Pulse Combustion Thermo Acoustic Refrigeration (PUTAR) - PROCESS, BENEFITS & PROBLEMS

PROCESS	BENEFITS	PROBLEMS
1. Flue gases from the boiler are fed into a heat exchanger.	1. The process can be added on to any existing or future power generation plant that is fossil fuel fired.	1. What is the economic PUTAR unit size, the current size (2.5t/day) or 50, 100, 200t/day, etc.
2. The flue gases are cooled down by the remnant cleaned flue gases initially at -155°C, the latter of which are heated and passed to the chimney.	2. The efficiency of the existing power generation plant can be substantially improved through the extraction of more heat from the flue gases and passed to the combustion air. The net overall cost of electricity will not rise if the efficiency gains are taken up.	
3. SOx, H_2O, N_2O, NO_2 and other easily condensed flue gas components are condensed out of the flue gases in the heat exchanger and captured for sale or disposal or use.	3. No other separate flue gas processing needs to be carried out for the PUTAR process to proceed free of problems, e.g. NOx, SOx, particulates and water removal.	
4. The PUTAR provides the main cooling in further heat exchangers, condensing out the rest of the NO_2, CO_2 and NO via a heat transfer fluid loop.	4. The fuel source for the pulse combustion driver for the PUTAR can be any combustible gas or liquid including ethanol or mixture of gases and liquids.	
5. The flue gas is now an oxygen depleted air stream with a CO_2 concentration less than the ambient air and at a temperature of -155°C	5. Very minimal parasitic power required, especially for the liquifaction and transportation of the CO_2 up to 200kms.	
6. This cold remnant cleaned flue gas is now passed through the heat exchangers in processes 2 and 3 cooling down the incoming flue gases.	6. No ongoing requirements to replace materials consumed or lost during the CO2 capture process.	
7. The CO_2 solid, condensed out in process 5, is fed into a series of sealable inter-linked chambers that are externally heated by cooling water or steam from the steam power turbines to produce liquid CO_2 at high pressure and ambient temperature, ready for disposal.	7. Process 7 reduces or eliminates the need for cooling water.	
	8. **All** CO_2 is removed from the flue gas.	
If the coal is gasified and the gas burnt in a super critical pressure pulse combustion boiler	Up to 50% improvement in efficiency is achieved. Also power output is instantly adjustable so that no peak power generators are required. This would save natural gas for alternative uses.	