

**Integrating Energy into  
Local Regulations and Programs**

**Final Report**

***Task 1  
Technical Support for Integrated  
Community Energy Solutions***

**Dec. 12, 2011**

**Submitted to**



**Metropolitan Washington  
Council of Governments**

**Submitted by**



**with support from**



**222 South Ninth Street, Suite 825  
Minneapolis MN, 55402  
Phone 612-338-4489**

## Contents

<b>Executive Summary .....</b>	<b>1</b>
<b>Introduction .....</b>	<b>4</b>
Background .....	4
Definitions .....	4
District Energy (DE) or District Energy Systems (DES) .....	4
Combined heat and power (CHP) .....	4
Microgrids .....	4
Integrated Community Energy Solutions (ICES) .....	4
Community Energy Systems (CES) .....	5
Eco-District .....	5
Focus of This Report .....	5
Organization of This Report .....	5
<b>Energy and Environmental Policy Context .....</b>	<b>6</b>
International Policies .....	6
European Union (EU) .....	7
Denmark .....	8
Germany .....	9
South Korea .....	9
Canada .....	10
U.S. Energy Policy .....	11
Overview .....	11
Tax Incentives .....	11
Finance or Incentive programs .....	12
Federal Energy Regulatory Commission (FERC) .....	13
Portfolio Standards .....	13
Clean Energy Standard .....	13
Proposed Federal Laws Addressing District Energy .....	14
U.S. Environmental Policy .....	15
Air Quality .....	15
Climate Change .....	18
<b>Local Policy Examples Outside the COG Region .....</b>	<b>19</b>
St. Paul .....	19
Markham .....	21
Vancouver .....	23
North Vancouver .....	24
Toronto .....	24
Seattle .....	25
Portland .....	26

<b>COG Region Policies, Plans, Regulations and Programs .....</b>	<b>28</b>
Energy Policy Frameworks .....	28
State Policy .....	28
Local Jurisdictions .....	31
Planning .....	36
Federal .....	36
District of Columbia .....	38
Maryland.....	39
Virginia .....	41
Establishing Community Energy Systems.....	42
District of Columbia .....	42
Maryland.....	44
Virginia .....	49
Building Compatibility .....	54
District of Columbia .....	54
Maryland.....	55
Virginia .....	56
<b>Best Practice Recommendations .....</b>	<b>58</b>
CES Challenges .....	58
Awareness, Information & Education.....	58
Leadership .....	58
Price Signals .....	58
Air Emissions Permitting.....	58
Capital Costs .....	59
Land Use .....	59
Lack of Integrated Planning .....	59
Siting .....	59
Grid Access.....	59
Recommendations .....	60
<b>References.....</b>	<b>63</b>

## Executive Summary

The Metropolitan Washington Council of Governments (COG) recently launched a new initiative in the region to advance district energy systems, combined heat & power (CHP), and microgrids. Deployment of these technologies, which we refer to collectively as Community Energy Systems (CES) has the potential to: cut emissions of criteria pollutants and greenhouse gases (GHG); reduce peak power demand; enhance energy security by providing local and more reliable sources of energy; reduce energy cost volatility; and strengthen the local economy by spending more energy dollars locally.

Local governments have a range of potential opportunities to facilitate implementation of CES through zoning, regulations, ordinances, policies and programs. This report describes current policies and regulations in the COG region, summarizes examples of policies elsewhere, and recommends best practice strategies for consideration by COG jurisdictions.

The report describes fundamental characteristics of CES and the resulting challenges faced in implementing these systems, including those relating to:

- Awareness, Information & Education
- Leadership
- Price Signals
- Capital Costs
- Air Emissions Permitting
- Land Use
- Lack of Integrated Planning
- Siting
- Grid Access

Internationally, CES activity is greatest in countries and provinces which have established strong energy efficiency and GHG reduction goals, with taxation, financing assistance, portfolio standards and other policies and programs that provide price signals that encourage CES implementation. Given the overall political and legal framework in the US generally and the COG region specifically, COG region jurisdictions cannot rely on this type of broader policy support.

However, local jurisdictions can help facilitate development of CES in a number of ways, depending on specific state and local laws and policies:

1. Set specific **goals** for energy efficiency and GHG emission reductions. Local government commitments provide an important context and driver for a range of actions including implementation of CES. Cost-effective reduction of building energy requirements should be a first priority.
2. Conduct an **Opportunity Assessment** to identify high-priority locations for potential CES by mapping:

- a. Areas with high existing or future thermal loads;
  - b. Potential energy sources (such as power plants, data centers, wastewater treatment facilities, sewer lines, industrial facilities, surface water bodies, etc.);
  - c. Location of major gas and power energy infrastructure; and
  - d. Scheduled infrastructure capital improvement projects (e.g. road improvements, sewer and stormwater).
3. Convene key **stakeholders** to review the results of the Opportunity Assessment and identify and evaluate stakeholder interests and benefits.
  4. Work with major stakeholders to fund, ideally with both public and private sources, **Integrated Energy Master Plans** (IEMPs) for the most promising locations. An IEMP should address technical and economic issues as well as questions regarding the appropriate model for development, financing, ownership and operation.
  5. Identify individuals within the local government who have the interest, ability and authority to act as a **champion** for implementation; also identify champions within major non-government stakeholder entities.

If the IEMP(s) produce positive results, the following actions would facilitate development of a CES. The ability to implement the following recommendations may be constrained by state or local laws and policies:

6. Identify and evaluate the local government's **preferred role in ownership and financing** of CES, including providing or facilitating low-cost sources of financing such as tax exempt bonding or tax increment financing.
7. Work with building owners and developers to assess current and planned HVAC designs and conduct **detailed building feasibility studies** for large buildings and master plans to analyze the energy, economic and environmental costs and benefits of district energy service compared with conventional approaches.
8. Develop recommended **CES compatibility standards** for building HVAC design, addressing criteria for: hydronic distribution within the building; criteria for hot water and chilled water supply and return temperatures; allocation of small amount of basement space for future interconnection with a district energy system; and minimum criteria for the building automation system.
9. As permitted by legal authority, develop a model **franchise agreement** so that potential developers of a CES understand the terms, conditions and costs of obtaining a thermal energy service franchise. Franchises need not grant exclusivity to a district energy provider.

10. As permitted by legal authority, consider providing **franchise fee repayment deferrals** until a CES reaches an established threshold of financial stability, and/or a franchise fee discount tied to, e.g., GHG emissions benefits.
11. Establish a Community Energy Working Group within your jurisdiction to **coordinate and streamline policies**, activities and decision-making in all departments having an impact on CES development.
12. Create **clear permitting guidelines** — such as a streamlined Conditional Use Permitting process — to support expedited site selection for CES plants and distribution system routing.
13. Consider providing temporary **property tax relief** to property owners that connect their buildings to district energy.
14. Where supportive of other planning goals, establish **zoning or comprehensive plan-based linkages and/or incentives** to exceed minimum green building performance thresholds and make connection to district energy one consideration in such incentives. Linkages may include, e.g., density bonuses, or modification of zoning to allow for construction of CES plant facilities near to the center(s) of development density.
15. Ensure that any **Energy Performance Labeling** system applied in the jurisdiction recognizes the efficiency benefits of a district energy system serving the building.
16. **Lead by example** by committing to connecting all local government buildings to the CES as soon as it is practical and cost-effective to do so.

## Introduction

### **Background**

The Metropolitan Washington Council of Governments (COG) recently launched a new initiative in the region to advance district energy utilities, combined heat & power (CHP), and microgrids. These technologies are defined below. Deployment of these technologies in the region has the potential to:

- cut emissions of both criteria pollutants and greenhouse gases;
- reduce peak power demand;
- enhance energy security by providing local and more reliable sources of energy;
- reduce energy cost volatility; and
- strengthen the local economy by spending more energy dollars locally.

### **Definitions**

Although there are no universally accepted definitions of the following interrelated and overlapping terms, the meaning of these terms as used in this report are as follows.

#### **District Energy (DE) or District Energy Systems (DES)**

District energy systems deliver hot water, steam or chilled water from a central plant(s) to multiple buildings via a network of pipes to meet thermal end uses: space heating, domestic hot water, air conditioning or industrial process heating or cooling. DE systems can use a wide variety of energy sources including CHP, and may incorporate a microgrid.

#### **Combined heat and power (CHP)**

CHP systems use the same energy source to simultaneously produce useful thermal energy and electricity or mechanical power in an integrated system. A variety of technologies can be used for CHP, including reciprocating engines, combustion turbines, steam turbines, organic rankine cycle turbines and fuel cells.

#### **Microgrids**

Microgrids are small-scale electricity distribution systems that link and coordinate multiple distributed energy resources into a network serving some or all of the energy needs of one or more users located in close proximity, which can operate connected to the traditional centralized electric grid or autonomously from it, in an intentional island mode.

#### **Integrated Community Energy Solutions (ICES)**

ICES is a general term for a cross-cutting set of community systems that emphasize synergy between multiple sectors, such as energy supply and distribution, housing and buildings,

transportation, industry, water, wastewater and solid waste management. Integrated Energy Master Plans, Community Energy Plans and Community Energy Strategic Plans are variants on this terminology. ICES may include DE, CHP or microgrid systems.

### **Community Energy Systems (CES)**

A CES is an integrated approach to supplying community energy requirements from renewable energy or high-efficiency sources. Generally, CES include DE and may or may not include CHP or microgrids. The term CES is frequently used interchangeably with DES.

### **Eco-District**

Although there is no widely held definition of this term, which has only recently come into use, it is generally understood to refer to an urban area in which planning is aimed at integrating the objectives of sustainable development and reduction of the ecological footprint of the project.

### **Focus of This Report**

Local governments have a range of potential opportunities to facilitate implementation of ICES through zoning, regulations, ordinances, policies and programs. An important focus of this project is to identify, evaluate and recommend best practice strategies.<sup>A</sup>

Community energy is an enormous topic, covering many end-uses, technologies, levels of government and policy issues. This project does not address every strand of this complex web. The effort is focused on district energy, CHP and microgrids. Technologies such as electric vehicles, non-CHP renewable power generation (wind, photovoltaic, etc.) are not part of the scope of this project. However, to the extent that our investigation of policies resulted in information relevant to these technologies, this information is incorporated into the report.

### **Organization of This Report**

First we will provide a brief overview of the broader policy context, describing key national and international policies and issues that are relevant to potential action by COG members to facilitate implementation of DE, CHP and microgrids. Then we address the following:

- Local Policy Examples Outside the COG Region -- Descriptions of the policies, programs or regulations, and their relevance to DE, CHP and microgrids, using national and international examples of such measures.

---

<sup>A</sup> A related report, "Cost Benefit Information and Business Case for Integrated Community Energy Solutions," provides information on the costs and benefits of integrated community energy systems, including district energy, microgrids and CHP.



- Existing Local Policies – Compilation of COG region information on existing policy and program approaches in the COG region. Including information on legislation, regulations, local ordinances, and local policies and programs.
- Best Practice Recommendations – In the context of current local policies and programs and review of national and international practices, recommend best practices for local government policies, programs and requirements to facilitate implementation of DE, CHP and microgrids in the region.

## Energy and Environmental Policy Context

### International Policies

The United Nations Framework Convention on Climate Change (UNFCCC) process has failed to produce an international consensus and binding policies on climate change. However, the importance of climate change in energy and environmental policies continues to grow, particularly in the European Union (EU). Greenhouse gas emissions are a key focus of a range of tax policies and regulations in the EU and elsewhere.

Australia recently enacted a carbon tax as part of a series of new environmental laws, including the establishment of a Climate Change Authority and Green Fund to spur investments in efficiency and renewable energy. With the new law, Australia now joins a group of countries including Finland, Denmark, New Zealand, the Netherlands, the United Kingdom, and Sweden where some form of carbon legislation is on the books. The Australian law has a much wider scope and will have a broader impact on the country than the carbon taxes passed elsewhere. The government has set the initial price per metric ton of carbon dioxide equivalent at Aus\$23 (about US\$25).

The roles of DE and CHP in international policy frameworks vary widely, as summarized below. A key driver for policy support of district energy is recognition that, by enabling the use of renewable and waste heat sources, district energy helps reduce consumption of fossil fuels (primary energy) and the related environmental impacts, particularly GHG emissions. In addition, there is growing recognition that district energy is directly relevant to other major policy goals, including:

**Energy and Economic Security** – By tapping thermal energy from local sources – existing in the community served – DE helps reduce economic risk and retain more energy expenditures in the local economy, providing opportunities for economic multiplier benefits as that money is spent locally.

**Reliability and Power Grid Benefits** – DE not only provides reliable thermal infrastructure; it can also strengthen the power grid by:

- reducing power demand in high load areas by cutting power requirements to meet thermal demands;

- generating power in high load areas with CHP;
- shifting power demand to off-peak periods using thermal energy storage; and
- facilitating use of renewable power sources by balancing and voltage support through thermal energy storage and CHP, respectively.

The role of district energy varies widely internationally. As illustrated in Figure 1, district heating has a dominant market share in some countries, while in others it remains fairly limited. Below, following an overview of EU policies affecting DE and CHP, the policy frameworks relevant to DE and CHP in Denmark, Germany, South Korea and Canada are summarized, covering a range of policy approaches.

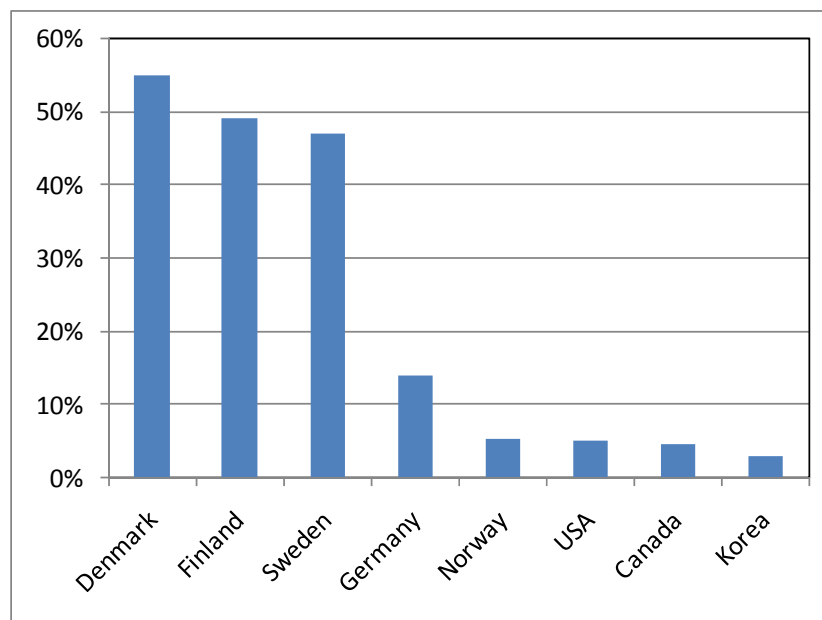


Figure 1. District Heating Share of Total Heat Market in Selected Countries<sup>1</sup>

## European Union (EU)

The EU has adopted a number of Directives which encourage implementation of DE and CHP. For example, the Energy Performance of Buildings Directive<sup>2</sup> requires a common method for calculating the integrated energy performance of buildings on the basis of primary energy (fuel consumed), sets minimum performance standards for new retrofit buildings, and establishes a building certification system. According to the Directive, the calculation methodology should not stop at the building wall; it also accounts for the efficiencies of the thermal and electric grids feeding a building. However, the countries are responsible for setting standards based on the directive, and many have not fulfilled the Directive in this regard and focused on final energy consumption in the building, thereby putting DE at a disadvantage.

Germany and Finland provide the best practice examples of translating the Directive's primary energy approach into national laws. The Finnish building code set primary energy standards for new buildings, with district heating having a lower primary energy coefficient (0.7) than fossil

fuels (1.0) or electricity (2.0). District heating based on CHP, waste heat or renewable sources is automatically considered to meet a requirement that a certain percentage of energy must come from renewable sources.

The Directive on the Promotion of Renewable Energy<sup>3</sup> establishes a framework for achieving a goal of 20% renewable energy by 2020. This Directive explicitly directs Member States to: consider the promotion of renewable DE; encourage local governments to incorporate such systems in plans for new development and renovation areas; and incorporate into building codes a requirement for minimum levels of renewable energy, including renewable energy delivered through DE systems.

The Directive on the Promotion of High-Efficiency Cogeneration<sup>4</sup> established a framework for promoting CHP through criteria through certification of the origin of high-efficiency CHP electricity.

## **Denmark**

Denmark is one of the most energy-efficient countries in the world, largely achieved through a pro-active energy policy promoting efficiency, renewable energy and CHP. District heating has played a key role in this transformation. The Heat Supply Law of 1979 was an important factor in district heating (DH) and CHP market growth by creating a new public planning process focused on heat supply. Local governments were required to assess their heat requirements and options for meeting future requirements. Local plans were integrated into regional plans. The Heat Supply Law stipulated that district heating systems must operate on a non-profit basis, and heat and electricity prices must reflect actual costs.

