

# ***Cogeneration and Distributed Generation Are Missing!***

***(From President Bush's New Energy Plan)***

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In response to the then-looming (or as some would note, current) energy crisis in the United States, the White House issued a National Energy Plan to clarify the state of the situation, and offer some possible means of power shortage relief. Despite the fact that much of the country, including power-hungry California, had survived the summer relatively unscathed, it was certainly not for lack of increased generation and conservation efforts.

Yet another drought season, transmission issues, and/or unusually warm summer temperatures could still spell power woes for the Golden State and the rest of the country. As future policy will be influenced by the Plan, examination of its suggestions should be considered to better understand and predict the White House's position on energy-related matters.

The plan outlines the situation, from the current energy challenges facing the US to its impact on the economy, as well as looking at conservation, efficiency, and current infrastructure, along with many other energy issues. Analysis, explanation or even and significant clarification of one point, however, is notably lacking from the discussion:

**Distributed Generation**



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## **“DISTRIBUTED ENERGY”**

The closest the idea of distributed generation (DG, “disgen”) is considered in the plan is in Chapter 6, *Nature’s Power*, as “distributed energy.” It is noted to “reduce peak demand loads... [bypass] congested areas of transmission by placing new generating capacity closer to the consumer, and thus achieving greater overall system efficiencies.” It also notes efforts need to be made in increasing the ease of “integration,” assuming the integration of on-site power systems with the overall grid.

Yet the section makes no mention of actual bulk of current distributed generation technologies, such as the popular reciprocating engine generator set, easily a billion dollar industry in this country. Gas turbines, often the choice for larger scale (over 10 MW) on-site power operations which operate on a peak shaving or prime power basis, are another large and rapidly growing market not included in “distributed energy.” Granted, the chapter in which the segment is located is focused on renewable and alternative energy, something a diesel-powered reciprocating engine can hardly claim to be.

Yet the above statement made by the plan regarding disgen’s benefits does apply to these “old economy” technologies, and can have a considerable impact in alleviating current power crunch discomfort. It is significant enough to be discussed, and has essential advantages—on-site power reduces needs for transmission systems, which are best rather unsightly, at worst costly, inefficient, and unreliable. The overall drain on the power grid and central plant is also reduced, at the very least during peak times.

**The few paragraphs regarding distributed energy do address these issues, but not in a context which shows the benefits of DG on a larger scale, or realistically addressing the current DG market.**

So what does the plan indirectly say about distributed generation? In other words, what policies, if implemented, could affect DG? As is the case with many reports on such large topics, to be manageable the report cannot be overly specific. This necessary vagueness makes finding direct benefits or oppositions to DG rather difficult to identify. If one considers DG to be recip and gas turbine generator sets, as it would be sensible since these units make up the bulk of the market, then issues which affect and are addressed in the plan would be rather limited, and in this case are confined to emission regulations.

## ***HOW THE PLAN AFFECTS DG***

Under the current White House plan, emission control would not effectively increase for distributed generation. The only reference to air quality control for disgen is again seen in the previously mentioned "Distributed Energy" segment. The article points out that "current air quality regulations do not take into account the additional energy savings from many distributed energy technologies."

This seems to imply that air quality regulations could be loosened, since distributed energy may reduce the overall need for power on the central plant(s), particularly if employed in a cogeneration function which could significantly increase the efficiency of the on-site system. What is curious about this statement is its questionable relevancy to the new types of DG technologies the segment is (presumably) referring. One of the main benefits of the technologies mentioned in this segment, whether wind, solar, microturbine, or fuel cell, is their environmental "friendliness." As noted earlier, the segment does not make reference to the common diesel generator, a comparably dirtier technology than those which are the focus of Chapter 6.

**Therefore, why the concern of misplaced understanding in current air quality regulations?**

A more viable argument against current regulations might be the limits imposed on the running times allowed by back-up generators, considering the timing of the report in which rolling blackouts of California and quite possibly New York, New England and parts of the Midwest were considered imminent (and may still be in summers to come). Yet even this argument is only applicable to current diesel gensets, and not the future of gensets, which have already begun to trend toward cleaner-running natural gas gensets and cleaner and more efficient gas turbines.

## ***COGENERATION***

**Cogeneration is another aspect barely noted in the plan.**

Cogeneration can have a marked increase in the efficiency and cost considerations of on-site power options. The plan does refer to it, noting it in a case study, but otherwise attention to it is sparse. Clean coal technology, for comparison, headlines four segments, as well as a case study,

and is also earmarked for \$2 billion in federal funds.

While coal-fired plants provide over half the country's energy, and should therefore receive a considerably amount of attention for increasing efficiency and environmental "friendliness," the relative disregard of an application which can double the efficiency of on-site power technologies indicates a somewhat nearsighted approach to the energy problem.

**Cogeneration should receive more clarification and backing in the Bush plan.**

While new advances in efficiency are being made in on-site power technologies, efficiency rates increase dramatically when used in combined heat and power (CHP). The most common application for smaller (less than 30 MW) gas turbines is CHP, as well as some units employed in combined-cycle operation, using excess heat of the gas turbine to run a steam turbine (more common for larger units).

Microturbines are also increasingly being employed in CHP applications, channeling the excess heat to boilers or industrial processes such as drying. These various cogeneration applications can double the efficiency rates of gas turbines or microturbines, from at most roughly 40 percent to nearing 80 percent efficiency.

Fuel cells, though still in beta-testing stages, also emit high temperature gasses, steam, or water which can be captured and used in CHP processes. CHP is particularly necessary in the marketing for fuel cells and microturbines, which are among the most expensive distributed generation technologies. Increasing the efficiency by two-fold reduces their per-kilowatt costs by half, making the technologies more competitive with cheaper reciprocating engine gensets, which are usually employed in short-running back-up operations that are not conducive to CHP.

## ***DISTRIBUTED GENERATION AS A SOLUTION***

To the defense of the White House, "energy" is a huge and unwieldy topic, covering more than just resource exploration, to production and delivery of fuels down to the electricity entering your meter or the gas being pumped into your car. It also deals with the implications—environmental, economic, and political—of the entire process.

It's more than likely that in devising the Plan the most important

and controversial topics, such as new power plants, alternative fuels, and transmission, would get priority over what may be deemed a short-term solution such as DG. Yet as the installed capacity of recipis and gas turbines continues to rise, one wonders exactly how “temporary” the solution needs to be. Assuming continual compliance with environmental regulations, independent businesses are being forced to “solve” the energy crisis their own way, one back-up or peak shaving generator at a time. Chances are, once the new power plants promised to us come on-line, these generators will not necessarily go away.

**Perhaps instead of focusing on issues which President Bush and his administration have been forced to defend—such as his stance on the environment—actual solutions, such as incentives for clean burning, easy it install and integrate on-site power systems, should be proposed and outlined.**

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#### ABOUT THE AUTHOR

**Roberta Gamble** is an industry analyst, energy markets, with Frost & Sullivan. She focuses on cogeneration and distributed generation in North America, researching reciprocating engine generators, T&D equipment, and alternative fuels, including hydrogen and biodiesel.

Ms. Gamble has authored reports on the North American Generator Set Market, North American Emerging Endusers of On-Site Power, and the Alternative Fuel Infrastructure for Fuel Cell Vehicles.

Her previous experience includes management of the financial and business aspects of gas turbine power plant commissioning and construction. As business administrator, then commercial project manager for several multi-million dollar projects while at Siemens Westinghouse Power Corporation, Roberta’s experience included contract administration, project budgeting, as well as working with legal and regulatory bodies.

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