

	ALTERNATIVE ROUTE	DELIVERS SECOND 230 KV SOURCE TO HARBORTON, RESOLVES TRANSMISSION OUTAGE VULNERABILITIES, SUPPORTS PROJECTED ENERGY NEEDS	ENVIRONMENTAL IMPACT TO SENSITIVE AREAS AND COMMUNITY RESOURCES	PROPERTY IMPACT TO HOMES, BUSINESSES	MEETS FEDERAL RELIABILITY REQUIREMENTS NEEDED IN THREE YEARS	LOW IMPACT ON CUSTOMER PRICES	MEETS PROJECT CRITERIA
INSIDE FOREST PARK	PHASE 3 HARBORTON RELIABILITY PROJECT (PROPOSED PROJECT)	SEQUENTIAL LINE SHUTDOWNS NEEDED FOR CONSTRUCTION	SELECTIVE TREE REMOVAL IN 4.7 ACRES WITHIN EXISTING UTILITY RIGHT-OF-WAY IN FOREST PARK	UTILIZES EXISTING EASEMENTS AND UTILITY-OWNED PROPERTIES	ATTAINABLE WITHIN NEEDED TIME FRAME	~\$10M	YES
	CONSTRUCT TWO NEW TRANSMISSION SEGMENTS AND REBUILD ONE EXISTING TRANSMISSION SEGMENT(2022 PRE-APPLICATION PROPOSAL)	MOST STRAIGHTFORWARD CONSTRUCTION SEQUENCE	SELECTIVE REMOVAL ACROSS ~6 ACRES WITHIN EXISTING UTILITY RIGHT-OF-WAY IN FOREST PARK	UTILIZES EXISTING EASEMENTS AND UTILITY-OWNED PROPERTIES	ATTAINABLE WITHIN NEEDED TIME FRAME	~\$10M	YES, WITH SOMEWHAT LARGER IMPACT WITHIN FOREST PARK
	ONLY BUILD HARBORTON TO ST MARYS 230 KV LINE	DOES NOT RESOLVE GRID OVERLOADS. DOES NOT RESOLVE RELIABILITY ISSUES. DOES NOT SUPPLY ADEQUATE POWER TO NORTH, NORTHWEST PORTLAND				UNKNOWN - RELATED UPGRADES WOULD BE NECESSARY. ESTIMATED BASE COST \$20-40 MILLION UP TO \$131 MILLION IF TRANSFORMER REPLACEMENTS ARE REQUIRED	NO
	UTILIZE 4-CIRCUIT STRUCTURES	CREATES RISK OF SERIOUS GRID IMPACTS FROM COMMON STRUCTURE FAILURE EVENTS; DOES NOT COMPLY WITH PGE SYSTEM REQUIREMENTS	WOULD REQUIRE WIDER CLEARING CORRIDOR AND REMOVAL OF MORE MATURE TREES, TALL GROWING SHRUBS				NO
	USE TALL STRUCTURES	MEETS PROJECT NEEDS	WOULD REQUIRE BIGGER TOWER BASES, MORE ROAD ACCESS, WITH RIPPLE IMPACTS TO ADDITIONAL PGE TOWERS IN FOREST PARK. NEW EASEMENTS FROM CITY WOULD BE REQUIRED WITH STRUCTURAL CONFIGURATION POTENTIALLY IMPACTING WETLAND			UNIQUE NATURE OF STRUCTURES ARE ESTIMATED AT \$20 MILLION	NO
	UNDERGROUND NEW 230 KV SEGMENT FROM HARBORTON TO TOWER 2996	MEETS PROJECT NEEDS	WOULD REQUIRE REMOVING ALL TREES, VEGETATION OVER DUCT BANK, AT TEMPORARY CONSTRUCTION WORK AREAS. SIGNIFICANTLY MORE HEAVY EQUIPMENT, LONGER CONSTRUCTION TIME, REQUIRES ONGOING CLEARANCE OVER BURIED DUCTS TO PREVENT ROOT ENCROACHMENT. WOULD REQUIRE REMOVING PUBLIC ACCESS TO ISOLATE FACILITIES			COSTS ESTIMATED 5-10X HIGHER THAN OVERHEAD CONSTRUCTION	NO
	BUILD A 230 KV SWITCHING STATION IN FOREST PARK	MEETS PROJECT NEEDS	WOULD REQUIRE NEW EASEMENT AND ADD NEW, FENCED STATION WITHIN FOREST PARK AND AN IMPROVED ACCESS ROAD FOR OPERATIONAL USE. WOULD REQUIRE CLEARING, LEVELING THE AREA.			\$30-50 MILLION	NO