Most CHP plants are owned by local authorities and are fuelled by natural gas. Having now achieved a comprehensive energy system based on CHP, DH and wind, Denmark now aims to substitute fossil fuels with biomass in its CHP plants to further reduce GHG emissions and enhance long-term energy security. Denmark has integrated energy planning with solid waste management planning, resulting in significant use of heat and electricity produced from waste.

Denmark also encourages efficiency, CHP and DH through energy taxes, which were started in 1977 and increased significantly in 1986. In addition, during the 1980s subsidies were provided construction of district heating distribution networks.

CHP and renewable electricity production is also encouraged through feed-in tariffs (FIT). The original FIT supported all CHP plants, but are now only available to CHP plants with an electricity capacity less than 25 MW using waste, biofuels and natural gas

Other key policies include:

1. Obligation to connect or remain connected (1982, amended 2000). Local authorities have the power to require that all consumers connect either to a natural gas supply or to a district heating network. This obligation applies to new and existing buildings, but for existing buildings the connection needs to occur at the latest 9 years after notification of owners.
2. Electric Heating Ban (1988, amended 1994). Electric heating is banned in all new buildings and in existing buildings that have a water based central heating system or access to a public supply of natural gas or district heat.

## **Germany**

In Germany, there are FIT for electric energy generated by both renewable sources as well as CHP. DE has indirectly benefitted from these incentives because it provides a customer base for thermal energy from CHP.

Under the 2002 CHP law, power utilities must connect CHP plants and pay a price equal to the average baseload electricity price of the European Energy Exchange during the previous quarter. The CHP law was modified in 2008, establishing a goal of doubling the CHP share of total electricity to 25% by 2020. The new law also was designed to ensure compliance with the EU Directive on the Promotion of High-Efficiency Cogeneration. In addition, the 2008 law gave CHP plants dispatch priority equal to renewable energy power plants, and provided subsidies for extension and new construction of heating networks if at least 60% of the heat is supplied from CHP.

## **South Korea**

In Korea, DE and CHP are officially considered energy saving activities supported by the Government. The major driver for DE development is the zoning system, which can exclusively designate a particular construction area for DE supply. Every 5 years the Government formulates and publishes the updated master plan for Integrated Energy Supply.

Any organization, whether a public or private entity, must consult with the Ministry of Knowledge and Economy while doing spatial planning in their region to assess the merits of implementing DE and CHP to serve the area. The Ministry will then determine if that particular region will be subject to integrated energy supply. DE providers are licensed by the government, which also regulates thermal energy prices.

## Canada

### National Policy

Although the Federal Government has been committed to reducing overall GHG emissions by 17% below 2005 levels by 2020,<sup>B</sup> there is no formal federal policy supporting DE and CHP in Canada. Starting in the mid-1980s, the federal government did implement a small but effective information and education program, working in concert with the Federation of Canadian Municipalities (FCM). Today, there is a strong interest in DE by the provinces and municipalities, with GHG reduction a key driver. Many municipalities have set voluntarily targets to the reduced GHG emissions, and DE systems are widely recognized as a potential measure to achieve the targets.

Integrated Community Energy Solutions (ICES) Roundtables were conducted, bringing together senior-level stakeholders to exchange views on the best way forward from here. The resulting report – ICES, A Roadmap for Action -- was released by the Canadian Council of Energy Ministers in 2009. The Roadmap describes the role that Canada's federal, provincial and territorial governments can play in advancing ICES and sets out a broad strategy for action. It also includes a variety of options from which governments can choose, according to their priorities, to advance community energy performance and complement existing energy efficiency activities in different sectors.

### British Columbia

British Columbia (BC) has implemented strong climate change and energy policies that directly or indirectly encourage implementation of district energy and CHP. The 2007 provincial Energy Plan required that all new electricity generation have net zero GHG emissions, established a \$25 million Innovative Clean Energy Fund, and developed a Bioenergy Strategy to take advantage of the province's abundant bioenergy resources. The Bioenergy Strategy seeks to develop at least 10 community energy projects that convert local biomass into energy by 2020.

The GHG Emission Reductions Target Act (Bill 44 2007) set specific GHG reduction targets (33% reduction from 2007 by 2020 and 80% reduction by 2050) and required that public sector entities be carbon neutral by 2010. The need to purchase offsets to achieve this goal has been a powerful driver for public sector organizations to reduce GHG emissions.

The BC Carbon Tax Act (Bill 18 2008) established the first carbon tax in North America. The carbon tax is currently Can\$25 per metric ton carbon dioxide, increasing to Can\$30 in July 2012. The carbon tax has increased the cost of natural gas, thereby improving the profitability of highly efficient or renewable district energy systems.

---

<sup>B</sup> As this report was finalized, it was announced that Canada was formally withdrawing from the Kyoto Protocol.

The Clean Energy Act (Bill 17 2010) set a goal of electricity self-sufficiency, with at least 90% of power coming from renewable. This is helped the economics of CHP, as well as district heating since it provides a heat sink for CHP. However, CHP has not benefitted as much as might be expected because most BC power comes from zero GHG emission hydropower.

### Ontario

A key current driver for CHP is a Ministerial directive to strategically integrate another 500 MW of CHP projects into Ontario's electricity system. The Ontario Power Authority (OPA) has issued Requests for Proposals for CHP projects over 20 MW. In addition, in May 2011 the OPA launched a Clean Energy Standard Offer Program for projects less than 20 MW connected to distribution system. Applications for specified areas closed at the end of June 2011. A second tranche of applications were accepted in July and August for the remaining required capacity. In its CHP procurement, OPA is becoming more strategic by focusing on projects that are in urban areas close to load centers and have a stable heat host (DE is more stable than industrial hosts).

## **U.S. Energy Policy**

### **Overview**

In the U.S., federal policies and programs specifically addressing DE and CHP are minimal. The U.S. Department of Energy (DOE) is focused on technology Research and Development (R&D) rather than on overcoming market barriers that constrain implementation of efficient and renewable energy systems. DOE does fund eight regional Clean Energy Regional Application Centers (RACs) that provide information and technical assistance on CHP and DE.

### **Tax Incentives**

#### Investment Tax Credit (ITC)

Taxable entities are eligible to receive an investment tax credit (ITC) for a range of energy property including certain CHP, fuel cells, microturbines, wind, solar and geothermal facilities.<sup>5</sup> The fuel cell and solar ITC is 30%. The ITC for other energy properties is 10%. The 10% CHP ITC is available for the first 15 MW of CHP electricity generation capacity as long as the plant has a total electricity generation capacity less than 50 MW. This law defines CHP property eligible for the credit as a system which produces:

- at least 20% of its total useful energy in the form of thermal energy which is not used to produce electrical or mechanical power (or combination thereof), and
- at least 20% of its total useful energy in the form of electrical or mechanical power (or combination thereof),
- the energy efficiency percentage of which exceeds 60 %, and
- which is placed in service before January 1, 2017.

Legislation has been proposed to modify the CHP ITC to increase the eligible limit to 25 MW electricity capacity and eliminate the 50 MW cap.

### Production Tax Credit (PTC)

Taxable entities are eligible to receive a production tax credit (PTC) for the generation of electricity using certain renewable resources.<sup>6</sup> Wind, geothermal, and "closed-loop" bio-energy (which is powered by dedicated energy crops) are eligible for PTC of 2.2 cents per kilowatt-hour (kWh) of electricity produced. Other technologies, such as "open-loop" biomass, incremental hydropower, small irrigation systems, landfill gas, and municipal solid waste, receive 1.1 cents per kWh.

### ITC in Lieu of PTC

Under current law, taxpayers may instead elect to receive an ITC in lieu of the PTC that would otherwise be available.<sup>7</sup>

## **Finance or Incentive programs**

### Tax-Exempt Financing

Tax-exempt bonds can be used to finance a range of facilities with public benefits, including: airports; facilities for the furnishing of water, electric energy or gas; and local district heating or cooling systems.<sup>8</sup> Tax-exempt bonds have lower interest rates than conventional bonding vehicles because bondholders do not have to pay income tax on the interest. "Local district heating or cooling system" is defined as "any local system consisting of a pipeline or network (which may be connected to a heating or cooling source) providing hot water, chilled water or steam to two or more users for residential, commercial, or industrial heating or cooling, or process steam."

### Energy Sustainability and Efficiency Grants and Loans

The Energy Security and Independence Act (EISA) of 2007, passed by the Congress and signed by the President, authorized a program for Energy Sustainability and Efficiency Grants and Loans for Institutions.<sup>9</sup> Appropriation of \$750 million annually for 5 years was authorized for implementing or improving sustainable energy infrastructure, including district energy systems, facilities for production of energy from renewable sources, CHP, waste heat recycling or natural sources of thermal energy. Eligible public sector entities include institutions of higher education, local governments, municipal utilities, public school districts or designees of these institutions. No funds have been appropriated to implement this program.

### Waste Energy Recovery Incentives

EISA also authorizes a program to encourage the recovery of industrial waste heat and recycling it into useable heat and electricity.<sup>10</sup> This provision establishes a program to provide waste energy recovery grants at the rate of \$10/MWh of electricity or \$2.92/MMBtu of useful thermal energy. No funds have been appropriated to implement this program.

## Federal Energy Regulatory Commission (FERC)

The FERC Small Generator Interconnection Procedure (SGIP) interconnection procedures<sup>11</sup> set three tiers of review for interconnection requests for all eligible distributed generation technologies and systems up to 20 MW, including those interconnecting to both the distribution grid and the transmission grid (if an interconnection is subject to state jurisdiction). The three tiers are:

- Level 1: Small generating facilities no larger than 500 kW;
- Level 2: Certified facilities no larger than 2 MW that do not qualify for the Level 1 process;
- Level 3: Facilities no larger than 20 MW not qualifying for the Level 1 or Level 2 process.

Fees for interconnection requests increase with each Level. The process for each level differs as well; in general Level 1 requests require an evaluation and no additional studies. Level 2 requests require an initial review and possibly a supplemental review and/or modifications to either the small generating facility or the utility facilities. Level 3 requests may include a scoping meeting (which may be waived), a feasibility study (which may be waived), system impact study, and facilities study. Level 2 and 3 both require a signed Small Generator Interconnection Agreement before the systems may begin operation.

Regardless of the size or tier in which the facility is evaluated, it is the utility's discretion whether or not an external disconnect switch is required. Another important aspect of the interconnection procedures for non-net metered systems is that they stipulate a dispute resolution process.

## Portfolio Standards

Thirty states have a mandatory renewable portfolio standard (RPS), which requires that a growing percentage of electricity sold by retail electric utilities comes from renewable sources. Another four states have voluntary RPS goals. In addition, 22 states have enacted energy savings goals or energy-efficiency resource standards (EERS). Similar to an RPS, an EERS requires that electric utilities meet a growing percentage of their requirements through efficiency. Twenty states have a mandatory EERS, and five states are in the process of enacting an EERS. A few states have implemented Advanced Energy Portfolio Standards (AEPS) which include a combination of RPS/EERS. Of importance for district energy systems is that 13 states include CHP in their mandatory portfolio standards, and another four include CHP in voluntary goals.<sup>12</sup>

Bills have been introduced in the Congress which would establish a federal RPS and/or EERS; however, such legislation has been very controversial.

## Clean Energy Standard

During the past year, one new major energy policy concept has enjoyed at least some bipartisan traction: the Clean Energy Standard, in which the portfolio standard concept is broadened to encompass other sources including nuclear, clean coal with carbon capture and sequestration (CCS), and (in some proposals) energy efficiency measures. President Obama has called for a Clean



Energy Standard to provide 80% of electricity by 2035 from a range of sources including “efficient natural gas” as well as nuclear and coal with CCS.

One of the policy drivers behind the Clean Energy Standard is a concern about maintaining power grid reliability by replacing retiring coal capacity. Increasingly stringent regulation of coal air emissions and ash management is expected to push as much as 52,000 MegaWatts (MW) of coal-fired power plants into retirement – one sixth of total current coal power capacity.<sup>13</sup>

The International District Energy Association (IDEA) advocates that any Clean Energy Standard legislation should:

1. Include CHP as an eligible clean technology.
2. Take a truly technology-neutral approach to calculating credits based on the avoided primary energy consumption or GHG reductions compared with: generation of electricity using a reference plant generating only power (for example, a natural gas combined-cycle plant); and production of heat using a natural gas boiler.
3. Allow credits to be issued to entities other than electric utilities.

This approach will be far more cost-effective and flexible in increasing power-sector efficiency and reducing GHG emissions, as demonstrated in an analysis presented in an IDEA White Paper.<sup>14</sup>

### **Proposed Federal Laws Addressing District Energy**

Legislation developed with the support of the International District Energy Association (IDEA) was introduced in both the House and Senate in July 2010. Titled the Thermal Renewable Energy and Efficiency Act of 2010 (TREEA), the bill was aimed at stimulating increased use of renewable energy sources and recovered waste heat for heating and cooling buildings. S.3626 was a bipartisan bill sponsored by US Sens. Al Franken (D-Minn.) and Kit Bond (R-Mo.). The House companion was introduced by Rep. Betty McCollum (D-Minn.), with Reps. Jay Inslee (D-Wash.) and Paul Tonko (D-N.Y.) as original co-sponsors. The bill had three provisions:

- Provide a production tax credit for renewable thermal energy;
- Expand the applicability of tax-exempt financing for district energy facilities to include production plants and building interconnections; and
- Modify the EISA 2007 authorized program of grants for institutional district energy systems.

Based on Congressional feedback during 2010, the bill has been redrafted and renamed the Clean Local Energy Efficiency and Renewables Act (CLEER). The key change compared with TREEA is that an investment tax credit has been substituted for the production tax credit. The IDEA and its Congressional champions are evaluating the appropriate timing for introduction.

## **U.S. Environmental Policy**

### **Air Quality**

#### Air emissions permitting<sup>C</sup>

Air quality permitting requirements require a case-by-case analysis based on the type of plant facility, fuels used, the general location relative to current air quality, the specific location relative to dispersion of pollutants, the operating schedule for the facility and other factors.

New and modified sources of air emissions, such as boilers, require permits for construction and operation depending on the type of source (fuel type, emissions level, industry) and the location (whether the region is in attainment or nonattainment of the National Ambient Air Quality Standards ("NAAQS")).

NAAQS are set by the EPA, under the authority of the CAA. The NAAQS limit the allowable outdoor concentration of six *criteria pollutants*:

- Carbon monoxide (CO)
- Nitrogen oxides (NO<sub>x</sub>)
- Sulfur dioxide (SO<sub>2</sub>)
- Particulate matter (PM/PM-10)<sup>D</sup>
- Ozone
- Lead

If a new source of air pollution, or a modification of an existing source is proposed in a way that increases emissions, a new source permit is required or an existing permit must be modified. New Source Review (NSR) is a pre-construction review and permitting program. This program is intended to ensure that new emissions will not degrade air quality in attainment areas (areas that meet NAAQS) or interfere with plans to achieve attainment in non-attainment areas (areas that do not meet NAAQS).

NSR comprises two programs:

- Prevention of Significant Deterioration (PSD), which applies in attainment or unclassifiable areas; and
- Non-Attainment Area (NAA), which applies in non-attainment areas and imposes stricter requirements.

---

<sup>C</sup> This discussion draws on a range of sources including [www.epa.gov](http://www.epa.gov) and "District Energy Systems: An Analysis of Virginia Law, Prepared for the Northern Virginia Regional Commission by McGuire Woods Consulting".

<sup>D</sup> EPA groups particle pollution into two categories: "Inhalable coarse particles," such as those found near roadways and dusty industries, are larger than 2.5 micrometers and smaller than 10 micrometers in diameter. "Fine particles," such as those found in smoke and haze, are 2.5 micrometers in diameter and smaller.

Washington D.C. as well as parts of Northern Virginia and Southern Maryland have been designated as a nonattainment areas for ozone, 1 hour (severe); ozone, 8 hour (moderate), and PM 2.5.

For a given project, PSD may be applicable for one pollutant and NAA may be applicable for another pollutant.

Sources are defined as major or minor, as defined and discussed below. Both major and minor sources must obtain a permit. The following discussion focuses on major source permitting.

New major sources and modified major sources in attainment areas must use Best Available Control Technology (BACT) and in non-attainment areas must use Lowest Achievable Emission Rate (LAER). Major source permitting requires the application of BACT controls for non-attainment areas, Lowest Achievable Emission Rate (LAER) controls for attainment areas, and an ambient air impact analysis. BACT is determined on a case-by-case basis and is defined for each subject pollutant as an emissions limitation based on the maximum degree of reduction that is achievable taking into account energy, environmental, and economic impacts and other costs. LAER is defined similarly except that economic impacts cannot be considered.

