FINAL REPORT

Financing Municipal Energy Projects

Federal Incentives, NH Financial Incentives, Local Opportunities, Innovative Financing, and Successful Practices in Europe & the US

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Financing Municipal Sustainable Energy Projects

Introduction

This report is prepared for the Town of Wolfeboro, NH to research alternative financing mechanisms for municipal energy efficiency and greenhouse gas emissions reduction projects. The research is funded by the Energy Efficiency and Conservation Block Grant Program of the American Recovery and Reinvestment Act.

The report summarizes a wide range of existing methods for funding municipal energy projects at the federal, state, and local level. Best practices in European and American cities and towns are reviewed and some innovative financing methods are introduced in this report. Wolfeboro is unique within New Hampshire in that it has its own Municipal Electric Department.

Municipalities and Sustainable Energy Management

Municipalities have to meet diverse challenges to provide their inhabitants with a clean and safe environment. They play key roles and bear responsibilities in local energy management. They are at the same time[1]:

- **Consumers and service providers** in their municipal properties and buildings.
- **Planners, developers and regulators,** setting the framework for local businesses and stakeholders.
- **Suppliers** of heat and electricity for their citizens and local businesses.
- **Advisors and motivators**, raising awareness and promoting sustainable energy for citizens and local businesses, stakeholders.

In the above roles, local governments carry out several permanent tasks and implement a broad variety of projects that usually involve both “intangible” and “physical investments”. Often we tend to forget about the importance of the “human side” of energy management, however, the first step is to have an “owner”, an *energy manager or team* responsible for energy issues, who prepares and organizes investment projects, *energy audits* and *feasibility studies* as well as takes care of *awareness raising* and *training needs* for citizens and local businesses.

Physical sustainable energy investments can be carried out in two main areas. On the “supply side” projects concern either the improvement of the energy efficiency or transformation of energy from fossil fuels, using new technologies (combined cycle for example) or production from renewable energy sources. “Demand side” projects include investments in energy efficiency or target the rational use of energy (energy consumption management).

[1] New Forms of Financing Municipal Sustainable Energy Projects (2006), ADEME Convention for Energie-Cités, *Collection of best practices on new forms of financing municipal sustainable energy projects*

Several project types on the demand side offer "low-hanging fruits", i.e. considerable gains with short payback period. These are typically energy efficient refurbishment of municipal buildings. Key motivations for such investments are to stop escalating expenses meanwhile providing an equivalent or better comfort and security.

I. Direct Investments in Energy Management

When talking about financing municipal energy projects we can talk about *financing direct investments* or indirect means for the *promotion and support* of sustainable energy management investments.

In case of financing direct investments we can distinguish between classical and innovative methods. Under "classical" methods we generally understand *equity (or self-) financing*, where project investors invest their own resources without using any external fund, or *'debt financing'* where investors borrow the money they invest, either in form of loans or by issuing shares. These methods are broadly applied but often cause difficulties for municipalities, who are required to provide guarantees or have a limited borrowing capacity.

This is why innovative methods for investment financing are gaining momentum today, offering more flexibility and reducing barriers to traditional methods. Three methods are considered as the most relevant or interesting in this domain:[2]

1. ***Leasing***, when the loan is given in the form of a piece of equipment of which the lessor remains the owner. This can be an expensive form of financing and generally limited to a relatively common and clearly defined object, which limits its usability in case of more complex projects.
2. ***Performance contracting*** is a shared savings contract, where the Energy Services Company (ESCO) for a certain remuneration of its services guarantees a certain amount of energy savings to its customer. The investment can be financed either by the ESCO or the customer, or by a third party, a bank or a financial institution.
3. ***Third party financing*** involves, as its name says, a third party sponsor, generally a financial institution, which makes the investment based on the financial performance of the project and often guarantees the operation.

II. Incentives to Promote Sustainable Energy Investments

Classical financial incentives include *direct investment subsidies* paid to beneficiary investors, directly from the state budget or via public funds managed by national or local energy agencies, or local governments. *Tax incentives or voluntary agreements* are more market-conform means. Tax incentives can be applied in a positive sense to encourage environmental friendly and sustainable energy investments in forms of: *tax exemptions*

[2] Ibid

Innovative methods combine efforts of the public sector (regulatory measures and financial incentives) to provide a leverage effect via mobilising additional resources of the private or economic sectors (incl. banks or public companies), to bring the rational use of energy into the normal market mechanisms.

Public Private Partnerships (PPP) can be built and carried out in several ways that can complement each other. Opportunities are broad: from *reduced rate loans* supported by local/ regional/ or national authorities and granted by a financial institution, via *public-private investment funds* for rational use of energy, to creating the regulatory framework and *incentives for energy service companies*.

Existing mechanisms for municipalities to fund energy projects[3]

FEDERAL

Financial Incentives for Renewables & Efficiency

Qualified Energy Conservation Bonds (QECBs)

	Federal
Incentive Type:	Federal Loan Program
Eligible Efficiency Technologies:	Unspecified Technologies
Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Municipal Solid Waste, Hydrokinetic Power, Anaerobic Digestion, Tidal Energy, Wave Energy, Ocean Thermal
Applicable Sectors:	**Local Government**
Amount:	Varies
Authority 1: Date Enacted: Date Effective:	26 USC § 54A 10/03/2008 (subsequently amended) 10/03/2008
Authority 2: Date Enacted: Date Effective:	26 USC § 54D 10/03/2008 (subsequently amended) 10/03/2008
Authority 3: Date Effective:	IRS Notice 2009-29 04/07/2009
Authority 4: Date Enacted: Date Effective:	26 USC § 6431 02/17/2009 (subsequently amended) 03/18/2010 (for QECBs)
Authority 5: Date Effective:	IRS Notice 2010-35 04/26/2010

The *Energy Improvement and Extension Act of 2008*, authorized the issuance of Qualified Energy Conservation Bonds (QECBs) that may be used by local governments to finance certain types of energy projects. QECBs are qualified tax credit bonds, and in this respect are similar to new Clean Renewable Energy Bonds or CREBs. The October 2008 enabling legislation set a limit of $800 million on the volume of energy conservation tax credit bonds that may be issued by state and local governments. *The American Recovery and Reinvestment Act of 2009*, enacted in

[3] U.S. Department of Energy, Database of State Incentives for Renewables & Efficiency

February 2009, expanded the allowable bond volume to $3.2 billion. In April 2009, the IRS issued Notice 2009-29 providing interim guidance on how the program will operate and how the bond volume will be allocated. Subsequently, H.R. 2847 enacted in March 2010 introduced an option allowing issuers of QECBs and New CREBs to recoup part of the interest they pay on a qualified bond through a direct subsidy from the Department of Treasury. Guidance from the IRS on this option was issued in April 2010 under Notice 2010-35.

With tax credit bonds, generally the borrower who issues the bond pays back only the principal of the bond, and the bondholder receives federal tax credits in lieu of the traditional bond interest. The tax credit may be taken quarterly to offset the tax liability of the bondholder. The tax credit rate is set daily by the U.S. Treasury Department; however, energy conservation bondholders will receive only 70% of the full rate set by the Treasury Department under 26 USC § 54A. Credits exceeding a bondholder's tax liability may be carried forward to the succeeding tax year, but cannot be refunded. Energy conservation bonds differ from traditional tax-exempt bonds in that the tax credits issued through the program are treated as taxable income for the bondholder.

For QECBs issued after March 18, 2010, the bond issuer may make an irrevocable election to receive a direct payment from the Department of Treasury equivalent to the amount of the non-refundable tax credit described above, which would otherwise accrue to the bondholder. The direct payment comes in the form of a refundable tax credit to the issuer in lieu of a tax credit to the bondholder. This option was formerly limited to Build America Bonds (see 26 USC § 6431, H.R. 2847 and IRS Notice 2010-35 for details). The advantage of either option is that it creates a lower effective interest rate for the issuer because the federal government subsidizes a portion of the interest costs.

In contrast to CREBs, QECBs are not subject to a U.S. Department of Treasury application and approval process. Bond volume is instead allocated to each state based on the state's percentage of the U.S. population as of July 1, 2008. Each state is then required to allocate a portion of its allocation to "large local governments" within the state based on the local government's percentage of the state's population. Large local governments are defined as municipalities and counties with populations of 100,000 or more. Large local governments may reallocate their designated portion back to the state if they choose to do so. IRS Notice 2009-29 contains a list of the QECB allocations for each state and U.S. territory.

The definition of "qualified energy conservation projects" is fairly broad and contains elements relating to energy efficiency capital expenditures in public buildings; green community programs (including loans and grants to implement such programs); renewable energy production; various research and development applications; mass commuting facilities that reduce energy consumption; several types of energy related demonstration projects; and public energy efficiency education campaigns (see 26 USC § 54D for additional details). Renewable energy facilities that are eligible for CREBs are also eligible for QECBs.

Renewable Energy Production Incentive (REPI)[4]

	Federal
Incentive Type:	Performance-Based Incentive
Eligible Renewable/Other Technologies:	Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Geothermal Electric, Anaerobic Digestion, Tidal Energy, Wave Energy, Ocean Thermal
Applicable Sectors:	**Local Government, Municipal Utility**
Amount:	2.2¢/kWh (subject to availability of annual appropriations in each federal fiscal year of operation)
Terms:	10 years
Expiration Date:	10/01/2016 (in-service date)
Web Site:	http://apps1.eere.energy.gov/repi
Authority 1: Date Enacted:	42 USC § 13317 10/24/1992 (subsequently amended)
Authority 2:	10 CFR 451

Established by the federal *Energy Policy Act of 1992*, the federal Renewable Energy Production Incentive (REPI) provides incentive payments for electricity generated and sold by new qualifying renewable energy facilities. Qualifying systems are eligible for annual incentive payments of 1.5¢ per kilowatt-hour (kWh) in 1993 dollars (indexed for inflation) for the first 10-year period of their operation, *subject to the availability of annual appropriations in each federal fiscal year of operation.* Qualifying systems must generate electricity using solar, wind, geothermal (with certain restrictions), biomass (excluding municipal solid waste), landfill gas, livestock methane, or ocean resources (including tidal, wave, current and thermal). The production payment applies only to the electricity sold to another entity.

