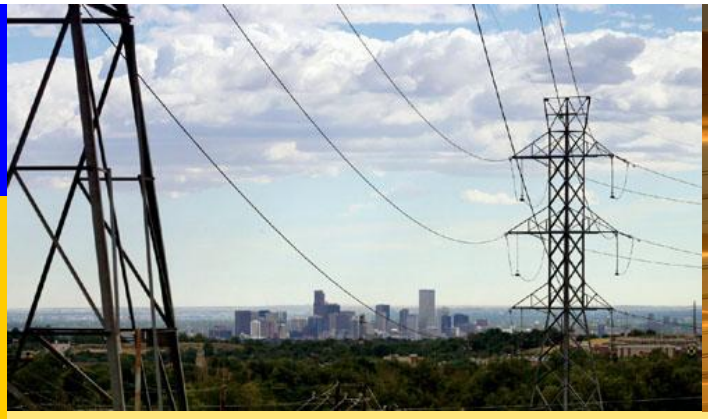

Energy Transmission and Distribution

David Callahan and Chuck Luna

The Rocky Mountain Land Use Institute

Sustainable Community Development Code

Research Monologue Series:

Energy

RMLUI

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About the Research Monologue Series
The Sustainable Community Development Code, an initiative of the Rocky Mountain Land Use Institute, represents the next generation of local government development codes. Environmental, social, and economic sustainability are the central guiding principles of the code. Supporting research for the code is represented by a series of research monologues commissioned, presented and discussed at a symposium held at the University of Denver in September of 2007. RMLUI and the University of Denver's Sturm College of Law extend its gratitude to the authors of the papers who have provided their talents and work pro bono in the service of the mission of RMLUI and the stewardship of the creation.

About the Authors

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*Cover Pictures from
www.denverpost.com/opinion/ci_4525454--Power lines and City of Denver
http://www.freefoto.com/images/13/18/13_18_63---Power-Lines_web.jpg

"Adapt or perish" is a Darwinian maxim that Sinclair Lewis' George Follanbee Babbitt would have done well to remember.[1] Unfortunately, Babbitt's world view was a confusion of platitudes borrowed largely from the Horatio Alger novels of the character's youth. Unable to see beyond the current zeitgeist, Babbitt's world changes and he is unable to sustain that world for two reasons. First, he lacks the ability to see that people and forces outside of his rather limited field of vision sustain his world. Second, he lacks the ability to understand that the order of that world is maintained by change. His world view is a Polaroid, not a moving picture. In this, Mumford would see plainly that banker Babbitt lacked the vision to view his world as an organism, and this lack of vision would lead to his downfall. This static Babbitt approach may be analogous to some of today's less progressive approaches to managing the world's ever changing demand for energy in an environmentally and economically sustainable manner.

Defining sustainability in the field of energy distribution

The definition of *sustainability* has been the subject of debate for over 20 years. The term has gained more attention in recent times, especially as the idea of global warming has gained credibility. For the sake of expediency and simplicity, this paper will accept the Brundtland Commission Report (1987[2]) definition, which described sustainability as, "…development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Taking sustainability to the level of energy distribution requires properly evaluating the affect of any new utility (transmission line, power generation plant, substation, or other major facility) on the environment, the economy, and social equity.

Status

Current U.S. energy use faces serious challenges. Despite historically high energy prices and continued concerns over energy security, air quality and global climate change, energy demand continues to grow. Demand can be attributed to many factors, although its management comes down to what the people want. Today we are living in a world where consumerism is prevalent. Technology and the internet have made access to merchandise previously unavailable to the consumer easier to purchase. This is further fueled by savvy marketing that bombards people with messages that we should consume more. Energy supply and demand and protecting the environment require a shift away from consumer materialism, or at the very least, a new paradigm in energy consumption. What is more, we need to stay mindful that decisions made today will either help deal with these challenges more effectively, or complicate the ability to secure a more environmentally sensitive and stable economical energy future.