	UPGRADE EXISTING HARBORTON-TROJAN 230 KV LINE TO 500 KV	MEETS PROJECT NEEDS	WOULD REMOVE TREES IN FOREST PARK, ALONG 30+ MILE LINE TO COLUMBIA COUNTY. WOULD WIDEN VEGETATION CLEARING FOR NEW TOWERS TO SUPPORT HIGHER VOLTAGE AND INCREASE GROUND CLEARANCE	WOULD REQUIRE HUNDREDS OF NEW EASEMENTS AND POSSIBLY CONDEMNING PROPERTY WEST OF FOREST PARK		~\$424 MILLION	NO
OUTSIDE OF FOREST PARK - TRANSMISSION	NW MARINA WAY ROUTES (X2)	DISPLACES AN EXISTING TRANSMISSION LINE; WOULD NOT IMPROVE TRANSMISSION RELIABILITY IN CONSTRAINED AREA (SOA)	TREE REMOVAL NORTH OF FOREST PARK, POTENTIALLY IN MILLER CREEK OR ENNIS CREEK RIPARIAN AREAS	REQUIRES ENTIRELY NEW EASEMENTS, OR PURCHASE OF PRIVATE PROPERTY, INCLUDING RESIDENTIAL PROPERTIES	ADDITIONAL STUDIES, DESIGN AND LAND ACQUISITION OR DEMOLITION OF AN EXISTING TRANSMISSION LINE AND CONDEMNATION WILL EACH TAKE >6 YEARS	>\$26 MILLION + LAND ACQUISITION COSTS	NO
	NEW 230 KV TROJAN-EVERGREEN DIRECT ROUTE	WOULD NOT ADDRESS OVERLOADS IN NORTH, NORTHWEST PORTLAND	FRAGMENTS BLOCKS OF INTACT FOREST HABITAT IN COLUMBIA AND MULTNOMAH COUNTIES	REQUIRES TAKING (CONDEMNING) SUBSTANTIAL NEW PROPERTY	>6-10 YEARS	~\$245 MILLION	NO
	NEW SPRINGVILLE SWITCHING STATION	DOES NOT DELIVER 230 KV POWER SOURCE; DOES NOT CREATE ADEQUATE POWER SUPPLY FOR NORTHWEST PORTLAND	REQUIRES ACQUIRING PARCELS IN DEDICATED NATURAL AREA	POTENTIAL NEED TO ACQUIRE PRIVATE PROPERTY	POTENTIALLY ATTAINABLE WITHIN NEEDED TIME FRAME	~\$30-50 MILLION + LAND ACQUISITION COSTS	NO
	NEW TROJAN-HARBORTON VIA WASHINGTON STATE	WOULD NOT ADDRESS BROADER BOTTLENECK IMPACTING HILLSBORO AREA	WOULD DIRECTLY AFFECT SALMONID SPECIES PROTECTED BY THE ENDANGERED SPECIES ACT	PGE DOES NOT OWN LAND OR EASEMENTS NECESSARY FOR THIS CONSTRUCTION	INTERSTATE PERMITTING, FEDERAL REVIEW WOULD TAKE ~6-10 YEARS	~\$135 MILLION, NOT INCLUDING THE TERMINAL OR ELEVATED COST OF SUBMARINE EQUIPMENT	NO
	NEW 230 KV LINE FROM WILSONVILLE AREA TO EVERGREEN SUBSTATION	WOULD NOT CREATE A TRANSMISSION PATHWAY TO HARBORTON TO MITIGATE OVERLOADS IN NORTH, NORTHWEST PORTLAND; LIMITED BENEFICIAL TRANSMISSION CAPACITY	NEW RIGHTS-OF-WAY WOULD BE REQUIRED FOR MULTIPLE NATURAL RESOURCE AREA CROSSINGS	NEW RIGHTS-OF-WAY AND CONDEMNATION WOULD BE REQUIRED FOR PRIVATE PROPERTY	~10+ YEARS	~\$108 MILLION, NOT INCLUDING TERMINAL FACILITIES, EASEMENT ACQUISITION, GRID RECONFIGURATIONS AND PERMITTING THAT COULD DOUBLE THE COST	NO
