Integrated Gasification Combined Cycle (IGCC) Technology

Gasification technology is not new and has been used to convert a variety of hydrocarbons, coal, and petroleum coke into a synthetic gas (syngas) for more than 50 years. IGCC plants combine or integrate several technologies, namely gasifiers, combustion turbines, and steam turbines. Despite public promotions by some sellers of the technology, the integration of these technologies is still new and evolving. Also, commercial viability of an IGCC plant is suspect as reliable integration of these technologies has presented significant engineering challenges and the cost of IGCC plants is dramatically higher than for competing proven electric generating unit technologies.

Uncertainties, including but not limited to the lack of performance guarantees or guarantees that are not at the same level as vendor guarantees for other technologies; the lack of a standard plant design; and significantly higher capital costs have delayed the development and implementation if IGCC. Other engineering challenges include but are not limited to long start up times, excessive downtimes, and unacceptably short service lives for the materials used to construct gasifiers. Also, because gasifiers are unreliable, redundancy, specifically, a second gasifier, is required to maintain any hope for successful commercial operation of IGCC plants. These factors limit the reliability and cost effectiveness of gasification as a means to generate electric power.

Experience with IGCC technology for electric power generation in the United States is limited to a few units rated at or below 260 MW, most of which were DOE/NETL co-funded demonstration projects built during the last decade. As of October, 2007 in the U.S., five planned IGCC projects had been cancelled, including one considered for the Corpus Christi site now planned for the Las Brisas CFB project, and four more had been put on hold. Many more planned IGCC projects have been cancelled during 2008, citing significantly higher capital costs, lack of performance certainty and reliability. In addition, the widely competed for DOE Future Gen project (Texas was a finalist but lost in the final round of DOE consideration despite adopting laws and rules to expedite the environmental permitting of such a project) was also cancelled in January 2008 when the predicted cost approximately doubled the original cost estimate.

It is indisputable that IGCC technology creates added risk and cost in the pre-construction engineering phase, construction of the plant, and the plant's performance. Consequently, IGCC project proposals tend to be in regulated markets where the additional costs can be passed on to the consumer. A recent, but by no means unique example is the Duke Energy Corp. 630 MW IGCC plant under construction near Edwardsport, Indiana. A recent article in the Chicago Tribune, November 22, 2008, reported that the plant's original cost was estimated at $1.3 billion but current estimates approach $2.35 billion (and are increasing) or about $3.7 million per MW. Furthermore, the article explained that Duke's customers can expect an approximately 18% percent rate increase to pay for the IGCC plant, despite over $460 million in government tax breaks. Ironically, in apparent disregard for the purported environmental benefits of IGCC and in opposition to the project, Sierra Club commented: "[o]nce you do all the

cost assessments, the fact is this [referring to the IGCC project] is going to gouge ratepayers. The cost of this just continues to skyrocket."

To bridge the cost gap between IGCC with a carbon capture and sequestration feature and other more proven solid fuel technologies, EPACT 2005 offered investment tax credits for advanced coal technologies, including IGCC. EPACT 2005's IGCC tax credits were heavily over-subscribed, however, with applications totaling $5 billion for only $1.6 billion in credits. Moreover, carbon capture technology for an IGCC plant is not at hand. Although it is often argued to be more readily available for application to an IGCC plant, it is still undeniably non-existent. In fact, the Massachusetts Institute of Technology study, The Future of Coal, release last year stated "[i]n sum, the demonstration of an integrated coal conversion, CO2 capture, and sequestration capability is an enormous system engineering and integration challenge" and "[t]his is an enormous and complex task and it is not helpful to assume that it can be done quickly or on a fixed schedule…"

Finally, present tense applications for gasification technology are to create synthetic natural gas primarily for use as feedstock in chemical manufacturing processes. An example is the widely-touted and, as widely, misunderstood pending permit application for Hunton Energy Freeport Holdings LLC. The application pending at the TCEQ is not an IGCC plant with integrated carbon capture and sequestration. The primary product of the project is to manufacture a synthetic natural gas for sale to market. Waste heat from the synthetic natural gas production process will be used to generate a relatively small amount of electric power for delivery to the ERCOT grid. Consequently, the product (chemical manufacturing feedstock) and related emissions from the Hunton project are not comparable to product (electric power) and related emissions from the Las Brisas power plant project; they are simply different facilities performing much different functions.