Volume IV, Issue 1, January/February 2004

DG MONITOR℠

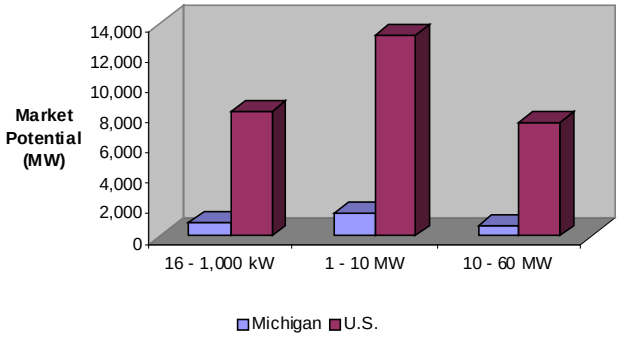
Energy Bill Update

On Friday February 13th, Senate Republicans unveiled a revised Energy Bill. After several weeks of negotiations, the new energy bill S. 2095 emerged much leaner than the $31 billion energy bill blocked in the Senate on November 21st 2003. The new bill will cost an estimated $14 billion and changes in the bill address the concerns several senators had with the earlier bill.

Senate Energy & Natural Resources Chairman Pete V. Domenici introduced the new bill under Rule 14. Under Rule 14, the bill can bypass the committee process and be immediately placed on the Senate calendar and brought to the Senate floor for consideration. This expedited consideration was part of an agreement reached between Majority Leader Bill Frist and Senate Minority Leader Tom Daschle. The two agreed to consider the bill swiftly and with as few amendments as possible. Senator Domenici had hoped to introduce the *(continued on page 8)*

Michigan Efforts Help Tap DG Potential

In recent a study, the Resource Dynamic Corporation found that Michigan has the third largest untapped DG state market potential in the U.S., with 3.1 GW of DG capacity that has not yet been installed, as shown in the figure below. This estimate evaluates all industrial and commercial establishments in the state by comparing the life-cycle *(continued on page 6)*



Source: The Potential U.S. Market for Distributed Generation, 2004 Edition, Resource Dynamics Corporation.

PROMOTING DG TO ENHANCE THE T&D SYSTEM

Due to the August blackout and other recent events, there is a sharpened public policy focus on reshaping the future of the U.S. power delivery system. In response, the Resource Dynamics Corporation, publisher of the *DG Monitor*, and Bingham McCutchen LLP are organizing the Council for Distributed Grid Enhancement (CDGE). CDGE will nationally promote DG as a solution to modernizing and strengthening our grid. CDGE stakeholders will be pushing the implementation of financial and policy incentives designed to lower the barriers to and ease the adoption of DG, and will be reaching out to policymakers, the public and the media. CDGE's goal is to become a sustaining center to advance and advocate near-term DG.

Mission. To ensure that DG becomes an integral part of the enhanced transmission and distribution (T&D) system in the U.S., improving its efficiency, reducing its cost and lowering security risks to its operation.

Goal. Assuming a leadership role as a sustaining center to advance and advocate near-term applications of DG, and recognition of its contribution to grid operation and security. *(continued on page 9)*

IN THIS ISSUE

RESOURCE DYNAMICS CORPORATION

To view earlier editions of the DG Monitor or to begin receiving the publication via email please visit: www.distributed-generation.com.

About the DG Monitor. The DG Monitor is a bimonthly publication of the Resource Dynamics Corporation covering the many facets of the emerging Distributed Generation marketplace. Articles both report and interpret the most important items. In addition, the Monitor includes special series on DG technologies, applications, manufacturers, and other issues, providing the reader with a complete picture of these topics over several issues.

Comments or requests for additional information can be addressed to DGMonitor@rdcnet.com, through our website at www.distributed-generation.com, or by calling 703/356-1300.

Executive Editor…….. Paul L. Lemar, Jr.
Editor…….... Elizabeth A. Kime-Krigas
ekime@rdcnet.com

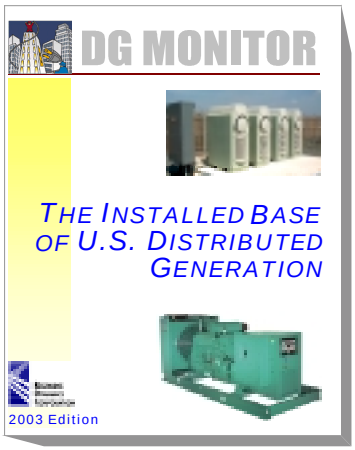
The **Resource Dynamics Corporation (RDC)** creates business solutions that empower clients to compete effectively in changing energy markets. Often, these involve evaluating the role of new technologies. All senior staff have both business and engineering backgrounds, with a distinct focus on strategy implementation. We combine these strengths to create innovative business solutions for energy technologies and markets. **RDC** utilizes an extensive set of tools including proprietary databases and models to develop these solutions.

