## Inside this document

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>3</td>
</tr>
<tr>
<td>Critical Community Energy Considerations</td>
<td>5</td>
</tr>
<tr>
<td>System risks and reliability</td>
<td>5</td>
</tr>
<tr>
<td>Environmental and climate change risk mitigation</td>
<td>7</td>
</tr>
<tr>
<td>Efficiency</td>
<td>7</td>
</tr>
<tr>
<td>Local issues</td>
<td>8</td>
</tr>
<tr>
<td>The Way Forward</td>
<td>9</td>
</tr>
<tr>
<td>Call to Action</td>
<td>10</td>
</tr>
</tbody>
</table>

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In response to massive blackouts, huge conversion losses, concerns about greenhouse gas and demands for safer, renewable and improved production and delivery economics, change in the multi-billion-dollar energy production and distribution system is well underway around the world. A variety of strongly held principles and beliefs held by advocacy groups, politicians, governments, operators, investors, corporations, and consumers are driving research, pilot projects and large scale reduction in traditional energy sources, production and distribution. Changes include new types of electricity production such as solar panels, windmills, and biomass. Other developments include district heating and cooling systems connecting multiple buildings to local energy production centres and distribution.

“If one had to choose from a number of assumptions which over the past two decades had influenced the development of the global energy sector most, the majority would perhaps pick the environment and especially climate change. Renewable energy would also be at the top of the list of decisive factors. The energy sector looked different until the UN Framework Convention on Climate Change was signed in Rio de Janeiro in 1992. Since then, sustainable development has become one of the principal drivers shaping the energy future of the world. The energy sector has long lead times and therefore any long-term strategy should be based on sound information and data.”

—World Energy Resources: A Summary World Energy Council 2013

Finance professionals, therefore, have a significant role to play in data capture, analysis, interpretation and planning to provide high quality, timely and comprehensive decision support information to ensure effective and efficient deployment of new energy sources and distribution at every level and every organization. The accounting profession has its own challenges:

“Finance organizations tend to be working with technologies and systems that are less than half as effective as needed – just trying to keep up with current business methods and operations. As outward facing systems and ways of doing business change, improve, and accelerate, we see Finance organizations at risk of falling further and further behind. More data is coming in from more sources; the pace of business is accelerating; ways of doing business are changing; new markets and opportunities are emerging faster.”

—Finance at a Crossroads: The Risks of Standing Still. Saugatuck Technology

“Life is ten percent what happens to you and ninety percent how you respond to it.“

—Lou Holtz, www.brainyquote.com
In the energy sector, where the matters of scale, government policies, and local organizations scope make financial, operational planning and control systems extremely complex. Traditionally, finance professionals have and continue to have critical roles to play in both compliance and management reporting. In today’s changing world, however, understanding how things might be different and how potential financial and non-financial challenges, risks and alternatives might play out creates demands on finance professionals to play an even more critical role than they have in the past. The new role involves them in preparing analyses and projections for all decision-horizons, whether short, medium or long-term, to ensure financial, operating and compliance goals are fully understood in an integrated way. Further to the need to understand time-related planning perspectives are the concerns of different layers of analysis relative to multiple levels of government, different ownership models for production and distribution corporations, as well as scope, whether global, national, state, regional, municipal or private. Adding to the complexity of all this are considerations related to privatization in a variety of corporate forms and roles depending on different government preferences as well as geographic preferences and availability of resources.

Therefore, the modelling capability is necessary to take advantage of integrated financial and non-financial data, which is now more readily available due to modern databases, operating software, massive computing power, telecommunications and improved analytical techniques.

► [http://www.nreca.coop](http://www.nreca.coop)
With these advantages, historical, real-time current and projected, information can be rapidly assimilated and provided in an appropriate form to decision makers so they can make the best-informed choices possible. Central to management control, then, is the need to perform long-term simulation modelling and analytics to support strategic planning relative to an appropriate strategic horizon, potentially decades into the future. Based on a well-developed view of the future, annual budgets become the first year of medium-term operating plans, which may be a five-year view. After that, changes of any kind, (e.g. performance variances, market, environmental, technology) should trigger serious real time analysis performed by finance professionals to help managers make better-informed decisions to modify operational activities. Management insight should be provided by what-if analysis, simulation modeling and on-the-fly forecast updates. The information and decisions made are also used to update strategic and operating plans.

