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# **TOMPKINS COUNTY ENERGY AND ECONOMIC DEVELOPMENT TASK FORCE**

*Final Report, June 13, 2016*

Prepared by the Task Force, with support from Tompkins County  
Area Development and Planning Department staff



## **Energy and Economic Development Task Force**

Late in 2014, County Planning Commissioner Ed Marx and Tompkins County Area Development Director Michael Stamm formally committed their organizations to collaborate on addressing long-term and immediate energy needs and emissions in ways that contribute to a vital local economy.

In a co-authored document, a pledge was made to bring “a broad variety of voices to the discussion of community goals and strategies, as well as tangible steps to meet both energy and economic development goals.” It was also agreed that “discourse in the community around the topics of economic development, energy, and greenhouse gas emissions must be based on clear and accurate information and occur in a civil and respectful manner.”

Recognizing the clear need for such informed discourse, and the desirability of an active engagement with members of the local business community, Legislature Chair Mike Lane asked Michael Stamm to consider creating a TCAD work group based on these principles and to work with County staff to define how such a group would be organized and where its focus would be most effectively directed.

Over the past year, this 19-person task force, chaired by Sciencenter Executive Director Charlie Trautmann, and made up of a balanced mix of individuals with expertise in renewable and traditional energy resources, business operation, real estate development and other aspects of the community has been meeting to develop this report and recommendations.

Task Force Members were:

- Peter Bardaglio, President, Black Oak Wind Farm & Coordinator, TC Climate Protection Initiative
- Robert Bland, Associate Vice President of Energy and Sustainability, Cornell University
- Mike Cannon, Vice President Commercial Banking, Tompkins Trust Company
- Graham Gillespie, President, HOLT Architects
- Jerry Goodenough, Chief Operating Officer, Upstate New York Power Producers
- Melissa Kemp, Director of Commercial and Utility Development, Renovus Solar
- Michael Lane, Chair, Tompkins County Legislature
- Glenn Morey, Legislator, Tompkins County Legislature
- Martha Robertson, Tompkins County Legislature
- Ken Schlather, Executive Director, Cornell Cooperative Extension of Tompkins County
- Herman Sieverding, Vice President of Integrated Acquisitions and Development Corporation
- Jennifer Tavares, President, Tompkins County Chamber of Commerce
- Mike Thorne, Superintendent of Public Works, City of Ithaca
- Charlie Trautmann, Executive Director, Sciencenter
- Irene Weiser, Councilwoman, Town of Caroline
- Steve Welliver, Executive Vice President, Welliver McGuire Inc.
- Joe Mareane, County Administrator, Tompkins County (non-voting member)
- Ed Marx, Commissioner, Tompkins County Planning Department (non-voting member)
- Michael Stamm, President, Tompkins County Area Development (non-voting member)

## **The Support Team**

- Martha Armstrong, VP & Director of Economic Development Planning, TC Area Development
- Katherine Borgella, Deputy Commissioner, TC Planning Department
- Judy Rowe, J.A. Rowe Consulting and Ina Arthur, Office Manager, TC Area Development

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# Executive Summary

In 2014, a proposed gas distribution pipeline along West Dryden Road sparked community debate over the apparent conflict between Tompkins County's economic development and greenhouse gas (GHG) emissions goals. The County Legislature and Tompkins County Area Development recognized the need to create an environment for productive discourse and development of practical solutions to meet both goals.

The Energy and Economic Development Task Force served over a 12-month period and developed eight key recommendations and related tactics. The intent was that the recommendations could be initiated within the next five years, would be under local control, would advance the County's GHG emission goals, and would support the County's economic development goals:

- 1. Work with the Public Service Commission and NYSEG to reduce dependence on natural gas, while supporting the ongoing Energy Smart Community collaboration with NYSEG to support increased dependence on distributed energy resources**
  - Tactics include: meet with the Public Service Commission and NYSEG to assess alternatives to the West Dryden Road pipeline and establish a model process to reduce use of gas.
- 2. Provide secure and reliable energy to support local industrial processes**
  - Tactics include: leveraging resources of Cornell University, local industry and NYSERDA to help transition industry processes to non-fossil fuels.
- 3. Reduce fossil fuel energy use in commercial and industrial buildings**
  - Tactics include: create a program to assist businesses with planning and financing energy improvements and develop financial tools that support the incremental costs of making energy investments.
- 4. Develop the energy infrastructure needed to support an energy system that primarily relies on renewable energy resources**
  - Tactics include: work with NYSEG to accommodate large amounts of renewable generation; promote a REV type program for natural gas; zone for renewable energy development.
- 5. Reduce fossil fuel use in transportation**
  - Tactics include: develop a community-wide Transportation Demand Management program and encourage major employers to adopt electric vehicle-friendly policies.
- 6. Develop housing in ways that limit energy use both in buildings and transportation**
  - Tactics include: create an energy rating system for housing; enact land use codes that promote density in "smart growth" locations; resolve the split incentives problem between residential building owners and tenants to improve energy efficiency in rental buildings.
- 7. Educate decision makers, contractors, developers, and the public at large on critical facets of energy and economic development**
  - Tactics include: create materials and sponsor workshops and forums to help forge a common understanding of energy and economic development issues.
- 8. Implement the strategies and evaluate progress regularly**
  - Tactics include: consider these recommendations in developing the Tompkins County Energy Strategy Update and convene a task force at least once a year to review progress.

The EEDTF proposes that these actions – if taken together - will support economic growth in Tompkins County while simultaneously meeting the County's goals for reduced GHG emissions.

## INTRODUCTION

In 2014, a proposed gas distribution pipeline along West Dryden Road sparked considerable community debate over the apparent conflict between economic development and the Tompkins County Legislature's (TCL) stated goal of reducing greenhouse gas (GHG) emissions at least 80%, compared to 2008 levels, by 2050. As a result of this debate, the TCL and the community's economic development agency, Tompkins County Area Development (TCAD), recognized the need to create an environment where a productive discourse could take place and practical solutions to meet both goals could be developed.

TCL asked TCAD to convene the Tompkins County Energy and Economic Development Task Force (EEDTF) to address the issue during 2015 and 2016. The group, listed on the inside cover, was diverse and broad-based. It included 16 voting members representing the Tompkins County Legislature, climate advocacy, housing and industrial development, Cornell University, construction, renewable energy, the City of Ithaca, and various other constituencies. The group included three non-voting members, the President of TCAD, the TC Commissioner of Planning, and the Tompkins County Administrator, plus support from TCAD and Tompkins County Planning Department (TCPD) staff and a consultant who specialized in coaching high-performance teams. The group was chaired by Charlie Trautmann, executive director of the Sciencenter and adjunct associate professor at Cornell's School of Civil & Environmental Engineering.

**Charge and scope.** The EEDTF charge, included as Appendix G, was to recommend short-term actions that could be initiated under local control within the next five years that would, in turn, advance the TCL's GHG emissions goals while, at the same time, also advancing economic development in Tompkins County.

The recommendations of the Task Force were to consider the triple bottom line (a balance of environmental, equity, economic factors). The Task Force was also charged with coordinating its efforts with other ongoing or planned energy projects, such as the Tompkins County Energy Roadmap (a long-term planning effort completed in early 2016) and an update of the Tompkins County Energy Strategy (to begin in mid-2016). Appendix C contains a Glossary of Energy-Related Projects.