Payments may be made only for electricity generated from an eligible facility first used before October 1, 2016. Appropriations have been *authorized* for fiscal years 2006 through fiscal year 2026; however, program funding is determined each year as part of the U.S. Department of Energy budget process. If there are insufficient appropriations to make full payments for electricity production from all qualified systems for a federal fiscal year, 60% of the appropriated funds for the fiscal year will be assigned to facilities that use solar, wind, ocean, geothermal or closed-loop biomass technologies; and 40% of the appropriated funds for the fiscal year will be assigned to other eligible projects. Funds will be awarded on a pro rata basis, if necessary.

[4] Ibid

STATE: NEW HAMPSHIRE

Financial Incentives for Renewables & Efficiency[5]

Community Development Finance Authority (CDFA)
Municipal Energy Reduction Fund

State:	**New Hampshire**
Incentive Type:	State Loan Program
Eligible Efficiency Technologies:	Equipment Insulation, Lighting, Chillers , Furnaces , Boilers, Heat pumps, Central Air conditioners, CHP/Cogeneration, Heat recovery, Steam-system upgrades, Compressed air, Programmable Thermostats, Energy Mgmt. Systems/Building Controls, Caulking/Weather-stripping, Duct/Air sealing, Building Insulation, Windows, Doors, Siding, Roofs, Comprehensive Measures/Whole Building, Custom/Others pending approval, Unspecified Technologies
Eligible Renewable/Other Technologies:	Not specified, Other Distributed Generation Technologies
Applicable Sectors:	**Local Government**
Amount:	$5,000-$400,000
Maximum Incentive:	$400,000
Terms:	Flexible terms, structured out of energy savings **Rates:** 3 years: 2.5% 5 years: 3% 7 years: 3.5% 10 years: 4%
Funding Source:	Greenhouse Gas Emissions Reduction Fund (RGGI)
Program Budget:	$1.5 million
Start Date:	3/17/2010
Web Site:	http://www.nhcdfa.org/web/erp/merf/merf_overview.html

Overview

CDFA's Municipal Energy Reduction Fund is available to help municipalities improve the energy efficiency of their municipal buildings, street lighting, water and sewer treatment facilities, and where appropriate, electrical distribution systems. The goal is to reduce energy usage and costs.

[5] U.S. Department of Energy, Database of State Incentives for Renewables & Efficiency

Utilizing funds from New Hampshire's Greenhouse Gas Emissions Reduction Fund,* the New Hampshire Community Development Finance Authority (CDFA) has developed a revolving loan program for municipal governments to invest in energy efficiency and alternative energy. Typically, loans will be structured so that the payments will be made with money saved by the energy improvements. A wide variety of energy efficiency technologies as well as alternative energy technologies are eligible, the program is customizable depending on a municipality's needs. CDFA will work with municipalities to take advantage of other programs that might be available (utility incentives or other loans, for example).

**The Greenhouse Gas Emissions Reduction Fund is funded with proceeds from CO2 auctions held under the Regional Greenhouse Gas Initiative, of which New Hampshire is a member along with nine other Northeastern and Mid-Atlantic states.*

Program Details

CDFA was awarded $1.5 million in funding from the Greenhouse Gas Emissions Reduction Fund, through the New Hampshire Public Utilities Commission to capitalize a revolving loan fund, the Municipal Energy Reduction Fund, to finance energy improvements to municipal facilities and activities.

Loans to municipalities will be structured out of energy savings. The savings will be calculated based on the last several years of energy usage and several years of future projected usage. The terms of the loans will be flexible and can be structured as a service contract if desired by the town.

CDFA will encourage applicants to leverage other funding sources into a project, including those offered through utility rebate and loan programs.

Eligible Activities

The program will be available to finance improvements to the overall energy efficiency performance of a municipality's buildings, thereby lowering the overall energy costs and the associated carbon emissions. These activities will include, but are not limited to:

- Improvements to the buildings envelope including air sealing and insulation in the walls, attics, and foundations;
- Improvements to HVAC equipment inside conditioned space;
- Installation of sealed combustion, high efficiency condensing boilers with AFUE>97% Hydronic Systems or other high efficiency systems; and
- Installation of alternative energy sources.

New Hampshire - Pay for Performance Program (TRC)[6]

State:	**New Hampshire**
Incentive Type:	State Rebate Program
Eligible Efficiency Technologies:	CHP/Cogeneration, Comprehensive Measures/Whole Building, Custom/Others pending approval, (Must result in at least 15% reduction in total energy consumption and overall project must have internal rate of return of at least 10%)
Applicable Sectors:	**Local Government**
Amount:	Tiered incentive structure: Incentive 1: $0.10/sq ft Incentive 2: $0.19/kWh saved and $20.00/MMBTU saved Incentive 3: $0.05/kWh saved and $5.00/MMBTU saved
Maximum Incentive:	Incentive 1: $40,000 Incentives 2 and 3: $200,000 or 50% of the project cost Note: there is a maximum $500,000 per entity cap.
Equipment Requirements:	The comprehensive project must result in a minimum 15% reduction in total facility source energy consumption.
Installation Requirements:	Participants must work with one of the Program Partners listed at www.nhp4p.com. To participate, projects must complete an Energy Reduction Plan and must benchmark the project using EPA's Portfolio Manager.
Funding Source:	Greenhouse Gas Emissions Reduction Fund (GHGERF)
Program Budget:	$5,000,000
Start Date:	02/28/2011
Web Site:	http://www.nhp4p.com/

The New Hampshire Pay for Performance is a comprehensive energy efficiency program that works with large energy consumers to increase energy efficiency in their facilities. Eligible participants include commercial and industrial companies, developers, municipalities, schools, universities, and other institutional entities that have an electrical demand of at least 100 kW (during any of the previous 12 months) and/or the facility consumers 1,000 MMBTU or more a year for space or process heating.

Participants must work with Pay for Performance Partners to develop and/or approve an "Energy Reduction Plan," which consists of three components: (1) a comprehensive energy audit; (2) a financing plan for making energy efficiency improvements; (3) a construction schedule.

To be eligible for incentive payments, the project's comprehensive energy improvements must

[6] Ibid

result in a minimum 15% reduction in total facility source energy consumption. At least two energy efficiency measures must be included in the project. Renewable energy may be part of the project but it does not count towards the 15% reduction requirement and renewable energy is not eligible for incentives. Combined heat and power is eligible, but at least 5% of the reduction requirement must be met by another efficiency measure.

Refer to the program web site for additional details, including information about how to apply and how find a Pay for Performance Partner.

Eligibility

Commercial and industrial facilities in New Hampshire that have electric demand of ≥ 100 kW (in any of the previous 12 months) and/or annual fuel consumption of ≥ 1,000 MMBTU for space or process heating. Municipalities, universities, K-12 schools and other institutional facilities are also eligible.

Incentives

Incentives will be paid out on the following three payment schedule:

Incentive #1: $0.10/square foot of conditioned space, capped at $40,000.

- Designed to defray, but not necessarily cover, the cost of the Energy Reduction Plan development. To be paid on approval of Energy Reduction Plan and proof that construction has begun.

Incentive #2 : $0.19/kWh saved and $20.00/MMBTU saved

- Based on projected savings and paid at construction completion.

Incentive #3: $0.05/kWh saved and $5.00/MMBTU saved

- Based on actual energy savings performance one year post construction.

Total performance incentives (#2 and #3) will be capped at $200,000 or 50% of project cost on a per project basis. In addition, there is an annual entity cap of $500,000 where entity is defined as a single building owner (municipality, private business, School Administrative Unit, …).

LOCAL Opportunities

Financing Public Sector Projects with Clean Renewable Energy Bonds (CREBs)[7]

Clean renewable energy bonds (CREBs) present a low-cost opportunity for public entities to issue bonds to finance renewable energy projects. The federal government lowers the cost of debt by providing a tax credit to the bondholders in lieu of interest payments from the issuer. Because CREBs are theoretically interest free, they may be more attractive than traditional tax-exempt municipal bonds.

In February 2009, Congress appropriated a total of $2.4 billion for the "New CREBs" program. No more than one-third of the budget may be allocated to each of the eligible entities: (1) governmental bodies, (2) electric cooperatives, and (3) public power providers. Applications for this round of "New CREBs" were due to the Internal Revenue Service (IRS) on August 4, 2009. There is no indication Congress will extend the CREBs program; thus going forward, only projects that are already approved under the 2009 round will be able to issue CREBs. This factsheet explains the CREBs mechanism and provides guidance on procedures related to issuing CREBs.

On October 27, 2009, the U.S. Department of the Treasury announced the allocation of $2.2 billion of issuing authority for "New CREBs" to successful applicants. Per IRS Notice 2009-33, the IRS plans to reallocate any unallocated volume cap as well as any relinquished or reverted allocations. Because $191 million of the volume cap for electric cooperatives was not allocated on October 27, there may be a supplemental allocation round for cooperative projects.

How it Works

With CREBS, a type of tax credit bond, the investor receives a tax credit from the U.S. Department of the Treasury (Treasury Department) rather than an interest payment from the issuer. However as discussed below, in many cases the tax credit provided to investors has been insufficient and investors have required issuers to pay supplemental interest payments or issue their bonds at a discount. Tax credit bonds differ from traditional tax-exempt municipal bonds in several ways.

- **Tax-exempt municipal bonds.** The issuer makes cash interest payments. The federal government exempts this interest income from federal taxes, thereby allowing an investor to offer bond rates that are lower than those for a corporate bond of similar credit rating.
- **Tax credit bonds.** The federal government provides the investor with tax credits in lieu of interest payments from the borrower, theoretically subsidizing municipal borrowing completely.

[7] U.S. Department of the Treasury 2009c. Rates found at https://www.treasurydirect.gov/govt/rates/irs/rates_qtcb.htm

Application and Allocation Procedure

The CREBs program is administered by the IRS. Each time Congress makes a CREBs authorization, the IRS issues guidance soliciting applications from qualified entities with qualified projects. In April 2009, the IRS published an application and related guidance for securing "New CREBs" allocations (U.S. Department of Treasury 2009a). These applications were due to the IRS on August 4, 2009. Projects eligible for allocations include facilities that generate electricity from a variety of sources including, wind, solar, closed-loop biomass, open-loop biomass, geothermal, small irrigation, qualified hydropower, landfill gas, marine renewables, and trash combustion. Projects that receive allocations in this round will have three years to issue the bonds.