In addition, in non-attainment areas new sources must offset their emissions by purchasing emission reduction credits from existing sources that agree to reduce emissions by an amount greater than the emissions from the new source.

Facilities with emissions below major source thresholds, but above exemption levels, are subject to “minor” NSR permitting. Additionally, a source with the potential to be a major source may be permitted as a minor source if it has permit conditions that effectively limit emissions to minor source levels (“synthetic minors”) and avoid permitting as a major source.<sup>E</sup> Greenhouse gases are now covered by the PSD program and must be taken into account.

Regulations provide certain exemptions for new and modified sources.<sup>F</sup> Additionally, sources with emissions below certain levels are exempt from new source review.<sup>G</sup>

---

<sup>E</sup> For district systems using biomass, the State Air Pollution Control Board has issued a general permit for Minor New Source Review for biomass pilot projects. 9VAC5-520-10 et seq. Such projects must be new sources, must not be an incinerator, and must qualify as a minor source. Additionally, such projects must generate no more than the energy equivalent of 5MW of electricity, generate solely from biomass, and such energy must be sold to an unrelated person, a stationary source, or used in a manufacturing process. Certain testing requirements and conditions apply.

<sup>F</sup> 9VAC5-80-1320. Exemptions include external combustion fuel burning equipment units (not engines and turbines) using one of the following: solid fuel with a maximum heat input of less than 1,000,000 Btu per hour; liquid fuel with max heat input less than 10,000,000 Btu per hour; liquid and gaseous fuel with a max heat input less than 10,000,000 Btu per hour; or gaseous fuel with a max heat input of less than 50,000,000 Btu per hour.

<sup>G</sup> Pollutant Exemption Levels in “potential to emit” (tons per year) for New Sources are as follows: Carbon Monoxide 100; Nitrogen Oxides 40; Sulfur Dioxide 40; Particulate Matter 25; Particulate Matter (PM10) 15; and Volatile organic compounds 25.

In addition to the NSR pre-construction permitting program, facilities may also be subject to a Title V Federal Operating Permit or a State Operating Permit. Major sources subject to Title V include those that emit 100 tons per year of any criteria pollutant; or 10 tons per year of a single hazardous air pollutant or 25 tons per year of all hazardous air pollutants. State Operating Permits may contain the emission limiting conditions necessary to create a synthetic minor source from a potentially major source.

Air emissions characteristics of the district energy technologies evaluated in this study are discussed above. Assessment of specific permitting requirements is beyond the scope of this study.

### Boiler MACT

In April 2010 the Environmental Protection Agency (EPA) issued proposed rules that would reduce emissions of toxic air pollutants (including mercury, metals, and organic air toxics, which include dioxins).<sup>15</sup> These rules addressed maximum achievable control technology (MACT) for existing and new industrial, commercial, and institutional (ICI) boilers:

- Major ICI sources, i.e., those emitting more than 10 tons per year (tpy) of any single air toxic or more than 25 tpy of any combination of air toxics;
- Area ICI sources, i.e., those emitting less than those thresholds.

Further, EPA issued proposed new source performance standards (NSPS) and emission guidelines (EG) for new and existing commercial and industrial solid waste incineration (CISWI) units.

IDEA and many other organizations submitted extensive comments on the proposed major source rules and area source rules.<sup>16</sup> Major points made by IDEA included:

- Combining the “best in class” for each separate pollutant creates a “Frankenstein” standard that cannot be met.
- The standard should include a separate standard for periods of startup and shutdown.
- Available emissions data are not of sufficient quantity and quality to support the proposed MACT approach to area source emissions limitations.
- The standards fails to adequately account for variability in emissions

In response to overwhelming negative comments, in March 2011 EPA proposed to defer the effective date of boiler MACT guidelines until either the proceedings for judicial review of the regulations is complete, or until the Agency completes its reconsideration of the rules. The purpose of the delay is straightforward: to allow USEPA to seek additional public comment before requiring thousands of facilities to make significant capital investments that may not be reversible if the standards are revised following reconsideration.<sup>17</sup>

### Cross-State Air Pollution Rule

In July EPA issued the Cross-State Air Pollution Rule (CSAPR), which replaces the Clean Air Interstate Rule promulgated in 2005 and remanded to EPA by the U.S Court of Appeals for the

District of Columbia Circuit in 2008. CSAPR, which takes effect in 27 states in the eastern U.S. on January 1, 2012, caps electric power plant emissions of nitrogen oxides (NOx) and sulfur dioxide (SO<sub>2</sub>).<sup>18</sup>

This rule is expected to have encourage a shift from coal-fired power production to natural gas. In addition, as states develop plans to implement it, the Cross-State Air Pollution rule allows them to offer energy efficiency credits to reduce electricity consumption.

### **Climate Change**

In June 2009 the U.S. House of Representatives passed the “American Clean Energy and Security Act” (ACES),<sup>19</sup> a landmark climate change bill that would establish an economy-wide GHG cap-and-trade system. Although climate legislation was introduced in the Senate, serious efforts to pass climate legislation died in late 2009. Current political and economic conditions preclude passage of significant federal climate legislation in the near term.

## Local Policy Examples Outside the COG Region

Many European cities have made DE and CHP key elements in community energy planning, following national policies as discussed above. More recently, a growing number of North American cities have followed this path. Of particular note are St. Paul MN, Markham ON, Vancouver BC, North Vancouver BC, Toronto ON, Seattle WA and Portland OR.

### **St. Paul**

In the late 1970s the City of St. Paul was selected by the U.S. Department of Energy (DOE) and the Minnesota Energy Agency for studies to determine the feasibility of a modern hot water district heating system in the U.S. Based on positive results from the study, Mayor George Latimer spearheaded the creation of a private non-profit corporation to develop the system. Its initial board of directors included representatives of building owners, the City of St. Paul and the local electric utility, which had for decades provided district heating service via an aging district steam system. DOE provided \$1 million of the \$3 million seed money, playing a critical role in catalyzing the development of the first modern hot water district heating system in the U.S.

Final feasibility studies and marketing were completed in 1982, with the Mayor playing a critical leadership role in educating building owners and community about the benefits of district heating. The system started operating in 1983. The initial project cost, including construction, financing and other expenses (not including building conversions) was \$45.6 million in 1982 dollars. Funding sources included tax exempt revenue bonds and loans from the City of St. Paul and Housing and Urban Development (HUD) funds. The City played a vital role in helping the system in the early years by deferring payment of franchise fees until the young utility company reached a certain threshold of financial viability on its balance sheet.

In 1992 a district chilled water system was developed to help customers respond to the phase-out of CFC refrigerants. The City played an important role in obtaining low-cost loans for construction of the system.

## Profile: St. Paul District Energy System

### District Heating

The heating system currently serves 32 million square feet of building space, representing over 80% of the downtown heating market. Hot water is distributed through pre-insulated steel pipes, with 32,000 feet of twin supply and return piping. The hot water supply temperature varies from 250°F under winter peak conditions to 190°F during summer. The heating plant has the flexibility to use a variety of fuels. Initially coal was the primary fuel, with some natural gas and oil consumption. Now biomass is the primary fuel, as discussed below, with solar thermal capacity starting up in 2011.

### District Cooling

The cooling system now serves 19 million square feet of building space. Chilled water is distributed through steel pipes wrapped in protective coating, with 36,000 feet of twin supply and return piping. The chilled water supply temperature is generally 42°F, with warmer temperatures during the cooler months. The cooling plant uses primarily electric chillers, with steam absorption chillers driven by low-pressure steam from CHP. Two chilled water storage tanks enable the company to generate chilled water using low-cost night-time power. Storage provides lower cost peak cooling capacity and additional operational flexibility, and reduces peak electricity demand.

### Biomass Combined Heat and Power

In 2003 the company began operating a biomass CHP facility producing 25 MW electricity and 220 million Btu per hour (MMBtu/hr) of heat. Power is sold to the local electricity utility under a 20 year agreement. The CHP facility provides over 70% of the annual heat production. The biomass facility consumes waste wood from downed trees, trimmings and branches. By turning regional wood waste into a useful product, the system keeps about \$12 million of the community's energy dollars in the local economy. Making use of this wood waste also helps solve an ongoing environmental challenge, since much of it currently goes to landfills or is burned in open fires.

### Solar Thermal

21,000 square feet of flat-plate solar collectors, with a design capacity of 3.4 MMBtu/hr, began operation in early 2011. Actual capacity obtained in early operations was nearly 5 MMBtu/hr. This is the first solar thermal facility in the nation to be integrated with a district energy system.

## **Markham**

The Town of Markham, Ontario was motivated to create a district energy system for two fundamental reasons:

- An ice storm in Montreal interrupted the supply of electricity, providing Markham with a real life example of what happens when a community relies entirely on an outside resource for electricity.
- Markham was actively trying to attract hi-tech industry to the community and was looking for an additional edge by ensuring highly reliable, efficient and economical energy.

The district energy system proved to be the added edge that was needed to convince IBM to locate in a new mixed development called Markham Centre. Other hi-tech firms, such as Motorola, have also decided to locate there. The Town of Markham sees district energy as its key GHG reduction strategy. The entire system, profiled below, is owned and operated by Markham District Energy, a company owned by the Town.

Markham Centre is a mid-rise, mixed-use, pedestrian-oriented and transit supportive downtown for all of the residents of the Town of Markham, projected to ultimately be home to 41,000 residents and 39,000 employees.

The planning for Markham Centre began in the early 1990's. The Town of Markham updated its Official Plan to include Markham Centre in 1994. The Town adopted 11 "Guiding Principles" to ensure that the ongoing development of Markham Centre implements the Town's vision.

Performance Measures were developed from the Guiding Principles by the Markham Centre Advisory Group to further articulate the objectives for Markham Centre and provide a clear direction of expectations for development.<sup>20</sup> The Advisory Group has worked with Town staff to ensure that implementation plans for Markham Centre adhere to these principles.

Although connection is not mandatory, all major developments in Markham Centre are connected to the DE system. Developers must respond to the Performance Measures, which encourage connection to district energy, in their development plan. DE service is seen as an economically competitive tool for achieving sustainability, a means of reducing development costs, and a strategy for speeding approval of development plans. DE rates are not regulated.



## Profile: Markham District Energy

The district energy system that serves the new Markham Downtown Centre Development began operation on December 1, 2000. Markham is North America's first district energy system to combine the use of hot water for heating, chilled water for cooling and combined heat and power (CHP). FVB Energy Inc. was involved in the project from the very first feasibility study to a continuing role in the detailed design of plant, piping and building connection systems.

The first plant is located adjacent to the local utility's office. Natural gas fired boilers within the plant produce hot water for the district heating system. Several electric centrifugal chillers in combination with a hot water absorption chiller produce the chilled water for the district cooling system. A 3.5 MW gas-fired CHP engine supplies reliable power as well as heat which is used in the District Heating system as well as to produce cooling with the absorption chiller. The entire plant can separate itself during a grid interruption.



### Highlights

- System Services a Critical 24/7 Software Solutions Laboratory
- 3.5 MW Gas Fired CHP Engine
- Additional 5.0 MW of Gas Fired CHP Engine Added in 2008
- Hot water Storage Added in 2009
- 2nd Plant in Operation in 2008, 3rd Plant in Operation in 2011
- Second Separate District Energy System, including the Fourth Plant, Now Under Construction
- Local Municipality Owns and Operates Entire System
- Currently over 8 Million sqft of Building Space Served By System

## **Vancouver**

The City of Vancouver has used district heating for over 40 years. Central Heat Distribution Ltd. (CHDL), a private district heating company, has served downtown Vancouver buildings since 1968. In recent years, the City of Vancouver has pursued expanded use of district heating based on European hot water designs. As described above under Energy and Environmental Policy Context, the province of British Columbia has developed the most supportive policy environment for DE in North America.

The City of Vancouver has implemented a number of efforts to promote and implement DE:<sup>21</sup>

- Conducted “Opportunity Mapping” to identify high existing or future heating loads, plans for replacement of energy or other infrastructure, and potential unused heat sources.
- Financed and now operate the Southeast False Creek District Energy System (see text box).
- Require any development parcel over 2 acres to undertaken a study to determine the long-term benefits and viability of purchasing DE services.
- Established zoning principles and criteria for transit corridors which are favorable for district energy.
- Developed Connectivity Guidelines for building developers.<sup>22</sup>
- Currently developing a model DE franchise agreement.

### **Profile: Southeast False Creek District Heating System**

A highly efficient hot water based district heating system was installed as part of the revitalization of the Southeast False Creek area in Vancouver. The site is former industrial land and the location of the Athlete's Village for the 2010 Winter Olympics. In 2005 the City of Vancouver engaged FVB Energy to help develop the district energy concept and business plan, stressing the City's keen interest in a highly sustainable solution. The system consists of a low temperature hot water district heating system and electric heat pumps to extract heat from sewage, driven by predominantly hydroelectricity. The hot water distribution system uses European Standard (EN 253) thin walled steel pipe, insulated with PUR insulation, HDPE outer jacket and a built in leak detection system.

Construction began in 2007 and the system was commissioned prior to the 2010 Winter Olympics. The DES is expected to continue expanding to serve additional mixed-use real estate development. This will include interconnection between Southeast False Creek (6,000 residential units plus some commercial) and the adjacent False Creek Flats (more Commercial and Industrial).

#### **Highlights**

- System Began Service for the 2010 Winter Olympics Athletes Village.
- 26 MW (thermal) Low Temperature Hot Water System.
- 9.2 MMBtu/hr Heat Pump for Extraction of Heat from Sewage.
- Future Additional Bioenergy Source under Consideration.
- Brownfield Redevelopment.
- Local Municipality Owned and Operating Entire System.

## **North Vancouver**

The City-owned Lonsdale Energy Corporation has provided district heating services since 2004. Hot water is produced in multiple small plants. In accordance with Bylaw 7575, as amended periodically, any new building larger than 1,000 square meters is required to connect to the district heating system for heating purposes unless it is determined by the City's Director of Finance that the cost to the City for providing the service would be excessive.

The key performance requirements for buildings connected to LEC include the following:

- Hydronic or hot water heat must be used in the building heating systems.
- Both the space heating and domestic hot water systems must be heated by the LEC system.
- Domestic hot water is to be heated to a minimum of 140 °F under all load conditions.
- The system must be designed with a high temperature differential to ensure that all building heating and domestic hot water needs can be met and that high efficiencies are realized.
- There is to be a maximum return water temperature of 110 °F under all load conditions on the building side of the system. (The LEC system is designed to provide 170 °F to the customer side of the heat exchanger for heating purposes in the building.)
- In-building mechanical control systems must be configured to allow the exchange of information between the LEC and in-building system.

## **Toronto**

For many years the City of Toronto owned and operated the Toronto District Heating Company, a steam system. The City has divested some of its ownership to the Ontario Municipal Employees Retirement System (OMERS), which now owns 57% of share in ownership of the company, now called Enwave. More recently, Enwave created a district cooling system using a deep water cooling system that is integrated with the City's water supply system.

From its experience with Enwave, the City of Toronto understands the benefits of district energy and has taken a number of steps to increase its implementation. Recognition of the challenges of maintaining power grid reliability has helped fuelled Toronto's interest in expansion of district energy and CHP. Downtown Toronto is transmission constrained, with many transformer stations at capacity, limited short-circuit capacity and little or no spare capacity/redundancy. The City believes that it is critically important to provide reliable power to maximize the value of downtown land and facilitate development and redevelopment. The City also seeks to reduce the costs of living and working in Toronto.

The Toronto City Council allocated \$1 million to study the costs and benefits of community energy systems. In 2010 the City completed a District Energy Node Study, identifying 27 potential district energy nodes/locations identified in the City, and in June 2011 issued a Request for Proposals for Detailed Business Cases for 3 DE Nodes. A report to City Council on this activity is planned for late 2011, defining opportunities and value for the City, and presenting the detailed business cases.

Although it is 43% owner of Enwave, the City desires to see a competitive environment for development and operation of DE system. The City sees its roles, in DE development to be determined on a project-specific basis, as:

- Advocate
- Customer and anchor for DE development
- Potential partner investor
- Policy support
- Lessor of land/infrastructure

## **Seattle**

A privately owned district steam system, operated by Seattle Steam Company (SCC), has served downtown Seattle buildings for over 100 years. The city's power is provided by a municipal electric utility, Seattle City Light (SCL). In 2004, on behalf of SCL, FVB Energy evaluated the potential for district energy in the South Lake Union/Denny Triangle redevelopment area north of downtown Seattle. The study concluded that district energy could provide significant environmental and power grid benefits with potentially viable long-term economics, but that there were significant barriers to implementation that could not be overcome without strong public sector leadership and early-stage investment. At that time SCL was not willing or able to become that public sector champion, and other parts of the City government were also unable to play that role.