We develop business solutions in four areas:

- **Distributed Generation**
- **Marketing for Energy Businesses**
- **Strategies for Power Suppliers**
- **Strategies for Energy Purchasers**

RDC has entered its 23rd year. Meeting our clients' needs has always been our top priority and we have consistently delivered outstanding consulting services that enable our clients to reach their goals. Clients include energy companies, consumers, financial institutions, law firms, equipment vendors, trade associations, research organizations, government agencies and international institutions.

For more information, see www.rdcnet.com.



How much DG is there in my state or region?

What is their aggregate capacity?

Where are these units located?

The Installed Base of U. S. Distributed Generation 2003 Edition helps decision makers at all levels answer these questions and make informed DG policy, regulatory and market decisions by providing detailed estimates of the total number of DG units installed in the U.S. as of 2001, and their capacity by 19 size ranges from less than 15 kW to 60 MW. Breakouts are made by technology, application, primary fuel consumed and year of installation. Additional regional and industrial breakouts are provided for a subset of the larger generators.

Additional reports are also available:

With the new IEEE 1547 DG Interconnection Standard likely to be released this year, the ***DG Monitor's Directory of Interconnection Technologies and Equipment*** helps decision-makers quickly develop a short list of potential interconnection solutions. This publication lists the equipment and technologies necessary to interconnect all kinds of DG applications, and provides contact information for manufacturers and distributors.

Evaluating DG technologies or markets? Check out the ***DG Monitor's 2004 DG Sourcebook!*** This report is a compendium of information on virtually every aspect of distributed generation technologies, applications, and markets - right at your fingertips! The 2004 Edition will be released in March 2004.

These reports are part of the DG Monitor™ publication series produced by the Resource Dynamics Corporation (RDC).

To order this report or other DG publications, go to

www.distributed-generation.com.

APPLICATION SERIES: OPPORTUNITY FUELS FOR DG AND CHP APPLICATIONS

With both natural gas and electricity prices rising, facilities are assessing alternative fuels for their power production needs. An opportunity fuel is any type of fuel that is not widely used, but has the potential to be a legitimate and reliable source of power. Most of the time, opportunity fuels are derived from waste or byproducts, and they are usually inferior in one way or another to conventional fossil fuels. However, natural resources are limited, emission controls are increasingly strict, and the price of many fossil fuels is volatile. Since opportunity fuels can be obtained inexpensively, and can use existing if slightly modified equipment, they can make an ideal cost-cutting solution. Although many opportunity fuels are only used for large-scale applications, some are perfectly suitable for DG/CHP operations. Opportunity fuels can often provide a cheap, reliable, and environmentally sound alternative, and many successful implementations have already been reported.

The Resource Dynamics Corporation is developing a study for Oak Ridge National Laboratory and the U.S. Department of Energy on opportunity fuels – particularly those with potential to break into the DG and CHP markets. While fuel can be made out of nearly any waste or byproduct stream, only a few are truly suitable for DG and CHP applications. Out of all of the opportunity fuels, anaerobic digester gas, biomass, coalbed methane, landfill gas, and tire-derived fuel are leading candidates for DG/CHP projects. All of these fuels have been proven in real-life applications, and are capable of obtaining a significant market share. Anaerobic digestor gas and landfill gas are two types of biomass gas collection that do not require a gasifier. For all other biomass gas applications, gasifiers are currently expensive and do not offer favorable economics for most small DG/CHP operations. In the paragraphs below, the pros and cons of these five fuel types and their potential applications are discussed.

Anaerobic Digester Gas. Anaerobic Digester Gas (ADG) is one of the more promising opportunity fuels. It can be captured at any wastewater treatment plant that utilizes anaerobic digestion. There are thousands of plants in the U.S. that currently use anaerobic digesters to treat their waste, and many more that could potentially benefit. A wastewater treatment plant's electrical and thermal demand can usually be at least partially fulfilled by utilizing ADG as a fuel, and several plants in the United States are already utilizing this free fuel source with reciprocating engines, microturbines and fuel cells. Anaerobic digesters are also found on animal farms, and some ADG farm projects have been successfully implemented. For example, Dairyland Power Cooperative (DPC), which provides the wholesale electricity to 25 electric distribution cooperatives and 20 municipal utilities, has an agreement to use anaerobic digester-generator systems from Microgy Cogeneration Systems, Inc. to generate electricity at dairy and swine farms within the DPC system. In December, the companies announced that a digester system will be installed at the Wild Rose Dairy to supply biogas to a 0.775 MW generator. This is the first of many Microgy anaerobic digester projects to come.