The Energy Act specifies that up to $800 million will be awarded to each category of applicant: governmental bodies, cooperative electric utilities, and public power providers. For governmental bodies and electric cooperatives, the Treasury Department will make awards to eligible projects, from smallest to largest project, until either the $800 million for each category has been exhausted or all applications have been granted. Awards to public power providers, namely municipal utilities, are no longer made on a smallest to largest project basis. The "New CREBs" methodology allows all eligible projects, regardless of project size, to receive funds. Public power providers will receive a prorata share of the overall allocation of funds in this category (U.S. Congress House 2008). Each project will be allocated a portion of the $800 million, based on the fraction of its total request to the total requested for all public power projects (U.S. House 2009).

The CREBs Tax Credit and Term

The tax credit received is calculated by multiplying the current tax credit rate by the CREB's outstanding principal. The tax credit is calculated quarterly and can be claimed against regular income tax liability or alternative minimum tax liability. Unlike the interest on traditional tax-exempt bonds, the CREBs tax credit is considered taxable income (i.e., as if it were interest income for the investor).

Because longer bond terms mean longer-lasting tax benefits for investors but increased costs to the Treasury Department, the CREBs program limits the maximum term of the bonds. Term limitations are currently on the order of 14 to 15 years.1 Thus, as interest rates (including applicable federal rates) fall, the maximum maturity of a CREB rises. Waiting to lock into a bond with a longer maturity might make sense if interest rates are expected to fall. For example, the long-term adjusted applicable federal rate (AFR)2 fell from 4.56% in April 2009 to 4.53% in May 2009, resulting in an increase in the maturity limit from 14 to 15 years for bonds issued in May. The Treasury Department must set the credit rate such that the issuer need not discount the bond nor pay additional interest payments (Internal Revenue Code Section 54A(b)(3)). For the first two rounds of CREBs in 2006 and 2007, the Treasury Department determined the tax credit rates based on the market rate for AA-rated corporate bonds (U.S. Department of Treasury 2007). However, this method proved problematic because many municipalities had credit

ratings lower than AA and were unable to borrow at a rate equivalent to the AA corporate rate; i.e., their borrowing rate was higher. Additionally, investor demand was limited because investors were unfamiliar with the instrument and because the size of the bonds tends to be small (IRS typically allocates funds from the smallest to the largest). Consequently, many issuers have had to discount the bonds or have agreed to pay supplemental interest to attract investors (Serchuk 2008). In addition, many potential issuers decided against issuing CREBs when the transaction costs and interest payments were higher than originally anticipated. In light of this market reaction, the Treasury Department modified its methodology for determining the tax credit rate. For "New CREBs," the Treasury Department bases the tax credit rate on yield estimates on outstanding bonds with investment grade ratings between "single A" and BBB for bonds of a similar maturity (U.S. Department of Treasury 2009b).

"New CREBs" reduce the annual tax credit rate allowed. Before the recent program changes, CREBs issuers were required to repay a fraction of the principle annually over the term of the loan, such that the investor received a tax credit on the full amount of the bond for the full term. Under "New CREBs," borrowers will repay the entire principal at the bond's maturity. As a result, the Energy Act reduced the annual tax credit rate allowed to 70% of the rate determined by the IRS (Hunton & Williams 2008). Table 1 shows recent rates published by the Treasury Department, with and without the 70% credit reduction. Given the current rates, issuers are likely to have to pay some supplemental interest.

Energy Financing Districts (EFDs)[8]

Energy Financing Districts (EFDs) enable local governments to raise money through the issuance of bonds to fund these clean energy projects (though bonds are not the only possible source of funds). The financing is repaid over a set number of years through a "special tax" or "assessment" on the property tax bill of only those property owners who choose to participate in the program. The financing is secured with a lien on the property, and, like other taxes, is paid before other claims against the property in the case of foreclosure. There is little or no up-front cost to the property owner, and if the property is sold before the end of the repayment period, the new owner inherits both the repayment obligation and the financed improvements.

Establishing an EFD requires the following steps:
1. Determine authority for EFDs; pursue enabling legislation if needed
2. Identify lead staff and advisors
3. Design the program to meet specified goals, with input from stakeholders
4. Secure funding
5. Formally create the special tax district or tax assessment district
6. Launch Program

[8] Fuller, Merrian, et al. Guide to Energy Efficiency & Renewable Energy Financing Districts for Local Governments. (Renewable and Appropriate Energy Laboratory, UC Berkeley, September 2009).

For local governments, an EFD provides an opportunity to address climate change locally, to support residents' environmentally-friendly building improvements at low cost to government, and to strengthen the local economy in energy efficiency retrofitting and solar installation. Because the loans are secured by property liens, an EFD program provides virtually no risk to the local government's general fund.

How Energy Financing Districts Work?

Energy Financing Districts (Sustainable Energy Financing, Clean Energy Assessment Districts, Contractual Assessments, or Special Tax Districts) are one way for a city to provide access to capital for their residents' and businesses' clean energy projects, including energy efficiency retrofits and installation of renewables such as solar thermal or solar electric systems. Energy Financing Districts tap into existing mechanisms that local governments are already familiar with, such as special tax districts or assessment districts, and allow these mechanisms to support clean energy projects. Energy Financing Districts enable local governments to raise money through the issuance of bonds to fund these clean energy projects (though bonds are not the only possible source of funds). The financing is repaid over a set number of years through a "special tax" or "assessment" on the property tax bill of only those property owners who choose to participate in the program. The financing is secured with a lien on the property, and, like other taxes, is paid before other claims against the property in the case of foreclosure. There is little or no up-front cost to the property owner, and if the property is sold before the end of the repayment period, the new owner inherits both the repayment obligation and the financed improvements.

Best Practices and Lessons to Learn from Municipal Energy Projects in the U.S.[9]

Besides the energy used in municipal buildings, public transportation, street lighting, and other operations, local governments exert influence over transportation and land use patterns, the energy efficiency of private buildings, and in some cases, local energy supply. Taken together, municipal governments can be said to have direct or indirect control over more than half the energy used in a community. This section provides a summary of a CEC[10]-sponsored study on best practices in energy use and supply in North American municipalities. Through this sharing of experiences and lessons learned in the region, the CEC seeks to promote action at the local level. Thus the case studies provide a wider policy and economic context as well as performance indicators. The common initiatives in all case studies are as follow:

Greening Existing Buildings

Most of the studied municipalities have undertaken initiatives to reduce energy consumption in the buildings they own or occupy. The goal of these initiatives is not only to save energy, reduce costs, and mitigate greenhouse gas emissions, but also to lead by example, i.e., to inspire local, private building owners to undertake similar initiatives. Generally, upgrades include replacement of lighting, climate control, and other energy-consuming equipment with newer, more efficient versions.

New Green Buildings

In addition to greening existing buildings, a few of the municipalities studied also have policies requiring that new municipal-owned buildings meet or exceed recognized energy-efficiency standards. Several of the studied municipalities, have either built or are in the process of building LEED-compliant facilities.

Greening Building Operations

In addition to savings obtained from physical upgrades, some municipalities save energy by improving the efficiency of building operations. Energy-consuming equipment is kept operating at maximum efficiency by adhering to a strict maintenance schedule and conducting repairs promptly. Some municipalities have undertaken initiatives to instill more energy-efficient workplace behavior.

Energy Management Tools

Several municipalities have recently begun using sophisticated energy management software that allows administrators to monitor energy by department, by building, or even by individual

[9] Best Energy Management Practices http://www.cec.org/municipalenergy/home.asp?varlan=en
[10] Commission for Environmental Cooperation: http://www.cec.org/municipalenergy/home.asp?varlan=en

system within a building. The data obtained helps municipalities evaluate their energy-efficiency initiatives and identify new opportunities for saving energy.

Renewable Energy

Many municipalities have developed renewable energy generating capacity of their own, such as solar thermal water heating and solar photovoltaic electricity generation on municipal buildings. The City of Burlington, for example, has installed solar photovoltaic panels on several schools, generating electricity and helping to acquaint students with renewable energy and sustainability. York Region is considering installing a wind turbine at one of its water treatment facilities. Several initiatives found at landfill and wastewater treatment facilities involve the capture of biogases to power small electric generators.

Procurement Policies

A few municipalities have adopted energy-efficient procurement policies, requiring that any materials or equipment purchased by the municipal administration meet certain energy-use criteria and other environmental standards.

Case Study: Burlington, Vermont - Climate Action Plan[11]

Located on the western shore of Lake Champlain, at the foot of the Green Mountains, Burlington is the largest city in Vermont, with a population of just under 40,000. In 2000, Burlington City Council adopted a Climate Action Plan, which included a five-point strategy to address climate change through initiatives both within the municipal corporation and in the community at large. The plan's five strategies include:

(1) Energy efficiency measures in municipal buildings and throughout municipal operations;

(2) Energy efficiency programs for homes and businesses;

(3) A public education campaign to raise awareness and encourage public participation;

(4) Biomass district energy and other clean energy alternatives for electricity generation; and

(5) Transportation demand management (TDM) programs to work in cooperation with local, state and federal agencies.

As a result, electricity consumption has been reduced and remains stable at 1989 levels. The Burlington Electric Department has also invested heavily in renewable energy development, which now makes up over two thirds of Burlington's energy mix.

[11] http://www.cec.org/municipalenergy/case_studies.asp?xmlFile=burlington&varlan=en

Following the Climate Action Plan's adoption, Burlington immediately updated its energy codes to meet the standards of the 2000 International Energy Conservation Code (IECC 2000).[12] All construction projects and newly procured equipment are now required to comply with the City's IECC 2000 standard (Burlington Electric, 2000a). More details on the Burlington Climate Action Plan can be found in Appendix 1.

