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SOLUTIONS FOR RENEWABLE ENERGY

ICONICS GEO Productivity Portals Target Renewable Energy Solutions

By Craig Resnick

Summary

ICONICS defines GEO Productivity Portal solutions ICONICS recently briefed ARC regarding their initiatives in the area of GEO Productivity Portal solutions. ICONICS defines GEO Productivity Portal solutions as advanced Web-based contextual portals leveraged for real–time productivity monitoring, control, performance analysis and reporting, including custom visualization and geographical mapping for distributed operations such as manufacturing, electric utilities, renewable energy production, transportation/logistics, retail facility networks, college campuses and corporate office buildings. There are numerous application examples, such as providing a dashboard view of overall productivity, alarm information from wind towers, and local meteorological information for wind farm management. These GEO Productivity Portal solutions also address the growing demand for utilities and manufacturers to meet their growing sustainability initiatives, for example obtaining energy from renewable sources to meet their future requirements. Driving forces for the development of renewable energy consist of concerns for energy security, a global aversion to continued environmental degradation, and possible climate change.

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Renewable Energy Driven By Endless Growing Demand

Today's global energy market is estimated 15,000 gigawatts, and predicted to double by 2050. The need for increasing supplies of energy, and in particular renewable energy, will be required to meet this demand. Replacement of significant quantities of the depleting reserves of fossil fuels by renewable sources will be essential. The actual growth rate of renewable energy will be driven by a combination of economic considerations and governmental efforts to implement policies that favor renewable energy.

For an energy source to be commercially viable, it must be affordable in comparison to alternative sources, as well as being readily available in sufficient quantities from a reliable and socially acceptable source. Risks to energy security can be attributed to market instabilities as well as physical security incidents and technical failures of physical assets, such as blackouts. Recent market volatility in the oil & gas industry piqued interest

in development of alternate energy sources, including renewable energy. Geopolitical instability can create market constraints which are exacerbated by the uneven global distribution of conventional fossil fuel reserves. However, renewable energy sources are generally indigenous to local or regional conditions and can thus reduce the impact of import restrictions.

Governments can mitigate risks from energy security by increasing the diversity and flexibility of energy supply sources. As a group, renewable energy represent one of the fastest growing sources of energy. For example, in the US, the Energy Policy Act of 2005 (EPAct) provided tax credits for renewable energy sources such as wind, solar, and biomass energy. The EPAct also expanded the research into hydrogen technologies and established nationwide renewable energy standards to encourage greater use of ethanol and biodiesel as transportation fuels. In Europe, renewable energy already plays a significant role in the energy supply.

Progression of Renewable Energy Technologies

The International Energy Agency (IEA) groups renewable energy sources according to the relative maturity of the respective underlying technology development. Renewable energy can be classified into three generations of technology evolution as shown in the following table.

| First Generation	Second Generation	Third Generation
Hydropower	Solar Heating /Cooling	Concentrated Solar
Biomass Combustion	Wind Energy	Ocean Energy
Geothermal Power	Solar Photovoltaics	Enhanced Geothermal
Geothermal Heat	Modern Bioenergy	Integrated Bioenergy

Renewable Energy Sources

First-generation renewable technologies have been in place for decades, with some applications dating back to the beginning of the twentieth century. Early hydropower and biomass combustion approaches both represent mature markets. For developing regions, these technologies are still viable sources of energy, assuming the necessary natural resources remain adequate. Pricing is usually competitive with conventional energy sources. Dwindling resources, environmental restrictions, and possible public reluctance are some potential restrictions on continued utilization.

Second-generation renewals have entered the energy market over the last several decades with varying degrees of success. The rate of adoption has reflected the pricing of competing energy sources, including the notable excursions of high oil pricing and/or concerns about the security of supply.

High spikes in both crude oil and natural gas prices stimulate interest in the development of these types of renewable energy sources. Additionally, future continued acceptance is driven by environmental concerns. Wind energy in particular is enjoying rapid growth in some world regions, as significant technological advances have been realized as the result of R&D efforts by countries whose policies support the utilization of renewable energy.

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Third-generation technologies for renewable energy are in varying stages of development and build upon the continued R&D efforts leveraged in part
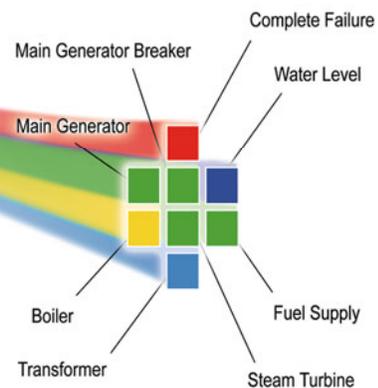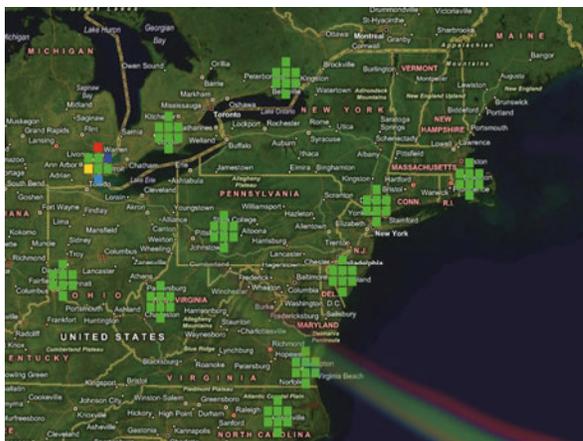
ICONICS Smart Pin and EarthWorX Technology

