



U.S. Department of Energy Categorical Exclusion Determination Form

Proposed Action Title: ESnet6 Project, Lawrence Berkeley National Laboratory, LB-CX-18-03

Program or Field Office: Berkeley Site Office

Location(s) (City/County/State): Berkeley, California

Proposed Action Description:

The U.S. Department of Energy (DOE) proposes a significant upgrade to the Energy Sciences network (ESnet) to replace its current architecture with a next generation system. Under this project, called "ESnet6," computing equipment and networking infrastructure at LBNL and other ESnet-participating institutions (colocation facilities) would also be replaced or updated. ESnet6 equipment is expected to have a lifespan of 7-plus years; preliminary total project cost range is approximately \$145M to 180M.

ESnet provides the high-bandwidth, reliable connections that link scientists at national laboratories, universities, and other research institutions. This enables collaboration on some of the world's most important scientific challenges including those involving energy, biosciences, materials, and the origins of the universe. Funded by the ASCR program within the DOE Office of Science, ESnet is managed and operated by the Scientific Networking Division at Lawrence Berkeley National Laboratory. As a nationwide infrastructure and DOE User Facility, ESnet provides scientists with unrestricted access to unique DOE research facilities and computing resources.

The current ESnet system (ESnet5) is eight years old and inadequate for handling projected increases in data traffic, which continue to predictably grow at an exponential rate. In addition, much of the system's underlying technical components are out of date or at or near their listed "end of life." This includes equipment deployed at ESnet's colocation facilities.

New network hardware and the leasing of additional fiber paths would begin in late 2018 or early 2019. Transition from ESnet5 to ESnet6 would take place between 2019 and 2021. New equipment (hardware and cabling, equipment racks, power supply as needed) would be installed at leased colocation facilities as well as within existing ESnet data centers. No facility construction or structural modification would take place. Existing equipment replaced by ESnet6 would be provided to other institutions for reuse or recycled and disposed of at appropriately licensed facilities.

Although not expected at this time, new fiber optic cable lines may be needed in a single or a few isolated locations to support ESnet6 upgrades. Any such new fiber optic cable would be installed in existing powerline or pipeline rights-of-way and/or added to transmission facilities. In any cases where such installations would be required outside of previously disturbed or developed powerline or pipeline rights-of-way, the lengths of such fiber optic cable courses would not exceed approximately 10 miles. Installation of new fiber optic cable and any supporting infrastructure would be conducted in a manner that does not adversely impact sensitive environmental resources such as jurisdictional wetlands and waters of the United States, historical resources, Native American tribal lands, special-status species habitat, or hazardous waste sites subject to RCRA and CERCLA jurisdiction. Furthermore, such installation activities would be fully subject to applicable local, state, and federal environmental regulations, as well as adherence to LBNL procurement Terms and Conditions, including concomitant NEPA review and approval, if required.

Operationally, ESnet6 is expected to have the same environmental footprint as current operations. Marginal energy use increases to accommodate heavier data traffic would likely be offset by the use of more efficient equipment. Staffing levels would increase slightly, at most. All work would take place in existing facilities designed for networking and research.

Categorical Exclusion(s) Applied:

B1.7 – Electronic equipment

B1.31 - Installation or relocation of machinery and equipment

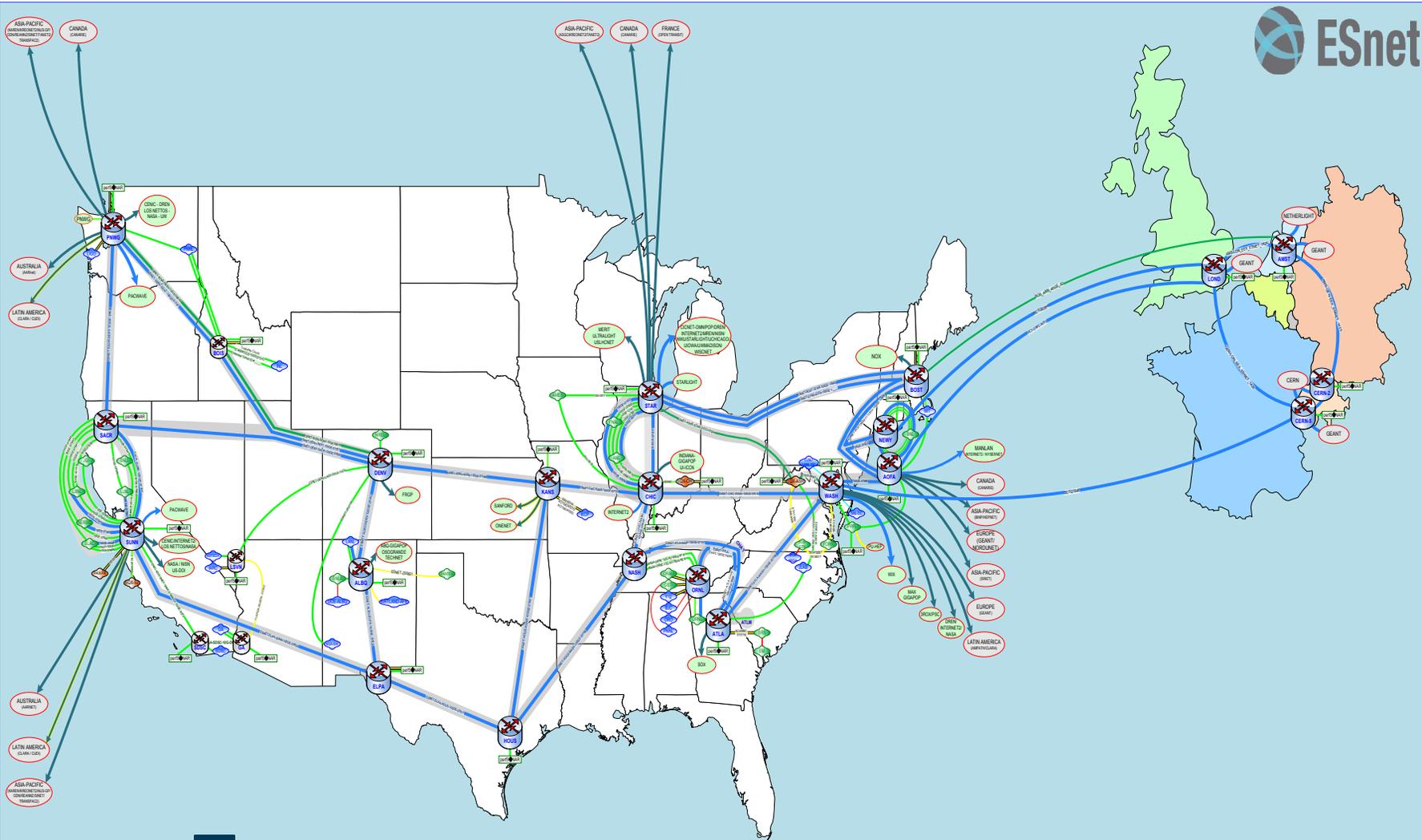
B4.7 - Fiber optic cable

B4.12 – Construction of powerlines

For the complete DOE National Environmental Policy Act regulations regarding categorical exclusions, including the full text of each categorical exclusion, see Subpart D of [10 CFR Part 1021](#).

Regulatory Requirements in 10 CFR 1021.410(b): (See full text in regulation)

The proposal fits within a class of actions that is listed in Appendix A or B to 10 CFR Part 1021, Subpart D.



ESnet Backbone Network



This map is for informational purposes only. It is not intended to be used for any other purpose.