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Thinking outside the coal-bin

Electrical plants generate most of their electricity during the day and mainly remain relatively idle overnight. A new but expensive electrical plant (SCS Energy) has been designed to fill that overnight void by generating a fuel from coal that will be useful 24 hours a day and be able to generate valuable products with that fuel during these slow periods. That fuel is hydrogen, which is a very versatile fuel and can be used to generate electricity and to produce chemical products such as urea or ammonia fertilizer. High sulfur coal that is less desirable is deliberately burned in this plant because the sulfur is used to manufacture sulfuric acid.



Ground coal is heated under pressure in the presence of O_2 . Under the proper conditions, the coal does not burn, but produces a mix of gases: H_2 , CO , N_2 , and SO_2 . The solids are recycled through the process where more gases are extracted. The glassy solid that is left is added to strengthen concrete. The gases are heated with steam, which converts the CO to CO_2 and more H_2 . The CO_2 is then piped to an underground storage in geological sites chosen for their impermeable caps that will hopefully prevent the escape of CO_2 to the atmosphere.