Biomass Fuels. Solid biomass fuels can be burned in boilers to produce steam, or they can be gasified and sent through a combustion turbine. Solid biomass can be used in boiler to produce steam to power small (50 MW or less) steam turbines for onsite power or co-fired with coal in existing boilers. These applications are generally limited to the companies and industries that produce biomass waste. It is possible that a market could develop for wood waste or crop and forest residues, as they are relatively inexpensive to obtain, but the labor-intensive collection processes impede this market development. Biomass fuels could play a major role in the future if prices are lowered or more government incentives are offered, but until then the fuels will likely only serve niche applications.

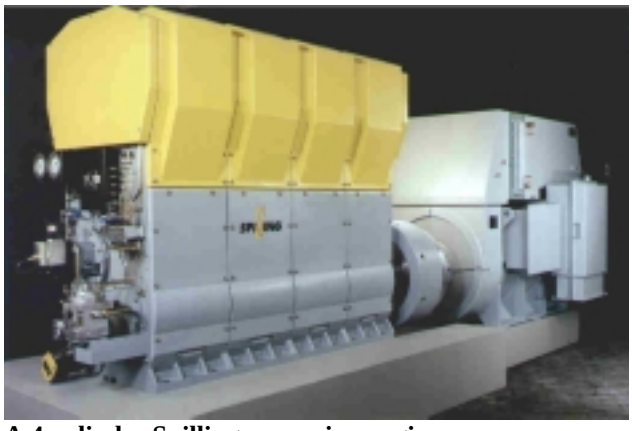
Coalbed Methane. In coalmining operations, methane gas is liberated inside of the mines. Much of this gas is Btu-rich and makes an excellent fuel source. In fact, the fuel is so similar to natural gas that it is often injected directly into local pipelines. In a few cases, the fuel has been successfully used to power on-site reciprocating engines and gas turbines in DG applications. While the demand for power and heat at coal mines is limited, coalbed methane is a potentially free fuel source that can be utilized for the mining operation's power needs. Fuel or power produced can be sold to the grid or, in the case that commercial or industrial buildings are located nearby, can be sold to these entities for revenue.

Landfill Gas. Landfill gas (LFG) is a methane gas produced in landfills that can be captured and converted into energy. LFG is *(continued on page 7)*

On-Site Power from Energy 'Wasted' in Gas Delivery Distribution – Guest Article

Many facilities receive natural gas at high pressure from the local gas utility. The gas is at high pressure because it is the most practical and economic method to move gas through pipelines from the gas fields to its destination. Significant amounts of energy are used to compress gas to high pressures for pipeline transportation, but before the gas can be used or distributed to end users, the pressure has to be lowered. The most common method for reducing the pressure is using a ball valve. A "gas expansion" ball valve functions much like a valve used to control water pressure and flow in a home's bathroom shower. While it is a tried and true design, ball valves do not allow for any energy recovery from the gas expansion. On the other hand, other gas expansion machines can be used to perform pressure reduction and in the process generate electricity. These machines are Spilling expansion engines and Mafi-Trench turboexpanders. Both types of machines operate with zero emissions and do not consume or burn any gas during the process of pressure reduction and power generation, as they only use the gas pressure. The Spilling expansion engine has been in production since the 1960s while the Mafi-Trench turboexpander has been in production since 1975. To date there have been 27 natural gas expansion systems installed with a total combined electrical generating capacity of greater than 20 MW – this does not include steam or other processing applications.

The specifics of each pressure reducing station application will dictate whether an expansion engine or turboexpander is most economically suitable, but both are not typically used together. An economically viable pressure reduction station will typically generate 500 kW to 7 MW of electricity.



A 4-cylinder Spilling expansion engine

The Spilling expansion engines are modified steam engines and are similar to internal combustion engines in that they have a reciprocating piston in a cylinder, but in the expansion engine each piston is double-acting. Unlike a typical internal combustion engine, however, there is no spark ignition of the gas. Therefore, the same amount of gas that enters the expansion engine also leaves it, albeit at a lower pressure, just like a reciprocating compressor, but running in reverse.

