Cost Estimates for Selective Catalytic Reduction and PNM San Juan Generating Station

EPA projections for the cost of installing selective catalytic reduction (SCR) technology at the PNM San Juan Generating Station (SJGS) are significantly less than those provided by PNM. SJGS costs for SCR are higher than at many other plants in general because of the plant elevation, site constraints and the scope of equipment. PNM issued a request for proposals for the SCR project in January 2012 and will update its estimates when those proposals are received.

Timeline on Cost Estimates

- **June 2007** – Black & Veatch, a global engineering firm, estimates installation of SCRs at SJGS to be $750 million or more.
- **January 2011** – EPA issues proposed federal implementation plan and estimates the installation cost of SCRs at SJGS to be $229 million
- **Early 2011** – To address the discrepancies, PNM engages Sargent & Lundy (S & L) to provide a conceptual design and review of the B&V costs. S&L has installed more than 66 SCRs, 52 of which were for coal units. The firm's estimated cost for installing SCRs at SJGS was $741 million.
- **August 2011** – EPA issues final federal plan with a cost estimate for installation of SCRs at SJGS of $345 million.
- **October 2011** – PNM hires S&L to prepare a formal engineering, procurement and construction specification package. The cost estimate for installation of SCRs at SJGS is $749 million to $897 million.

Primary Drivers for Cost Differences

Consideration	Why this Matters	Engineering Firm Estimates	EPA Estimates
Side-by-side construction of plant boilers create extreme congestion	The four units of San Juan were built in the 1970s and are closely adjacent to each other. Construction of SCRs, which add significant equipment to the units, will add challenges to the construction process.	Included in estimate	Not fully considered in estimate
SCR boxes will be placed on top of air heaters, with bottom of box about 120 feet off the ground and top of box about 18 to 20 stories high.	The existing steel configuration in at least two of the four units is not robust enough to support the SCR boxes. New steel infrastructure and special subsurface foundations will be necessary to adequately support the boxes.	Included in estimate	Not fully considered in estimate
Elevation of SJGS is 5,400 feet above sea level, causing need for larger SCR reactor box, larger flue gas handling equipment and ductwork compared to facilities at sea level.	Most plants in the U.S. are at or slightly above sea level. The high elevation at SJGS results in the need to push a larger gas volume to produce the same amount of power.	Included in estimate	Not fully considered in estimate
Balanced draft could be up to $100 million.	Balanced draft equipment allows more flue gas to be moved through pollution control equipment, minimizing the amount of flue gas escaping through existing equipment.	Included in estimate because retrofit of SCR increases pressure drop across the boiler that triggers the need for the upgrades	EPA assertsthat the cost should have been incurred during the 2006-2009 environmental upgrade.
Economizer bypass adds about $33 million and is needed to get the SCR up to temperature sooner during startup	The economizer bypass is a device that heats up the catalyst more quickly when the plant is not at full load. This makes the plant run more efficiently because it is easier to maintain a minimum temperature.	Included in estimate	Not considered in estimate

Dry sorbent injection to comply with limits in the federal plan	This device, which injects dry sorbent, helps remove additional acid gas emissions and is necessary to achieve the ultra low sulfuric acid emission rate.	Includes $6 million for dry sorbent injection	Not included in estimate
Required auxiliary power upgrades	Auxiliary power is the power that is used to operate the plant and is not for the end-use customer.	Includes full amount in estimates	Only included 20 percent of the costs, resulting in a $54 million difference from the engineering firm estimates.
Use of EPA cost manual 20-year economic lifetime	EPA did not use its own cost manual, which requires a 20-year economic lifetime.	Used 20 years per the EPA cost manual	EPA used 30 years, which results in a $15 million difference.
Annual operating and maintenance costs	Costs for such things as additional power consumption and catalyst replacement rate were underestimated in annual operating costs.	Estimated annual operating and maintenance is $114 million	Estimated annual operating and maintenance is about $28 million.