Abstract. Electric propulsion has been identified as an enabling technology for a wide range of missions. The use of electric propulsion can significantly reduce the spacecraft mass and launch vehicle requirements resulting in large cost savings. Electric propulsion can enable what would be flagship chemical missions to fit within lower cost missions. However, electric propulsion is currently not considered cost competitive with state-of-the-art bipropellant systems providing reasonable, $< 2 \text{ km/s}, \Delta V$. The In-Space Propulsion Project is investing in the HIVHAC propulsion system specifically to provide a lower cost electric propulsion option. NASA’s Science Mission Directorate is also offering a cost incentive for the use of the NEXT ion propulsion system for the Discovery mission solicitation. To fully understand the cost constraints of applying these primary electric propulsion systems, a study was completed to determine the cost viability of electric propulsion within the Discovery Mission cost limitations. Cost trades have been conducted for various propulsion system elements, solar array sizing, and mission duration. Results of the cost viability trades are presented herein.