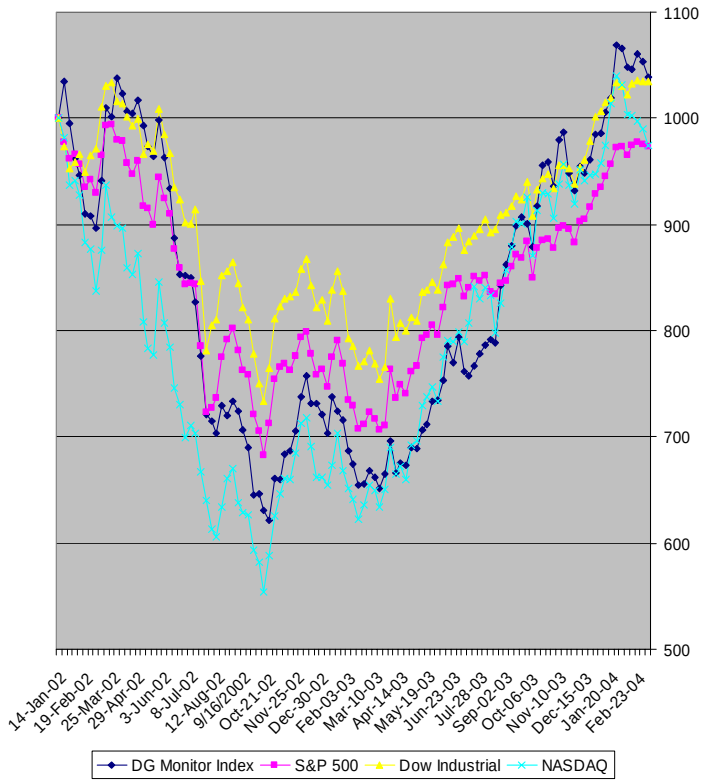
The Mafi-Trench turboexpander is akin to a steam turbine, with the exception that it utilizes natural gas instead of steam. Similarly, the same amount of gas that enters the turboexpander also leaves it, again, albeit at a lower pressure. For both expansion engines and turbo expanders, a programmable logic controller (PLC) is used to control/monitor the gas pressure let-down regulation and power generation in real-time. The key element of both units, however, is that neither the expansion engine, nor the turbo expander, consumes any natural gas to generate electricity, unlike an internal combustion engine or gas combustion turbine.

A law of physics is that as the pressure of a gas is reduced, its temperature will correspondingly drop. Commonly referred to as the Joules-Thompson effect, it is also the basic principle behind refrigerators and air-conditioners. It is interesting to note that there is a temperature drop of the outlet lower pressure gas in both ball valve pressure regulation and in the above two alternative gas expansion pressure regulation systems. This is an important consideration as corrosion and damage to gas pipelines are among the many problems that can occur when natural gas temperatures are allowed to fall close to, or go below, 32ºF. In order to prevent the gas temperature from getting too low, most pressure reducing stations employ some form of a preheating system to raise the temperature of the incoming, higher pressure gas.

The difference here is that a ball valve (producing no power) is isenthalpic and an expansion engine/turboexpander (producing power) is nearly isentropic. What this means is that with the nearly isentropic power-producing system, pressure reduction will result in a greater temperature drop of the gas when compared to an isenthalpic ball valve pressure reduction station. *(continued on page 9)*

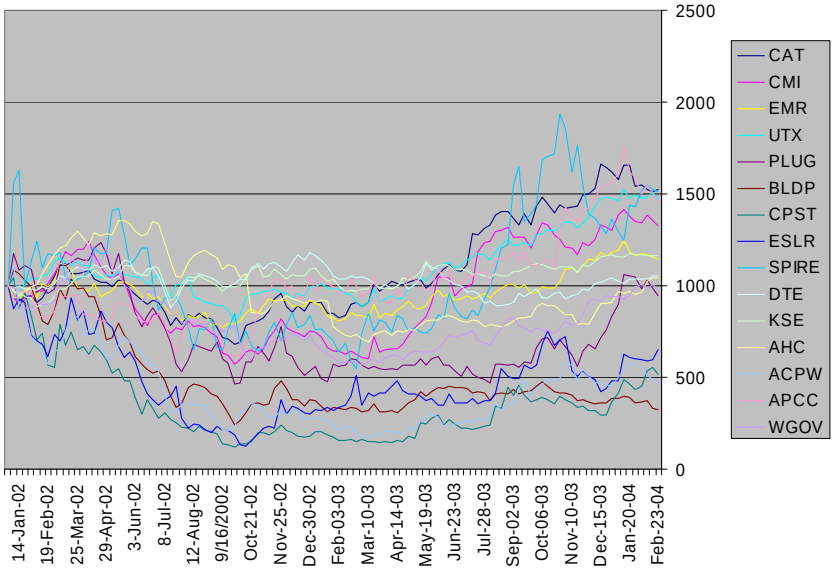
The DG Monitor Index℠

The DG Monitor Index℠ has surpassed the returns of the Dow Industrials, S&P 500, and the NASDAQ from January 2002 through February 23 2004. Many of the previous laggards performed well during the past two months, including PlugPower (up 43%) and Capstone (up 62%). Poor performers during the last two months include Ballard (down 9%), Caterpillar (down 1%) and American Power Conversion (down 1%).



Companies included in the DG Monitor Index℠ include:

- Active Power (ACPW)
- Amerada Hess (AHC) - replaced Clayton Williams Energy
- American Power Conversion (APCC)
- Ballard Power Systems (BLDP)
- Capstone Turbine (CPST)
- Caterpillar Incorporated (CAT)
- Cummins Incorporated (CMI)
- DTE Energy (DTE)
- Emerson Electric (EMR)
- Evergreen Solar (ESLR) - replaced AstroPower Incorporated
- KeySpan Corp (KSE) - replaced Duke Energy Corp
- PlugPower Incorporated (PLUG)
- Spire Corporation (SPIRE)
- United Technologies (UTX)
- Woodward Governor Company (WGOV)



Due to the evolving DG market, the composition of the Index has been changed. Clayton Williams Energy, AstroPower (currently in bankruptcy) and Duke Energy Corporation were removed and replaced by Amerada Hess, Evergreen Solar, and KeySpan Energy. These new DG Monitor Index℠ companies are now profiled.