To keep its work focused, there were several exclusions in the charge. While the EEDTF took these exclusionary issues into consideration, it did not try to specifically resolve longstanding issues that could not be realistically addressed in its 12-month timeframe, such as housing supply (specifically for low-moderate income residents), transportation as related to rural development, and the re-powering the AES Cayuga power station in Lansing with natural gas.

**Process used by the Task Force.** The EEDTF held a series of 18 meetings from June 2015 through May 2016. The initial meetings focused on Task Force members learning about various aspects of energy and economic development, taking advantage of its own member expertise along with that of outside experts. Many members contributed their expertise, experience, and research. The group held a public input session on October 27, 2015, which was attended by 50 individuals. Subsets of the group studied specific topics, took field trips to energy installations, such as Cornell's Combined Heat and Power system, the Franziska Racker Centers heat pump system, and the NY Independent System Operator in Albany. Various members of the group also interviewed experts.

**Acknowledgments.** The EEDTF gratefully acknowledges the efforts and support of many individuals and groups without whose support its work would not have been possible. TCL

convened the group, had three members participate and provided administrative support. TCPD and TCAD participated fully in the meetings and provided both funding and administrative support. Judy Rowe of Judy Rowe Consulting helped the group find early common ground and helped develop productive working relationships. The Sciencenter and Tompkins County Chamber of Commerce contributed their facilities for meetings. A number of outside experts gave freely of their time in educating the group, including Fernando de Aragon, Scott Bochenek, Gordon Boyd, Brian Conroy, Michael Eastman, Ian Shapiro, and Brice Smith.

The EEDTF thanks its ex officio members for their time and expertise: Ed Marx, Michael Stamm, and Joe Mareane. The Task Force is particularly indebted to Martha Armstrong (TCAD) and Katie Borgella (TCPD) for their dedication, long hours, and organizational expertise. Additionally, the Task Force would like to acknowledge the time, care, and expertise that Charlie Trautmann, chair of the group, brought to the discussions. His ability to home in on key points and listen to concerns expressed by the members was much appreciated and critical to the work of the Task Force.

Finally, we would like to acknowledge all members of the Task Force for their efforts on behalf of the residents, businesses, and visitors of Tompkins County. While individual members have deeply held personal views on many aspects of climate change and economic development, they each strove to bring their best creative thinking to the Task Force and worked to achieve a consensus document with recommendations to make the community stronger as we embrace this transition to a new green energy economy.

## **OVERVIEW**

The total gross product of Tompkins County is about \$7 billion, with 48% associated with local goods and services and 52% associated with Traded Sectors, or businesses providing products to be sold outside the county. Education (27%) and Manufacturing & Hi-Tech (18%) are Traded Sectors and together represent 45%, or nearly one-half of the entire gross product of the County (TCAD, 2015-2020 Economic Development Strategy)

With respect to energy supply, Tompkins County is in a state of transition. Natural gas prices are currently extremely low because fracking has increased the supply of inexpensive natural gas from the Marcellus shale and other U.S. geologic formations. Coal is rapidly declining as a fuel for power plants because of its cost and environmental impacts.

Half of the power used by New York State is generated by gas-fired power plants. Gas is currently the primary source of fuel for heating homes and businesses in the County, with propane used in many rural homes.

Gasoline and diesel (both fossil fuels) power the vast majority of vehicles on Tompkins County roads. These liquid fuel prices are approximately one-half of what they were only a few years ago. Heat pump technology, used for heating and cooling buildings, has progressed and the installed base is increasing because of technological advances, incentives and local expertise in design & installation, along with a growing awareness of the need to reduce fossil fuel use globally.

The cost of wind and solar power has decreased dramatically, and the installed base is increasing rapidly. According to NYSERDA's PowerClerk website, Tompkins County is a leader in New York in terms of solar power with 1,040 PV systems installed at residences and small commercial properties and over 13 MW of solar power generation capacity including the growing number of

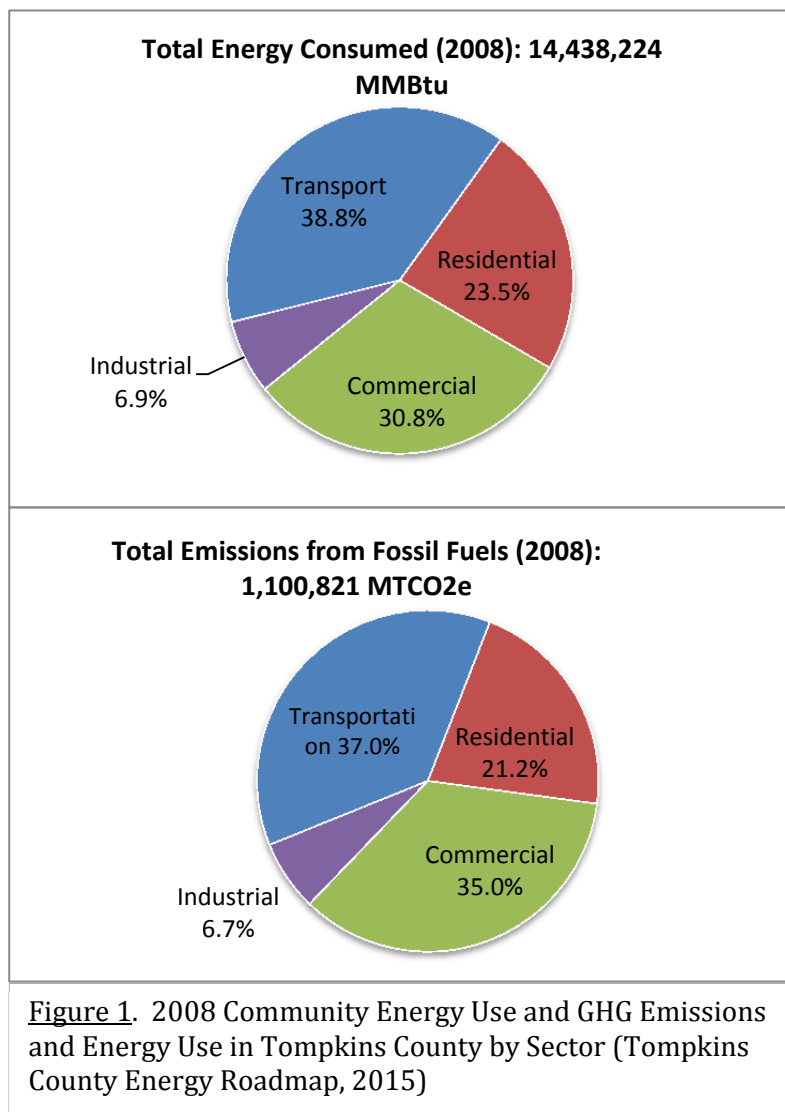
commercial and industrial projects. Solar is seeing strong growth in all sectors at this time and the expectation is that it will continue robust growth into the future.