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[1] The novel behind the name, *Babbitt* is Sinclair Lewis' classic commentary on middle-class society. George Follanbee Babbitt has acquired everything required to fit neatly into the mold of social expectation—except total comfort with it. Distracted by the feeling that there must be more, Babbitt starts pushing limits, with many surprising results.

[2] World Commission on Environment and Development. United Nations. Convened in 1983.

When Al Gore, Newt Gingrich, Arnold Schwarzenegger, and insurance giant Lloyd's of London all agree on something, it's obvious that a new wind is blowing. No industry feels this more acutely than energy. Energy companies are not only faced with the challenge of upgrading an aging infrastructure, but also planning for growing energy demand in an environmentally and cost effective manner. A wide range of customers advocate for maintaining affordability yet increase their demand for energy through poor or nonexistent conservation practices and added usage. Adding further to the complexity, there are now more local and state site and permitting regulations as well as federal requirements to access the various financing sources necessary to construct new energy facilities. The combination of planning, siting, financing and permitting requirements increase the timeframe and cost to bring to market this necessary, and often taken for granted, commodity. Public involvement has also taken on added importance in the permitting process. With more access to a broader range of information, today's environmentally conscious public has become another watchdog to insure that energy facilities properly mitigate any significant environmental impacts.

Like most large companies, utilities must also answer to shareholders and/or boards. Employees are entrusted to manage costs effectively and deliver allowed rates of returns and profits in a responsible manner. With the combination of local, state, and federal requirements, public oversight and business demands, any change to development codes that can be enacted to reduce the cost of siting and permitting could be perceived by all as a much added benefit.

Are Local Land Use Codes Slow to React to Sustainability?

Just as Babbitt was unable to envision solutions outside his "box" of understanding, traditional land use planning education does not equip planners to consider gas and electric planning as part of the planning repertoire. Land use planning theory and practice doesn't reach down to the level of utility planning. Rather, it concerns itself with properly defining public interest, the role of values, ethics, advocacy, feedback, rationality, positive and normative planning, and other esoteric concerns.

If planning theory is too broad to be of help, planning practice is too pragmatic. Planning practitioners must respond to the daily reality of public concerns about development in the intensely political environment of the local community. The most important planning tool available to practicing planners, the comprehensive plan, typically references transportation, water, wastewater, and storm water infrastructure, but neglects to address gas or electricity distribution. Whether an oversight or purposeful, it is entirely understandable. Most electric and gas companies are private entities, and the additional burden of incorporating the private interest of a utility company into a document that otherwise does not go so far as to locate specific land uses is politically risky. Especially because the general public tends to view power generation and distribution as having a blighting influence. It is one thing to call out in bubble diagrams the general location of residential, commercial and industrial areas, but quite another to specify the location of a possible substation, power plant, or high voltage electrical line.

Theoretical planning practice notwithstanding, there is nonetheless a rational basis in state law to include electric and gas distribution planning into the comprehensive plan. In Colorado, for example, the Colorado Revised Statutes 31-23-206 provides in pertinent part that the duty of the planning commission (in developing the comprehensive plan) includes but is not limited to making recommendations for:

> (c) The general location and extent of public utilities terminals, capital facilities, and transfer facilities, whether publicly or privately owned or operated, for water, light, sanitation, transportation, communication, power, and other purposes, and any proposed or projected needs for capital facilities and utilities, including the priorities, anticipated costs, and funding proposals for such facilities and utilities.

Relative to Colorado, there appears to be little to preclude the inclusion of electric facilities in regional and local comprehensive plans. Despite the awareness of the need for these facilities, there is a seeming reluctance to proactively include utilities at the planning table. This after-the-fact approach can lead to unnecessary and protracted discussions relating to siting and permitting, versus proactive discussions relative to how utilities can partner with governing bodies and the public to craft “comprehensive” land use plans to meet the needs of all concerned.