Amerada Hess.
Amerada Hess Corporation is involved in exploration, production, purchasing, transporting and selling crude oil and natural gas throughout the world. The Company also manufactures, purchases, and trades refined petroleum and other energy products. Hess Microgen, part of Amerada Hess, has over ten years of experience designing, building, and installing cogeneration and distributed generation systems, primarily in the US. Hess Microgen has pre-packaged systems based on reciprocating engines in the 100-450 kW size range.

Evergreen Solar.
Evergreen Solar is a developer and manufacturer of photovoltaic (PV) modules - the engines of solar electric systems - used in remote power and emerging grid-connected markets. The PV modules *(continued on page 6)*

(Index, continued from page 5) produced by Evergreen Solar incorporate a proprietary crystalline silicon technology known as string ribbon. This technology enables an innovative approach to manufacturing dependable and cost-effective PV modules.

KeySpan Corp.
KeySpan Corporation is a holding company involved with gas distribution, electric services, and energy services. KeySpan is a natural gas local distribution company in New York, Massachusetts and New Hampshire. The electric services segment manages Long Island Power's transmission and distribution system. The energy services segment provides a wide variety of energy-related services to customers in New York, New Jersey, Massachusetts, New Hampshire, Rhode Island and Pennsylvania. KeySpan is also involved in developing DG projects for all types of DG applications. ■

(Michigan, continued from page 1) economics of installing a DG unit vs. purchasing power from the grid at current price and performance characteristics, and counting up the cases where DG is the superior option. This estimate is on top of a relatively large installed base of DG in the state.

Michigan has taken steps to help make accessible the untapped DG potential in the state. The state been active in supporting DG, and has recently lowered some of barriers to DG implementation in the state. Perhaps most importantly, the Michigan Public Service Commission (PSC) adopted interconnection standards in an order published on July 8, 2003. These standards set out interconnection application procedures, project timelines, costs and technical issues. In addition, the rules discuss pre-certification of interconnection equipment. The PSC defined DG size categories, which are broken into less than 30 kW; 30 kW or more, but less than 150 kW; 150 kW or more, but less than 750 kW; 750 kW or more, but less than 2 MW; and 2 MW or more. On September 23, 2003, the Commission's rules governing electric interconnection standards, R 460.481 et seq., became effective.

The process began with Subsection 10e(3) of Michigan Public Act 141 of 2000, which provides that the PSC "shall establish standards for the interconnection of merchant plants with the transmission and distribution systems of electric utilities." The Act provides some limitations, namely that electric utilities should not be required to interconnect with generating facilities with a capacity of less than 100 kW for parallel operations. Cost associated with interconnection are to be borne by the merchant plant, unless the commission has otherwise allocated the costs and provided for cost recovery.

Public Act 141 of 2000 took effect on June 5, 2002, and with this mandate in hand, the PSC initiated proceedings (Case No. U-12485) on June 19, 2002 to establish standards for the interconnection of merchant plants with the transmission and distribution systems of electric utilities. Commission Staff worked with electric utilities, owners and operators of merchant plants and proposed merchant plants in Michigan and other relevant stakeholders, and filed reports on the results of its consultations. PSC staff filed the final report on October 2, 2000.

After reviewing the report, the Commission issued an order on February 5, 2001 and made several principal determinations. This included requiring separate sets of standards that impose escalating technical requirements for five capacity-based categories: (i) Under 100 kW; (ii) 100 kW or more, but under 500 kW; (iii) 500 kW or more, but under 1 MW; (iv) 1 MW or more, but under 40 MW; and (v) 40 MW or more. The Commission also determined that the standards must specify strict time limits for processing applications and completing the tasks required to accommodate the interconnection, and that the standards should incorporate mechanisms that limit charges in light of the size, type, complexity, and location of the project in to ensure that the costs charged by utilities to project developers for processing applications are reasonable.

The Commission directed each electric utility to file proposed interconnection standards that were consistent with the preceding determinations and further provided an opportunity for interested persons to file comments. None of the proposals received were acceptable to the Commission, as they did not use the delineated five size classification and did not "promote interconnection in the way that the Commission envisioned when it commenced these proceedings." As such, the Commission commenced a rulemaking to implement statutorily mandated standards. *(continued on page 7)*

(Opportunity Fuels, continued from page 3) of similar composition to ADG, about 50 percent methane, so most units designed for one fuel will work with the other. There are many landfills in the United States that have installed reciprocating engines and microturbines on-site and currently use LFG for heat and/or power, and hundreds more that could potentially benefit from LFG utilization. While applications are usually limited to powering landfill operations or selling to local utilities, some communities have begun using LFG to generate power at schools and commercial buildings as well.