Meanwhile, there are long-standing concerns about fossil fuel use because of its effect on climate. The Tompkins County Legislature has passed a plan calling for at least an 80% reduction from 2008 levels of GHG emissions by 2050, as well as a more immediate goal of at least a 20% reduction in GHG emissions by 2020. New evidence of the accelerating effects of GHG emissions on climate have led many scientists to move up the proposed timeframe for reductions. Cornell, for example, has moved its carbon-neutral goal forward to 2035, and many in Tompkins County advocate reaching a 100% reduction in emissions before 2050.

**Energy in Tompkins County.** Figure 1 summarizes the relative GHG emissions and energy used in 2008 by sectors in Tompkins County.

Figure 1 implies that to achieve an 80% reduction of GHG emissions:

- Major changes will be needed in the transportation sector (a sector currently dominated by fossil fuels)



- Major improvements in building energy efficiency will be required in both the residential and commercial sectors, as well as deployment of significantly different space heating technology.

**Tompkins County Energy Roadmap: Evaluating Our Energy Resources.** The Tompkins County Energy Roadmap evaluated community energy resources and developed scenarios that meet both projected community energy needs and the greenhouse gas emission reduction goal of an 80% reduction from 2008 levels by 2050. The results were intended to accomplish two objectives: 1) to provide concrete evidence that achieving emission reductions is possible and portray a number of ways that might be achieved; and 2) provide direction for near and long-term actions that can be taken locally to move us forward toward our goal.

It is directional in nature and is meant to identify local opportunities for the community

to achieve its goals. The intent is for the analysis, conclusions and recommendations in the Roadmap to help update the County’s Energy Strategy during 2016. The goal of this update is to identify concrete action steps that can be taken to reach the 2050 goal. The Energy Roadmap links directly with the EEDTF effort by providing data and a long-term outlook, in comparison with the short-term, five year outlook of the EEDTF.

The Roadmap presents three alternative energy scenarios that utilize local potentials to reduce greenhouse gas emissions by 80% and meet the County’s projected energy needs in 2050. The three scenarios represent a wide range of conditions that reflect the divergent ways that energy systems might evolve in the next 35 years but all rely on high levels of efficiency improvements in both buildings and transportation, deployment of large amounts of local renewable energy, and varying degrees of grid-supplied electricity generated outside of Tompkins County, along with markedly reduced levels of thermal energy from natural gas.

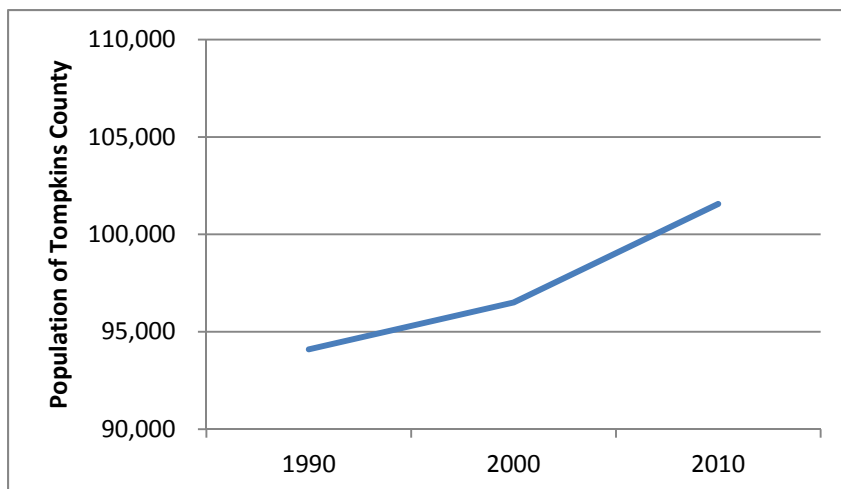
The Energy Roadmap does not propose a “preferred scenario,” but instead sets out alternative routes to reaching the 80% GHG reduction goal, including using no natural gas (the “All Electric” scenario) and maintaining a significant amount of natural gas (the “Maintaining Half 2008 Levels of Natural Gas” scenario). It then assumes that any of a number of possible scenarios in between those two “bookends” could allow the county to achieve its energy goals. One intermediate scenario was created, and identified as the “Mixed” scenario.

The Energy Roadmap is intentionally designed to be inspirational, demonstrating that it is possible to achieve the GHG emissions reductions required to avoid the most catastrophic effects of climate change. Moreover, the report demonstrates that it is possible to achieve this result in a community having relatively modest energy resources of its own.

The EEDTF made use of the research done by the Energy Roadmap project and applied it to the generation of near-term solutions that could be implemented under local control.

**Economic Development in Tompkins County.** Figures 2 and 3 show population and employment in Tompkins County over time. Tompkins County’s vision for the future, as stated in the most recent economic development strategy created by TCAD, includes:

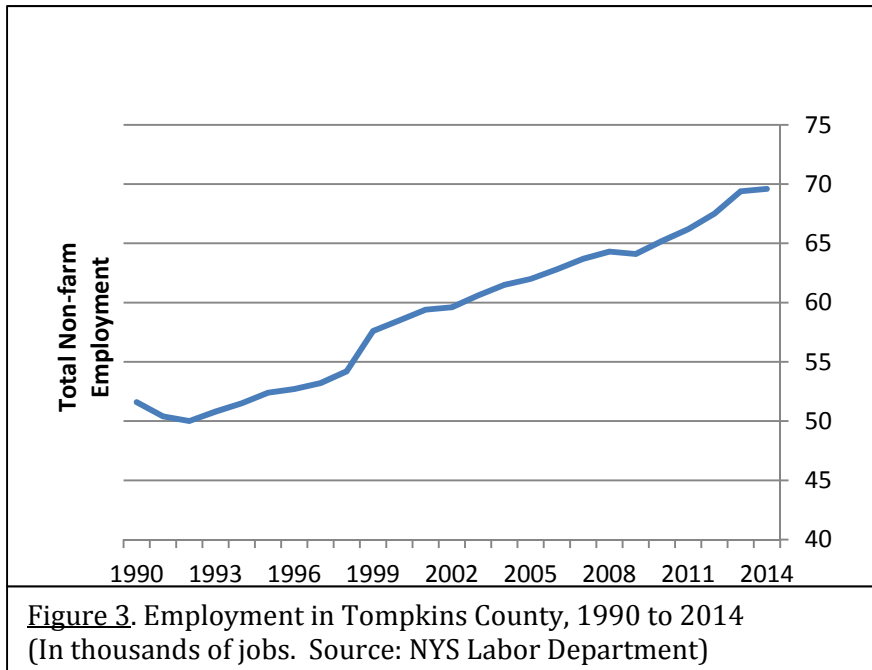
- A diverse and growing economy that offers good paying jobs, career development, and investment opportunities.



- Safe, healthy communities with vibrant cultural resources.
- A thriving region reflecting commitments to investing locally and protecting the natural environment.

**Figure 2.** Population of Tompkins County for the past 20 years. (Source: U.S. Census, includes students)





- An outstanding international reputation as a place where people want to live, work, play, visit, and invest.

The County’s strategy for promoting economic development, as implemented by TCAD and its partners, consists of offering business planning, financial, site location and workforce services to both existing businesses and new businesses started by local entrepreneurs. The focus is on manufacturing and high tech companies that create high-quality job opportunities, higher

wages, better benefits, and increased opportunity for advancement.

In summarizing its goals for economic development, TCAD envisions real economic growth, aggregated across all sectors of the economy, of about 1% annually.

