety, facility inspections, and ancillary capital investments.

### Natural Gas Investments

On average, Avista responds to over five hundred incidents each year where damage is done to one of our natural gas lines. These service disruptions are generally the result of 'dig-ins' by a third party. The investment made to repair the immediate damage to lines often requires follow-up replacements of select segments of line, valves, service lines, or cathodic protection systems. These costs are accounted for in the 'Gas Non Revenue Program.'

### Electric Transmission and Distribution

Investments associated with maintaining primary and secondary powerlines and underground cable result from repair of facilities damaged during outages, as well as

unplanned construction needed to keep the system in safe and proper working order. Some of these activities include:

1. Repair of broken or damaged equipment discovered in the field (not necessarily related to a customer outage);
2. Addition of conductor or cable to support three-phase customer loads;
3. Replacing undersized wires or cables causing power quality issues for customers;
4. Reconfiguration of overhead lines to maintain safety zone clearances for joint-use utilities.[25]
5. Modifications of overhead lines to protect large birds from electrocution.
6. Repair or replacement of wire or equipment that has been stolen (e.g. copper wire).

### Emergency Storm Response

Avista responds on average to approximately 8,000 outage events each year, though not all of these events are related to major storms. Avista tracks the costs of major events through the Emergency Storm Response program. Outages related to major storms can be quite variable from year to year. For example, on November 17, 2015, Avista experienced the largest single storm event in its history with nearly 6,000 individual outages on a single day, impacting over 168,400 Avista electric customers.[26] The majority of the outages was the result of hurricane force winds that severely impacted the Spokane metropolitan area. By contrast, the Company experienced no major storm events in 2016. Capital repairs during major storms are generally limited to the electric distribution and transmission grids but can extend to substation and communication facilities.

### Generation Investments

In addition to its hydroelectric projects and the Colstrip and Kettle Falls thermal projects, Avista has several natural gas-fired generating stations. Investments in this category are required to maintain and operate all of these facilities and include work resulting from equipment breakdown, needs discovered during routine inspections, emergency replacements, and operator safety.

### Spokane Secondary Electric Network

Avista serves the core business district of downtown Spokane via an underground electric "network" that provides highly-reliable service to this dense urban core. Most mid-size to

[25] Joint use utilities are other utility service providers such as telephone or cable that are allowed by law to use our poles to support their facilities for a fee.

[26] "Windstorm Pummels Spokane, Killing Two People and Causing Widespread Blackouts," The Spokesman Review, November 17, 2015, http://www.spokesman.com/stories/2015/nov/17/windstorm-pummels-spokane-killing-two-people-and-c/

large cities are served by the same type of electric network, including for example, Seattle, Portland, and Tacoma. The network is made up of heavy electric cable in concrete-reinforced pathways and major equipment such as large underground transformers. Because the network is composed of extensive equipment all placed underground, and in reinforced concrete built to withstand heavy traffic, the investments needed to maintain, repair, and replace these systems is significant.

Investment needs by program under the Failed Plant & Operations investment driver are provided in Table 22.

*Table 22 – Expected Investment Needs by Program for Failed Plant & Operations*

| Business Case* | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|
| Base Load Thermal Program | $2,790 | $2,790 | $2,790 | $2,790 | $3,100 |
| Electric Storm | $3,000 | $3,000 | $3,200 | $3,200 | $3,200 |
| Gas Non-Revenue Program | $6,000 | $6,000 | $8,000 | $8,000 | $8,000 |
| Meter Minor Blanket | $300 | $300 | $300 | $300 | $300 |
| Nine Mile Rehabilitation | $500 | $0 | $0 | $0 | $0 |
| Peaking Generation Business Case | $450 | $450 | $450 | $450 | $500 |
| SCADA – System Operation & Back-up Center | $1,000 | $920 | $920 | $1,025 | $920 |
| Technology Failed Assets | $556 | $556 | $618 | $556 | $618 |
| Total | $14,596 | $14,016 | $16,278 | $16,321 | $16,638 |

*All dollars are shown in $ thousands

The total dollar amounts in the table above represent the total of the investment associated with the individual Business Cases within this Investment Driver category. The Business Cases explain the need for the projects, the alternatives assessed, why the projects are necessary in this time frame, and address the costs, risks and/or consequences if the projects are not completed.