More recently, the City has returned to consideration of district energy as a key strategy for achieving Seattle's climate protection goals. The city evaluated ten neighborhoods to develop a prioritized list of near-, medium-, and long-range opportunities for district energy in Seattle.<sup>23</sup> Three areas were determined to have sufficient projected development density for district energy systems. However the densities anticipated for the entire neighborhood are not high enough to support an expanded district energy system. The following key challenges for implementation were identified:

- District energy is a capital-intensive, high-risk business requiring long-term commitments by multiple customers to attract investors.
- There is a general lack of understanding and trust among customers and owners of existing district energy systems and their historical role or future potential.
- Current energy prices, regulations and incentives do not necessarily provide incentives for connection and in some cases create disincentives.

To address the challenges, four recommendations were considered by the City:

- Form an Interdepartmental Steering Committee tasked with moving district energy forward in the City.
- Develop a new strategic community partnership model in the City, initially focused on the high-priority area (First Hill) with the opportunity to expand to other areas. The City would serve on a technical committee to provide strategic oversight, and could play a

number of roles to support the utility or incentivize hook-ups. The City would not finance the district energy system.

- Pursue policy reform regarding: infrastructure installation costs; green building policies; and state utility policy and incentives.
- Fund additional feasibility analysis of two additional neighborhoods.

The City has decided to focus its near-term efforts on pursuing the recommendations related to a strategic community partnership and policy reform.

## **Portland**

The Portland District Cooling Company (PDCC) district cooling system was originally developed by Portland General Electric (PGE), a local electric utility headquartered in Portland. Portland Energy Solutions (PES) constructed the district plant and distribution loop and began operations in 2001. The system supplies chilled water for a multi-use, five block development, formerly the Blitz Weinhard Brewery Blocks. Customers include offices, housing, retail and telecommunications facilities. The system has had several owners in the intervening years, and is now owned by Veolia.

In 2008 a feasibility study was prepared on behalf of the City for a “Neighborhood Energy Utility in the North Pearl District”. The study evaluated the feasibility of a district energy system that incorporates renewable energy sources and supports long-term goals of carbon-neutrality within the North Pearl District (an area north of the Brewery Blocks), with possible extension to other nearby neighborhoods. The study identified significant potential synergies between the PDCC system and the North Pearl district, which is 10 blocks from the border of the primary study area. A 6 MW CHP system using brewery waste as a fuel source emerged as one of the preferred alternatives.

The City of Portland’s 2009 Climate Action Plan recognized the advantages of district energy and established a goal of producing “ten percent of the total energy used within Multnomah County from on-site renewable sources and clean district energy systems” by 2030. Actions to be completed before 2012 include:

- Making investment funds available to help finance distributed generation and district energy systems,
- Establishing at least one new district heating and/or cooling system,
- Facilitating the installation of at least ten megawatts of on-site renewable energy, and
- Collaborating to reduce carbon emissions in Portland’s electricity mix.

Key findings regarding Portland’s regulatory framework affecting DE includes:

- The City has recently eliminated the requirement for a Site Development Permit for the installation of underground district energy piping.
- A Land Use Review is required if a district energy project includes ground disturbance in an Environmental Zone or Greenway Zone.

- Given that all of the currently identified district energy opportunity areas are in commercial zones, expedited Conditional Use permits may be the most appropriate permitting path for district energy projects
- Current code also does not allow small-scale district energy systems in any zone to produce greater than 1 MW of electric power.

## COG Region Policies, Plans, Regulations and Programs

### Energy Policy Frameworks

#### State Policy

Statewide energy policies in Maryland (MD) and Virginia (VA) influence the strategies adopted by the MWCOG governments within those jurisdictions. The District of Columbia (DC), which is independent of any state jurisdiction, has developed a relevant policy framework via legislation and climate action plans. These frameworks are supportive in varying degrees or neutral to the development of distributed power generation, combined heat and power (CHP), microgrids, or other community energy solutions. DC includes district energy as an explicit strategy, whereas in MD and VA district energy, if mentioned at all, appear primarily in local government policy frameworks.

#### Overview of State Energy and Climate Policies

The District of Columbia released a draft climate action plan, *Climate of Opportunity*,<sup>24</sup> in September 2010 as part of the GreenDC initiative begun under the framework of the Clean and Affordable Energy Act of 2008 (CAEA). The action plan specifically recommends measures for district energy systems; micro-utilities and solar co-operatives; and on-site power generation.

Maryland has comprehensive energy and climate strategies that specifically reference distributed power generation and CHP. The EmPower Maryland initiative, enabled by legislation passed in 2008,<sup>25</sup> includes goals to reduce per capita energy consumption by 15% by 2015 and increase the state's renewable energy portfolio to 20% by 2022. The initiative calls for the design and implementation of incentives for CHP, grants for residences and businesses to develop small-scale renewable power generation, and related regulatory changes at the Public Service Commission (PSC), Federal Energy Regulatory Commission (FERC) and Congress to incentivize new generation. The 2008 Climate Action Plan<sup>26</sup> similarly articulates an energy supply strategy that specifies "standards, incentives and barrier removal for distributed generation, including combined heat and power."

Virginia's 2010 Energy Plan contains a general goal to "support expansion of distributed generation options at industrial, commercial, and residential sites".<sup>27</sup>

Objectives or goals related to renewable energy production and utilization are features in either the statewide policies or action plans, thus providing a potential foundation for microgrid development based on small-scale renewable power production. For example, the two states and DC all have renewable portfolio standards (RPS), which in the case of Virginia is voluntary. Green power purchasing requirements and energy efficiency standards within public buildings provide a

demand-pull for potential implementation of community energy solutions defined at the local level.

In March 2008, Virginia enacted legislation<sup>28</sup> that would allow local jurisdictions to assess the property tax of energy efficient buildings at a reduced rate. Under this law, eligible energy-efficient buildings, not including the real property on which they are located, may be considered a separate class of property for local taxation purposes. It does not appear that any local jurisdictions have implemented this authority. A key question is how to encourage greater efficiency without substantially reducing tax revenues.

### Summary of Major Policy Tools

Table 1 summarizes types of policy and regulatory mechanisms that have been adopted in the two states and DC that could support development of other community energy solutions.

	PBF <sup>a</sup>	RPS <sup>b</sup>	Net Metering	Interconnection	Access Laws	Construction & Design	Green Power Purchasing	Required Green Power
MD		●	●	●	●	●	●	
VA		●	●	●	●	●	●	●
DC	●	●	●	●		●	●	

a. Public Benefit Fund

b. Renewable Portfolio Standard

*Table 1. Overview of State/District Policies<sup>29</sup>*

#### *PBF (Public Benefit Funds)*

Most public benefit funds (PBFs) were developed by states during the electric utility restructuring era, in the late 1990s, to ensure continued support for renewable energy, energy efficiency and low-income energy programs. These funds are commonly supported through a very small surcharge on electricity consumption (e.g., \$0.002/kWh). This charge is sometimes referred to as a "system benefits charge" (SBC). PBFs commonly support rebate programs, loan programs, research and development, and energy education programs.

#### *RPS (Renewable Portfolio Standards)*

As discussed above under U.S. Energy Policy, renewable portfolio standards (RPSs) require utilities to use renewable energy or renewable energy credits (RECs) to account for a certain percentage of their retail electricity sales -- or a certain amount of generating capacity -- according to a specified schedule.



### *Net Metering*

For electric customers who generate their own electricity, net metering allows for the flow of electricity both to and from the customer – typically through a single, bi-directional meter. When a customer’s generation exceeds the customer’s use, electricity from the customer flows back to the grid, offsetting electricity consumed by the customer at a different time during the same billing cycle. In effect, the customer uses excess generation to offset electricity that the customer otherwise would have to purchase at the utility’s full retail rate.

### *Interconnection*

Interconnection standards specify the technical and procedural process by which a customer connects an electricity-generating to the grid, as discussed above under U.S. Energy Policy. Such standards include the technical and contractual terms that system owners and utilities must abide by. State public utilities commissions typically establish standards for interconnection to the distribution grid, while the Federal Energy Regulatory Commission (FERC) has adopted standards for interconnection to the transmission level. Many states have adopted interconnection standards, but some states’ standards apply only to investor-owned utilities -- not to municipal utilities or electric cooperatives. (Several states have adopted interconnection guidelines, which are weaker than standards and generally apply only to net-metered systems.)

### *Access Laws*

Solar and wind access policies are designed to establish a right to install and operate a solar or wind energy system at a home or other facility. Some solar access laws also ensure a system owner’s access to sunlight. These laws may be implemented at both the state and local levels. In some states, access rights prohibit homeowners associations, neighborhood covenants and local ordinances from restricting a homeowner’s right to use solar energy. Easements, the most common form of solar access policy, allow for the rights to existing access to a renewable resource on the part of one property owner to be secured from an owner whose property could be developed in such a way as to restrict that resource. An easement is usually transferred with the property title. At the local level, communities use several policies to protect solar access, including solar access ordinances, development guidelines requiring proper street orientation, zoning ordinances that contain building height restrictions, and solar permits.

### *Construction and Design*

Building energy codes adopted by states (and some local governments) require commercial and/or residential construction to adhere to certain energy standards. While some government entities have developed their own building energy codes, many use existing codes (sometimes with state-specific amendments), such as the International Energy Conservation Code (IECC), developed and published by the International Code Council (ICC); or ASHRAE 90.1, developed by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). A few local building energy codes require certain commercial facilities to meet green building standards.

Many states and local governments, as well as the federal government, have chosen to lead by example by requiring new government buildings to meet strict energy standards, including green

building standards, energy-reduction goals, equipment-procurement requirements, and/or the use of on-site renewable energy. Many of these policies require that new government buildings (and renovated buildings, in some cases) attain a certain level of certification under the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) program. Equipment-procurement policies often mandate the use of the most efficient equipment, including equipment that meets federal Energy Star criteria. Policies designed to encourage the use of on-site renewables generally establish conditional requirements tied to life-cycle cost analysis.

#### *Green Power Purchasing*

Government entities, businesses, residents, schools, non-profits and others can play a significant role in supporting renewable energy by buying electricity from renewable resources, or by buying RECs. Many state and local governments, as well as the federal government, have committed to buying green power to account for a certain percentage of their electricity consumption. Green power purchases are typically executed through contracts with green power marketers or project developers, through utility green power programs, or through community aggregation.

#### *Required Green Power*

Several states require electric utilities to offer customers the option to buy electricity generated from renewable resources, commonly known as "green power." Typically, utilities offer green power generated using renewable resources that the utilities own (or for which they contract), or they buy RECs from a provider certified by a state public utilities commission.

### **Local Jurisdictions**

In addition to DC, several other COG localities have taken the lead in creating policies that directly address community energy planning and solutions, as discussed below.

#### Arlington County

A Community Energy and Sustainability (CES) Task Force, composed of a broad range of public and private stakeholders, was established to guide the process of developing a Community Energy Plan.<sup>30</sup> The Task Force reported to the County Board in May 2011, recommending countywide goals for long-term, mid-term and short-term reduction of GHG emissions, as illustrated in Figure 2. The Community Energy Plan process is driven by objectives for economic competitiveness and a GHG emissions target of 3 metric tons CO<sub>2</sub>e /capita per year by 2050.

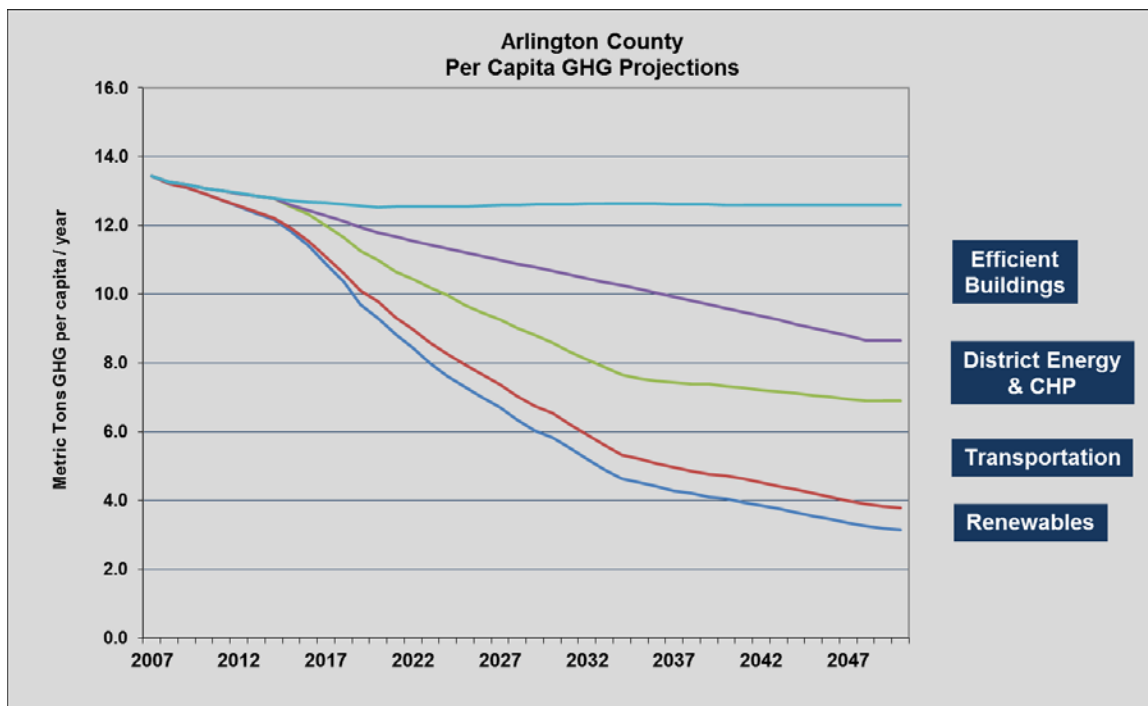


Figure 2. Arlington County Greenhouse Gas Reduction Goals<sup>30</sup>

The Task Force report kicked off an 18-month implementation period which is expected to culminate in a Final CEP and Implementation Work Plan in Nov. 2012. Key near-term efforts include:

#### Buildings

- Establish detailed baselines of building characteristics and energy use by building type - residential and non-residential
- Finalize design for building energy performance label and install labels in County buildings by end of summer

#### District Energy and Renewable Energy

- Evaluate legal & financial options for DE in Arlington
- Clarify the economics of making buildings DE-ready
- Conduct DE and DE-ready buildings workshop for Engineers and Architects
- Advance IEMP efforts in high-probability DE areas
- Evaluate solar potential in Arlington

#### Transportation

- County purchasing fuel-efficient vehicles; smart fleet management
- Use B20 biodiesel in County fleet operations

- Install Electric Vehicle (EV) infrastructure for County fleet use
- Facilitate EV infrastructure development in private sector

#### **Education/Outreach/Financial**

- Technical Work Group to weave CEP into all aspects of County activities
- Identify specific metrics for monitoring progress toward Task Force goals
- Promote existing Federal and state tax credits and other incentives for building efficiency improvements
- Establish clearinghouse for financial incentives
- Align with "Federal Buildings Personnel Training Act of 2010", Public Law 111-308 and partner with agencies to encourage certification of existing workforce

Among the recommendations being pursued under this initiative are establishing DE systems in high-density areas, owned and operated by a new District Energy Company; and creating a mixed-use, net-zero energy scale project. The Community Energy and Sustainability Task Force identified four potential scale project areas: Columbia Pike, Crystal City, East Falls Church and Rosslyn. The County's CEP initiative also includes implementation of policy mechanisms including energy performance labeling, financial incentives, and education and outreach programs.

In 2011, a consortium composed of Arlington County, Vornado/Charles E. Smith (a major real estate developer) and WGL Holdings (Washington Gas, the local gas utility) contracted for development of an Integrated Energy Master Plan (IEMP) for Crystal City.

#### Loudoun County

Loudoun County has developed a policy context for comprehensive planning and implementation via its County Energy Strategy.<sup>31</sup> A priority articulated by the strategy is to maximize the use of clean, distributed CHP. The County Energy Strategy recommends implementation of at least 100 MW (electric) capacity distributed CHP by 2040 using approaches such as district energy, CHP, micro-CHP and biogas- or biomass-based CHP.

Other County Energy Strategy recommendations include creating a program where all homes and buildings will have a current Energy Performance Label (EPL) whenever sold or rented; maximizing use of economically viable renewable energy; and a comprehensive approach to providing a support structure via public education and engagement, planning and land use, multi-utility energy services ownership and operation, and grants and financial incentives.