All of this creates a clarion call to increase the sophistication of finance professionals who work in all aspects of the energy sector. Together, they should establish a complete set of management control principles and practices for the industry, including the application of leading software, computing power, communications, and database technologies.

Critical Community Energy Considerations

System risks and reliability

Most of us can relate to the debilitating effects of electricity blackouts and indeed there have been major outages in northeast North America back in 1995 (human error in setting a switch), 2003 (software failure in a control center), and in Japan, in 2011, the Fukushima incident (massive catastrophic tectonic related loss of power with long-term systematic implications). These failures demonstrated a variety of concerns, related to human safety, internal operations, communications, transportation, fuel shut down, and the list goes on. Yet the causes of each event were dramatically different. Indeed, the list of power outage causes, big and small, is as long as are the risks.
Finance professionals should perform planning, analysis, and reporting relative to the following:

1. The cost of failure and remediation of production and distribution networks both within the electricity system as well as to users and the economy.

2. Cost (operating and capital) of emerging opportunities to reduce dependence on massive production and distribution networks and deployment of localized systems. Opportunities might include implementation of local wind, solar and district energy solutions.

3. Capacity, operational, Green House Gases (GHG), and financial implications associated with the shift in production e.g. there is an increase in coal-fueled production with potential GHG increases following the elimination of atomic energy production in Germany, Switzerland, Belgium and Spain. Meanwhile, other countries are eliminating coal to reduce GHG, leading to deployment of safer, localized renewable energy production.

4. Attractiveness, effectiveness and efficiency of localized renewable energy sources (wind turbines, solar panels) and considerations such as wind patterns on the effectiveness of wind turbines, coupled with local attitudes towards wind turbines, and sunshine hours on solar panels. Political pressures can also have significant influence; for example, wind turbines are heavily deployed in Sweden and Denmark, but not so much in Germany, presumably for political reasons.

5. Customer generation of electricity from privately owned wind turbines and solar panels feeding back into the network.

6. Energy storage, although presently not material in North America, is clearly advancing in Europe, where the use of giant water tanks, Aquifer Thermal Energy Storage, and geothermal heating and cooling applications are already well established. Also, other variables such as electric vehicles and the Tesla Powerwall will provide options to consumers to shift electric network draw to lower-cost times of the day.

7. District energy projects, where numbers of buildings are supplied with hot and cold water for heating and cooling purposes from a central source, are coupled with locally generated electricity. Consider that garbage is being used to produce clean and renewable energy, in Venice, Malmo, and Copenhagen, for example, using a variety of methods including combustion, pyrolysis, gasification or anaerobic digestion, and is accomplished with reduced carbon emissions and less environmental impact relative to other methods.

8. Local economics are improved by implementing district energy infrastructure as a result of creation of new jobs.
Environmental and climate change risk mitigation

Protection of the environment and climate change are high drivers of change for the energy industry, including production and distribution, planning, measuring and tracking performance and all of its financial implications in terms of energy demand Kilowatt Hours (kWh), types of energy (electric, gas, oil,) sources (atomic, coal, oil, hydro, renewable). As the purpose of planning is to ensure goals are set to prioritize resource allocation, having sustainable funding has a huge influence over the actual deployment and timing of mitigating actions.

Finance professionals should perform planning, analysis, and reporting relative to the following:

1. Deployment of sufficient localized renewable energy sources, such as wind turbines, requires decades to accomplish. Balancing policy decisions against high cost requires careful long-term planning to be viable.

2. Political exuberance for a particular solution might lead to ineffectiveness, long-term debt, high prices, and, consequently, adverse local economic impact.

3. Conservation tactics and building form (increasing number of apartments versus single family homes) drive demand for energy down from residential properties.

4. Reduction of low cost, high pollution and risky sources, such as coal, with atomic energy and renewable sources.

Efficiency

Apart from the risks already mentioned, conversion loss in massive energy provision systems is a major concern because of process inefficiency. Conversion and distribution of source energy (e.g. coal, oil, or natural gas) into consumable electricity at the point of use can lead to losses of as much 67% of the original input energy value. For example, of the 100% energy in carbon fuel, such as coal or natural gas consumed in a generation plant, only 33% of the energy remains by the time it is processed.
You might consider the implications of that fact on the merits of operating a gasoline fueled car versus electric regarding efficiency, financial and GHG production. You might also consider the advantages of locally produced renewable or atomic energy versus carbon fueled.

