Focus and Cost to undergrounding

Focus

- Cable design , DC power distribution, material & labor, cross bore reduction, subsurface quality/characterization, cost-effective casing, HDD that can change depth during drilling, fear of using HDD in urban because of cross boring (urban)
- Areas that are not being addressed, quantifying benefits to the community and PUC, partnering with natural gas lines that are abandoned, the most likely rate case success, practicality, convince utility companies to underground, the portion that gets the least funding and most impact on cost

Cost

- The job site is not efficient, labor sits around too long waiting for the next step
- Labor is the primary cost (50%)
- Major cost is trenching and repaving the roads
  - Trenchless technologies could reduce cost
  - Metric should be cost per delivered MW, not cost per mile

System level & Component Level, Cable/Conduits, Program Scope

System level & component level

- Component level: what technology needs the most focus, conduits, HDD with variable depth while drilling
- System level: regulations (even if you go trenchless, you have to verify where you are), primary lines, focus on system level but change the design for undergrounding, system level should only be a focus if the budget allows for it, why so much focus on reducing cost and not increasing value proposition
- Consider setting multiple “base cases” – ie urban/suburban/rural; distribution vs transmission
- Consider what “generic” cases take us form 18% undergrounding to 50-60%

Cable/conduits

- Typically, 760 MCM, 1000 MCM (6” conduit), cable size really depends on the conduit size and the borehole size from drilling, the issues start with drilling
- Need to install boxes every ~100 ft limits value of drilling vs open trenching?

Program scope

- The most important aspect is to get the lines in the ground, materials that can reduce cost and increase value proposition, policy shifts, share the same conduit with other utilities, new materials that are not conductive but as strong as metals to electrically isolate the lines from the surface