Key Success Factors[13]

The Climate Action Plan benefits from the involvement of several partners within the municipal corporation. The Burlington Electric Department plays the primary role in overseeing the implementation of energy efficiency measures and overseeing sustainable building design and construction. The Department of Public Works is tasked with implementing climate-friendly municipal transportation measures and supporting state and regional actions. The Community and Economic Development Office (CEDO) is increasingly responsible for managing the overall direction of the plan through the Legacy Project.

The City has also formed important linkages with partners outside the municipal corporation to implement joint programs, including the Chittenden County Regional Planning Commission, the Chittenden Solid Waste District, and the Chittenden County Transportation Authority. The University of Vermont, the Fletcher Allan Hospital Complex, the Institute for Sustainable Communities, and the local Chamber of Commerce have also played supportive roles by making small grants to the Community and Economic Development Office, which is responsible for administering the Legacy Project.

Financial Aspects

In 1997 and 1998, the City of Burlington received two Environmental Protection Agency (EPA) grants of $35,000 and $28,000 to help local businesses improve energy efficiency. The City decided to use a portion of these grants to begin research on the municipal buildings component of the Climate Action Plan. The City also received a small Environmental Protection Agency grant to launch the Legacy Project. Funding for municipal building construction and energy efficiency renovation projects has been allocated through the City's operating funds and through cost-sharing programs with other institutions.

In addition, voter-approved bonds have been employed by the Burlington Electric Department to cover energy efficiency improvements to utility operations, including minor upgrades to the McNeil Generating Facility. A total of $6 million has been allocated to programs for increasing energy efficiency in homes and businesses since the 2000 plan was adopted. Funding for these programs increased from $318,810 in 1999 to $956,459 in 2006. In 2008, a voter-approved

[12] http://www.iccsafe.org/e/prodshow.html?prodid=3800S00&stateInfo=fiajldbfdhmjbpVa6792133

[13] http://www.cec.org/municipalenergy/case_studies.asp?xmlFile=burlington&varlan=en

bond worth $11 million will fund a major upgrade to the McNeil Generating Facility to reduce nitrous oxide emissions.

Since receiving its initial grant in 1998, the Legacy Project has been funded by small grants and donations from local businesses and institutions. Local entities including the United Way, the Fletcher Allan Hospital Complex, the University of Vermont and the local Chamber of Commerce each donate between four and ten thousand dollars annually to the Legacy Project, while the City contributes an additional $30,000 to fund Legacy Project staff and operations. The Burlington Electric Department has made a one-time donation of $2,000 to the Legacy Project for rewriting the Climate Action Plan in 2008. Staffing expenses for the Legacy Project are partly covered by the University of Vermont in the form of research support from students and faculty.

As in the case of the Burlington Electric Department and the Legacy Project, officials from the Solid Waste and Public Works Departments say that emission reduction measures have become part of normal operating procedures and are therefore integrated into routine program funding. Thus, there are no estimates available on the total staff time is allocated to climate change measures by the City of Burlington. Funding for the 10% Challenge has been secured through the Alliance for Climate Action (ACA), which has successfully attracted a number of small grants, amounting to an average total between $20,000 and $30,000 per year.

Case Study: Long Island Green Homes Program, Babylon, NY[14]

The Long Island Green Homes Program supports a broad set of policies to encourage energy efficiency in Babylon, a town on the south shore of Long Island. In 2006, Babylon developed a comprehensive green building code and became the first Long Island town to adopt aggressive energy efficiency standards consistent with the ENERGY STAR New Homes performance standards for new home construction and to require LEED-certification for all new commercial buildings over 4,000 sq ft. The Town also adopted the 12X12 Initiative to Combat Global Warming (a program of the Sierra Club), committing Babylon to reducing its greenhouse gas emissions 12% by 2012.
To implement their financing program, the definition of solid waste was expanded to include CO2 so that $2.5 million of the Town's solid waste reserve fund could be used to finance energy retrofits. The program funds cost-effective energy efficiency measures such as air sealing, insulation, caulking, and replacing space heating and hot water systems. The program can also finance solar energy improvements, but only if the home already meets the Energy Star standard for new home construction. Thus far, 650 homeowners have submitted applications for funding. The average project costs $7,100 and is expected to save 28% of the home's energy use.

[14] http://www.ligreenhomes.com

Case Study: Community Energy Initiatives in Upstate New York[15]

Fabius, Caroline, and Cayuga County

Fabius is a small town southeast of Syracuse in Onondaga County whose economy revolves mainly around farming. A group of residents with help from outside experts decided to pursue the development of a community energy plan to assess the feasibility of renewable energy production in the Town. The Fabius Energy Steering Committee began to meet in May of 2007 to develop a proposal for the development of a municipal energy plan. The Fabius Energy mission includes energy education in the schools and the community, increased energy efficiency and conservation, and the adoption of renewable power generation initiatives that are environmentally and economically viable.

Caroline is a small town southeast of Ithaca in Tompkins County. The energy initiative in Caroline began in 2004 when the Town Board decided to purchase a portion of the Town's electricity needs from wind power. The advocates of purchasing wind power later had the idea that the Town instead could actively produce its own wind energy and keep the money inside the community. The group Energy Independent Caroline (EIC) was formed with two main objectives.

First, the group aims to reduce the town's electricity usage by educating and informing community members about energy conservation and efficiency. Second, the group is pursuing the development of a community owned industrial scale wind farm. EIC has sponsored several community events about energy efficiency and has begun the pre-development work for the construction of locally owned wind turbines.

The renewable energy effort in Cayuga County is focused on the development of a community anaerobic digester. Unlike the Caroline project, the digester is being developed at the county level by the Cayuga County Soil and Water District. The facility will collect manure from nearby farms and anaerobically digest it with the goal of reducing odors, increasing water quality, and producing natural gas to be used to generate heat or electricity. The liquid by-product will be transported back to farms to be used as fertilizer for fields, while the county will use the natural gas produced to provide electricity and heat for its buildings.

Case Study: A Corporate Approach to Wind Power: Lewis County, NY[16]

In contrast to the Town of Caroline's plan to construct a community owned wind farm, the Maple Ridge Wind Farm in Lewis County was proposed, constructed, and is owned by two large corporations from outside the area. Corporate wind farm development brings up a different set of issues and considerations for municipalities than the community energy initiatives in Fabius

[15] CaRDI, 2007, "Municipal Approaches to Energy Conservation and Renewable Energy Production: A Resource for Community Energy Initiatives", Shawn Lindabury, Todd M. Schmit, Rod Howe, and Tania Schusler
[16] Ibid

and Caroline. Most wind farm development in the United States follows the corporate model so Towns should be familiar with both approaches. Towns with good wind potential may be approached by outside developers to build wind turbines, as was the case in Lewis County.

Historical Background

The effort to build the Maple Ridge Wind Farm started in 1999 when a representative from Atlantic Renewable Energy Corporation approached residents, Towns, and the County about his idea to build a wind farm in Lewis County. Lewis County is a prime location for a wind farm because of its constant lake effect winds and its abundant open farmland. Some residents expressed concerns about aesthetics, bird mortality, and the noise of wind turbines, but most people were won over by the payments the developer offered to landowners, neighbors, schools, towns, and the county. Construction of the wind farm is now complete with 195 wind turbines built since the project began.

Project Characteristics

With 195 wind turbines and the capacity to produce electricity for 125,000 homes (all of Lewis, Jefferson, and St. Lawrence counties), the Maple Ridge Wind Farm is the largest renewable energy project in the United States east of the Mississippi. At maximum capacity it can provide 2% of New York State's residential electricity demand. The project is spread over a total area of 21,000 acres in the Towns of Martinsburg, Lowville, and Harrisburg, but the wind turbines use less than 1% of this acreage. Maple Ridge is owned by a partnership of PPM Energy (owned by Iberdrola) and Horizon Wind Energy.

Benefits to Communities

The first benefit for communities and residents are the direct payments Maple Ridge pays to landowners. All the wind turbines are located on private land and landowners receive a yearly payment for each turbine sited on their land. The cost per wind turbine averages between $6,000 and $10,000 -annual depending on the actual amount of energy produced. These payments can be a significant source of revenue for large landowners, especially farmers, who own a lot of land and install multiple turbines. Neighbors of property owners who install wind turbines are paid $1,000 in exchange for signing a Good Neighbor Agreement, which waives some of the neighbor's rights to sue Maple Ridge.

In New York, the most common property tax payment relationship between a project owner and the affected taxing jurisdictions (i.e., County, city, town, village, school district) is a contracted "Payment in Lieu of Taxes" (PILOT). A PILOT is generally used as a tool by local taxing jurisdictions to incent a developer's interest in a certain area and is most often negotiated at a rate well below full assessment values. A common PILOT structure is an annual payment per MW of installed capacity for a contract term of up to 15 years. Specific guidelines for determining the level of PILOT payments do not exist except for the provision that the payments may not exceed what would have been owed had the equipment been assessed under ordinary tax provisions.

The Maple Ridge project will make payments to these entities for 15 years before going on the tax rolls. These payments are significant infusions of money into tight budgets for local government entities. For example, the town of Martinsburg's annual budget is around $400,000 per year, but under the PILOT agreement with Maple Ridge the town will receive $1.2 million per year for 15 years, according to the Town Supervisor.