	NEW 230 KV LINE FROM BLUE LAKE TO RIVERGATE OR HARBORTON	DOES NOT RESOLVE GRID OVERLOADS. DOES NOT RESOLVE 3-TERMINAL LINE RELIABILITY ISSUES	WOULD REQUIRE A WILLAMETTE RIVER AERIAL OR SUBMARINE CROSSING IMPACTING PROTECTED FISHERIES AND OTHER CONSTRAINTS	SPANS 17 MILES IN URBAN AREAS; WOULD REQUIRE PROPERTY ACQUISITION AND CROSSING ELEVATED ROADS, EXISTING TRANSMISSION LINES	PLANNING, CONSTRUCTION WOULD EXCEED 3 YEARS BY AN UNDETERMINED AMOUNT	~\$108 MILLION, NOT INCLUDING TERMINAL FACILITIES, EASEMENT ACQUISITION, GRID RECONFIGURATIONS AND PERMITTING THAT COULD DOUBLE THE COST	NO
	SUBMARINE CABLE BETWEEN BLUE LAKE-HARBORTON	WOULD NOT ADDRESS TRANSMISSION CONSTRAINTS. DOES NOT RESOLVE GRID OVERLOADS. DOES NOT RESOLVE 3-TERMINAL LINE RELIABILITY ISSUES	INSTALLATION, MAINTENANCE WOULD DIRECTLY AFFECT SALMONID SPECIES PROTECTED UNDER THE ENDANGERED SPECIES ACT	~22 MILES OF EASEMENT ACQUISITION WOULD BE REQUIRED	PLANNING, CONSTRUCTION WOULD EXCEED 3 YEARS BY AN UNDETERMINED AMOUNT	>\$88 MILLION	NO
	NEW 230 KV LINE FROM GRESHAM TO RIVERGATE	WOULD CREATE A NEW 230 KV PATH BY REBUILDING AN EXISTING 57 KV SYSTEM AND ADDING A NEW LINE	WOULD REQUIRE A WILLAMETTE RIVER CROSSING	~23 MILES THROUGH THE URBAN CORE OF PORTLAND FROM THE SPRINGWATER CORRIDOR TO OMSI TO HARBORTON AND ACQUISITION OF PROPERTY	ACQUIRING EASEMENTS, DESIGN, PERMITTING AT THIS SCALE LIKELY >10 YEARS	\$141 MILLION, NOT INCLUDING LAND ACQUISITION, TERMINAL EQUIPMENT AND REBUILDS AT MULTIPLE SUBSTATIONS ALONG THE ROUTE	NO
OUTSIDE OF FOREST PARK - NON-TRANSMISSION	VARIOUS ALTERNATIVES BY BPA	CHANGES ON BPA'S SYSTEM DO NOT RESOLVE IDENTIFIED OVERLOADS AND OUTAGE VULNERABILITIES ON PGE'S SYSTEM			PGE HAS NO ABILITY TO REQUIRE BPA TO IMPLEMENT THESE IMPROVEMENTS IN TIME TO MEET PROJECTED LOADS		NO
	NEW GENERATION OR STORAGE	DOES NOT RESOLVE CONSTRAINTS OR ADDRESS OUTAGE VULNERABILITIES IN NORTHWEST PORTLAND; TYPICALLY REQUIRES NEW TRANSMISSION FACILITIES TO CONVEY ADDED GENERATION TO CUSTOMERS					NO
	DELAY NEW TRANSMISSION (DEMAND RESPONSE, EFFICIENCY, DIST. ENERGY RESOURCES)	THESE MEASURES ARE INCLUDED IN PGE'S PLANNING STUDIES. THEY ARE INSUFFICIENT TO FURTHER DELAY ADDING NEW TRANSMISSION FACILITIES					NO

- ALTERNATIVE MEETS CRITERIA
- UNKNOWN IF CRITERIA IS MET
- DOES NOT MEET CRITERIA

WE LOOKED AT 24 ALTERNATIVE PROJECTS USING THE CRITERIA ABOVE TO FIND A FEASIBLE PROJECT. A FEASIBLE PROJECT IS ONE THAT WILL ENSURE RELIABLE POWER CAN BE SERVED BY A PROJECT THAT CAN BE CONSTRUCTED BY 2028 WHILE MINIMIZING ADVERSE IMPACTS TO THE ENVIRONMENT, PROPERTY OWNED BY OTHERS, SAFETY AND CUSTOMER PRICES.



# HARBORTON RELIABILITY PROJECT

## PROJECT ALTERNATIVES EVALUATED



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