from second generation commercialization refinements as well as from new technology approaches. Newer forms of renewable energy are, for example, enhanced geothermal and bioenergy systems, concentrated solar power technology, and a collection of technologies associated with ocean

energy. The newer solar power thermodynamic approaches can utilize various designs of parabolic collector systems to concentrate the power and route it to a central solar receiver tower. Solar approaches have had an intermittent development history until recently and overall lag wind energy adoption applications. Ocean-based renewable energy technologies consists of energy generation from tidal, thermocline, current, or wave motion sources. Ocean energy is even earlier in the adoption curve than thermal solar, and will require considerable R&D effort to finalize a commercial scale plant system that is both sustainable and economically competitive.
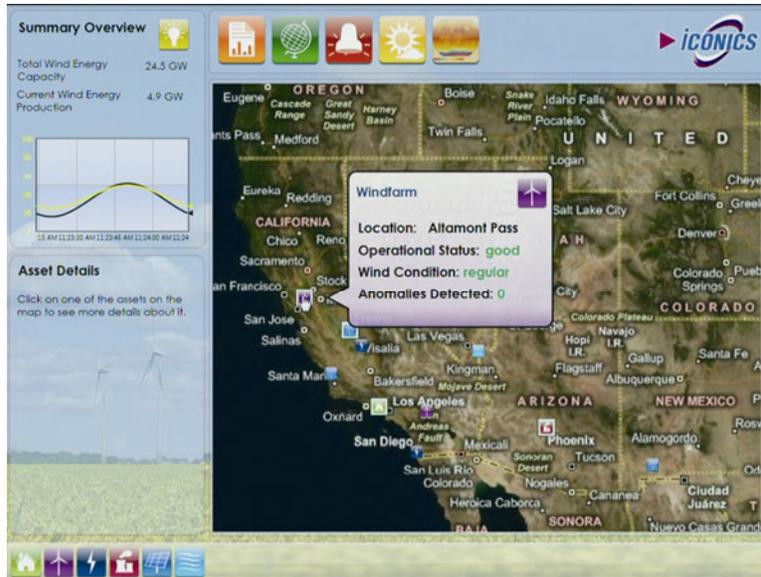
ICONICS Renewable Energy Solutions

To address the demands being created by the need for renewable energy, ICONICS has recently released their GEO Productivity Portals. Built on Microsoft.NET technology and designed for Windows Server 2008 and Windows 7, the GEO Productivity Portal solution targets, for example, complete operations of wind and solar farms; provides energy analytics, data historians and reports designed for specific applications such as wind farm management; offers GEO SCADA with updates for integrating metrological information; features alarm management with instant alerts; and provides standards based OPC Connectivity.

Besides GEO SCADA, the portals are built from a combination of ICONICS

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technologies, including productivity analysis and real-time online collaboration and visualization dashboards. ICONICS GEO Productivity software such as ICONICS PortalWorX is used to create and manage custom business portals and visualization dashboards that provide single sign-on collaboration. PortalWorX is based on Microsoft SharePoint Server .NET technology, which provides the tools to create a portal for real-time and historical business information. PortalWorX requires minimal administration, and is designed for simplified configuration.

ICONICS Productivity Analytics is also a part of GEO Productivity software, which provides Overall Equipment Effectiveness (OEE) and downtime information through real-time data aggregation and connectivity to multiple data sources. Productivity Analytics helps to establish context with KPIs and deliver business intelligence throughout an organization.

Another component of the GEO Productivity software is ICONICS EarthWorX, which provides real-time visualization of widely dispersed assets, such as wind turbines placed in different geographical locations. ICONICS' SmartPin technology allows for drill down capability to view alarm conditions and status for any global location to identify, locate, view and manage assets through Web-based GENESIS64's integration with Microsoft Virtual Earth.

GEO Productivity Portal Benefits

Benefits derived for users of GEO Productivity Portals include the ability for operators to monitor and manage dispersed assets from any global remote location by using standard desktops, laptops, or PDA devices, leveraging 2D and 3D graphics to visualize the enterprise assets in real-time with live data. Managers also have the ability to define and configure security roles and permissions to allow selected access of wind turbines, pumps, motors, values or any device requiring operational assistance; as well as the ability to control, start and stop any process from a single user interface. Operators can use configurable Key Performance Indicators (KPIs) for real-time performance tracking against set targets, while also receiving real-time alarm notification to maintain operations running 24/7/ 365. Finally, managers can measure productivity by viewing real-time information to maximize global operational efficiencies via access to

production reports, making comparisons against historical information obtained from a web based portal.

In Summary, Renewable Energy is a Strong Opportunity

While still a small percentage of the overall electric generating capacity,

wind, solar, geothermal, and biomass renewable electric generation projects are coming on line at a record rate, with much new capacity anticipated. Many leading utility companies and independent power producers are moving ahead with both small and large scale projects. Carbon-neutral renewable energy will represent an increasingly important component within the world's overall energy mix as fossil fuels become scarcer and increasingly more expensive to produce and purchase over time.

To address the demand to monitor, control, maintain and measure performance of remote and mobile operations for renewable energy applications, ICONICS, via their GEO Productivity Portals, is able to provide a solution that targets applications such as alternative energy/wind power, solar, bio fuel, hydro and fuel cell. Since the cost per megawatt is currently higher for renewable energy than for coal or fossil fuel, and since wind and solar-powered electrical generation are both dependent on the intermittent nature of the wind and sun, these renewable energy sources have a great need for solutions that can help drive down the cost per megawatt, as well as provide resource availability optimization. ICONICS should continue to enhance their GEO Productivity Portals in these areas, where the ability to visualize and report data and information will have a most dramatic affect on profitability and asset utilization, and thus future project justification.

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