### **KEY ISSUES RELATED TO ENERGY, GHG EMISSIONS, AND ECONOMIC DEVELOPMENT**

In searching for solutions to meet Tompkins County’s goal of reducing GHG emissions 80% by 2050 while simultaneously advancing economic development in the County, the Task Force initially heard from a variety of experts who brought the group to a common level of understanding around energy sources and end uses. This section summarizes the key issues involving energy and its relation to economic development.

#### **Natural Gas in Tompkins County**

Because of the public controversy over the West Dryden Road Pipeline and the continued/expanded use of shale gas in the county, natural gas received considerable attention from the Task Force and in this report. The Task Force recognizes the scientific evidence that methane is a significant greenhouse gas whose emissions must be minimized as soon as possible.

The Task Force also recognizes that a lack of economically competitive and readily available alternatives to natural gas supply in Tompkins County, whether real or perceived, has resulted in the loss of high quality employment opportunities and significant private sector investment. It has also resulted in the use of alternatives for heating commercial facilities, including propane, electricity and air-sourced heat pumps.

The Tompkins County Energy Roadmap, described above, concludes that: Transitioning to renewable sources of energy is critical to address GHG emissions and achieving emissions goals will require development of renewable energy systems to supply the majority of our energy needs. By

2050, we should “Reduce natural gas use by at least 50% from 2008 levels, or 21 million therms, by reducing demand for thermal energy, deploying significant numbers of ground and air source heat pumps, and utilizing biomass resources.” Further, the Roadmap cautions that while it may be possible to maintain up to 50% of 2008 levels of natural gas use and still achieve GHG emissions goals, that “would require achieving levels of efficiency and deployment of local renewables that would be extremely challenging. In addition, maintaining such a level of natural gas use will require addressing fugitive methane emissions from the production and transmission of natural gas.”

The Tompkins County Energy Focus Areas study is currently being conducted by the Tompkins County Planning Department and Tompkins County Area Development, with cooperation by NYSEG. The results of this study (initial results due in second quarter of 2016) should provide additional data on energy supply and demand in several geographic areas that are deemed critical to the economic development of the County to inform planning for future energy needs and infrastructure. This work will have particular relevance to natural gas capacity and planning for future energy supply.

The Task Force advocates for immediate actions to help the County achieve its stated goals of 20% GHG reduction by 2020 while also addressing economic development goals while stepping up the rate of conversion to renewable energy sources as quickly as feasible.

The push towards a renewable energy future assumes that Tompkins County will make the transition from electricity generated by fossil fuels to electricity generated from renewable sources. The grid will need new renewable generation capacity to replace: a) existing demand for electricity that is generated by fossil fuels, b) the increased demand needed to replace natural gas used for space heating, c) the electricity needed to replace natural gas in some industrial processes, and d) the electricity needed to power electric vehicles.

The Task Force believes that sustained local efforts, as outlined in this report, coupled with New York State’s commitment to convert power generation to renewable sources over time, can proceed in parallel and in a similar time frame to yield a significant reduction in GHG emissions within the next 10 - 20 years, while simultaneously supporting economic development in Tompkins County.

**West Dryden Road Pipeline: Utility and Distribution Framework.** The most urgent case-in-point highlighting the tension between short- and long-term GHG emissions and economic development goals is the proposed Lansing/Freeville Gas Reinforcement Project, also known as the West Dryden Road pipeline.

The Task Force understands that its recommendations are unlikely to affect current *planning activities* for the pipeline project; however, *the Task Force is committed to an energy future that reduces the use of fossil fuels*, and eventually makes them obsolete. From this perspective, the West Dryden Road project is seen by a number of its members as a step in the wrong direction.

In view of this apparent conflict, the Task Force has discussed seeking a way forward that meets the County’s near-term economic development goals while also putting Tompkins County on a path toward a sustainable, renewable energy future.

In its effort to support current economic development projects, both under-construction and planned, while simultaneously striving for an energy future based primarily on renewable sources, the Task Force:

1. Acknowledges that NYSEG has the responsibility to prevent disruption of service to current users and businesses that have invested heavily in homes, facilities, and jobs in Tompkins County with the expectation of adequate energy supply. NYSEG, therefore, is planning to invest in new energy infrastructure.
2. Strongly advocates a series of measures that will - *as soon as possible* - put Tompkins County on a clear path toward dramatically and systemically reduced use of fossil fuels, starting now and continuing during the coming decades. Specific measures are provided under the Recommendations section of this report.

In a meeting with the Task Force, Michael Eastman, Vice President for Gas Operations with New York State Electric & Gas (NYSEG), described gas infrastructure in its Tompkins County service area. He explained that most of the gas that services Tompkins County from the Dominion pipeline passes through the Spencer Street point of delivery and the East Ithaca Feeder Station and is distributed via a distribution pipeline system designed for a static (no load) pressure of 60 psi. Engineering guidelines call for the gas pressure to drop no more than 30% throughout the distribution system as a result of demand, drops in temperature, and other factors.

The gas in the distribution system flows generally northward in Tompkins County. The pressure drops to the north as the gas is tapped from the distribution system and used by customers. In Lansing, which represents the far end of the system, the pressure currently drops by as much as 50% on cold days, which is well below the 30% maximum drop that engineers design for.

Eastman further explained that, because of the physics of gas flow, the pressure vs. flow relationship is non-linear, and that once the pressure has dropped 50% or more in the system, a relatively small additional demand can lead to essentially zero pressure (and therefore system failure) at the far end of the system. He stressed that this possible loss in gas service applies to customers within the Lansing moratorium area and the Cornell Business and Technology Park.

He said that the West Dryden Pipeline would allow for some growth, but the main reason for its construction is to prevent system failure. There has been discussion of the need to possibly expand the current moratorium on natural gas hook-ups from the Lansing area to include downtown Ithaca.

He explained that this problem has been a growing concern for 20 years, but that it was improved for a while after Cornell built its own dedicated pipeline from the Dominion line and took its demand off of the service area distribution line. He said that reducing demand in the area served by the East Ithaca Feeder Station could improve pressure concerns, too, but that it would take significant demand reductions to bring the pipeline in compliance with pressure requirements for safe and adequate service for its customers and there are not large enough consumers now served by the pipeline to make that happen very quickly. He said that there are typically 15-40 peak gas demand days per winter, with demand increasing approximately 6 times above normal, so it is very challenging to try and offset that much demand.

It is the understanding of the Task Force that NYSEG is committed to constructing the pipeline. NYSEG will proceed with the eminent-domain process, if necessary, and plans to have the pipeline in operation by late 2017.

**Concerns about Methane and Greenhouse Gas Emissions: Research and Activism.** Citizen activists and homeowners along the proposed route of the West Dryden Pipeline have many reasons for their opposition to the pipeline's construction. One of the biggest drivers is concern

over the role that methane (natural gas) plays in climate change. This concern is heightened by the fact that the methane consumed in the County now comes primarily, if not all, from hydrofracking of the shale resources in Pennsylvania. Opponents to any expansion of methane infrastructure would like to see a "line drawn in the sand" to force developers, NYSEG and others to seriously consider non-methane alternatives.