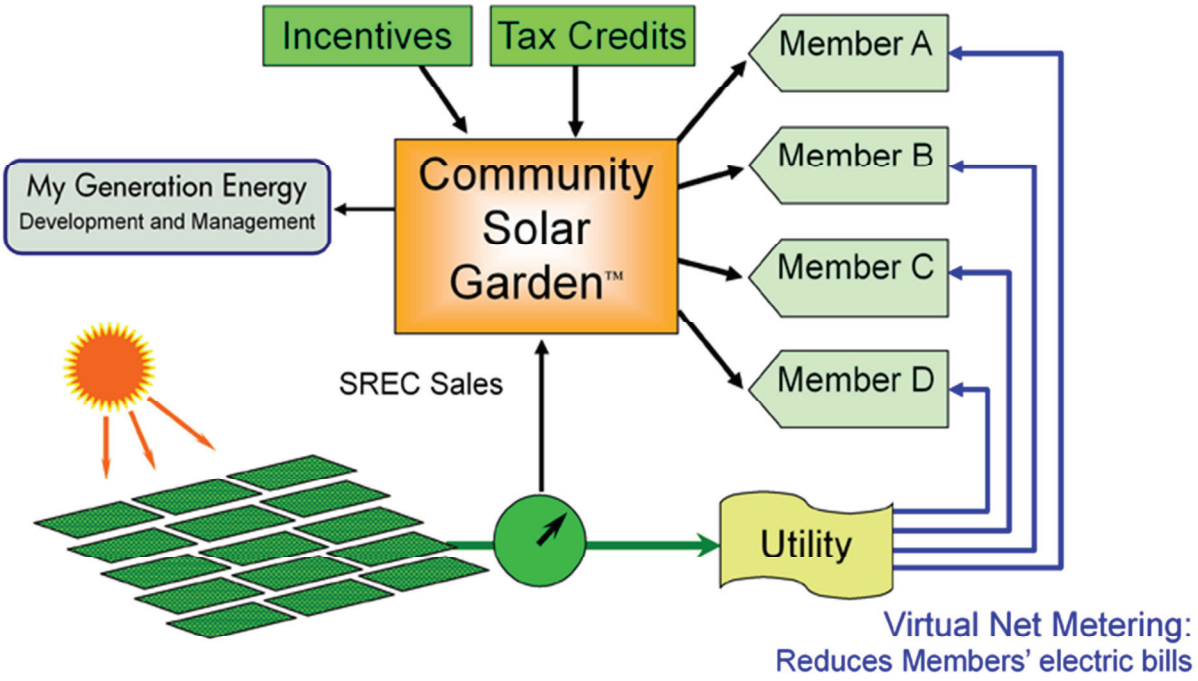
Residents are excited by the prospects of new infrastructure such as broadband internet access, and new playgrounds, schools, and roads. The town has hired a consultant to invest the money wisely and figure out the best way to spend it.

Other benefits include the creation of new jobs within the region. Most of these jobs were created temporarily during the construction phase of the project, but a smaller permanent workforce is required to maintain and monitor the turbines. The payments to farmers and landowners create a new source of income for struggling small farms and ease the pressure to subdivide and sell large portions of land. The money from Maple Ridge allows the county to maintain outdoor recreation opportunities like snowmobiling, hunting, and fishing, while keeping the agricultural base strong.
An advantage of corporate developed wind farms is that communities do not have to do the work involved with the development of a wind farm. Volunteers in groups like Energy Independent Caroline devote a huge amount of time and effort to this work, while corporations will pay for all of it in a corporate owned project.

An Innovative Idea: Community Solar Garden[17]

Newly enacted energy policies make this community-based approach a cost-effective and efficient method. We can keep our energy dollars within the community while we generate clean electricity. By pooling the resources of the members, we create a shared solar installation. Thanks to "virtual net metering" each member receives their benefits without having separate wires running to their home or business. The members also share the tax credits and Solar Renewable Energy Certificate sales. The benefits to the members are possibly better than if solar were actually installed on their individual homes or businesses!

[17] http://www.mygenerationenergy.com/community-solar-garden



Case Study: Rifle, Colorado

Recently a new 5-acre, 858-kilowatt Garfield Community Solar Garden opened for business in Rifle, Colo., as the largest community solar project of its kind in the country. The array, which was developed by the Clean Energy Collective in Carbondale, will provide more than 1.5 gigawatt hours of electricity each year and will service 350 members who buy into the project and can enjoy solar power without having to own their homes or have suitable roofs or substantial land for installing panels on their own property. The project, situated in rural Rifle, a town at the epicenter of natural gas and other fossil fuel extraction efforts, seems like an unusual setting for such a progressive project.

About the Clean Energy Collective

The Clean Energy Collective is a developer of community-based renewable energy facilities and a leader in community power generation. Based in Carbondale, Colorado, the CEC is pioneering the model of delivering solar power-generation through large-scale facilities that are collectively owned by participating utility customers. The CEC's proprietary RemoteMeter™ system automatically calculates monthly credits and integrates with existing utility billing systems, enabling all residential and commercial utility customers to easily have clean, renewable power credited on their monthly utility bills, without modifying their home or office.

The Ownership Model

Most existing solar gardens are utility-owned, with panels leased to individual customers, who receive a credit on their electric bill. In the Rifle array, customers actually own particular physical panels, and the array is managed by a third party, for-profit company. The model consists of a set of contracts between customer, utility, array owner, and solar company that allows tax credit savings to be passed to the customer while not being treated as a security, such as a share of stock. It is implemented under federal law, which makes it nationally replicable.

Case Study: Sacramento SolarShares (Utility owned solar garden)[18]

How does it work?

SolarShares is an alternative to owning a solar system that you will need to pay several thousand upfront to purchase, or pay a few hundred dollars a month on a loan payment until the system is paid off. With SolarShares, the fixed monthly fees to participate start at $10.75 per month for a 0.5kW system for small energy users. After your monthly fee, the amount of power generated by your share shows as a credit on your bill - average about $5 a month. And that offsets the amount you pay for electricity produced through other methods.

Under a long-term PPA[19] - typically 20 years – Sacramento Municipal Utility District (SMUD) buys energy from a new local PV project installed by a 3rd-party vendor. SMUD resells this energy to SolarShares participants ("customer") at a price lower than the PPA price.

The customer buys an annual amount of solar energy by selecting a size for their "virtual rooftop system." For example, a customer who chooses a 1-KW system receives the equivalent of what would be produced by a 1-KW rooftop system having the same capacity factor as the SolarShares system. SMUD guarantees the amount of energy to be delivered over a 12-month period. The customer pays a fixed monthly fee and receives a bill credit for the energy produced each month by their virtual system. The credit per kWh is the same as what the customer would earn from a net-energy-metered rooftop system—i.e., full retail.

The size of system offered to a given customer depends on the customer's annual electricity consumption for the previous 12 months. Smaller users are restricted to smaller systems in order to preclude the possibility of over-generation and make the program available to a greater number of customers. Likewise, the customer's annual usage also determines their monthly SolarShares fee. Because larger users receive greater value from net metering due to SMUD's tiered rate structure, they also pay more per kWh for SolarShares but still pay about the same annual premium as smaller users for participating in the program.

[18] http://blog.solargardens.org/2011/06/guest-post-smud-solar-shares-in.html
[19] Power Purchase Agreement

The SolarShares price in cents per kWh is designed to exceed the average grid price the customer would pay over 20 years if grid prices escalate by 3% per year. SMUD's goal is to keep the system subscribed up to 95% of its full output, with the additional 5% used as a safety margin ensuring that SMUD can keep its delivery commitment to customers in the event the system produces less energy than estimated.

The system was subscribed to the desired level within six months of program inception. Little paid marketing was necessary—media stories and word of mouth were sufficient to produce this level of demand. Approximately 700 customers were sufficient to fully subscribe the system, and there is a persistent waiting list of approximately 60 customers. The current mix by customer size is about 27% small, 51% medium, and 22% large.

SolarShares Potential as a Sustainable Business Model[20]

The ability to balance the price per kWh paid by SolarShares customers against the price paid by the utility under the PPA suggests great potential for making distributed PV at least a breakeven proposition for both the program participants and the utility. Moreover, having the utility handle all program administration and resource acquisition removes the first-cost and decision complexity that are now formidable barriers to increased customer uptake of rooftop PV.

The utility is able to reduce the cost of adding renewable generation within the distribution grid by having a subset of ratepayers help defray the higher cost of PV relative to other renewables. The ability to site systems on roof space as well as less developable land gives many community institutions (such as schools) the potential to serve as system hosts and perhaps receive revenue in the form of space leasing, thus forging new partnerships between the utility and its constituencies.

[20] http://www.smud.org/en/community-environment/solar/Pages/solarshares.aspx

Best Practices and Lessons to Learn from Municipal Energy Projects in European Countries[21]

Promoting and supporting innovative schemes, such as public private partnerships, ESCOs, performance contracting or third party financing brings us back to the importance of the appropriate legal framework that can dismantle inhibiting barriers, and foster new investments. Local sustainable energy policies and schemes give a strong sign of municipal commitment to local businesses to invest in clean technologies. National legislation and related incentives can and should also give further impetus to local investments.

This document provides a review of municipal sustainable energy management projects and corresponding opportunities for innovative financing of local projects. It also provides a collection of best practices and demonstrates lessons to be learned from each other. The case studies include ten case studies from all over Europe:

1. Energy savings in primary schools via energy performance contracting
Prague, Czech Republic

2. Energy efficient retrofitting of street lighting, financed by municipal bond issuance
Varna, Bulgaria

3. Refurbishment of office lighting in Public Private Partnership with ESCOs
Hodmezovasarhely, Hungary

4. Refurbishment and small scale cogeneration in public buildings, financed via "intracting"
Stuttgart, Germany

5. Energy efficient refurbishment of dwellings via zero rate loans
Picardie, France

6. Modernisation of the municipal district heating system via carbon financing
Timisoara, Romania

7. Modernisation of the traffic control system by municipal funding scheme
Stockholm, Sweden

8. 'Solar Roofs' Initiative in public private partnerships
Berlin, Germany

[21] New Forms of Financing Municipal Sustainable Energy Projects (2006), ADEME Convention for Energie-Cités, *Collection of best practices on new forms of financing municipal sustainable energy projects*