Tire-Derived Fuel. The United States produces millions of scrap tires every year, and tire-derived fuel (TDF) is one way to solve the ever-growing problem of what to do with them. When chopped up and processed for TDF, tires have a heating value higher than coal and also produce fewer NO_x and SO_x emissions. The market price for TDF is usually slightly less than that for coal on a per-Btu basis, but with economics of scale, this could be driven much lower. Tire-derived fuel can replace coal in boilers, or the two fuels can be co-fired. While coal boilers and steam turbines are not typical for DG and CHP applications, tire-derived fuel could still find a niche in the market with smaller steam turbine sites.

As part of the ongoing project for Oak Ridge National Laboratory and the Department of Energy, the Resource Dynamics Corporation researched 20 different opportunity fuels, and these five fuel types are the most promising for DG/CHP applications based on the screening methodology utilized. The cost of these fuels, including equipment modifications, new equipment, and maintenance was estimated and analyzed, and potential markets for the fuels pinpointed. The next step in the project is to perform a detailed economic assessment of the market using RDC's DISPERSE Model to find exactly which markets show the most potential, and which fuels are most likely to be successful in future applications.

(Michigan, continued from page 6)
The rulemaking focused on standards that could be applied to all electric utility systems in Michigan, so that the rules would prescribe as much uniformity as possible, but also allow each utility to develop its own standards to make allowances for its own operating characteristics. The Commission drafted proposed rules as the starting point for the rulemaking in Case No. U-13745, and took comments on the rules. The proposed effective date of the rules was set at March 1, 2004.

After a series of comments and revisions, the PSC adopted interconnection standards in an order published on July 8, 2003. The July 8, 2003 order was revised and filed with the Joint Committee on Administrative Rules on August 4, 2003. The revisions were in response to comments filed in the case. The revised rules were submitted to the Legislative Service Bureau and the Office of Regulatory Reform for their approval, which was granted on July 23 and 28, 2003, respectively.

The revised rules met with further resistance. On August 7, 2003, the Michigan Electric and Gas Association, the Michigan Electric Cooperative Association, Consumers Energy Company, and The Detroit Edison Company filed a petition with the PSC for rehearing or clarification of the July 8, 2003 order or reopening of the proceedings. After reviewing the case, the PSC denied the petition for rehearing and ordered that the rules governing electric interconnection standards should be adopted.

On September 23, 2003, the Commission's rules governing electric interconnection standards became effective. 2003 MR 18, at 7. Rule 2(1), R 460.482(1), requires electric utilities to file proposed interconnection standards within 90 days of the effective date. On October 24, 2003, the Michigan Electric and Gas Association, the Michigan Electric Cooperative Association, Consumers Energy Company, and The Detroit Edison Company jointly filed a request to extend the deadline by three months in order to accommodate their efforts to develop a uniform set of interconnection standards for electric utilities in Michigan. The request was granted, and the utilities were granted until March 22, 2004 to file applications for approval of proposed interconnection procedures.

With 3.1 GW of DG potential capacity yet to be installed in the state, these proceedings and other efforts by Michigan may have important ramifications for the DG market. To view case documents, go to: http://efile.mpsc.cis.state.mi.us/cgi-bin/efile/viewcase.pl?casenum=12485 and http://efile.mpsc.cis.state.mi.us/cgi-bin/efile/viewcase.pl?casenum=13745.

(Energy Bill, continued from page 1) new energy bill earlier, as part of a $318 billion transportation bill. However, this plan was rejected.

Some provisions of particular interest for *DG Monitor* readers are noted below along with the relevant title. Included are increases in R&D funding for DG, especially for renewables and fuel cell programs. Proposed amendments to the Public Utility Regulatory Policies Act (PURPA) would, under certain conditions, require utilities to provide net metering and remove utilities' obligation to enter into new contract or obligation to purchase or sell electric energy from qualifying cogeneration facilities.

Title II: Renewable Energy
- New incentives for the increased development and use of clean and renewable energy.
- Mandates a federal renewable energy resources assessment to assist in the long-term planning for the expansion of renewable energy production.
- Reauthorizes the Renewable Energy Production Incentive Program.

Title VII: Transportation
- Reforms the EPACT alternative fuel vehicle mandate program to encourage the use of alternative and renewable transportation fuels.
- Authorizes $200 million grant program to assist states and localities in acquiring alternative-fueled vehicles, hybrid vehicles, fuel cell vehicles, and ultra-low sulfur diesel vehicles
- Establishes a fuel cell transit bus demonstration program

Title VIII: Hydrogen provision
- Authorizes $2.1 billion for the President's Hydrogen Fuel Cell Initiative.