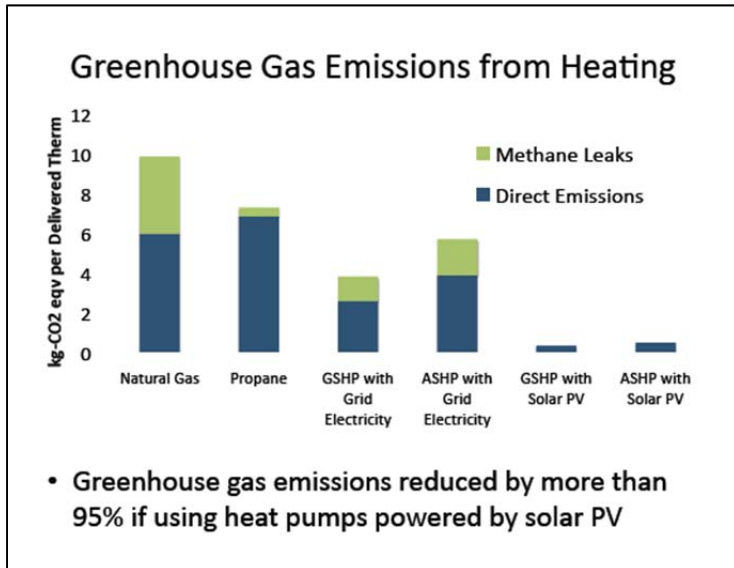
Research by local international experts Dr. Robert Howarth and Dr. Anthony Ingraffea on the topic of the contribution of shale gas on climate change have determined that there are severe consequences to the climate from using shale gas. This is due to the impacts of fugitive methane emissions associated with the hydrofracking process and leakage along the distribution system, along with the power of methane (up to 100 times CO<sub>2</sub>) as a greenhouse gas in the near term.

Howarth finds: "... In 2008, total greenhouse gas emissions from fossil fuel use in Tompkins County were somewhat more than 1.5 million tons CO<sub>2</sub>-equivalents, with 35% of all emissions attributable to methane venting and leakage and 65% from carbon dioxide. ... In 2008, virtually all of the natural gas used in the County came from conventional sources. Today, virtually all of the natural gas in Tompkins County is shale gas from the Marcellus play in Pennsylvania, with much higher methane emissions than was true for conventional natural gas. As a result, this switch in the source of our natural gas increases the greenhouse gas footprint of the County... to approximately 2.6 million tons. Methane makes up 60% of this emission estimate, and carbon dioxide only 40%. ... The take-home message is that we must reduce natural gas use in the County by a large amount if we are to meet the County's goals for total greenhouse gas emissions. ..." Excerpts from Robert W. Howarth, Ph.D., Methane and the Greenhouse Gas Footprint of Tompkins County: An Update, May 16, 2016.

"Fortunately, society does have a path forward: recent studies for the State of New York and for the State of California have demonstrated that we can move from a fossil fuel-driven economy to one driven totally by renewable energy sources (largely solar and wind) in a cost-effective way using only technologies that are commercially available today. The major part of the transition can be made within the next 15 years, largely negating the need for shale gas, with a complete transition possible by 2050." Howarth R. Methane emissions and climatic warming risk from hydraulic fracturing and shale gas development: implications for policy. Energy and Emission Control Technologies. 2015. Volume 2015:3, pages 45-54.

Tony Ingraffea has performed research documenting 57 methane leaks along 141 miles of City of Ithaca streets. He seeks additional data from NYSEG to complete the evaluation. "While the investigation found many locations of abnormal methane concentrations along the streets of Ithaca, it cannot yet associate any of those locations with the type of pipe used near those locations; it cannot determine the volume of gas being emitted near those locations nor can it sum the volume being emitted by all of them; it cannot, therefore, normalize this volume lost by the total volume being transmitted into the Ithaca district: what is the percentage of all the gas sent into the district that is being emitted unburned? These items of information are necessary to understand the state of leakage of methane from the current pipeline system under its current pressure and volume of flow, and how its leak rate might be affected by an increase in system pressure and volume of flow coming from the proposed pipeline through the Town of Dryden. It should be of further interest to the Task Force that methane leakage from the existing distribution system is NOT included in the County's current greenhouse gas emissions inventory." From A Brief Narrative for the PowerPoint Presentation Entitled, "Assessing Ithaca's Methane Emissions from Its Natural Gas Pipeline Distribution System and Point Sources", May 27, 2016.

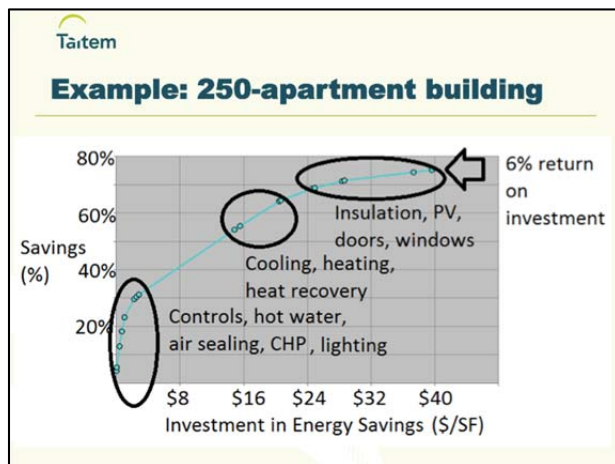
**Reducing Natural Gas Dependency: Excerpts from Two Presentations to the EEDTF on Energy and Economics for Buildings.** The Task Force learned about high performance buildings through presentations from two engineers who addressed both technology and economics. First,



Dr. Brice Smith of SUNY Cortland presented on heat pump technology that has recently evolved to be efficient in the low temperatures of Upstate NY winters. Ground source heat pumps (GSHP) outperform air source heat pumps (ASHP), but both are now more efficient than high-efficiency gas furnaces, and are economic for new construction and lifecycle replacements in older buildings.

*Graph from Dr. Brice Smith's presentation: The technology and Economics of Heat Pumps and High performance Buildings (December 3, 2015)*

Second, Ian Shapiro of Taitem Engineering presented on the energy savings and economic payback of a range of building investments from simple weatherization to deeper energy performance improvements.



*Graph: Energy investments, energy savings, and return on investment. From Ian Shapiro's presentation: Energy Opportunities in Buildings (December 9, 2015)*

- Low energy prices increases payback time, reduces return on investment
- Gas prices have plummeted
- Electricity prices are also low
- Oil prices have come down (still high)

*Slide: Return on investment for energy investments are low due to current low fuel prices. From Ian Shapiro's presentation (December 9, 2015)*

## Other Key Issues Related to Energy, GHG Emissions, and Economic Development

**Energy Use in Buildings.** As shown in Figure 1, about 50% of the energy consumed in Tompkins County is used in residential and commercial buildings. While it is not simple to segment the energy used for space heating from that used for water heating, cooking, clothes drying, and other uses, the County Energy Roadmap project estimated that 71% of building energy use was thermal and 29%

was electrical. Much of the thermal energy is supplied by natural gas in urban and suburban settings and propane in rural settings. Biomass, geothermal, air-source heat pumps, electric resistance, fuel oil and coal are fairly minor systems for thermal heat at this time.

Two key variables in building energy usage per square foot include:

- Efficiency of the building envelope (primarily insulation and infiltration)
- Type and efficiency of the heating system

It became clear to the Task Force that buildings represent a key area for reducing GHG emissions.

