



PSE's electric power system

Underground distribution lines

Puget Sound Energy has more than 20,000 miles of electric distribution lines throughout our 6,000 square mile service area. A distribution line is a medium-voltage (12.5 kilovolt) line that carries power from a substation to a local neighborhood. From there, the distribution voltage is stepped down further to serve individual homes and businesses.

Roughly half—more than 10,000 miles—of PSE's distribution lines are installed underground.

When is a line undergrounded and who covers the cost?

There are four different circumstances that result in distribution lines being installed underground, including:

- Customer plat and master planned development construction (rate schedule 85).** It is PSE's standard to install new distribution lines underground during construction of residential and commercial plats and master planned developments. This is because it's easy to construct lines underground when excavation is already occurring for plat/development construction, generally making underground lines the most cost-effective option in this scenario. PSE's tariff requires the developer to pay 100 percent of the cost to install underground lines in this scenario. However, in certain scenarios, PSE offers a credit to offset the installation costs based on the electric usage the project will generate once completed.



Underground distribution cable in a trench in Fairwood, WA

Party responsible for work	Construction scope	Cost sharing
Developer	Trench excavation, backfill and restoration	100% developer
PSE	Installation of duct, vaults, cables, electrical equipment, energization and customer service connections	100% developer

- Government-entity request (rate schedule 74).** Jurisdictions may request existing overhead distribution lines to be relocated underground, typically in relation to a city public improvement project (e.g., a city project to widen a road). In this case, PSE's tariff requires cost sharing between PSE and the jurisdiction as follows. Additionally, PSE customers must pay to convert the service line bringing power to their individual home or business from overhead to underground.¹

Party responsible for work	Construction scope	Cost sharing
Jurisdiction	Trench excavation, backfill and restoration	100% developer
PSE	Installation of cables, electrical equipment, energization, transfer of customer service connections and removal of old overhead poles and wires	60% PSE, 40% jurisdiction
PSE customer	Undergrounding the service line to their home or business, including trench excavation, backfill and restoration for the service installation	100% customer

¹ The cost sharing in schedule 74 does not apply if the existing overhead distribution line is on PSE easement or fee property. In that instance, the local requesting jurisdiction would pay 100% of the cost to underground the line.

- **Non-government entity request (rate schedule 73).** Occasionally, developers or groups of customers may request existing overhead distribution lines to be relocated underground (e.g. a group of neighbors wants to underground existing overhead distribution lines in their neighborhood). In this case, per PSE's tariff, the requesting party must pay for 100 percent of the project costs as detailed below. Additionally, PSE customers must pay to convert the service line bringing power to their individual home or business from overhead to underground.

Party responsible for work	Construction scope	Cost sharing
Requesting party	Trench excavation, backfill and restoration	100% requesting party
PSE	Installation of duct, vaults, cables, electrical equipment, energization, transfer of customer service connections and removal of old overhead poles and wires	100% requesting party
PSE customer	Undergrounding the service line to their home or business, including trench excavation, backfill and restoration for the service installation	100% customer

- **PSE-driven reliability project.** PSE monitors the reliability of our electric system on a daily basis and develops projects to improve electric service reliability for our customers. There are many different types of reliability projects, including but not limited to:
 - » Trimming and removing trees that could come in contact with the distribution line.
 - » Replacing aging poles and wires.
 - » Installing tree wire in areas that see many tree-related power outages. (Tree wire is a specially coated overhead wire that's designed to prevent a power outage when a tree limb falls into a power line.)
 - » Installing electrical switches and other equipment that provide for greater operational flexibility in the event of an outage.
 - » Converting existing overhead lines underground to avoid tree-related power outages.

The solution to a reliability problem is not one-size-fits-all. Rather, it's dependent upon each unique situation. PSE looks at criteria such as the area's specific outage history and causes, the configuration of the existing electric system, local geography and terrain, environmental impacts of underground solutions, costs, etc. PSE uses proprietary software that compares the costs and benefits of various solutions. If, after careful analysis, it is determined that a project to underground an existing distribution line is the best and most prudent solution, the project is then reviewed alongside many other potential electric and natural gas infrastructure projects across our service area. The goal of this project review is to select and construct a portfolio of capital projects that provides the maximum value to our customers. If the underground project is included in the portfolio, PSE constructs the underground project and its costs are covered in the rates of all 1.1 million electric customers, just like any PSE capital infrastructure project.

Party responsible for work	Construction scope	Cost sharing
PSE	Full construction scope	100% PSE

Cost of underground

Generally, the cost to install underground distributions lines is two to three times the cost to install overhead distribution lines. Below is an estimated cost difference between an overhead and underground construction project, as well as some other considerations.

	Overhead	Underground
Cost to install new distribution lines²	\$590,000 to \$830,000 per mile	\$900,000 to \$3 million per mile
Other considerations	<ul style="list-style-type: none"> • Initial costs for tree trimming during installation, as well as ongoing vegetation management costs • Minimal cost and environmental impact related to low disturbance of native soil material during construction (pole installation). • Costs less to maintain, repair, upgrade and relocate • Damages from car-pole accidents, trees and equipment failure occur more frequently 	<ul style="list-style-type: none"> • Initial costs for tree removal during installation, as well as nominal ongoing vegetation management costs • High cost and potential for adverse environmental impact related to the disturbance of native soil material during construction (trench, haul out, backfill and restoration). • Costs more to maintain, repair, upgrade or relocate • Damages from third party dig-ups, tree roots, and equipment failure occur less frequently

² There are many factors that affect the costs of both underground and overhead projects, such as the size of wire (feeder, 3-phase, small wire, or single phase), jurisdictional permit requirements, the number of trees affected, paving, geography, wetlands, etc.