Title IX: Research and Development
- Addresses R&D needs in energy efficiency, distributed energy and electric energy systems, renewable energy.

Title XII: Electricity
- Authorizes the creation of an Electric Reliability Organization to establish and enforce mandatory reliability rules.
- Remands proposed rulemaking on Standard Market Design and prohibits FERC from issuing a final order until December 31, 2006.
- Requires FERC to establish by rule within one year transmission pricing policies and policies for the allocation of costs associated with interconnection of new transmission facilities not located within RTOs.
- Repeals PURPA's mandatory purchase requirement.
- Requires utilities to offer net metering[1] to any of its "eligible on-site generating facility" customers upon request. No size limits are mentioned.

Title XIII: Energy Tax Incentives
- Extends placed-in-service date for wind, closed-loop biomass, and poultry waste facilities and adds open-loop biomass, geothermal energy, solar energy, small irrigation power, municipal bio-solids, and recycled sludge as qualifying energy resources. The credit is 1.8 cents per kW/hr.
- Provides a credit for the purchase of new qualified fuel cell, hybrid, or other alternative fuel motor vehicle.

Title XV: Ethanol and Motor Fuels
- Requires a renewable fuel content for gasoline started at 3.1 billion gallons in 2005 and increasing to 5.0 billion gallons in 2012. ■

[1] For purposes of this paragraph, the term 'net metering service' means service to an electric consumer under which electric energy generated by that electric consumer from an eligible on-site generating facility and delivered to the local distribution facilities may be used to offset electric energy provided by the electric utility to the electric consumer during the applicable billing period.

Changes to the Energy Bill

In order to halve the cost of the formerly $31 billion energy bill, several changes were made and include:
- The Safe Harbor provisions for MTBE and Ethanol-TBE have been deleted.
- Energy Savings Performance Contracts provision is deleted, for a savings of $3 billion.
- Geothermal royalty incentives are delayed to FY05 for a savings of $24 million.
- Four oil and gas provisions are delayed for a total savings of $260 million.
- The provision for research on ultradeep wells is now subject to future appropriations, for a savings of $1.5 billion.
- The provision, which allows WAPA and SWPA Power Marketing Administrations to go to third parties to finance future expansions to the electricity grid, has been delayed to FY05.
- The $500 million Denali Commission provision for the development of rural electric projects is now subject to future appropriations.

(Onsite Power, continued from page 4) Thus, expansion engine/turboexpander systems will require more preheating. Even when this is taken into account, the significant amount of power generated greatly offsets the increased preheating costs such that the payback can be around 3-6 years with annual savings starting around $250,000. However, these numbers are very site-specific and much will heavily depend upon the local price of electricity along with a company's internal accounting cost of natural gas that may be used for preheating.

Today in the US, expansion engine/turboexpander systems offer the potential for emission, tax, CHP, Qualified Energy Recovery Process and/or renewable energy credits, depending upon where it's located. For example, in terms of energy renewal, recovery and Renewable Portfolio Standard (RPS), the state of Nevada has recently enacted into law the classification of "Qualified Energy Recovery Process", which includes (AB 429, Sec. 6, 1. (b)) "the reduction of high pressure in water or gas pipelines." Furthermore, the Departments of Natural Resources (or its equivalent) in some states have also indicated that the power generated from energy renewal could be eligible for emissions credits against an identifiable power station.

This guest article was written by Bernie Watson, Program Manager, Technology, for Dresser, Inc, pip@dresser.com. Dresser is a manufacturer and marketer of highly-engineered equipment and specialized services sold primarily to customers in energy-related industries, including both expansion engines and turboexpanders under the Pressure into Power™ (PiP™) label. Further information is available at www.dresser.com/pip. Mr. Watson wrote this article using his experience with developing technology to business (TTB) through global technology strategy and integration across all areas within Dresser, Inc.

(Promoting DG, continued from page 1)

Approach.

- Organize key DG stakeholders to support CDGE mission.
- Develop breakthrough concepts that can revolutionize the role of DG in managing and enhancing the grid.
- Identify and promote workable DG solutions that can modernize and strengthen our grid in an equitable manner to all participants.
- Reach out to legislators, policymakers, regulators, the media and the public through white papers, other written materials and direct contact.
- Lower the barriers to stakeholder acceptance by pushing for the implementation of policy and financial incentives that ease the adoption of DG.

The plan is to kick-off CDGE in March 2004 with a press release and mission statement. At the organizational meeting, plans for enlarging the membership will be developed and the initial white paper, "Responding Now to the Threat of Future Blackout," will be widely disseminated. The CDGE "briefing package" will be targeted to federal, state and RTO/ISO level decision-makers, with legislative and policy briefings conducted at the federal, regional (RTO/ISO) and state level on the role of DG in grid modernization and enhancement. CDGE's efforts will be targeted to jurisdictions where results can be obtained in the short-term, collaborating with local groups wherever possible.