On June 21, 2011, the Loudoun County Board of Supervisors approved the creation of an Energy Advisory Task Force to develop and implement a plan to grow and attract companies that provide sustainable energy. The Task Force is an outgrowth of the County Energy Strategy, which set a goal that "Loudoun County will be recognized as the location of choice for investment in part because of its energy strategy."

### Frederick County

Frederick County adopted a Comprehensive Energy Plan<sup>32</sup> for country operations in September 2010 which establishes definitive annual goals for reducing the county's use of non-renewable energy over a fifteen year period in its office buildings, vehicle fleet and facilities by 50% or more. Recommended strategies included that are relevant to community energy solutions include:

1. Application of high efficiency energy performance standards for new construction and renovation projects and the retrofitting of existing building heating, cooling ventilation, lighting and control systems to improve efficiency and reduce the consumption of fossil fuels by up to 21%; and
2. On-site renewable energy installations utilizing geo-thermal, solar or wind energy could contribute up to a 4% conversion to renewable energy.

### Fairfax County

Fairfax County has launched a Private Sector Energy Task Force<sup>33</sup> to develop a transformational vision, supported by achievable strategies for energy efficiency, sustainability, and “green” technology. The Task Force is hearing presentations on CHP, district energy, and other community energy strategies as input to its deliberations. Comprehensive Plan guidance for the Tysons Corner Urban Center supports the use of community energy distribution systems.

### Other

Other governments are in various stages of implementing recommendations to establish a community energy plan.

- Falls Church has a Community Energy Plan Task Group tasked with developing a community energy plan which will include recommendations for government and community energy consumption reduction targets and strategies to reach those targets.
- The Prince William County 2008 Comprehensive Plan<sup>34</sup> specifies “develop a community energy master plan” as one of the energy policies and action strategies to be pursued.
- The City of Alexandria released its Energy and Climate Action Plan in March 2011. The plan identifies possible new short-term and medium-term measures to achieve the City’s GHG emission reduction targets of 10% by 2012, 20% by 2020 and 80% by 2050. Moreover, it identifies community energy strategies, particularly district energy and distributed renewable generation, as measures for long-term consideration.

Other COG region governments are implementing strategies to achieve energy efficiency and conservation in buildings, reduce greenhouse gas emissions, and/or advance the use or production of renewable energy. Both Takoma Park and Rockville are encouraging on-site generation of renewable energy through information programs.

### Summary of Policies and Programs

Table 2 summarizes the role of Integrated Community Energy Solutions in COG region local government energy policies and education and outreach programs.

	Energy Policy Framework	Education and Outreach Programs
<b>District of Columbia</b>	●	●
<b>Maryland</b>		●
Bowie	○	○
College Park	○	○
Frederick	○	○
Frederick County	●	○
Gaithersburg	×	×
Greenbelt	○	○
Montgomery County	●	●
Prince George's County	○	○
Rockville	●	●
Takoma Park	●	●
<b>Virginia</b>		
Alexandria	●	○
Arlington County	●	●
Fairfax	○	○
Fairfax County	●	●
Falls Church	●	●
Loudoun County	●	●
Manassas	×	×
Manassas Park	×	×
Prince William County	●	○

- Integrated into or specific objective of plan, policy or program objectives
- Referenced and/or facilitated by plan, policy or program objectives
- Under development or revision
- Being studied or considered
- No/minimal reference or not facilitated under existing policy framework or programs
- ×

Table 2. Overview of Role of Integrated Community Energy Solutions in COG Local Government Energy Policies

## **Planning**

As the Metropolitan Washington area includes the federal district for the nation's capital and is home to numerous Federal government and military agencies, planning processes often involve coordination across jurisdictional boundaries, and may at times involve review and comment by various government entities at the local, regional, state and federal levels.

Table 3 summarizes the role of Community Energy Solutions in MWCOG region local government planning processes.

### **Federal**

Federal interests in local land use planning are represented through the National Capital Planning Commission (NCPC). As part of its authority to guide the development of the National Capital Region (composed of the District of Columbia, Arlington County, Montgomery County and Prince Georges County), the NCPC reviews plans proposed by local jurisdictions and regional entities, and determines whether the plans have an impact on a federal interests, and if so, prepares comments to help local agencies coordinate with affected federal entities. The NCPC direct authority for review extends to all COG member governments, with the exception of the City of Frederick and Frederick County.

Since it was chartered in 1924, NCPC has had primary responsibility for comprehensive planning in the National Capital Region. When the District was granted home rule in 1973, planning responsibilities for the city shifted to the city government. The Comprehensive Plan for the National Capital<sup>35</sup> now is comprised of two parts: the District of Columbia Elements, overseen by the District government (discussed below), and the Federal Elements.

The Federal Elements of the Comprehensive Plan for the National Capital (Federal Elements) address matters related to federal properties and federal interests in the District and the region, and reinforce Smart Growth principles while supporting local and regional planning objectives. Last updated in 2004, NCPC is currently reviewing policies in the plan to evaluate which should be revised, including ensuring that policies meet the sustainability goals outlined by the White House Executive Order 13514.<sup>36</sup>

The NCPC's comments on proposed sustainability-related amendments to the District's zoning regulations<sup>37</sup> note that federally owned and leased properties in the region may also be subject to several directives that promote the development of high-performance buildings and sustainable sites for federal projects:

- The Energy Independence and Security (EISA), a federal law enacted in 2007,<sup>38</sup> requires federal buildings to be carbon-neutral by 2030.

	Land Use Planning	Community Master Plan	Integrated Community Energy Planning
<b>District of Columbia</b>	●	●	●
<b>Maryland</b>			
Bladensburg	○	○	×
Bowie	○	○	×
College Park	○	○	×
Frederick	●	●	×
Frederick County	●	●	×
Gaithersburg	○	○	×
Greenbelt	○	○	×
Montgomery County	●	●	×
Prince George's County	●	●	×
Rockville	○	○	×
Takoma Park	○	○	×
<b>Virginia</b>			
Alexandria	●	○	×
Arlington County	●	●	●
Fairfax	●	●	×
Fairfax County	●	●	⊙
Falls Church	●	●	●
Loudoun County	●	●	●
Manassas	○	○	×
Manassas Park	○	○	×
Prince William County	○	●	⊙

- Integrated into or objective of the plan or planning processes
- Facilitated by plan or planning processes
- Under development or review
- ⊙ Being studied or considered
- No reference/not addressed in existing plan or planning processes
- × No plan

Table 3. Overview of Role of Integrated Community Energy Solutions in COG Local Government Planning Processes



- Executive Order 12902, Energy Efficiency and Water Conservation in Federal Facilities and the Energy Policy Act of 1992 require federal agencies to reduce energy consumption of their facilities and install energy and water conservation measures.
- In addition to Executive Order 12902, Executive Order 13123, Greening the Government through Energy Efficient Management, was designed to meet and exceed the energy efficiency and water conservation provisions contained in Energy Policy Act of 1992 and increase investments in solar and other renewable energy.
- Executive Order 13123 also mandates federal agencies entering into leases, including renegotiation or extension of existing leases, to incorporate provisions that encourage energy and water efficiency and for build-to-suit lease solicitations to include criteria encouraging sustainable design and development, energy efficiency and verification of building performance.

Other federal regulations that support environmental protection and sustainable development practices include the National Environmental Policy Act (as amended) and the Energy Policy and Conservation Act.

Another NCPA plan affecting the District is the Monumental Core Framework Plan adopted by the NCPA in April 2009.<sup>39</sup> This comprehensive guide to planning for the areas surrounding the National Mall includes sustainability strategies to address the integration of green infrastructure into highly-urbanized sections of the city, investment into high-performance buildings, and renewable energy production.

## **District of Columbia**

### Land Use Planning Overview

The DC Office of Planning prepares the District Elements of the Comprehensive Plan, which are subject to NCPA review and approval. The District Elements, adopted in 2006, address citywide issues such as land use, human services, housing and economic development.

The District's Office of Planning is undergoing the first Amendment Cycle of the 2006 Comprehensive Plan. The process began in April 2009, with a Draft Amendment Report issued on September 8, 2009. The Mayor officially transmitted a set of amendments to the Council of the District of Columbia in June 2010. The draft Bill 18-867, "The Comprehensive Plan Amendment Act of 2010," is currently being considered by the Council.

### Community Energy Planning

The District has taken a comprehensive and proactive approach to planning and zoning to advance its policy objectives with respect to sustainability and clean energy, with the incorporation of policies and strategies that support community energy solutions. While the

District does not have an explicit integrated community energy plan, revisions to the District Elements of the Comprehensive Plan and proposed amendments to zoning regulations have been designed expressly to permit the development and deployment of distributed generation and district energy systems within the District.

As reported in the 2010 Comprehensive Plan Progress Report, the District is building more sustainably due to the Green Building Act of 2006 and a subsequent comprehensive overhaul of its building codes, as recommended in the Comprehensive Plan. The codes, effective January 2009, require greater water and energy efficiency and feature commercial energy requirements 7 percent higher than Maryland's or Virginia's. In line with Comprehensive Plan policies that encourage consuming and polluting less, the Clean and Affordable Energy Act (CAEA) of 2008 establishes District goals for cleaner and more affordable energy. Included among goals established by the CAEA are required Energy Star benchmarking for all qualified public and private buildings and a goal that 20% of the District's consumed energy come from renewables by 2012.

#### Eco-District Planning

The NCPC in coordination with the DC Office of Planning and other local and federal agencies are leading the Southwest Ecodistrict Initiative.<sup>40</sup> The initiative aims to transform the 10th Street and Maryland Avenue corridors located south of the National Mall in Southwest Washington. The plan is to create a model sustainability showcase of innovative technologies and sustainable urban development and infrastructure practices in the nation's capital. As envisioned, the eco-district will be an active multi-modal mixed-use neighborhood of significant cultural attractions and public spaces, offices, residences, and amenities. It will extend the civic qualities of the National Mall by creating prominent locations for nationally significant cultural destination. A Task Force convened by NCPC is charged with developing a Development Framework Plan and Action Agenda for the Initiative by mid 2011.

Elsewhere in the District, grassroots efforts have advanced some of the benefits of eco-district planning. In the Adams Morgan neighborhood, for example, businesses are coordinating "community purchases" of alternative energy.

## **Maryland**

#### Land Use Planning Overview

Local jurisdictions have land use planning authority in Maryland. Article 66B of the Maryland Annotated Code delegates planning and land use regulatory authority to all noncharter counties and all incorporated municipalities outside of Montgomery and Prince George's counties, as well as specifically identified towns within these two jurisdictions. This statute: enables local government to guide growth and development; outlines the responsibilities, roles, and functions of the planning commission; and sets the "ground rules" for operations. Many sections of Article 66B apply to all jurisdictions in the State that exercise planning and zoning powers. COG members who are covered under Article 66B include the City of Frederick, Frederick County, Gaithersburg, and Rockville.

Article 28 of the Maryland Annotated Code applies to Montgomery and Prince George's Counties and to all incorporated towns within those two counties not covered by Article 66B. This statute authorizes the Maryland-National Capital Park and Planning Commission (M-NCPPC) which has been empowered by state legislation since 1927 to provide land use planning in the two counties, as well as develop and manage a regional system of parks. The Commission operates through two Planning Boards appointed by each county government. Land use planning in Montgomery and Prince George's County is also subject to review by the NCPC.

The State's land use planning and policy agency, the Maryland Department of Planning, reviews comprehensive plans for consistency with the State's Smart Growth and growth management laws, specifically, Article 66B, Economic Growth Resource Protection and Planning Act of 1992, the 1997 Priority Funding Areas Act, and the requirements of HB 1141 and HB 2 from the 2006 Maryland General Assembly. The agency's review and comment on local plans are provided to counties and municipalities as guidance to insure local plans reflect the best possible land management policies and practices. State regulations require that local comprehensive plans be reviewed every six years.

#### Community Energy Systems in Community or Comprehensive Master Plans

Although the State of Maryland has a relatively forward-looking policy framework that could facilitate the development of community energy systems, the state-mandated comprehensive plans for most of the jurisdictions contain primarily traditional land use plan elements with little to no mention of integrated community energy planning or community energy strategies. Energy efficiency and conservation, especially in buildings or transportation, are the primary energy-based drivers of sustainability in more recently updated local comprehensive plans.

For example, the City of Frederick's recently updated 2010 Comprehensive Plan focuses on energy savings, energy-efficient site design and building construction. The land use element of plan encourages use of sustainable technologies, and "encourage[s] land uses, densities and regulations that promote energy efficient development patterns and relatively low expenses to municipal and state governments as well as low utility costs." There is no mention of integrated community energy planning.

Similarly, in Montgomery County, a Sustainable Action Plan was developed in 2008 as a cooperative effort between the Montgomery County Planning Board and the Montgomery County Executive to develop a policy framework and indicators to measure progress toward healthy and sustainable communities. The Plan includes among its objective to: update the building code to reflect the latest standards for energy efficiency; and provide incentives for consumers and businesses to use and generate renewable energy. An initiative to rewrite the zoning ordinances is underway in Montgomery County to support development of more sustainable, Smart Growth communities. The initiative includes a Sustainability Audit, which did not uncover many ordinances within the country pertaining to renewable energy or district energy.

Sector Plans for community revitalization projects underway in both Montgomery County and Prince George's County include some of the principle planning elements that are conducive to community energy strategies:

- Density incentives for mixed-use developments;
- Transit connectivity coupled with pedestrian infrastructure and Green Streets concepts; and
- Use of LEED green building practices throughout the area.

The Takoma/Langley Crossroads sector plan<sup>41</sup> in Montgomery County and the Greenbelt Metro Area sector plan<sup>42</sup> revision in Prince George's County are good examples of this approach. Sustainability strategies in both plans address energy efficiency in buildings and transportation modalities. Neither plan includes provisions for community energy planning or strategies.

#### Eco-District Planning

There are currently no planning efforts in COG's Maryland local governments that have adopted the "eco-district" terminology. Local redevelopment plans do include increased use of mixed-use planning, with attention to measures for energy conservation and efficiency.

### **Virginia**

#### Land Use Planning Overview

In the Commonwealth of Virginia, the General Assembly provides authority to the counties and cities through charters or other enabling legislation, and under the Dillon Rule local governments can only exercise authorities that have been specifically granted. Under the Dillon Rule, cities and counties may not impose more limits on developing private property than the General Assembly has authorized in the Code of Virginia.

State enabling legislation gives authority to local officials to authorize local officials to prepare Comprehensive Plans for the development of lands in their jurisdictions, consistent with overall state law.<sup>43</sup> The State requires that Comprehensive Plans be updated once every five years; some jurisdictions have processes for interim amendments to the Plan. Local jurisdictions have authority to create more detailed zoning ordinances that define acceptable use (residential, industrial, commercial, etc.) for each parcel of land.<sup>44</sup>

At the local level, planning agencies prepare Comprehensive Plans that include several elements, one of which is a General or Long-Range Land Use Plan. Counties and some other jurisdictions also create area plans and plans for special projects within their jurisdictions.

According to the findings of a Virginia Commonwealth University study presented to the Virginia Executive Institute in June 2008,<sup>45</sup> there is no one agency at the state level in Virginia that provides vision, guidance, and support to local planning officials. This results in development patterns that may have adverse impacts on energy use and sustainability. The study made several recommendations to promote the use and development of sustainable land-use practices by

localities, including a virtual statewide collaborative, which links planning officials at various agencies and the appointment of a senior advisor to the Governor for sustainable development.

### Community Energy Planning

Actions and policies relative to community energy planning were incorporated into the discussion above under Energy Policy Frameworks – Local Jurisdictions.

### Eco-District Planning

There are currently no planning efforts in MWCOG's Virginia local governments that have adopted the "eco-district" terminology. Localities have included energy and environmental concerns in district or area plans, such as the Tysons redevelopment plan and the Integrated Energy Master Plans currently under development in Loudoun and Arlington Counties.

## **Establishing Community Energy Systems**

### **District of Columbia**

#### Franchising and Facility Siting

DC Code Title 34 authorizes the District of Columbia Public Service Commission (PSC) to approve all power generation facilities regardless of size, if they are located entirely within the District. If the facilities are considered interstate facilities, they require FERC approval. Title 15 of the DC Municipal Regulations (DCMR) provides rules for approval of siting and constructing generation facilities, small generator or "customer generator" interconnection, and net metering. A "customer-generator" is defined in Title 34 as a residential or commercial customer that owns and operates an electric generating facility that:

- Has a capacity of not more than 1000 kiloWatts;
- Uses renewable resources, cogeneration, fuel cells, or microturbines;
- Is located on the customer's premises;
- Is interconnected with the electric company's transmission and distribution facilities; and
- Is intended primarily to offset all or part of the customer's own electricity requirements.

