The Role of Turbomachinery

In the Emerging Distributed Generation Opportunity

There are very few technologies that offer the promise of lower cost and improved efficiency that are, at the same time, better for the environment.

Distributed Power Generation does hold such promise, but its realization is by no means certain. The industry is struggling to overcome a number of technical and commercial challenges in what can only be described as an intensely political environment. The big regulatory issue, of course, is that the electric utilities want to own the distributed generation, which seems counter to the basic unbundling principles embedded into much of the deregulation thought process. Smaller generators were not much of a consideration in the early stages of deregulation and their existence poses a dilemma for the PUC policy-makers.

In principle, the effective use of distributed generation can mitigate the high cost and inefficiencies associated with the grid, and can enhance its delivered reliability and power quality. In addition, the relatively small unit electrical output and associated thermal capacity of DG units can extend the practical application of cogeneration to substantially more sites.

It is fair to say that deregulation is off to a slow start and that its proponents are looking for signs of progress. The biggest win so far is that DG is now a serious topic for discussion.

Turbomachinery and the related high temperature heat exchanger and combustion technologies hold important keys to the successful deployment distributed power generation technologies and as such offer many new opportunities to the members of our community.

The single biggest problem faced by the DG industry is that the appropriate gas turbine platforms for the deployment of distributed generation don't exist. Virtually all of the designs available today in the 500kW to 5.0MW are simple cycle units that are reliable, but do not provide an effective combination of cost and efficiency suitable for use in prime power applications.

The industry has traditionally pushed designs to higher temperature and pressure ratios in an attempt to improve efficiency levels, but there are practical limits to this approach in these sizes. It is generally recognized that the lower pressure and temperature ratio recuperated cycles can be applied, but legitimate concerns over the cost and life expectancy of the high temperature recuperative heat exchanger designs have slowed developments in this area.

It is important to understand that the technology base for these designs typically resides within the Industrial & Marine Divisions of the larger gas turbine companies, who have historically focused on larger engines. It appears that the smaller companies, who are building engines for DG, may not have the resources necessary to support the development of these new designs in the time frame needed to have a serious impact on DG.

I makes no difference to me who owns DG units, provided there is an sincere intent to actively deploy them, and that the deployment is done in a way to encourage the wholesale application of cogeneration. As a known, “card-carrying DG-advocate”, I am concerned about the pace of regulatory progress, but I also believe that it is time for the turbomachinery community to deliver on the technical promise.

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