

## John Hansen

Electric vehicles are not actually zero emission, they just change the location where the emission occurs. The amount of emission caused by electric vehicles depends totally on how the generation plant functions. It could be coal, natural gas, nuclear, hydro, wind or solar. Since electricity is bought and sold widely, the type of emission and location of the emission caused by any one electric vehicle could vary day by day or even hour by hour. All generation plants, even wind and solar, cause some pollution in the course of their construction, maintenance, and ultimately in the disposal of worn out components, such as failed solar panels, or wind turbine blades that have reached their fatigue lifetime. There is a further concern that widespread adoption of electric vehicles will require an approximate one hundred fold increase in the world wide need for lithium and rare earth metals needed in their manufacture. At present these materials are mostly used for cordless tools, cell phones and the like. Electric vehicles are an enormous step up from these small types of devices. It is likely that extraction of massive amounts of these minerals would present possibilities of extensive pollution.