#### Net Metering

As authorized under DC Code Title 34 and DCMR Title 15, net metering is currently available to residential and commercial customer-generators with systems powered by CHP and renewable technologies up to a maximum capacity of 1 MW. The District's net-metering rules specify that metering equipment must be capable of measuring the flow of electricity in two directions. Utilities are not prohibited from installing an additional meter on the facilities of eligible customer-generators, but utilities that choose to do so must pay for the added cost of the second meter and/or other necessary equipment. Net excess generation is credited to the customer's next bill at the utility's full retail rate. Utilities must offer a standard net-metering contract approved by the PSC.<sup>46</sup>

### Interconnection

The District of Columbia Small Generator Interconnection Rules in DCMR Title 15<sup>47</sup> were adopted in February 2009. The rules apply to systems up to 10 MW that are operated in parallel with the electric distribution system and not subject to the interconnection requirements of PJM. Four tiers are laid out with various criteria systems seeking to interconnect. IEEE 1547 is generally used as a technical standard for evaluation. External disconnect switches are not required for systems below 10 kW, but are required for all other systems. Systems larger than 1 MW require liability insurance.<sup>46</sup>

### Financial Assistance and Tax Incentives

The District currently has no financial incentives specifically for CHP.

The District operates a public benefit fund which includes renewable energy. The fund, the Sustainable Energy Trust Fund (SETF), was established under DC's Clean and Affordable Energy Act of 2008 (CAEA) and replaced previously authorized funds to provide energy assistance to low-income residents, and to support energy-efficiency programs and renewable-energy programs. The SETF is funded by a non-bypassable surcharge on the bills of energy utility customers who are not Residential Aid Discount or Residential Essential Service customers. The SETF surcharge funds a private company known as the Sustainable Energy Utility, which is responsible for implementation of energy saving installations in commercial buildings and increasing the District's renewable energy generating capacity.

Other financial incentive programs in the District include:

- The DC Pace Program (slated to be operational in 2011);
- Renewable energy credits for renewable generation facilities as authorized under the CAEA; and
- A renewable energy incentive program (REIP) to provide rebates on the installation of a solar (or photovoltaic) renewable energy system on single and multi-family dwellings, as well as commercial and institutional buildings. As of February 2011 the REIP is no longer accepting new applications. It is currently expected that the program will re-open to new applications when additional Fiscal Year 2012 funding becomes available.

### Government Procurement Policies

As of March 9, 2011, the District's total voluntary green power purchases by government, business, and residents are just over 8% of the District's total electricity load (756 million kWh/year out of a total District-wide residential, commercial and institutional electricity consumption of 9.1 billion kWh/year). This makes the District the largest EPA Green Power Community in the United States as ranked by total green power kWh/year.<sup>48</sup> The District has the tenth-highest green power percentage of total energy use of any Green Power Community. The District schools and other D.C. government buildings get half of their electricity from renewable sources, either by producing it themselves or buying renewable electricity -- wind or solar -- through a complex credit market.

The Downtown DC Business Improvement District is one of 71 EPA Green Power Partner organizations committed to purchasing green power. In addition, the District requires government officials to procure Energy Star qualified products (Energy Star Efficiency Amendment Act enacted in December 2004). In April 2009, the Mayor also issued Mayoral Order 2009-60 promoting environmentally friendly product purchasing practices within the District. The District also has requirements established under the CAEA for 10 buildings owned or operated by the District of Columbia to be benchmarked using the Energy Star® Portfolio Manager benchmarking tool.

## **Maryland**

### Franchising and Siting

The primary siting agency is the Maryland Public Service Commission (PSC). The State has pre-emptive authority in these matters over local governments. Under Maryland law,<sup>49</sup> developers must obtain a Certificate of Public Convenience and Necessity (CPCN) from the PSC to build or modify electric power plants in the state, with the exception of those which: a) produce on-site generated electricity; b) have capacity that does not exceed 70 MW; and c) any electricity exported for sale is sold only on the wholesale market pursuant to an interconnection, operation, and maintenance agreement with the local electric company. The Maryland Power Plant Research Program (conducted by the PSC) facilitates the study of the impact of proposed facilities on the environment and on other areas of public interest. It also coordinates the development of recommendations be included as conditions within the Certificate of Public Convenience and Necessity.

As of October 2009, the PSC had a total of 549 certified distributed power generators who were exempt from the CPCN process, with a total capacity of 867.4 MW. Just under 20% were based on renewable fuels. There were 12 CHP units representing 80.95 MW of capacity. Four of the CHP units were biomass-based; the others used fossil fuels.

### Net Metering

Maryland's net-metering law has been expanded several times since it was originally enacted in 1997. In their current form, the rules apply to all utilities -- investor-owned utilities, electric cooperatives and municipal utilities. Residents, businesses, schools or government entities with systems that generate electricity using solar, wind, biomass, fuel cell, and micro-CHP resources are eligible for net metering. The law permits outright ownership by the customer-generators as well as third-party ownership structures (e.g., leases and power purchase agreements). The provisions allowing for micro-CHP systems (H.B. 1057) and certain third-party ownership structures (S.B. 981) were added in May 2009 and took effect July 1, 2009. Net metering was extended to fuel cell electricity generation systems in May 2010 (H.B. 821).

Maryland is currently revising legislation and related rules for how customer-generators are compensated for net excess generation. In May 2011 the state enacted H.B. 860 (effective June

1, 2011) revising the law to address interpretations of a law enacted in 2010 that were detrimental to many net metering customers. The adoption of administrative rules and utility tariffs implementing the changes under H.B. 860 were pending as of May 2011.

Separately, in April 2011 Maryland enacted legislation (S.B. 271/H.B. 275) allowing "closed conduit hydro" facilities to net meter. In order to qualify for net metering such facilities must: operate within an existing potable water system; be owned or operated by a municipal corporation or public water authority; and produce less energy than is consumed to operate the water supply system. The amendments take effect on October 1, 2011.

### Interconnection

The Maryland Small Generator Interconnection Rule was adopted in 2008. The new rules apply to interconnections of all types of distributed generation systems of less than 10 MW to the electric distribution system for all types of utilities -- investor-owned utilities, rural cooperatives and municipal utilities. There are four levels of interconnection, and individual systems up to 10 MW are allowed to interconnect. Different levels of review are subject to specific technical screens, review procedures, and timelines. Generally speaking, the review process becomes more extensive and time consuming with increasing system size.<sup>50</sup>

### Financial Assistance

The Maryland Energy Agency (MEA) is a primary resource for financial assistance to residents, businesses, and state and local government agencies deploying small-scale power generation.

The Residential Clean Energy Grant Program provides financial assistance to residents who install solar photovoltaic, solar water heating, geothermal heat pump and wind turbine systems at their residence. The program is based on the Property-Assessed Clean Energy (PACE) model, which allows property owners to borrow money to pay for energy improvements, which is then repaid via a special assessment on the property over a period of years. Maryland's program authorizes local governments to adopt resolutions or ordinances establishing such programs, includes provisions permitting local governments to issue bonds to fund such financing programs. If adopted by a local governing body, the program allows local property owners to opt in to a renewable energy or eligible energy-efficiency loan program and repay the loan through a surcharge on their property tax bill. The surcharge remains attached to the property upon a change in ownership and is limited to the amount needed to recover costs associated with issuing bonds, financing the loans, and administering the program. The programs are designed to help satisfy Maryland's Renewable Portfolio Standard (RPS) requirements and EmPOWER Maryland goals.

In addition to the residential program, MEA also administers the Commercial Clean Energy Grant Program, which provides financial assistance to businesses, non-profits, and government entities. Other financial assistance programs to assist the development of clean energy resources include the State Anemometer Loan Program, the Jane E. Lawton Conservation Loan Program.



MEA coordinates with Maryland agencies and departments to help them identify grants such as Project Sunburst, which helps put solar energy systems on state buildings, and loans such as the State Agency Loan Program, which helps state agencies upgrade buildings with more energy efficient lighting and appliances

Grant and loan programs offered by the MEA for state and local government agencies include:

- Commercial Clean Energy Grant Program
- EmPOWER Clean Energy Communities Grant
- EmPOWER Energy Efficiency and Conservation Block Grants (EECBG)
- Get information about Project Sunburst
- State Agency Loan Program (SALP)
- Jane E. Lawton Conservation Loan Program

In addition to the state programs, the following are examples of financial assistance programs put in place by COG governments:

Montgomery County 's financial assistance programs includes their own EECBG programs, funded under the American Recovery and Reinvestment Act. The focus is primarily energy efficiency retrofits, including improvements to heating and air conditioning. The County also has property tax credits for renewable energy implemented at home.

#### Tax Incentives

Tax credit incentives offered by the state of Maryland include the Bioheat Tax Credit Program, the Clean Energy Production Tax Credit, and the Green Building Tax Credit.

The Bioheat Tax Credit Program allows individuals and corporations to take an income tax credit of \$0.03/gallon for purchases of biodiesel used for space heating or water heating. The maximum credit is \$500 per year. It may not be refunded or carried over to subsequent years. In order to qualify for the tax credit, the heating oil blend must contain at least 5% biodiesel (B5). The tax credit is only available for purchases made during the 2008 - 2012 tax years.<sup>51</sup>

The Clean Energy Production Tax Credit is offered for power generated by wind, geothermal energy, solar energy, hydropower, hydrokinetic, municipal solid waste and biomass resources. The list of biomass eligible resources is generally the same as those eligible for the federal renewable electricity production tax credit (PTC), except the Maryland law contains added provisions related to biomass and biogas technologies.<sup>52</sup> The tax credit has been in place since 2000, but has been amended several times since the initial enactment. Most recently, it was amended in May 2010 by H.B. 494 (effective July 1, 2010) to extend the facility in-service deadline from 2010 to 2015; set a minimum tax credit limit of \$1,000; and make excess tax credits refundable.

The Green Building Tax Credit is worth up to 8% of the total cost of the building. Buildings must be located in a priority funding area and be at least 20,000 square feet.<sup>53</sup>

Property tax incentives affecting COG governments in the State of Maryland include:

- Local Option - Property Tax Credit for High Performance Buildings
- Local Option - Property Tax Credit for Renewables and Energy Conservation Devices
- Montgomery County - High Performance Building Property Tax Credit
- Montgomery County - Residential Energy Conservation Property Tax Credits
- Prince George's County - Solar and Geothermal Residential Property Tax Credit
- Property Tax Exemption for Solar and Wind Energy Systems
- Special Property Assessment for Renewable Heating & Cooling Systems

Maryland has state sales and use tax exemptions for wind, geothermal and solar energy equipment from the state sales and use tax. The legislation authorizing the exemptions, initially passed in 2008, was modified in 2009 to include wind and to include systems that supply electricity to the grid (e.g. through a net metering agreement).

In May 2011 Maryland enacted S.B. 398, providing a sales and use tax exemption for sales of electricity from qualifying solar energy and residential wind energy equipment to residential customers. In order to qualify for the exemption, the sale of electricity must be for residential use on a property owned by a net metering eligible customer-generator. The law places sales/purchases of electricity under residential solar or wind retail power purchase agreements (PPAs) on a level playing field with customer purchases of electricity from the grid. The exemption takes effect July 1, 2011.

#### Government Procurement

Executive Order 01.01.2001.02 , Sustaining Maryland's Future with Clean Power, Green Buildings and Energy Efficiency, provides the framework for clean energy procurement in Maryland. The Executive Order calls for at least 6% of the electricity consumed by state-owned facilities to be generated from "green" energy sources. The Executive Order also makes it easier for the State to purchase alternative-fuel and low-emission vehicles for its fleet.

The state embarked upon an initiative in 2009 with the University System of Maryland, termed "Clean Energy Horizons", to contract for renewable energy through long-term power purchase agreements with clean energy developers. In December 2009 the Maryland Department of General Services (DGS) approved four contracts that are anticipated to eventually supply up to 20% of the electricity needs of state agencies and the university system.<sup>54</sup> The long-term agreements include both electricity and renewable energy credits (RECs), with a stipulation that the facilities come on-line by the end of 2014. The state reportedly intends to allow county, university and municipal partners access to the contracts to make their own renewable electricity purchases. The DGS is also pursuing the installation of renewable energy systems at several state buildings.

In addition to the state actions, the following are examples of initiatives or actions undertaken related by government procurement by COG governments in Maryland, as discussed below.

College Park's Strategic Plan 2010-2015 includes the objective to supply the energy needs of all city government facilities with 100% renewable energy through the purchase of renewable energy credits (RECs).<sup>55</sup>

Frederick County's Comprehensive Energy Strategy establishes definitive annual goals for reducing the county's use of non-renewable energy over a fifteen year period in its office buildings, vehicle fleet and facilities by 50% or more. Recommendations include use of on-site renewable power generation and purchase of electricity with an increased percentage of renewable generation sources from the County's electricity vendor. The latter would achieve up to an overall 10% conversion to renewable energy. Completion of a recommended waste-to-energy project will allow the County to purchase 100% of the County's electricity, which will convert 64% of the buildings baseline to a renewable energy. In addition, the Sustainable Action Plan for County Operations, adopted in August 2010, includes "making green purchases decisions" among the seven sustainability practices it intends to integrate into county operations and decision making processes.

Montgomery County updated its green purchasing policy in October 2008, enacting a resolution setting an FY 2009 goal of 15% renewable energy while maintaining the FY 2011 goal of 20%.<sup>56</sup> The 2008 resolution also updated the County's renewable energy qualification criteria to include only wind, solar, anaerobic digestion, landfill gas, biomass, geothermal, and tidal energy as defined under the Tier I resource definitions of the state RPS.

In April 2010, the County and its partners announced a new green power purchase of almost 162 million kWh, boosting the County's purchase to 30% of its annual electricity use. However, as of June 2011 the U.S. Environmental Protection Agency's Green Power partnership lists a current purchase of 134.6 million kWh, or 25% of electricity consumption for the collective group. The Montgomery County Clean Energy Buyers Group currently consists of Montgomery County Government, Montgomery County Public Schools, Montgomery College and The Maryland-National Park and Planning Commission. Also participating are the City of College Park, Chevy Chase Village, Chevy Chase Village Section 5, City of Gaithersburg, City of Rockville, City of Takoma Park, Town of Glen Echo, Town of Kensington, Town of Laytonsville and Town of Somerset.

Rockville was also named a EPA Green Power Community in 2011. The City purchases more than 60% green power for its municipal operations.

Prince George's County's policy is to increase the purchase of renewable electricity (solar, wind or biomass) by 2% of total consumption annually until the goal of 10% is reached by 2013. The County generates an average of 6.3 MW of electricity at its landfill gas to power facilities and can sell RECs from this operation. It is the goal of the County Government to construct all new County buildings and public schools in accordance with the LEED Silver Rating or equivalent rating under a comparable Green Building performance measure, such as Green Globes or SBTool 07. All new construction must comply with the International Energy Conservation Code (IECC) and

ASHRAE 90.1. All major renovations to existing County buildings and public schools shall have a goal of achieving a 50% reduction in energy use as compared to a 2007 baseline.

**Takoma Park** recently sought bids to provide cost effective solar photovoltaic electricity generating systems at two City owned facilities. Energy and environmental goals for the City's Department of Public Works include reduction of energy use and use renewable sources; use of alternative fuels when feasible; and environmentally preferable purchasing.

## Virginia

### Legal Framework

The following overview of the Virginia legal framework as it pertains to DES is drawn directly from a report recently prepared by McGuireWoods LLC for the Northern Virginia Regional Commission.<sup>H</sup>

A DES in Virginia would operate within a complicated legal framework similar in many respects to the legal framework within which utilities now operate in Virginia. On the one hand, that framework creates significant legal requirements and barriers for certain types of DES structures. On the other hand, Virginia's legal framework does not present severe barriers to a DES structured so as to avoid those impediments. There are a number of DES approaches that should allow for the lawful development and operation of a DES by both public and private entities in Virginia.

### *Dillon's Rule Issues*

Because Virginia is a Dillon's Rule state, public entities must find express authority under the Virginia Code to own or operate a DES. Various provisions of Virginia law clearly give to localities the authority to own and operate waterworks, gas works, electric plants, "and other public utilities" including chilled water facilities. The supply of heated water as well as chilled and heated air also would seem to fit within the definition of "other public utilities" but the issue is not entirely clear.

Regardless of whether there are Dillon's Rule questions about the authority of a locality to directly own and operate certain DES services, it is clear that a locality can own and operate the various utilities that would comprise a DES system through one or more of the various authorities and districts that a locality can form under Virginia law. So, directly or indirectly, Virginia localities have the authority to own and operate a DES under Virginia law.

---

<sup>H</sup> District Energy Systems: An Analysis of Virginia Law, Prepared for the Northern Virginia Regional Commission by McGuire Woods Consulting.

