

One and One Still is One: Cogeneration

There is a well known way to increase the efficiency of electricity generation – combined heat and power or cogeneration. You can use waste heat from a power plant for lower temperature uses, such as industrial process heat or water heating or space conditioning. Or you can use waste heat from industrial processes to produce electricity. As a transitional strategy for say the next ten or fifteen years this would make sense in the U.S. But now that we have added up the numbers above, you can see once fossil fuels are phased out we won't be able to afford to use sparse biofuels to generate electricity. Using waste heat from industrial processes is more promising – so long as it does not increase the fuel used for those processes. In the latter case though, cogeneration becomes a variable process just like wind. Combined heat and power in such cases displaces wind and other variable sources, but does not provide either a base or load following source. And if you have an industrial process with enough high temperature waste heat to power an electrical turbine, you may be better off using that waste heat for another industrial process – possibly by co-locating another industrial plant near it. These limitations make co-generation an excellent means of reducing fossil fuel during the transition, but not a significant source of ways to eliminate it. The only exception would be if we have a breakthrough in cheap hydrogen production from electricity, but not in fuel cells. A combined cycle hydrogen burning turbine, where the waste heat is used for non-electrical purposes could match or exceed fuel cells in the hydrogen-use efficiency.