9. Local stakeholders networking for planting of energy crops via municipal financing
Podlaskie Voivodship, Poland

10. Energy efficient retrofitting of district heating system by bank loans
Nova Dubnica, Slovakia

1. Prague (Czech Republic)	
Project type	**Energy Efficient Refurbishment of Primary School Buildings**
Financing structure	**Energy Performance Contracting (EPC)**
Project description	4 primary schools were refurbished within a project running from 2000 until 2006. Using the EPC method, the private company (Siemens) invested into energy efficient measures, such as temperature sensors for radiators and replacement of windows.
Objectives	Energy Savings
Policy background / Incentives	In the Czech Republic there is a law on energy efficiency in place. In 2005, with legal assistance of the EBRD a law enabling PPP investments, making them more simple and transparent was Implemented.[22] The Czech Ministry of Industry is also promoting EPC by *subsidizing the preparation phase*. This subsidy is at the disposal of municipalities, schools or buildings serving for health services. The successful applicants are able to cover 75% (up to 5.000 EUR) of the costs required for the preparation phase of the EPC by using the subsidies they obtained.
Evaluation	Due to the investments, the energy consumption, thus energy costs of the four buildings decreased min. by 20%. The city can keep a fraction of the financial savings achieved, and a percentage of the financial savings serves for the repayment of the installed technology and work carried out by the ESCO.
Positive aspects of this form of financing	The municipality could finance this operation via an off-balance method, without the need to make any upfront investment. The selection criteria of the ESCO contractor were the payback time as well as the rate of guaranteed savings, which guaranteed foreseeable results. Up to 36% yearly savings was achieved during the project lifetime. The surplus savings were shared 50-50% between the municipality and the ESCO. The ESCO reinvested 50% of its share, i.e. 25% of the total surplus savings were re-invested into partial change of windows in one school building, new hydraulic layout of heating pipelines etc. The project lifetime (6 years) is relatively short, thus giving an opportunity for the municipality to benefit from the savings longer, without any necessary upfront investments right after the end of the project.
Issues and negative aspects	Via more careful planning and establishing a stronger negotiation position, the city could have eventually achieved a better position against the ESCO company, benefiting of a higher amount of the financial savings.
Next steps	Currently, the municipality of Prague is planning to continue with EPC contracts to further decrease the energy consumption in the above mentioned four schools as well as in other schools.
Contact at the municipality	**Ing. Marta Arazimova** Head of the Department of Education and Culture Municipal Office, Cechticka 758, 143 12, Prague 4 - Modrany, Czech Republic +420 241 716 330 marazimova@p12.mepnet.cz

[22] EBRD, 2005: Strategy for the Czech Republic: http://www.ebrd.com/about/strategy/country/czechrep/strategy.pdf

2. Varna (Bulgaria)	
Project type	**Energy Efficient Retrofitting of Street Lighting**
Financing structure	**Municipal Bonds - 100% municipal investment (obligation) – organized by a financial institution**
Project description	The energy efficient modernization of the Municipality of Varna started in 2002 and ended in 2003 with a payback period of 2 years and 9 months. In 2002, Varna Municipality issued the first municipal bonds for financing energy efficient modernization of the city's street lighting system. The bonds were disbursed under private channels and the invitation to purchase them was sent out to approximately 50 potential investors. The bonds were sold within less than 24 hours.
Objectives	Modernizing the street lighting system at relatively low upfront costs and generating long term energy savings at the same time.
Policy background / Incentives	The Public Offering of Securities Act provides the necessary legislative framework and facilitates the issuing of municipal bonds in Bulgaria.
Evaluation	▪ The total annual savings amounted up to 10 035 MWh, in financial terms: EUR 512.000. ▪ This financing type reduced the projects' payback period to 2 years and 9 months.
Positive aspects of this form of financing	▪ Municipal bonds' issue proved to be a relatively cheap form of financing: the interest rate paid by the municipality was 9% while at the time the bank's average interest rates were in the range of 12% to 14%. ▪ The project generated good cash flow with high financial parameters. ▪ The annual savings when the street lighting system is working at full capacity are almost equal to the annual expenditures before the refurbishment.
Issues and negative aspects	▪ Municipal bonds emission requires a long and expensive preparatory work (obtaining the credit rating, working out an investment memorandum for the emission, waiting for the endorsement by the State Commission on Securities, selection of an intermediary investment broker), with a relatively precise estimation of the expected outcome. ▪ A major risk is also related to the sale of the municipal bonds: in case the subscription would have been unsuccessful in implementing the conditions envisaged in the memorandum (at least EUR 2 million collected within one month after the closure of the subscription), any collected amounts should have been paid back to the subscribers, together with the due interests charged by the bank. ▪ In case the emission has proved to be unsuccessful, the municipality would have incurred significant losses, since all the preparation costs of the emission and payment of the due subscription interests would be credited from the municipal account.
Next steps	No further plans in this direction. Municipal bonds emissions became expensive and not very appropriate for project financing. This is due to massive credit offers provided by the commercial banks together with the incentive of low interest rates for municipal investment credits (from 4% to 8%)
Contact at the municipality	**Mr. Kiril Yordanov** Mayor Municipality of Varna +359 52 600 616 kyordanov@varna.bg

3. Hódmezıvásárhely (Hungary)	
Project type	**Energy Efficient Refurbishment of Buildings - Indoor Lighting**
Financing structure	**Third Party financing, carried out by an Energy Services Company (ESCO)**
Project description	The municipality of Hódmezıvásárhely had no solvency to claim a credit; therefore it opted for a PPP construction without municipal contribution. It was a 9 years long rent construction.
Objectives	Achieving a modern and low cost lighting system without reducing the level of comfort by replacing existing components with more efficient alternatives.
Policy background / Incentives	The Hungarian Government launched a national programme (called: 'Light of Our Eyes > referring to our children) to promote public private partnerships, providing an organizational support (nation-wide tendering process) for PPP investments.
Evaluation	▪ Both lighting quality and energy efficiency improved. ▪ A cumulated 41% energy savings has been achieved. This means a 992 MWh/year energy savings (2000 operation hours/year).
Positive aspects of this form of financing	▪ The municipality was able to change the outdated (20-30 years old) and weak lighting systems. ▪ After the modernization the indoor lighting systems fitted to the quality standards and significant energy savings were achieved.
Issues and Negative aspects	▪ Because the municipality used a credit for the works the investment turned out to be more expensive as if it had been if financed from own sources at present value. ▪ The municipality had to commit itself to the creditor institution for a long time. ▪ When the municipality will be the owner of the lighting systems, they will be outdated; therefore the municipality might have to start a new investment.
Next steps	The future plans involve the continuation of the retrofitting works: refurbishment of the buildings' envelope, replacement of windows, heating / cooling.
Contact at the municipality	**Mrs. Ilona Fazekasné Czakó** Energy Manager Municipality Hódmezıváráshely Hódmezıvásárhely, Kossuth tér 1. Hungary 62/530-165, fax: 62-530-163 energia@hodmezovasarhely.hu

4. Stuttgart (Germany)	
Project type	**Energy Efficient Retrofitting of a Swimming Pool – Implementation of a Cogeneration Plant**
Financing structure	**Internal Contracting ("Intracting")**
Project description	At the "Sonnenberg" indoor swimming pool in Stuttgart a cogeneration gas engine was installed. The plant produces 5,800 hours/year in cogeneration, out of which annually approximately 300,000 KW electricity and 570,000 KW heat. The static payback period (calculated by taking into account the technical life-time of the equipment) represents 6.5 years. The project started in 2000. The investment costs of the cogeneration plant were about EUR 94,000.
Objectives	Achieve self-supply in heat and electricity in the swimming pool.
Policy background / Incentives	In 1995 the Stuttgart Environmental Protection Department in close cooperation with the Financial Department developed the "intracting" method for financing energy saving projects. This method is based on the idea of contracting but operates entirely within the city administration. It consists of a special budget item (a revolving fund) to which the cost savings are later returned. The Environment Department thus grants an earmarked, interest-free loan to the host department. The amount of the loan depends - as with the conventional Contracting - on the energy and cost saving potential. Today, the annual "intracting" budget represents approximately EUR 1.3 million in Stuttgart.
Evaluation	The annual savings obtained from the projects sum up to 13.900 MWh savings on heating, 1.850 MWh savings on electricity and 31.700 m3 savings on water. The implemented measures lead to a total annual cost saving of EUR 1.1 million.
Positive aspects of this form of financing	• No additional costs of possible risks and no interest charged on the invested capital. • Lacking an external contractor, transaction and administration costs of contract management are substantially reduced. • Small volume projects can be promoted as well, which otherwise would not be attractive enough for an external Contractor. "Intracting" also offers the possibility for partial financing of projects. • The preparation period is minimized by the internal completion of the process, so that energy conservation measures can be implemented in a shorter time.
Issues and Negative aspects	• Calculation of the investment costs can lead to misleading profitability forecasts. • Cost estimation was delivered by an external engineering company. This turned out to be too high, and thus previsions showed no profitability for half of the economic lifetime, therefore the "intracting" was evaluated as unfavorable. By using a rescheduling and cutting back on the technical side, costs were reduced and "intracting" approved.
Next steps	8 more cogeneration plants were implemented using the "intracting" method.
Contact at the municipality	**Dr. Jürgen Görres,** Office for Environmental Protection, Department for Energy Management Gaisburgstraße 4, D 70182 Stuttgart Tel: + 49 711 216 2912 Fax + 49 711 216 2413 Juergen.Goerres@stuttgart.de

5. Picardie (France)	
Project type	**Energy Efficient Insulation of Dwelling**
Financing structure	**'Zero rate bank loans' supported by the Picardie Region**
Project description	The loan is aimed to be used by tenants and owners for energy efficient insulation works – loft insulation mainly – in their dwellings built before 1982. Citizens are offered a maximum of EUR 6 500 and the loan is not subject to any income condition. To benefit from the loan, the private individual must send the loan application to the bank, with the seal of the company which will complete the work. The bank replies within 48 hours. The bank pays the company directly when the work is finished and after reception of the work certificate signed by both the customer and the company. The private individual pays no interest to the bank. The interest is paid by the Picardie Region. The regional budget sums up to EUR 1.8 million.
Objectives	▪ The regional allowance targets 25 000 households (dating from before 1982) during a period of over 5 years. ▪ The goal is to achieve 30% of economy on heating consumption, which accounts for EUR 300-350 per annum for a house of 100 m².
Policy background / Incentives	Picardie Regional Council is supporting the thermal improvement of the dwellings in order to achieve household cost and energy savings. Launching the "Picardie Avantage Isolation" loan scheme, this financial incentive intends to change citizens' behaviors by influencing directly their purchasing power and contributing to the reduction of the greenhouse gas emissions.[23]
Evaluation	• The scheme was launched in June 2006, therefore it is too early to make an evaluation since until now only a few files were handled. • Moreover, it needs to be mentioned that a learning process during the implementation of this process is inevitable. • Today, a close contact is maintained with the building professional federations as well as with the partner banks.
Positive aspects of this form of financing	• This form of financing creates a leverage effect for the tenants/ owners of the dwellings. • The loan is offered at a zero interest rate to the end users, the interest being paid by the Picardie Region. • This operation should be invisible for the private individual from a financial point of view as the refunding period of the loan can be extended up to 84 months. Therefore, the sum that needs to be paid back reaches a lower or equal level to the savings made on the invoice for the heating services. • This loan with subsidized interest rate will re-launch the insulation market in Picardie and should generate a work volume estimated at EUR 100 million due to many prospective employment opportunities for the craftsmen and the building companies.
Issues and negative aspects	Difficulties related to the public markets and to delays of various banking consultation services impose that the community mobilizes its internal resources upstream (legal, communication etc) without fearing to be surrounded by usual partners (ADEME) or by partners that are more familiar with the financial dimensions of this type of project (specialized cabinets).
Contact at the municipality	**Jean-Marc Pasquet** Conseil Régional Picardie 11 Mail Albert 1er B.P. 2616, 80026 Amiens Cedex, Picardie, France +33 (0) 322973586 jmpasquet@cr-picardie.fr