Transmission and distribution lines are necessary to deliver electricity to the customer. In simplistic terms, substations are the facilities that provide the interconnection between transmission lines transporting electricity from generation sources and reduce high voltage electricity to consumer levels. At the same time the comprehensive planning process is identifying the desired location of residential, commercial and industrial areas, it is also possible to generally forecast energy demand and the location and of timing of growth based on several factors such as, historical electric usage by market sector, density of development, and historic and forecasted market trends. Historic and future market trends will require the collaboration of public and private entities as well as economic and market experts.

Armed with this information, it will improve decision-making in forecasting electric demand (compared to existing supply), predict facility need by general location, and determine transmission and distribution requirements. Once known, facilities can become an inclusive component of the planning process and final plan. Development guidelines can be used to provide review and approval processes and performance standards. From a sustainability and conservation perspective, during the analysis phase of the comprehensive planning process, forecasted electric demand can be used to prepare alternatives to reduce demand, identify alternative energy sources, and building performance standards.

How to Avoid Babbitt’s Dilemma

There are various means to improve energy sustainability. However, the single most efficient method of improving energy sustainability is to reduce the need for it in the first place.

According to the U.S. Department of Energy and the U.S. Environmental Protection Agency's report titled the *National Action Plan for Energy Efficiency***,** improving the energy efficiency of homes, businesses, schools, governments, and industries—which consume more than 70 percent of the natural gas and electricity used in the country—is one of the most constructive, cost-effective ways to reduce energy demand. Increased investment in energy efficiency in buildings and industries not only lowers energy bills, reduces demand for fossil fuels, helps stabilize energy prices, and enhances electric and natural gas system reliability, but also reduces air pollutants and greenhouse gases. Again, according to the report above, many state and regional studies have found that pursuing economically attractive, but untapped energy efficiency, could yield more than 20 percent savings in total electricity demand nationwide by 2025. These savings could help cut load growth by half or more, compared to current forecasts. Savings in direct use of natural gas could similarly provide a 50 percent or greater reduction in natural gas demand growth. Potential varies by customer segment, but there are cost-effective opportunities for all customer classes.

Energy demand planning should be performed on a broad, regional basis, so that infrastructure placement can be based on a comprehensive evaluation of future growth. Broad-based wholesale markets can create impacts over wide geographic areas not previously considered comprehensively in power system planning. Grid modifications in one area often affect the performance of the grid in other areas, and such modifications can have significant economic impacts on market participants outside of the immediate area. Consequently, planning entities should be organized on a regional basis in order to assess needs, evaluate impacts, and provide effective interregional coordination more efficiently and provide a better environmental safeguard. Simply stated, "plan regionally, implement locally."

However, improving energy efficiency is only part of the equation. Heightened environmental concerns will continue to increase public scrutiny of power generation plants, transmission lines and distribution facilities. Add to that the challenges of maintaining affordability to the customer, finding methods and means to manage the large investments required for new energy infrastructure, and security issues, and it is clear that planners and local governments must invite utilities to the planning table to consider renewable energy sources and change existing energy paradigms from one of unchecked growth to one that is more considerate of affordability and sustainability.

Adaptation is not defeatism. Rather, it is simply prudent to think about policies that prepare for changing times. This may mean setting different building regulations or changing land use regulations and current planning practices.

Land Use Code Strategies:

Removing Obstacles

1. Streamline the development review process for energy facilities
2. Reduce costs for siting and permitting requirements

Incentives

1. Create economic incentives for distributed renewable energy sources

Regulations

1. Incorporate electric and gas transmission and distribution facilities in comprehensive plans and development codes
2. Apply development guidelines in review and approval processes and performance standards

Strategic Success Factors

1. Modify the comprehensive planning process to include the siting of energy facilities, much as is done for a master water and sewer plan, or a parks and open space plan
2. Implement energy planning on a regional level
3. Communicate the benefits of, and opportunities for, energy efficiency and conservation
4. Provide sufficient, timely, and stable program funding to deliver energy efficiency where cost-effective