**Transportation.** As shown in Figure 1, roughly one-third of the energy used in Tompkins County is consumed as vehicle fuel. Almost all of this energy is, at present, supplied by fossil fuels. As noted in the Energy Roadmap, a widespread transition to electric vehicles (EVs), coupled with reductions in vehicle miles traveled, are the most likely options to significantly reduce the County's GHG emissions related to transportation. Reductions in vehicle miles traveled can be incentivized through land use, commuting alternatives, and other policy changes. The transition to EVs, if and when it occurs, will depend on many factors, such as the cost of EVs and the availability of local charging stations.

As a point of reference, EVs use about 0.3 kW-hr/mile, or roughly 3 cents worth of electricity per mile at current rates. For comparison, a car with an internal combustion engine getting 33 miles/gallon costs 6 cents per mile at current fuel prices of about \$2/gallon.

**Industrial processes.** Energy use for industrial processes, such as manufacturing furnaces and clean rooms, accounts for approximately 7% of the County's 2008 energy use. Based on the available data, other energy uses provide significantly higher leverage on GHG emission reduction. However, it is often difficult to separate heating from industrial processing, since one meter may serve both uses.

The Task Force became aware of several businesses forced to use propane rather than natural gas as an energy source. NYSEG denied these businesses access to the natural gas infrastructure because of engineering issues related to gas pressure in the distribution system. The Task Force also learned of businesses that stated that energy availability was a key factor in their decision to move production (and thus jobs) to another city or state. In an effort to better understand the causes and potential solutions of these types of problems, the County commissioned two Energy Focus Studies, which are described elsewhere in this report.

**Renewable Energy Supply.** Tompkins County is highly active in renewable energy and is considered a statewide leader in the percentage of solar installations. A total of 30-35 MW of larger renewable energy projects are actively seeking interconnection to the electric grid as of this report.

The Governor of New York recently directed the PSC to develop a standard mandating that 50% of electric energy consumed in the State will be supplied by renewable sources by 2030.

The Public Service Commission, which regulates electric energy in New York State, is pursuing a sweeping initiative to re-think the financial model for energy supply through its "Reforming the Energy Vision" program. In addition, various other projects are under way, such as microgrid development and solar energy promotion efforts.

The Task Force visited the New York Independent System Operator (NYISO) facility in Albany to get a first-hand look at how the bulk electric transmission system is managed, from generation and transmission to the substation level. This visit helped the Task Force put its efforts on behalf of Tompkins County in perspective relative to the external bulk electric energy context.

Community Choice Aggregation (CCA) has recently been approved by the New York State Public Service Commission. Aggregation of electric supply through CCA programs offers the benefit of lower and/or stable utility prices for residents. Local communities will have the option to set community energy priorities, including: use of renewable energy sources, setting up competitive bidding for residential energy options, establishing a fund for energy planning and enhancements, and contributing to the stability and reliability of the electric grid.

**Economic Development Opportunities.** While this huge transition from fossil fuels to renewable energy resources and reducing demand is daunting, there is great potential for job and business growth to capture money currently leaving our community when funds spent on fossil fuels are transferred to multi-national energy companies. Re-circulating those funds in the local economy keeps the money working for Tompkins County residents. In addition to retaining wealth locally, many green energy job opportunities should arise as we face this transition and in fact have been seen in dramatic growth at renewable and energy efficiency services companies such as Renovus and Taitem Engineering.

Looking only at fairly basic energy efficiency improvements to existing commercial buildings, based on local case studies and data, there is potential for local contractors to do roughly \$42.5 million in energy efficiency business located in Tompkins County, with about \$21 million to be spent on labor. Tompkins County is in an excellent position to kick start the energy efficiency industry in the Southern Tier because it has expertise, financing and a population of building owners who are further along in their understanding of the value of energy efficiency (and the imperative to work on this because of climate change).

**Equity Considerations.** Reducing energy demand by insulating and air sealing homes and creating more opportunities to reduce single-occupancy vehicle travel will result in lower energy bills – a particular benefit to low-income households that typically pay a higher percentage of their income on energy. A recent study from the American Council for an Energy-Efficient Economy and the Energy Efficiency for All coalition found that low-income households devote up to three times as much income to energy costs as do other, higher-income households, and that African-American and Latino households spend disproportionate amounts of their income on energy.

It will be important to keep tabs on how this report's recommendations play out in the community so that no groups are disproportionately negatively impacted by any unanticipated consequences of the recommendations. Possible impacts include raising the cost of new construction through municipalities adopting energy efficient codes that stretch beyond current State code and lowering housing sales prices for low-income households who are not able to improve energy efficiency if it becomes more valued in the housing market. We are sensitive to the community's critical housing shortage – for all income levels but especially for residents at or below median income – and do not want to exacerbate the problem by simply mandating higher energy standards, which could increase the cost of housing. With this consideration, additional supports may be needed when we ask housing developers to meet higher standards. In addition, it would help if we could resolve the split incentives problem between landlords and tenants, so that improvements to energy efficiency benefit both parties.

## WHAT WE LEARNED...

During its meetings over twelve months on topics associated with local energy and economic development, the Task Force has concluded that:

1. Relationship-building and developing common understanding and language are critical elements for achieving emissions reduction and economic development goals.
2. Improvements must be made in communicating and coordinating near- and long-term planning and GHG reduction objectives with NYSEG and local businesses, developers, and planners.
3. Businesses and developers need access to independent, 3<sup>rd</sup> party experts to advise them on energy efficiency and renewable alternatives and to help them identify energy-related financing and incentives.
4. One of the best times for developers to incorporate energy efficiency and renewable energy into their projects is *before* municipal site plan review, when they have not yet invested heavily in design.
5. The scale of this problem (climate and economy) requires solutions that are synergistic and can really move the dial on both the climate and economic development front.
6. The combined effect of low natural gas prices and the absence of a system to place a price tag on carbon emissions undercuts the financial case for the owner of an existing property to make energy efficiency improvements or convert to a heat pump or other alternative energy system. The most fertile opportunity to foster a transition to a heat pump system is when a new building is constructed, when an HVAC system in an existing building reaches the end of its useful life and must be replaced, or when the system is using coal or oil as the primary fuel. On those occasions, the full life cycle costs of the competing systems can be considered--an approach that narrows the difference in cost and may favor the alternative system. Therefore, one key set of actors who can play a significant role in shifting the building from a high carbon emission system to one that is significantly lower is HVAC contractors.
7. The costs to implement the solutions necessary to make this energy transition are expensive, and funding mechanisms need to be developed with consideration and input from both the private and public sectors.

## RECOMMENDATIONS OF THE TASK FORCE

The charge of the Task Force was to develop recommendations that:

- 1) Could be at least initiated within the next five years
- 2) Were under local control,
- 3) Would advance the County's GHG emission goals, and
- 4) Would support the County's economic development goals, and
- 5) Were focused on the nexus between economic development and energy, while recognizing that transportation and housing are also important ghg emissions contributors.