In addition, large scale electricity storage is not financially viable. This results the need for off-peak power pricing strategies, sale of electricity below cost during periods of low demand shutting down generation plants. Excess generation sometimes results when renewable energy sources, such as windmills and solar panels, come on line due to favourable weather conditions, or when certain power plants, such as nuclear, can’t be throttled back due to their intrinsic design.

Local issues

In the United States, three major market activities include generation, transmission, and distribution, which engage thousands of organizations. Approximately one-third of organizations are involved in generation, while the rest are involved in transmission and distribution. Two-thirds are publicly owned, and of the remaining 1200, about 900 are a rural member (customer) owned cooperatives and about 250 are privately (investor) owned. Each organization has its governance model, leadership priorities and operating characteristics and therefore each can improve their performance using leading financial planning, analysis, reporting practices and technologies.
The Way Forward

Begin with automation of budgeting and financial reporting. Progress is being made by improving finance function practices in the energy field.

For example:

Electric Power Board (EPB) of Chattanooga is one of America’s largest publicly-owned electric power providers, which has also engaged in telecommunications by providing the gigabit internet speed service to homes, providing access to television and telephone services utilizing a community-wide fiber optics network.

Originally implementing Corporate Performance Management (CPM) software, Prophix, purely as a budgeting package, Electric Power Board (EPB) now uses Prophix to produce all of their financial reports, which are subject to strict federal regulations.

Benefits to using CPM software:

- Reduced monthly closing cycle to 5 days from much more in the past
- Improved consolidation and reporting processes
- Streamlined budgeting tasks
- Interfaces with Electric Power Board’s Oracle G/L via ODBC connection, automatically importing their numbers on a daily basis

CPM is used to track operational and financial performance data on a daily basis.

Many organizations use CPM automation to track actual results to ensure:

- As variances from plan arise, finance professionals can assess the likely impact of new factors on long-term objectives, so that decision makers are fully informed about the financial implications of different choices, and what risks, associated probabilities and compliance concerns are involved so they can make fully informed choices.

- Record keeping is accurate, complete and timely, to guarantee that investors, members, the public and regulators are satisfied that organizations are doing what is expected of them.
Others use CPM to:

- Prepare plans, budgets and forecasts of revenue and profitability by customer and service.
- Perform global/national/local competitive benchmarking analysis.
- Plan and monitor operations and network performance in real time with user-specific dashboards.
- Plan and analyze:
  - Global and country level
  - Mid-level (state)
  - Municipal level
- Reduce dependence on spreadsheets for short-/medium- and long-term planning and analysis.
- Automate reporting and control:
  - Compliance
  - Performance reporting – management and compliance
  - Management Control
  - Audit trail
- Model distribution and generation economics.
- Perform simulation modeling: Initiative financials and comparisons to traditional sources.
- Automate analysis of:
  - Pricing decisions – decoupling from cost
  - Cost projections
  - Budgeting
  - Risk planning, e.g. storm/adverse weather

Call to Action

It is clear that the energy industry, with all of its working parts (production, transmission, and distribution), is extremely important, for consumers and in relation to its environmental impact. At the same time, the energy industry is becoming increasingly more complex in response to demands for increased safety and reliability, reduced risk and pollution. Change is occurring at a rapid pace. What is not clear is whether finance professionals across the industry are uniformly using up-to-date planning, analysis and reporting software, telecommunications and financial methods to ensure long-term financial optimization/sustainability to achieve social and environmental goals.

It is time for energy industry finance professionals to collaborate at every level and in an integrated way to achieve long-term performance goals.
About Prophix

Prophix develops innovative software that automates critical financial processes such as budgeting, planning, consolidation, and reporting—improving a company’s profitability and minimizing its risks. Thousands of forward-looking organizations in more than 90 countries use software from Prophix to gain increased visibility and insight into their business performance.

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Community Energy for a Sustainable Future: The Role of Finance Professionals