[23] www.cr-picardie.fr/IMG/pdf/picardie_isolation_web.pdf

6. Timisoara (Romania)	
Project type	**Energy Efficient Replacement of Heat-Only Generation Units with Co-generation**
Financing structure	**Carbon Credits:** Colterm, the municipality owned district heating company (EUR 8 million) **Bank Loan (EBRD: European Bank for Reconstruction and Development EUR 15 million)**
Project description	The project represents a modernisation and an extension of the existing co-generation plant. By replacing outdated heat-only generation units with more environmentally-friendly gas turbines, Colterm S.A., the municipal district heating company will cut carbon dioxide emissions by approximately 120,000 tonnes per year[24]. These reductions will help produce up to EUR 4 million worth of carbon credits, which will be sold to the EBRD for the account of the Netherlands[25]. EBRD funds will be used to finance the installation of new gas and steam turbines with hot water recovery boilers for co-generation of heat and electricity. The loan will be guaranteed by the City of Timisoara.
Objectives	Increased efficiency and a more environmental friendly operation are expected to enhance the reliability and quality of supply of both electricity to the power grid and heat to the district heating network. Ultimately, generation and maintenance costs are expected to be reduced.
Policy background / Incentives	Kyoto protocol and its implementation > JI, CDM
Evaluation	The project only started in September 2006, therefore it is too early to make an evaluation.
Positive aspects of this form of financing	• The idea of generating and using carbon credits as payback means for the investment is an innovative approach that works greatly in favor of the company because it makes the project more financially viable. • A portion of Colterm's investment will be paid using an advance payment from the sale of carbon credits that will be generated by the investment. • Full cost recovery tariffs and increased transparency in billings will also improve customer satisfaction and encourage energy conservation.
Issues and negative aspects	Not yet known, since the project only started in September 2006.
Next steps	It is the first project in Romania to directly link the financing of a project with carbon credits. The sale of these credits is instrumental in making the project viable. It is a successful formula which should be considered in other cities, especially since district heating operators across many former command economies still require substantial restructuring
Contact at the municipality	**Colterm** str. Piatra Craiului nr. 3, Timisoara, Romania +40 0256 434 614 office@colterm.ro

[24] To cut a similar amount of CO2 using offshore wind-farm technology, an investment of around EUR 120 million would have been needed.
[25] EBRD and the Netherlands reached a joint agreement in 2003 to help reduce emissions in Central and Eastern Europe.

7. Stockholm (Sweden)	
Project type	**Energy Efficient Transport Infrastructure - Traffic Signals**
Financing structure	**100% Municipal Investment**
Project description	Municipality of Stockholm decided to replace conventional traffic signals by LED units at 530 signal control points, due to their energy efficiency and short payback period. The EUR 6 million project was completed by the end of 2001 with a payback period of 4.2 years.
Objectives	The traffic signal system was equipped with ordinary incandescent bulbs, which have high energy consumption and are expensive to maintain as they need frequent replacement. The replacement was an ideal target for savings. The specific aims of the project were to: • Use market forces via a large purchase to reduce the price of LEDs, which will help others to carry out similar projects without being dependent on subsidies. • Reduce the cost for management and maintenance and thereby encourage other improvements in the signal system. • Reduce energy consumption, bulb turnover and transport costs and thereby reduce the environmental impact of the signal system. • Increase public security through increased visibility and a reduced risk that signals are out of order. • Reduce maintenance on site and hence increase security for maintenance staff.
Policy background / Incentives	Over the past 30 years Stockholm has consistently followed policies designed to improve the energy performance of the city and has devolved action at the local level - for example every department in the city has its own energy consultant. Once the market was liberalized and privatized, the municipality was obliged to pay for the electricity it used, thus it became interested in energy savings. The energy saving potential of this project is very significant, can easily be replicated and there is a clear financial benefit to the local authority. But the incentive was greatly increased by the changes induced by liberalisation and the change in the utility from a service mentality (providing electricity to the municipality as a service free of charge) to a business mentality (maximizing sales and profits). One of the benefits of liberalization is that it makes the cost of each service transparent and therefore encourages the user to reduce energy costs.
Evaluation	Incandescent traffic lights required 6.4 million kWh where LED lights require 640,000 kWh. Annual savings consist of EUR 471,000 (electricity) and EUR 243,000 (maintenance), which sum up to a total of EUR 714,000.
Positive aspects of this form of financing	Once the municipality paid the bills, they took the necessary action to reduce the electricity consumption. Obviously, a clear relationship between investment costs and running costs was introduced.
Contact at the municipality	**Lars Söder** Traffic Administrator, Stockholms Trafikkontor Trafiktjänsten, Box 8311, S-104 20 Stockholm +46 8 508 262 08 lars.soder@gfk.stockholm.se

8. Berlin (Germany)	
Project type	**Solar Energy Generation by using the Municipal Roof Area**
Financing structure	**Public Private Partnerships**
Project description	In 2002, Berlin Municipality created the Solar Roof Initiative (Solardachbörse) to motivate the construction of solar power plants by private investors. About 80 buildings' roof space (schools, administrative buildings, sport complexes) are included in the initiative.
Objectives	To reduce greenhouse gases and save natural resources by harvesting solar energy from the idle roof area on 6000 municipal buildings.
Policy background / Incentives	Since 2004, Germany has raised feed-in tariffs[26] for renewables. This made electricity generated by solar power plants more economically viable and has led to increased interest from private investors.
Evaluation	By early 2005, 25 private investors had shown interest in the Solar Roof Initiative. The first plants were installed in summer 2005. The number of potential investors is continuously increasing. The publicity and promotion surrounding the scheme has significantly increased awareness of solar energy among municipal employees and across the city as a whole.
Positive aspects of this form of financing	By using a PPP financing structure the municipality transferred the financing of the construction material and of the technical knowledge to private investors.
Issues and negative aspects	• At first, many private investors showed interest, but no concrete contracts were signed due to lower feed-in tariffs at that time and higher module costs. • After the increase in feed-in tariffs for solar power, there was increased demand for solar modules, which could not be met by the existing production capacity. Therefore, local market conditions within the solar industry in Germany have delayed construction of new solar power plants.
Contact at the municipality	**Wolfram Müller** Senatsverwaltung für Stadtentwicklung Berlin/ Referat Klimaschutz Brückenstr.6, DE-10173 Berlin Tel: + 49 30 9025 2148 Fax: +49 30 9025 2509 wolfram.mueller@senguv.verwalt-berlin.de

[26] A feed-in tariff (FIT) is an energy-supply policy focused on supporting the development of new renewable power generation. In the United States, FIT policies may require utilities to purchase either electricity, or both electricity and the renewable energy (RE) attributes from eligible renewable energy generators

9. Podlaskie Voivodship (Poland)	
Project type	**Rural Development – Cultivating of Energy Crops**
Financing structure	**Local Authorities + Energy Agency**
Project description	Farmers do not always have access to the knowledge or support needed to cultivate and sell novel crops.. In North East Poland, the Podlaska Agency helped overcome this barrier by organizing information days and step-by-step seminars from November 2004 to March 2005. These taught 125 local growers how to produce and supply crops in the 'green energy' market. Local energy entrepreneurs participated at the seminar.
Objectives	To reduce carbon emissions and dependence on fossil fuel imports by planting energy crops.
Policy background / Incentives	The Polish Government aims to produce 7.5% of power from renewables by 2010. This has already led to the development of a 50 MW biomass energy CHP unit in the region, and increased opportunities for co-firing at existing power sites.
Evaluation	As a direct result of this education programme, 200 hectares were planted with energy crops, and five new farms were using biomass energy, thus an expanding green energy market was created. Some of the area used for cultivation of these crops was previously wasteland, so the scheme offered improvements in land management and environmental benefits.
Positive aspects of this form of financing	• Provision of free venues by the local authorities in order to enable the organisers to keep costs low and maximise participation. • Socio-economic benefits to declining rural communities.
Issues and negative aspects	Financial support is still essential in many regions to make energy crop cultivation commercially viable for farmers. However, as the Podlaska Agency project demonstrates, simply opening up the channels of communication between farmers and energy companies can also yield impressive results.
Next steps	It is planned to follow the first phase of seminars, with a second series of events. This will include site visits to existing energy crop producers and greater involvement from local energy companies, helping to tighten the links between local producers and buyers of biomass.
Contact at the municipality	**Podlaska Agency for Energy** Starobojarska 15 Bialystok PL - 15-073 Tel: +48 85 740 86 83; Fax: +48 85 740 86 85 paze@pfrr.bialystok.pl

10. Nová Dubnica (Slovakia)	
Project type	**Energy Efficient Retrofitting of District Heating System**
Financing structure	**Equity of Investor** **Bank Loan (partially covered by IFC[27] guarantee)**
Project description	The project consists in the construction of a 2x7 MW biomass boiler in the existing boiler house using wood chips and sawdust. Accompanying investments concerned upgrading of distribution grid (installation of compact exchange units and new circulation pumps). Total investment was around 3.1 M EUR.
Objectives	- To prevent disconnection of some clients - To make heat price stable - To minimize gas consumption by using biomass from the surrounding forests - To benefit from CO_2 reduction
Policy background / Incentives	Heat price is regulated price by state regulatory office (URSO). Price consists of variable components (fuels) depends on actual consumption, fixed components (depreciation, interests. wages, operation & maintenance costs) recalculated to all consumers + reasonable profit that is limited and together with depreciation serve for debt service repayment and generation of new investments. Due to reduction of fuel costs, all customers may benefit from minimum increase of heat price
Evaluation	- Company is achieving sound financial parameters as for profitability and cash flow generation that is sufficiently enough for debt service coverage - Company is able to produce all heat from biomass due to supplementary installation of 2 MW container boiler - Company improved a logistics of fuel supply by construction of large storage capacity for wood waste - Company diversified a portfolio of supplier
Positive aspects of this form of financing	- Bank loan enabled to realize complete switch of fuel base in period when gas prices boosted sharply, this helped to stabilize heat market - IFC guarantee compensated lack of equity which was below standard ratio
Issues and negative aspects	multi-source financing may lead to slower approval process
Next steps	- Monitoring of projects with respect of - Further upgrading of distribution grid
Contact at the municipality	**TERMONOVA** Nová Dubnica Tel.: +421 44 40 809, 810 Fax: +421 44 32 221

[27] International Finance Cooperation

Lessons In Municipal Energy Projects and Financing[28]

1. The presence of designated staff (an energy manager or energy agency) is of utmost importance. Clear communication and organizing different stakeholders around a common objective can lead to impressive results.