### *Virginia Public Utility Regulation*

A non-governmental entity that provides utility service in Virginia will be regulated by the Virginia State Corporation Commission (the "SCC"). The SCC regulates, among other things, the rates, terms and conditions and quality of service of public utilities, as well as the construction and acquisition of public utility facilities. However, the SCC does not have the power to regulate utility services provided by (or to) municipal governments except with respect to the construction of electric generation facilities. The construction of electric generation facilities requires the owner or operator to obtain a certificate of public convenience and necessity ("CPCN") from the SCC authorizing the construction, regardless of whether the owner is a public or private entity. The SCC currently regulates thermal services only in the case of chilled water but has not been presented with the question of regulating heating services or chilled air in the case of private utilities. In general, this means that:

1. a public entity may develop and operate a thermal-only DES without regulation by the SCC; this provides broad regulatory leeway for DES development and operation by public entities;
2. a private entity may develop and own a thermal-only DES without regulation by the SCC as to the construction of the facility, with rate and service regulation by the SCC as to the provision of cooled water, and potentially as to steam, hot water and cooled air;
3. any DES, public or private, that constructs electric generation facilities of any size will be subject to SCC regulation through the requirement to obtain a CPCN for the facility (except for certain small renewable facilities);
4. electric generation facilities of a privately owned DES will be subject to significant SCC regulation and will be permitted only to generate power for use by the DES in its own thermal energy production or to sell power at wholesale (i.e. no power sales to DES customers, with certain limited exceptions); and
5. without regulation by the SCC as to rates or terms of service, electric generation facilities of a publicly-owned DES will be permitted to self-generate, to sell at wholesale and, under appropriate circumstances, to sell power to DES customers at retail.

### Energy Facility Siting

The SCC regulates the siting of electrical generation facilities over 5 MW. Requirements vary for (i) electric generating facilities with rated capacities of 50 MW or less but greater than 5 MW, and (ii) renewable energy electric generating facilities with rated capacities equal to 100 MW or less but greater than 5 MW, and (iii) those facilities that exceed the upper limits (greater than 50 MW or 100 MW for renewables).<sup>57</sup>

The Department of Environmental Quality (DEQ) is the state environmental regulatory agency that administers air emissions regulations and permitting, air quality planning, and other programs pertinent to CHP environmental impacts. For small CHP applications, Chapter 80 Article 6 of the Virginia air quality regulations covers minor sources and describes applicability and exemption levels. Small new sources may be exempt from permitting and sources making modifications that lower or entail de minimus increases in emissions may be exempt from having to amend their permits. Project planners should consult the regulations and contact DEQ to determine permitting requirements.

According to the 2010 Virginia Energy Policy, Section 2, the DEQ is drafting permits by rule for renewable energy projects of 100 MW or less in size (such as land-based wind projects) and of 20 MW or less if the project results in air emissions (such as biomass projects) to provide a streamlined permitting process for smaller renewable projects

In March 2011, the Virginia legislature enacted broad guidelines for local ordinances for solar and wind.<sup>58</sup> The law states that any local ordinance related to the siting of solar or wind energy facilities must:

- Be consistent with the Commonwealth Energy Policy (§ 67-102);
- Provide reasonable criteria for wind and solar energy siting, protecting the locality while promoting wind and solar development; and
- Establish reasonable requirements for noise limitations, buffer areas, set backs, and facility decommissioning.

#### Net Metering

Virginia's net-metering law, updated in March 2011 and effective July 1, 2011, applies to residential generating systems up to 10 kW in capacity and non-residential systems up to 500 kW in capacity. Utilities may choose to offer net metering to larger non-residential systems. Net metering is available on a first-come, first-served basis until the rated generating capacity owned and operated by customer-generators reaches 1% of an electric distribution company's adjusted Virginia peak-load forecast for the previous year. Net metering is available to customers of investor-owned utilities (including competitive suppliers) and electric cooperatives, but not to customers of municipal utilities.

#### Interconnection

Virginia has two interconnection standards: one for net-metered systems and one for systems that are not net-metered.

Customer-generators that net meter must comply with the interconnection rules within the regulations governing net metering.<sup>59</sup> These rules apply to residential customers generating up to 10 kW and commercial systems of up to 500 kW (or greater if the utility's net metering tariff specifies a higher capacity limit for commercial systems). Utilities that have already enrolled 1% of their peak load for the previous year are not required to allow additional customers to net meter.

In May 2009, the SCC adopted interconnection procedures for systems that are *not* net-metered. These rules, which took effect July 1, 2009, apply to all electric utilities -- investor-owned utilities, municipal utilities and electric cooperatives -- operating in Virginia.

The FERC Small Generator Interconnection Procedure (SGIP) rules (described above under U.S. Energy Policy) provide the basis for these regulations.

### Financing Assistance

The Virginia Resources Authority makes loans to counties, cities, towns, and authorities in several loan programs with the advantage of below market rates or credit enhancement in the project areas. These programs include:

- Biomass Energy Grants Program
- Economic Development Program
- Energy Conservation Block Grants to Local Governments
- Energy Efficiency Rebates
- Local Government and School Facility Renewable Energy Utilization Program
- Solar and Wind Incentive Program
- State Facilities Renewable Energy Grants Program

Virginia passed enabling legislation in 2009 authorizing local governments to establish a loan program to provide financing for clean energy improvements to property owners via local ordinance.<sup>60</sup> Governments that opt to establish a program must hold a public hearing to solicit feedback on the draft ordinance/plan. Within the final ordinance, local governments must specify which "clean energy improvements" would be covered, they must determine funding sources, establish interest rates and loan terms. Local governments are authorized to include the participation of private lenders. In addition, within the ordinance, the local government must determine the method for collecting the loan repayment, either via water or sewer bills, real property tax assessments, or other billing method. Legislation passed in 2010 (SB 110) clarifying that the locality is authorized to place a lien on the property for the amount of the loan and that a locality may bundle loans and transfer them to a private financial institution, without impacting the lien. As of July 2011, no communities in Virginia offer PACE financing programs.

In April 2011, the Virginia legislature created the Voluntary Solar Resource Development Fund. The fund is administered by the Department of Mines, Minerals and Energy (DMME). All utilities are required to provide a link on their web site to the DMME web site, where customers can make contributions to the fund. Utilities must also provide opportunities for customers to donate through their paper newsletters, emails or bills. The fund will be used to provide loans for residential, commercial, or nonprofit solar energy projects.

In addition to the state financial programs, Arlington offers an innovative bonus density incentive for private developers who build to LEED™ certification and works closely with developers to ensure that all new construction incorporates green building components.<sup>61</sup>

Arlington also has established a Green Building Fund and a policy of having site plan developers who do not commit to achieving a LEED rating from the U.S. Green Building Council (USGBC) contribute to the Fund.<sup>62</sup> The contribution is calculated at a rate of \$0.045 per square foot. (This contribution calculation is based on the fees assessed by the USGBC for registration and evaluation of a formal LEED application.) The Green Building Fund is used to provide education and outreach to developers and the community on green building issues. If a project receives

LEED certification from the USGBC, the Fund contribution is refunded upon receipt of the final LEED certification.

Fairfax County has established Comprehensive Plan guidance that establishes linkages between green building practices and the attainment of certain Comprehensive Plan options, planned uses and densities/intensities of development. In addition, Comprehensive Plan guidance establishes an expectation for LEED Silver certification or equivalent for nonresidential proposals in Tysons Corner as well as building height incentives for LEED Gold and Platinum certification or equivalent in Annandale.

### Tax Incentives

Virginia allows any county, city or town to exempt or partially exempt solar energy equipment or recycling equipment from local property taxes.<sup>63</sup> Residential, commercial or industrial property is eligible. The statute broadly defines solar energy equipment as any that is “designed and used primarily for the purpose of providing for the collection and use of incident solar energy for water heating, space heating or cooling or other application which would otherwise require a conventional source of energy.” Recycling equipment is defined as equipment which is “integral to the recycling process and for use primarily for the purpose of abating or preventing pollution of the atmosphere or waters.” Cities and counties currently offering an exemption include: Albemarle, Alexandria, Charlottesville, Chesterfield, Dinwiddie, Fairfax, Falls Church, Hampton, Hanover, Henrico, Isle of Wight, King and Queen, Loudoun, Lynchburg, Prince William, Pulaski, Richlands, Roanoke, Spotsylvania, Warren and Wise.

In Fairfax County, property owners can qualify for a tax exemption for the installation of solar equipment that is designed and used primarily for the purpose of providing for the collection and use of solar energy for water heating, space heating or cooling or other applications which would otherwise require a conventional source of energy.<sup>64</sup> Qualifying solar energy systems include solar heating and hot water systems, passive solar energy systems, south facing windows used as solar collectors, trombe walls (a sun facing wall designed to collect solar energy and act as a thermal mass for heating the structure), greenhouses integrated into the heating system of the structure, thermal storage systems, movable insulation, and shading devices designed primarily for shading windows to assist in summer cooling.

In March 2008, Virginia enacted legislation that would allow local jurisdictions to assess the property tax of energy efficient buildings at a reduced rate.<sup>65</sup> Under this law, eligible energy-efficient buildings, not including the real property on which they are located, may be considered a separate class of property for local taxation purposes. Accordingly, the governing body of any county, city or town may, by ordinance, allow a special assessment of the property taxes for this class of property. An energy-efficient building is defined as any building that exceeds the energy efficiency standards of the Virginia Uniform Statewide Building Code by 30%; meets performance standards of the Green Globes Green Building Rating System, the LEED System or the EarthCraft House Program; or qualifies as an Energy Star home under federal Energy Star criteria.



As of July 2011, none of the COG members in Virginia have enacted ordinances under this authorization. This law does not provide an outright exemption but allows localities to adopt a separate and lower tax rate on the value of qualifying energy efficient buildings. Fairfax County staff have stated that there are many problems with this concept, and note that only 3 small localities in the state have even tried to implement this legislation. Fairfax County therefore does not have the required ordinance to implement this program and do not have a separate tax rate.

### Government Procurement

Virginia offers a unique opportunity for local governments to negotiate their energy rates and the Virginia Energy Purchasing Governmental Association (VEPGA) permits local governments to take full advantage of this opportunity. VEPGA has reached agreement with Virginia Power on Rider G-CM, which gives VEPGA members the option of purchasing RECs as part of their electricity purchases.<sup>66</sup>

In 2002, Arlington joined the U.S. EPA's Green Power Partnership, pledging to purchase at least 3% of its electricity from clean, renewable sources. In 2005 Arlington began purchasing RECs equivalent to 3% of its total electricity use from a wind farm in West Virginia. Arlington is a national leader in green building practices, with Virginia's first Silver LEED silver public building (Langston-Brown). The County now has 6 LEED-certified buildings, with 14 in the pipeline. The City of Alexandria now has 5 LEED silver or better facilities.

Fairfax County's Sustainable Development Policy for Capital Projects establishes expectations for LEED Silver certification for most of these projects. As of March 2011, eight projects had attained LEED certification (including three at the Silver level and four at the Gold level), two projects had attained Green Globes certification (one at the 2 Globes level), five projects had been completed with LEED certifications pending and 12 additional LEED projects were in some stage of pre-design, design or construction.

In May 2007, Fairfax County entered into a three-year contract to purchase more than 24 million kWh of wind energy through the VEPGA. The goal at the end of the contract term was for wind power to account for 10% of the county's annual electricity consumption, up from 5%. The wind energy purchase is one component the County's commitment to the "Cool Counties" initiative reduce GHG emissions.

### **Building Compatibility**

#### **District of Columbia**

DC Construction Codes were adopted in 2008 to implement legislation passed in December 2006, the DC Green Building Act. The codes are mandatory across the District. Residential buildings must comply with code, which is more stringent than the 2009 IECC. For commercial buildings, builders must comply with the 2008 DC Construction Codes, which is based on ASHRAE 90.1-2007. It is expected that, starting in 2012, the code will require all commercial developments of 50,000

square feet or more to qualify for LEED certification. Enforcement of the building code (all plan reviews, interpretations, and appeals) is the responsibility of the Building and Land Regulation Administration, which is a part of the District of Columbia Department of Consumer and Regulatory Affairs (DCRA).

Zoning is handled by the DCRA's Office of Zoning. Modifications to Title 11 DCMR (Zoning) under review would expressly permit district energy systems in all districts. This would be most applicable in new large-tract developments. While district energy is likely implicitly allowed under the current regulations, the regulations do not explicitly allow the a DE system or the structure that houses the central plant. Other modifications being considered will permit wind and solar generation accessory to all development in all zones and as a primary use in industrial, high density, and parks areas (with limitations to protect historic districts or national monuments from visual and other impacts). The recommendation would expressly allow solar panels and small wind turbines accessory to any primary use and would further allow larger stand-alone facilities dedicated to wind or solar power generation on lots in compatible areas. Limits on both accessory and standalone facilities would be tailored to limit visual, noise, and safety impacts, as well as to ensure compatibility with existing neighborhood character.

In early 2011 the District approved revisions to its zoning regulations to address sustainability.<sup>67</sup> The revisions include regulations that expressly allow for the development of district energy systems and distributed renewable energy generation, in addition to green building design, low impact development, transit oriented development, energy efficiency and other measures of sustainability. Federally owned property within the District is not subject to local zoning requirements. However, the NCPC's analysis<sup>36</sup> indicates that the Federal Elements of the Comprehensive Plan contain many policies that align with the intent of DC zoning revisions to address sustainability, including protection of environmental resources and implementation of energy efficiency and conservation in buildings.

In addition to DC's building codes, DC has taken a national leadership role in Energy Performance Labeling (EPL). The approach in DC, established through the Clean and Affordable Energy Act of 2008 (B17-492) (CAEA), is based on annual benchmarking rather than a transaction-based approach. CAEA requirements for benchmarking of government buildings using the Energy Star® Portfolio Manager tool began in fall of 2009. Annual benchmarking for private buildings will be phased in over four years, starting on January 1, 2010. The District is currently the only US jurisdiction to require ratings for new commercial buildings.

## **Maryland**

The 2010 Maryland Building Performance Standards are mandatory statewide and require both the residential and commercial building codes to comply with the 2009 International Energy Conservation Code (IECC - The Energy Code), the latter with reference to ASHRAE 90.1-2007. Each local jurisdiction in Maryland may modify these codes to suite local conditions with exception to the IECC and Maryland Accessibility Code (MAC - The Accessibility Code). The Energy Code and the Accessibility Code can be made more stringent but not less by the local jurisdictions. Codes are

enforced by each local jurisdiction by inspectors trained through the state Department of Housing and Community Development.

Maryland has not adopted a statewide Energy Performance Labeling (EPL) program. Energy performance standards in public buildings are governed by a series of legislation. Most recently, the Maryland High Performance Buildings Act (S.B. 208), passed in April 2008, requires that capital projects involving the construction or major renovation of state buildings meet the criteria for classification as a "high performance building". New schools being constructed with state assistance must also meet this standard. High performance buildings are defined as buildings that achieve at least a silver rating the under the LEED system or a comparable numeric rating on an approved and nationally recognized system.

No local EPL or community energy compatibility standards projects or initiatives have been identified. Most jurisdictions have adopted some form of energy performance standards related to green buildings for municipal or commercial construction.

Among local COG governments in Maryland, although local zoning ordinances may implicitly support development of community energy systems, and in particular district energy, no zoning reform initiatives that explicitly target community energy solutions have been identified.

Frederick County completed its Comprehensive Plan and Zoning update in 2010. The update focuses on traditional comprehensive plan elements as mandated by the State of Maryland. In Montgomery County, an initiative to rewrite the zoning ordinances is underway.

## **Virginia**

In Virginia, the Uniform Statewide Building Code (USBC) provides a statewide minimum requirement applicable to all new buildings. The latest revision of the USBC, effective March 1 2011, references the 2009 IECC. It will be phased in over a one year period. Enforcement of the USBC is handled by local building department through plan reviews and inspections.

As Virginia is a Dillion Rule state (as noted above), local governments are not able to amend the USBC and handle only enforcement through plan reviews and inspections. Any other strategies adopted by local governments must necessarily be voluntary.

Virginia has no statewide EPL programs. As part of the Governor's Executive Orders on energy, Virginia does designate energy standards for public buildings. New buildings (larger than 5,000 gross sq feet) and major renovations (where the cost greater than 50% of building value) are required to meet LEED Silver or Green Globes Two Globes Standards. In addition, the order instructs the Commonwealth to encourage the private sector to adopt energy-efficient building standards by giving preference when leasing facilities for state use to facilities meeting LEED Silver or Green Globes Two Globes standards. Local governments in the region are meeting this or a similar standard for their buildings.