During 2015 and early 2016, the Task Force developed a large number of potential recommendations from a variety of sources, including:



- Discussions at meetings of the Task Force (including with expert speakers Brice Smith, Ian Shapiro, Gordon Boyd, Fernando de Aragon, Michael Eastman, Brian Conroy, and Tony Ingraffea, as listed in the appendices)
- Suggestions from public input sessions
- Suggestions from experts and consultants during interviews with Task Force members

The Task Force reasoned that for its recommendations to be implemented, a number of conditions would need to be met, including:

- Engagement and buy-in by stakeholders
- Clear decision-making authority
- Clear responsibility for management, action, and oversight
- Effective communication among all interested parties
- Availability of funding/financing

In developing its recommendations, the Task Force considered these conditions and made the further assumption that the County's Energy Strategy update would be the appropriate venue for developing a detailed action plan that would build on the Task Force's recommendations and provide a process to incorporate the needs into the County's future planning activities. Finally, the Task Force realized that some of its key recommendations, although they could be *started* in five years, might require more time to fully implement.

To select from over 100 potential recommendations, the Task Force used the following process:

1. Recommendations first were SCREENED using the five elements of the group's charge. Similar ideas were combined or made part of a broader idea, where appropriate. This consolidation resulted in 41 unique recommendations.
2. Recommendations were then rated for IMPORTANCE by Task Force members. Items receiving one or no votes by any voting member of the Task Force were discussed and omitted, if agreed to by group consensus. This process resulted in a further narrowing of the recommendations.
3. Recommendations were then DISCUSSED individually by the Task Force during the course of three meetings. During these discussions, the group considered a broad range of factors, such as:
  - Is it practical?
  - Is it worthwhile? (benefit/cost ratio)
  - Is there time & budget to assess its feasibility more fully?
  - Will it significantly reduce GHG emissions?
  - Will it significantly stimulate economic development (or at least not negatively impact it)?
  - Are there any potential indirect benefits or costs?

This process led to a set of primary recommendations, which are presented in detail below. All recommendations that were considered are listed in Appendix F, as a record of the Task Force's work that can be used in future energy and economic development planning efforts.

The Energy and Economic Development Task Force recommends an eight-pronged approach to meet community energy and economic development goals including specific local initiatives that should be undertaken to support needed change. The primary recommendations from the Task Force are:

**1. Work with the Public Service Commission and NYSEG to reduce dependence on natural gas, while supporting the ongoing Energy Smart Community collaboration with NYSEG to support increased dependence on distributed energy resources**

- a. Meet with Public Service Commission officers, Department of Public Service and NYSEG staff as soon as possible to assess alternatives to the West Dryden Road pipeline. If early discussions identify realistic alternatives that are a) economically viable, b) can be implemented with existing technology, and c) meet the energy needs of the high tech industries located along Warren Road in the Northeast sector of the County which have been seriously impacted by NYSEG's rejection of applications for additional natural gas service connections, then ask the PSC to mandate and incentivize NYSEG to pursue these alternatives rather than build the pipeline.
- b. Ask the Public Service Commission and other agencies for permission and support in establishing a model process in Tompkins County, in cooperation with NYSEG, to reduce both peak and sustained gas usage through weatherization, industrial process design, conservation, conversion to electric heat pump, and other measures on an ongoing, sustainable basis.
- c. Work with PSC, NYSEG and other entities to encourage and develop better financing tools to spur the conversion of fossil-fueled heating systems to electric heat pumps or other systems that can be fueled through renewable sources.

**2. Provide secure and reliable energy to support local industrial processes**

- a. Address the needs of energy for industrial processing through research, planning and technical assistance to better quantify and understand both the economic impact of these activities, as well as the energy needs and reliability needs of the industrial sector. Cumulatively industrial processes use less than 10% of energy consumed in the county, yet reliable gas and electric infrastructure to support the economy is critical as we make this energy transition. Additionally, it may not be possible for some industrial activities to efficiently use energy sources other than natural gas, so the transition of industry to non-fossil fuels may take longer than typical commercial or residential buildings. As we move forward, it will be important to plan for continued reliable energy supply to the industrial sector including, as necessary, using some of the capacity of existing natural gas and electricity infrastructure that can be freed up by reducing demand through efficiency improvements and renewable energy use elsewhere in the community.
- b. Work with our unique local resources, including Cornell University, the Atkinson Center, local industry and NYSERDA to develop research projects and alternative non-fossil fuel technologies to address the energy needs of industry, as well as to share best practices.

**3. Reduce fossil fuel energy use in commercial and industrial buildings.**

- a. Work to reduce peak and base load demand for both electricity and thermal energy to achieve immediate GHG emissions reductions, avoid the cost of developing excessive

generation, and optimize efficient use of energy resources. The Energy Focus Areas project should contribute directly to this effort.

- b. Create a “navigator” program to provide independent, expert advice and hand-holding to assist businesses with planning, evaluating and financing energy improvements. Promote this program and enlist business leaders’ support through initiatives such as the Ithaca 2030 District, which is funded by a NYSERDA Cleaner Greener Communities grant, and the proposed model Southern Tier Integrated Energy Program. TCAD and Chamber of Commerce leadership will be essential to engage business leaders. The navigator needs to serve both new construction and existing structure upgrades. The navigator should be familiar with NYSERDA and other State and Federal incentives. This position should provide information and training to HVAC and plumbing sales people so that when people replace existing heating and hot water systems, they are directed to efficient electric-sourced rather than fossil-fuel-sourced replacements.
  - c. Enact local energy codes and aggressively pursue compliance with existing codes that reduce fossil fuel energy use. The Tompkins County Council of Governments could play a key role in coordinating action among the County’s municipalities. Develop a commercial building energy disclosure program that requires buildings over a certain size or level of energy intensity to provide information annually regarding their energy use. The Ithaca 2030 District will model how such a program could work. Resolve the split incentives problem between commercial and industrial building owners and tenants to provide mutually beneficial outcomes from improvements to energy efficiency in leased buildings. Local commercial and industrial building owners could be convened to work through solutions to this problem.
  - d. In order to encourage development that is very highly energy efficient and incorporates renewable energy, develop a variety of financial instruments and incentives that support the incremental costs of doing so. This includes promoting the Property Assessed Clean Energy program through Energize NY recently adopted by Tompkins County and the City of Ithaca, potential Green Energy Incentives currently being studied by the Tompkins County IDA, Tompkins County Planning and TCAD, as well as the City of Ithaca, and other innovative methods to make such investments “pencil-out”.
- 4. Develop the energy infrastructure needed to support an energy system that primarily relies on renewable energy resources.**
- a. Work directly with NYSEG to transition our energy infrastructure from a system primarily reliant on fossil fuels for electricity and thermal energy to one that primarily utilizes renewable energy sources. This will need to include changes and upgrades to the utility infrastructure to accommodate large amounts of renewable energy generation and a Reforming the Energy Vision (REV) type program to address natural gas. Several initiatives are now underway including the Energy Smart Community collaboration between NYSEG, Tompkins County and Cornell University, and the Energy Focus Areas project being developed by Tompkins County Planning and TCAD.
  - b. Support development of local renewable energy resources through local land use codes that promote development of these resources in appropriate areas and do not create unnecessary obstacles to development. This is an initiative identified in the 2015 Tompkins County Comprehensive Plan and is part of the Planning Department’s 2016 work program. Advocacy with NYSEG, the PSC, NYSERDA, and local municipalities may be required to overcome existing hurdles to renewable energy development. The Tompkins County Council of Governments could be a key partner.