The action plan for federal and state legislators, policymakers and regulators will be designed to 1) stimulate appropriate DG investment and implementation directly benefiting grid modernization and reform; 2) construct regulatory practices (e.g., PBR) that encourage utility acceptance; and, 3) support informed public policy decisions based on the beneficial role from incorporating DG into the T&D system. CDGE's annual membership fee is $10,000.

For more information, contact N. Richard Friedman at 703/356-1300, Ext. 203 or at nrf@rdcnet.com.

Ask the DG Monitor

Have a question for the Monitor?
Email: askthemonitor@rdcnet.com.

Correction in Response to Reader Question:
In the October 2003 article entitled, "Technology Series: Diesel to Natural Gas Engine Conversions", third paragraph, the sentence "At low power outputs and engine start-up, diesel fuel is used in higher quantities, but when the engine is running at a high power output, natural gas dominates and the NG/diesel ratio reaches about 80 percent" should have read "… the NG/diesel ratio reaches about 4:1." Thanks to our readers for finding the error.

- DG Monitor Staff

DG NOTES

Feb 2004 - **Nuvera Fuel Cells Inc**. received a multi-million-dollar order, contingent upon project continuation funding, for eight FORZA™ fuel cell power modules from Vehicle Projects LLC, which is leading an international consortium to develop the world's largest PEM fuel cell vehicle under contract to the US Department of Defense.

Jan 27, 2004 - **Distributed Power, Inc**. will purchase a cogeneration facility serving a hotel south of Los Angeles, and one serving a hotel in New York City. Each project contains **Hess Microgen LLC** equipment as well as energy purchase agreements with approximately four years remaining.

Jan 26, 2004 - **FuelCell Energy** signed an agreement with Salt River Project to provide and service a 250-kW Direct FuelCell® power plant to be located at the Arizona State University East Campus in Mesa, Ariz. The unit will feed the electricity output into SRP's local grid. Delivery is expected in late 2004 or early 2005.

Jan 23, 2004 - **Microgy Cogeneration Systems, Inc**., Merced Irrigation District and Gallo Cattle Company will explore developing projects designed to provide up to 4 MW of renewable generating capacity to be located at two of Gallo's milking sites. *Jan 16, 2004* - Five Star Dairy, LLC will purchase a Microgy digester systems as part of Microgy's relationship with Dairyland Power Cooperative under which Microgy expects to construct approximately $60 million of projects in Dairyland's service territory.

Jan 22, 2004 - **Evergreen Solar, Inc**. successfully completed a prototype research project for its proprietary String Ribbon™ technology for manufacturing solar cells -- enabling the growth of four silicon ribbons from a single furnace. This research project was co-funded by a three-year, $2 million grant from the Advanced Technology Program of the National Institute of Standards and Technology.

Jan 8, 2004 - **DTE Energy Technologies** launched its "ENE" series, which uses exhaust gas recirculation engine technology developed by **Menag Group AG**, **Liebherr Engines**, **ETH Zurich** and the Swiss Ministry of Energy, as part of the energy|now™ product line. These systems can meet the California Self Generation Program Guidelines for 2007 emissions, and provide CHP with electrical outputs of 202 to 350 kW *Jan 7, 2004* - **DTE Energy Technologies** started delivery of the ENI 85, a CHP on-site energy system rated at 85 kW.

Jan 2004 - **Xantrex Technology Inc**. and **Atlantis Energy Systems Inc**. are offering a new inverter and solar panel combination designed to make it easier for home builders to install renewable energy systems. By combining a Xantrex SunTie XR grid-tie inverter with Atlantis Energy System's Sunslates roofing product, the roof of a house can act as both a roof and a power plant simultaneously. ■

RDC Focuses on DG Standards in New Publication

A new bimonthly, *Distributed Energy*, is now available from Forester Communications. In the inaugural issue, RDC Chairman and CEO N. Richard Friedman and Thomas Basso of the National Renewable Energy Laboratory (NREL) provided an article entitled *IEEE 1547 National Standard for Interconnecting Distributed Generation: How Could It Help My Facility*?

The article discusses the future of DG and how its implementation depends on cost and performance improvements, favorable energy prices, and the lowering of challenges to DG installations. *IEEE 1547 2003 Standard for Interconnecting Distributed Resources with Electric Power Systems* can help mitigate these challenges, especially those associated with the difficulties and expenses of DG interconnection.

The article details the development process that led to the publication of IEEE 1547, then goes further, helping explain how the Standard will impact individuals and their facilities. IEEE 1547 can help reduce costs and make DG applications economic. In turn, these applications can provide reliability, environmental, and many other benefits.

To read the complete article, go to www.distributednrg.com/de_0311_ieee.html. You can also sign up receive a complimentary subscription at www.distributednrg.com/de.html.

CONFERENCES

5th Annual USCHPA Policy Day Conference, Washington, DC, May 10 - 12, 2004.