2. Not having the necessary funds for investment in energy efficiency, conservation and renewable, municipalities continue to waste energy and money. Those, who recognize the potential leverage of public-private partnerships and engage in third party financed projects, can realize substantial gains.
3. Careful financial planning and caution when applying third party financing is essential. In most cases, the term of an Energy Performance contract would be more than 5 years. However, a too long contract engagement to the ESCO or not properly evaluated credit needs can be harmful at the end of the project, leaving the municipality with an outdated facility by the end of the contract.
4. In case of Energy Performance Contracting it is also important to properly evaluate the scope of the investment. ESCO companies tend to 'pick the low hanging fruit', providing large savings potential, while less profitable investments with longer pay-back time are not covered by the EPC. A cooperation of several smaller municipalities, with multiple municipal buildings can create such pools and achieve the minimum 'economies of scale' for an ESCO.
5. The innovative dimension of certain financing schemes lies within the successful combination of different methods causing a leverage effect. The bonds emission of municipality would not have secured a short payback period without the financial competence of the organizing financial institutes.
6. Internal vs. external financing: Applying external services providers, such as energy services companies adds additional administrative and transaction costs to the projects budget linked with the contract management as well as includes the additional cost (interest) of the external capital. Careful evaluation of these costs needed.
7. Once the supportive legal framework is in place, it is important to raise knowledge and awareness to engage the financial sector as they are crucial in facilitating third party financing.
8. Transparent service costs and a clear relationship between investment costs and running and operational costs are driving factors for municipal energy savings.
9. Community solar gardens would be suitable and feasible projects to be implemented in small towns with the cooperation of local governments.

[28] New Forms of Financing Municipal Sustainable Energy Projects (2006), ADEME Convention for Energie-Cités, *Collection of best practices on new forms of financing municipal sustainable energy projects*

Conclusion

Conditions of Success[29]

Positive Factors

Municipalities that have made the most progress on energy efficiency and GHG reduction appear to have been helped by the following factors:

- an employee or even a whole department overseeing energy management
- a high level of public awareness of environmental issues and substantial public support
- a supportive municipal policy environment, with strong climate change and sustainability policies that address energy use
- financial support from senior governments and other national agencies
- collaboration with local institutions, especially universities
- politicians or municipal administrators championing the cause

Barriers and Challenges

Municipal officials across the country report similar barriers and challenges that prevent their communities from making progress on energy efficiency and GHG reduction. Those mentioned most frequently include:

- lack of interest and support from municipal politicians
- lack of enforcement and accountability for meeting energy management targets
- lack of horizontal coordination among municipal departments
- resistance to changes in workplace behavior that would improve energy efficiency

[29] http://www.cec.org/municipalenergy/home.asp?varlan=en

Appendix I: Burlington Case Study

Municipal Context and Background

Local municipalities are responsible for electricity, water and wastewater services while regional entities are responsible for solid waste and transportation management across the greater Burlington area. The local economy is centered on light industry, services, and retail. Burlington enjoys a strong tradition of community action and public participation in policymaking related to protection of the environment. Over the past two decades, the City of Burlington has worked with local organizations, businesses, and individual citizens to implement projects that have promoted sustainable community development, economic self-sufficiency, social equity, and environmental protection (ICLEI, 2002).

City Council began to address climate change in 1996, when it voted to support a resolution to participate in the "Cities for Climate Protection" campaign organized by the International Council For Local Environmental Initiatives (ICLEI). In 1998, the City adopted a resolution to reduce GHG emissions by 10% below 1990 levels by 2005 and used a portion of two small federal Environmental Protection Agency (EPA) grants to begin investigating emission reduction strategies. This new priority prompted Mayor Peter Clavelle to launch the Burlington Climate Protection Task Force to draft a plan. The task force was composed of employees from the Burlington Electric Department and energy experts from the community.

City Council adopted the resulting five-point Climate Action Plan in May 2000 and directed the Burlington Electric Department to integrate the plan's targets into municipal operations. A public outreach program, called the 10% Challenge, was designed to develop public awareness and encourage residents and businesses to reduce their greenhouse gas emissions. In 2002, the Burlington Climate Protection Task Force was renamed the Alliance for Climate Action (ACA) and assumed responsibility for the 10% Challenge.

In 1999, at the same time as it was developing the Climate Action Plan, the City initiated the Legacy Project, a public consultation process with the aim of developing a comprehensive action plan to promote economic, environmental and social well-being. The project is managed by the Community Economic Development Office (CEDO), which benefits from the input of leaders from business, low-income, environment, academic, youth and social service groups.

Description of the initiative

The rationale behind the Climate Action Plan was to create a comprehensive program to help reduce Burlington's GHG emissions from industrial, commercial, residential and institutional sources, including municipal operations. The plan consists of five strategies to achieve the City's annual emissions reduction target of 156,000 tons.

Burlington's Climate Action Plan Strategies

Strategy	Annual CO2 Reductions Goals
1. Energy efficiency in municipal buildings and operations	6,000 tons (Efficiency: 4,000 tons; Solid Waste: 2,000 tons)
2. Residential and business energy efficiency programs	20,000 tons (Residential 6,000 tons; Commercial & Industrial: 14,000 tons)
3. Public education and outreach	70,000 tons (Transportation: 20,000+ tons; Buildings: 50,000+ tons)
4. Biomass district energy and alternative fuel development	35,000 tons (50,000 tons at full cogeneration build-out)
5. Transportation	25,000 tons (TDM Projects: 9,000-15,000 tons, Policies: 10,000 tons)
TOTAL	**156,000 tons**

Source: http://www.burlingtonelectric.com/SpecialTopics/climate.htm

Energy Efficiency in Municipal Buildings and Operations

Under the supervision of the Burlington Electric Department, all departments were directed to assess heating, ventilation and air conditioning systems (HVAC), water heating, lighting, appliances and equipment for energy saving opportunities. The Climate Action Plan also called for the creation of a **revolving energy fund**, dedicated to improving the efficiency of municipal buildings and operations through retrofits and new construction; no such fund has been created to date.

Residential and Business Energy Efficiency

The second strategy, overseen by the Burlington Electric Department, is to reduce GHG emissions from electricity and fossil fuel usage in homes and businesses by implementing energy-efficiency programs and constructing new, high-performance buildings. Programs focused on capturing energy savings in homes and businesses include: lighting installations; motor efficiency measures; air conditioning upgrades; switching electric hot water and electric space heating systems to the use of other fuels; and improving production process efficiency, ventilation and refrigeration (in the industrial sector). Specific programs include Residential Smartlight, consisting of a leasing mechanism to promote the use of CFL bulbs ($.20/bulb per month for 60 months); the Commercial Smartlight program, which consists of leasing CFL bulbs at $0.35/lamp per month for 36 months to businesses; and Neighbor$ave, consisting of the installation of energy and water saving devices as well as CFL bulbs, using the Smartlight lease mechanism.

Public Education and Outreach

The third strategy resulted in a public education campaign called the 10% Challenge, initiated in 2002. The campaign was intended to help citizens and businesses make sustainable consumption decisions with regards to heating, electricity, and transportation while implementing quantifiable actions to reduce emissions. An interactive website, initiated with the 10% Challenge and still in operation, allows citizens and businesses to estimate their GHG emissions and provides information about what people can do to reduce emissions (see www.10percentchallenge.org).

Biomass District Energy and Alternative Fuels

The fourth strategy reflects the Burlington Electric Department's commitment to supporting biomass district energy and other alternative energy sources. One of the initiatives proposed under this strategy was to implement cogeneration at Burlington's wood burning facility, the McNeil Generating Station; the project has not been implemented. Another initiative of this strategy was financial support for the development of other renewable energy projects, including wind power, residential solar-power projects and new practices in landfill methane capture and processing.[30]

Policy Context

The Climate Action Plan is supported by the 2006 Municipal Development Plan, which commits the City to energy conservation and efficiency measures, investment in renewable energy production, solid waste diversion, and clean building design and construction. Where energy efficiency measures are concerned, the Burlington Electric Department works in cooperation with a statewide non-profit organization called Efficiency Vermont (EVt) to manage the implementation of measures sponsored by the State of Vermont. Vermont offers rebates tailored for homes and businesses to encourage investment in renewable energy equipment and high-efficiency HVAC equipment and controls (EESI, 2006). The local utility also partners with the Champlain Valley Office of Economic Opportunity (CVOEO) to deliver comprehensive energy services to qualified low-income households.[31]

[30] Note: 67% of Burlington's power is already generated by renewable sources (biomass and hydro) compared with 10% in the rest of New England. (Burlington Electric, 2006a)

[31] http://www.cvoeo.org/htm/Weatherization/weatherization_home.html

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