**5. Reduce fossil fuel use in transportation.**

- a. Build community infrastructure to support a transition to electric vehicles. A NYSERDA-funded EV Deployment Infrastructure Study is currently underway sponsored by the Ithaca-Tompkins County Transportation Council in collaboration with the Tompkins County Planning Department. Recommendations of that study should be implemented.
- b. Develop a community-wide Transportation Demand Management (TDM) program with a goal of no net increase in vehicle miles traveled. This might be accomplished by expanding support of the Cornell Cooperative Extension Way2Go program, Tompkins County Area Transit, Ithaca Carshare, Bike Walk Tompkins, the Downtown Ithaca Alliance, and others working to implement different aspects of TDM in order to reduce car dependency, particularly drive-alone trips. TCAD and the Chamber of Commerce will be key partners to engage greater direct employer participation.
- c. Encourage major employers to adopt EV-friendly policies, such as providing charging stations, privileged parking spaces, and reduced parking fees.

**6. Develop housing in ways that limit energy use both in buildings and transportation.**

- a. Develop an energy rating system for housing to inform potential homebuyers and renters of the energy characteristics of housing units. The local Residential Energy Score Project, funded by a NYSERDA Cleaner Greener Communities grant, has comprehensively evaluated options for such a system locally and implementation of the most feasible approach coming out of that process should be pursued.
- b. The location of housing is critical to long-term GHG emission reductions in transportation, as well as optimization of investments in other infrastructure. Enact land use codes that promote housing at appropriate densities in “smart growth” locations identified in local land use plans and the County’s Comprehensive Plan. Existing plans at the County, City and Town of Ithaca are in excellent alignment as are many other town plans. Enacting zoning changes where necessary to promote development in accordance with these plans should be a high community priority. The City of Ithaca Density district, the Chain Works district, the Collegetown Density district and Town of Ithaca Traditional Neighborhood Design High Density Neighborhoods on East Hill and South Hill should be pursued as priority housing development areas.
- c. Resolve the split incentives problem between residential building owners and tenants to provide mutually beneficial outcomes from improvements to energy efficiency in rental buildings. Local residential landlords could be convened to work through solutions to this problem.

**7. Educate decision makers, contractors, developers, and the public at large on critical facets of energy and economic development.**

- a. Create materials and sponsor workshops and forums to expand the conversations that were so helpful to the Task Force in forging common understanding of energy and economic development issues. Topics for education include:
  - i. The relationship of energy to economic development,
  - ii. Supply and demand constraints,
  - iii. Land use and property rights concerns as they pertain to renewable energy,
  - iv. Land use and property rights concerns as they pertain to developments that increase density in population and job centers,

- v. Landlord-tenant split-incentives around energy,
- vi. Planning for the equitable distribution of benefits and impacts from the new energy economy for all sectors of the community, and
- vii. Existing and emerging technology solutions, such as heat pumps.

## 8. Implement the strategies and evaluate progress regularly

- a. Staffs of TCAD and TCPD will review these recommendations to determine how to move them forward and what staff resources to move these recommendations forward.
- b. TCPD will consider these recommendations in developing the Tompkins County Energy Strategy Update, slated to begin in 2016, and will develop a detailed plan for actions to achieve many of these recommendations as part of that process.
- c. TCAD and Tompkins County will convene this Task Force (or a Task Force of similar diverse viewpoints) at least once a year to review the topics of energy and economic development, these Task Force recommendations, and any important new technologies or energy/economic development issues to determine whether changes in approach need to be made.

The Task Force believes that these actions taken together will support continued economic growth in Tompkins County while simultaneously meeting greenhouse gas emissions reduction goals. Added economic development benefits will be the jobs created retrofitting buildings and developing renewable energy systems, and the savings on energy costs that will allow financial resources that would otherwise leave the community to be spent and invested locally.

## NEXT STEPS

The Task Force focused on using currently available information in its deliberations. It identified several areas of energy information that were lacking, including details about the existing energy supply constraints in areas of the county considered critical for job creation and retention, and the economics and incremental costs of more energy efficient development. During the course of the Task Force's work, several activities were initiated to address these data needs, partially in response to issues identified by the Task Force as both important and time sensitive. It is envisioned that these studies will provide the information needed to develop programs and initiatives to take action on many of the recommendations of the Task Force.

**Energy Focus Area Study.** The Energy Focus Areas Study was initiated: to clarify the capacity of energy supply and distribution systems in areas of Tompkins County that are critical to economic development, to identify any constraints to identified potential development in these areas, and to help determine strategies to address those constraints. Potential strategies might be to increase energy efficiency, implement demand management, and promote local renewable energy generation.

The study considers four geographic areas, including:

1. Airport area/Cornell Business and Technology Park and associated commercial/industrial environs;
2. Collegetown to East Hill Plaza;
3. South Hill, including Ithaca College, the South Hill Business Campus, Therm, and the Emerson (Chainworks) redevelopment site; and
4. Downtown Ithaca, including the east side of the Inlet.

At the time of this report, a consultant had begun preliminary discussions with NYSEG and was in the process of defining energy demand for projected development in the coming 5-10 years.

**Green Energy Incentives Study.** This study was initiated to assist the Tompkins County Industrial Development Agency (IDA) in developing potential tax incentives for building projects that achieve very high levels of energy efficiency and reductions in greenhouse gas emissions. The initial project tasks include:

- Calculating the gap, if any, between: 1) energy efficiency and renewable energy measures that a well-informed developer would be motivated to design into a new project, based on their own return on investment (ROI) calculation, and 2) what would be required to achieve various levels of energy or emissions reduction, such as the 80% reduction by 2050 standard of Tompkins County, or the 70% reduction standard of the 2030 District initiative.
- Developing guidelines for determining whether new commercial and industrial construction, extensive expansions, or renovations are designed to meet selected energy efficiency/renewable energy standards.
- Developing methods to measure whether energy and emissions goals were achieved.

As of the date of this report, a consultant was selected and was working with Tompkins County and IDA staff to interview building developers and develop three local case studies.

## **SUMMARY**

Tompkins County takes pride in its quality of life, environmental leadership, and innovation. The Energy and Economic Development Task Force was charged with applying these values to the challenge of reducing greenhouse gas emissions in the County while supporting the economic growth and opportunity that sustain the quality of life for all residents and guests of the County.

The Task Force's recommendations represent a solid base of next steps for various governmental agencies and other stakeholders to take. Much of the necessary technological development to reduce greenhouse gas emissions will likely take place beyond the borders of the County. We must be vigilant and ready to adopt promising practices as they become available.

On the other hand, Tompkins County has a strong capacity to implement a variety of measures itself in the coming five years in pursuit of its goals. The Task Force hopes that Tompkins County, by implementing its recommendations, will remain at the leading edge of change and inspire others who also seek to reduce greenhouse gas emissions while growing the economy that provides a key element of their quality of life.

## **REFERENCES**

- 1 Tompkins County Planning Department, "Tompkins County Energy Roadmap," <http://tompkinscountyny.gov/planning/energy-climate>
- 2 Tompkins County Area Development, 2015 "Tompkins County 2015 Economic Development Strategy," <http://tcad.org>