There are some notable voluntary efforts by COG governments in Virginia related to building compatibility:

- Loudoun County's County Energy Strategy recommends development of voluntary Energy Performance Labeling to both educate the market and to raise the market transparency of the actual energy performance of homes and buildings. If adopted by the County, a current EPL would be available anytime a building is sold or leased. The County would complement the EPL with a variety of outreach and incentive initiatives. The CES also notes that zoning guidelines must be developed for district energy ownership and operation. Given Dillon Rule restrictions within the state, Special Exception Zoning applied to Scale Projects by the County could be a possible means for implementing new energy systems, including district energy.
- Arlington County has been exploring the implementation of community energy compatibility standards and EPL as part of the Community Energy Plan. EPL would be applied to county and public school buildings.

## Best Practice Recommendations

Before addressing recommended local government policies, regulations and programs, it is useful to summarize some fundamental characteristics of CES and the resulting challenges faced in implementing these systems.

### CES Challenges

#### **Awareness, Information & Education**

Generally, the people and organizations who could be key stakeholders in implementing a CES are not aware of the potential benefits of these systems. Even if city officials, building owners and others are aware of district energy and its benefits, they generally lack the expertise necessary to facilitate the implementation of these systems. Development of a new community CES is a complex undertaking that requires support from many stakeholders, including building owners, utilities, city officials, engineers and architects.

#### **Leadership**

Development of a new CES is a complex undertaking, involving many institutional, technical, legal and financial issues. Successful implementation of a CES requires one or more informed, motivated public sector “champions” who understand the benefits of a CES and how to successfully guide its implementation and integrate stakeholder interests.

#### **Price Signals**

Lack of price signals for the public benefits of CES (in economists’ terms -- “positive externalities”) such as lower GHG emissions, infrastructure flexibility, decreased price volatility, improved energy security, and local economic benefits of using local resources to meet local needs. Although in some cases CES can be economically viable based on direct current economics (ignoring externalities), it is often challenging without a wise technical plan for phased implementation, some form of financial support from the public sector, and a concerted information and education program to communicate the long-term economic, environmental and energy security benefits.

#### **Air Emissions Permitting**

Despite potential regional air quality benefits, development of district energy systems may be hampered by air quality regulations. Our current air quality regulatory system does not always recognize the total environmental benefit of district energy system because it focuses on the central district energy plant emissions without consideration of offset emissions from building-scale combustion source and power plant emission reductions resulting from reduced grid power demand and/or the contribution of CHP power to the grid.

## **Capital Costs**

The large initial capital investment required is a key constraint to development of a new CES. While district energy is a proven and reliable energy service technology, its benefits are accrued over an extended period. The difficulty is "birthing" the system, given the high initial capital costs and the need to obtain sufficient customer commitments to finance the initial investment. Financing the initial feasibility and design studies and the development effort is often a key barrier, since a potential system's financial viability cannot be evaluated prior to the completion of such studies.

## **Land Use**

CES work best in densely developed areas with a mix of building uses. However, US land-use development patterns, and plans and regulations governing them, do not always encourage the high thermal densities or mixed use patterns most conducive to CES.

## **Lack of Integrated Planning**

When the issues of new power plant capacity, solid waste management, environmental quality, local economic development and other critical issues are approached through integrated community energy planning, the benefits of a CES become more visible. However, decisions about these issues are generally not made in an integrated fashion in the US.

## **Siting**

While new district energy distribution technologies can economically and efficiently transport energy over greater distances than previously possible, a CES plant must still be sited relatively close to potential users that are usually located within a densely developed area. Power plant siting processes are generally still oriented toward siting large centralized plants far from population centers, despite the fact that new plant technologies are far smaller and cleaner than in the past. In addition, siting can raise crippling "Not In My Back Yard (NIMBY)" problems.

## **Grid Access**

The overall increase in competitive pressure in power generation has both positive and negative impacts on district energy. Increasing competition will increase the pressure to wring as much marketable energy as possible out of power plants, thereby making more valuable the "thermal sinks" which a CES represents. On the other hand, increasing competitive pressure may make it more difficult to establish new CHP CES because of their capital intensiveness and the time lag before these systems achieve sufficient growth to realize their full economic benefits. In an era of increasing competition in electric generation, power plant investment time-frames may tend to shrink, making it more difficult to substitute capital for energy through a CES or other energy systems with high capital costs and low fuel costs.

## **Recommendations**

It is no surprise that CES activity is greatest in countries and provinces which have established strong energy efficiency and GHG reduction goals, with taxation, financing assistance, portfolio standards and other policies and programs that provide price signals that encourage CES implementation. Given the overall political and legal framework in the US generally and the COG region specifically, COG region jurisdictions cannot rely on this type of broader policy support. However, local jurisdictions can help facilitate development of CES in a number of ways, depending on specific state and local laws and policies:

1. Set specific **goals** for energy efficiency and GHG emission reductions. Local government commitments provide an important context and driver for a range of actions including implementation of CES. Cost-effective reduction of building energy requirements should be a first priority.
2. Conduct an **Opportunity Assessment** to identify high-priority locations for potential CES by mapping:
  - a. Areas with high existing or future thermal loads;
  - b. Potential energy sources (such as power plants, data centers, wastewater treatment facilities, sewer lines, industrial facilities, surface water bodies, etc.);
  - c. Location of major gas and power energy infrastructure; and
  - d. Scheduled infrastructure capital improvement projects (e.g. road improvements, sewer and stormwater).
3. Convene key **stakeholders** to review the results of the Opportunity Assessment and identify and evaluate stakeholder interests and benefits.
4. Work with major stakeholders to fund, ideally with both public and private sources, **Integrated Energy Master Plans** (IEMPs) for the most promising locations. An IEMP should address technical and economic issues as well as questions regarding the appropriate model for development, financing, ownership and operation.
5. Identify individuals within the local government who have the interest, ability and authority to act as a **champion** for implementation; also identify champions within major non-government stakeholder entities.

If the IEMP(s) produce positive results, the following actions would facilitate development of a CES. The ability to implement the following recommended best practices may be constrained by state or local laws and policies:

6. Identify and evaluate the local government's **preferred role in ownership and financing** of CES, including providing or facilitating low-cost sources of financing such as tax exempt bonding or tax increment financing.
7. Work with building owners and developers to assess current and planned HVAC designs and conduct **detailed building feasibility studies** for large buildings and master plans to analyze the energy, economic and environmental costs and benefits of district energy service compared with conventional approaches.
8. Develop recommended **CES compatibility standards** for building HVAC design, addressing criteria for: hydronic distribution within the building; criteria for hot water and chilled water supply and return temperatures; allocation of small amount of basement space for future interconnection with a district energy system; and minimum criteria for the building automation system.
9. As permitted by legal authority, develop a model **franchise agreement** so that potential developers of a CES understand the terms, conditions and costs of obtaining a thermal energy service franchise. Franchises need not grant exclusivity to a district energy provider.
10. As permitted by legal authority, consider providing **franchise fee repayment deferrals** until a CES reaches an established threshold of financial stability, and/or a franchise fee discount tied to, e.g., GHG emissions benefits.
11. Establish a Community Energy Working Group within your jurisdiction to **coordinate and streamline policies**, activities and decision-making in all departments having an impact on CES development.
12. Create **clear permitting guidelines** — such as a streamlined Conditional Use Permitting process — to support expedited site selection for CES plants and distribution system routing.
13. Consider providing temporary **property tax relief** to property owners that connect their buildings to district energy.
14. Where supportive of other planning goals, establish **zoning or comprehensive plan-based linkages and/or incentives** to exceed minimum green building performance thresholds and make connection to district energy one consideration in such incentives. Linkages may include, e.g., density bonuses, or modification of zoning to allow for construction of CES plant facilities near to the center(s) of development density.
15. Ensure that any **Energy Performance Labeling** system applied in the jurisdiction recognizes the efficiency benefits of a district energy system serving the building.



16. **Lead by example** by committing to connecting all local government buildings to the CES as soon as it is practical and cost-effective to do so.

## References

---

- <sup>1</sup> EuroHeat & Power, District Heating and Cooling, Country-by-Country 2011 Survey.
- <sup>2</sup> European Commission, 2010/31/EC.
- <sup>3</sup> European Commission, 2009/28/EC.
- <sup>4</sup> European Commission, 2004/02/EC.
- <sup>5</sup> Internal Revenue Code 26 USC Section 48.
- <sup>6</sup> Internal Revenue Code 26 USC Section 45.
- <sup>7</sup> Internal Revenue Code 26 USC Section 48(a)(5).
- <sup>8</sup> Internal Revenue Code 26 SUC Section 142.
- <sup>9</sup> Section 471 of Public Law 110-140, incorporated as Section 399a in the Energy Policy and Conservation Act (42 U.S.C. 6371h-1).
- <sup>10</sup> Sections 451-453 of Public Law 110-140.
- <sup>11</sup> Federal Energy Regulatory Commission (FERC) Orders No. 2006, 2006-A and 2006-B, Docket No. RM02-12-002, 18 CFR Part 35.
- <sup>12</sup> Spurr, M. Portfolio Standards: Status and Implications for District Energy, International District Energy Association, District Energy Magazine, Second Quarter 2010.
- <sup>13</sup> Elliott, Gold and Hayes, Avoiding a Train Wreck: Replacing Old Coal Plants with Energy Efficiency, American Council for an Energy-Efficient Economy, August 22, 2011.
- <sup>14</sup> International District Energy Association, Combined Heat and Power (CHP): Essential for a Cost Effective Clean Energy Standard, April 2011.
- <sup>15</sup> U.S. Environmental Protection Agency, Docket No. EPA-HQ-OAR-2002-0058, National Emissions Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters, 75 Fed. Reg. 32006 and Docket No. EPA-HQ-OAR-2006-0790, National Emissions Standards for Hazardous Air Pollutants for Area Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters, 75 Fed. Reg. 31896.
- <sup>16</sup> Comments of the International District Energy Association, National Emissions Standards for Hazardous Air Pollutants for Area Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters (Docket ID No. EPA-HQ-OAR-2006-0790), August 23, 2010
- <sup>17</sup> Federal Register May 18 2011.
- <sup>18</sup> U.S. Environmental Protection Agency, Cross-State Air Pollution Rule (CSAPR), July 6, 2011.
- <sup>19</sup> H.R. 2454.
- <sup>20</sup> Performance Center Document, Markham Town Centre, Jan. 2009.
- <sup>21</sup> Pander, Sean, City of Vancouver, phone conference July 2011.
- <sup>22</sup> District Energy Connectivity Guideline – Information for Developers, City of Vancouver, July 2011.
- <sup>23</sup> District Energy Pre-feasibility Study, City Council Briefing, July 11, 2011.
- <sup>24</sup> <http://green.dc.gov/green/cwp/view,A,1231,Q,460764.asp>
- <sup>25</sup> <http://www.energy.maryland.gov/facts/empower.html>
- <sup>26</sup> Maryland Commission on Climate Change (MCCC), Climate Action Plan, 2008.

<sup>27</sup> Commonwealth of Virginia Department of Mines, Minerals and Energy, The Virginia Energy Plan, July 1, 2010.

<sup>28</sup> <http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+58.1-3221.2>

<sup>29</sup> Database of State Incentives for Renewables and Efficiency, <http://www.dsireusa.org/>

<sup>30</sup> Arlington County Community Energy and Sustainability Task Force, March 11, 2011.

<sup>31</sup> Loudoun County Energy Strategy, adopted Dec. 15, 2009 and amended June 10, 2010.

<sup>32</sup> [www.frederickcountymd.gov/documents/County%20Manager/Sustainability/Publications/](http://www.frederickcountymd.gov/documents/County%20Manager/Sustainability/Publications/)

<sup>33</sup> <http://www.fairfaxcounty.gov/chairman/energytaskforce.htm>

<sup>34</sup> Prince William County Comprehensive Plan, adopted March 18, 2008.

<sup>35</sup> [http://www.ncpc.gov/ncpc/Main\(T2\)/Planning\(Tr2\)/ComprehensivePlan.html](http://www.ncpc.gov/ncpc/Main(T2)/Planning(Tr2)/ComprehensivePlan.html)

<sup>36</sup> Executive Order 13514: Federal Leadership in Environmental, Energy, and Economic Performance, March 2009.

<sup>37</sup> NCPCE File ZC-#08-06-9, Letter to Anthony Hood, Chair, Zoning Commission of the District of Columbia, June 3, 2009.

<sup>38</sup> <http://www.gpo.gov/fdsys/pkg/PLAW-110publ140/content-detail.html>

<sup>39</sup> [www.ncpc.gov/ncpc/Main\(T2\)/Publications\(Tr2\)/iframpages/monumental\\_core\\_framework  
\\_plan\\_a.aspx#FrameworkPlanPub](http://www.ncpc.gov/ncpc/Main(T2)/Publications(Tr2)/iframpages/monumental_core_framework_plan_a.aspx#FrameworkPlanPub)

<sup>40</sup> [www.ncpc.gov/ncpc/Main\(T2\)/Planning\(Tr2\)/SouthwestEcodistrict.html](http://www.ncpc.gov/ncpc/Main(T2)/Planning(Tr2)/SouthwestEcodistrict.html)

<sup>41</sup>

[www.montgomeryplanning.org/viewer.shtm#http://www.montgomeryplanning.org/community/takoma\\_langley\\_cr  
ossroads/documents/TakomaLangleyCrossroadsplanningboarddraft\\_web.pdf](http://www.montgomeryplanning.org/viewer.shtm#http://www.montgomeryplanning.org/community/takoma_langley_crossroads/documents/TakomaLangleyCrossroadsplanningboarddraft_web.pdf)

<sup>42</sup>

[www.pgplanning.org/Projects/Ongoing\\_Plans\\_and\\_Projects/Community\\_Plans\\_and\\_Studies/Greenbelt\\_Metro\\_Area  
\\_Sector\\_Plan\\_and\\_SMA.htm](http://www.pgplanning.org/Projects/Ongoing_Plans_and_Projects/Community_Plans_and_Studies/Greenbelt_Metro_Area_Sector_Plan_and_SMA.htm)

<sup>43</sup> Code of Virginia §15.2-2223.

<sup>44</sup> Code of Virginia §15.2-2280.

<sup>45</sup> <http://www.pmg.vcu.edu/pdfs/Promoting%20Sustainable%20Land%20Use%20Policy.pdf>

<sup>46</sup> ACEEE State Energy Efficiency Policy Database, [http://www.aceee.org/energy-efficiency-sector/state-  
policy/District%20of%20Columbia/182/all/195#Net\\_Metering](http://www.aceee.org/energy-efficiency-sector/state-policy/District%20of%20Columbia/182/all/195#Net_Metering)

<sup>47</sup> <http://www.dcregs.dc.gov/Gateway/ChapterHome.aspx?ChapterNumber=15-40>

<sup>48</sup> [http://rrc.dc.gov/green/lib/green/pdfs/GPC\\_Frequently\\_Asked\\_Questions.pdf](http://rrc.dc.gov/green/lib/green/pdfs/GPC_Frequently_Asked_Questions.pdf)

<sup>49</sup> PSC Title 20 Subtitle 79,

<sup>50</sup> [http://webapp.psc.state.md.us/intranet/electricinfo/GeneralInfo\\_new.cfm](http://webapp.psc.state.md.us/intranet/electricinfo/GeneralInfo_new.cfm)

<sup>51</sup> <http://www.energy.state.md.us/Residential/bioheatGrant.html>

<sup>52</sup> <http://www.energy.state.md.us/Business/CleanEnergyTaxCredit.html>

<sup>53</sup> <http://www.energy.state.md.us/Business/greenBuild.html>

<sup>54</sup> <http://energy.maryland.gov/documents/12809RenewablesRELEASE4.pdf>

<sup>55</sup> [http://www.collegeparkmd.gov/Documents/Admin/Strategic%20Plan%202010-2015%20Approved%208-10-  
10.FINAL.pdf](http://www.collegeparkmd.gov/Documents/Admin/Strategic%20Plan%202010-2015%20Approved%208-10-10.FINAL.pdf)

<sup>56</sup> [http://www.montgomerycountymd.gov/content/council/pdf/res/20081028\\_16-757.pdf](http://www.montgomerycountymd.gov/content/council/pdf/res/20081028_16-757.pdf)

<sup>57</sup> 20VAC5-302-10, 20VAC5-302-20, and 20VAC5-302-25

<sup>58</sup> <http://www.dsireusa.org/documents/Incentives/SB862.pdf>

<sup>59</sup> 20 VAC 5-315-40.

<sup>60</sup> Code of Virginia §15.2-958.3.

<sup>61</sup>

<http://www.arlingtonva.us/Departments/EnvironmentalServices/epo/EnvironmentalServicesEpoIncentiveProgram.aspx?InsLinkId=1075>

<sup>62</sup> <http://www.arlingtonva.us/departments/EnvironmentalServices/epo/EnvironmentalServicesEpoGreenBuildings.aspx>

<sup>63</sup> Code of Virginia §58.1-3661.

<sup>64</sup> <http://www.fairfaxcounty.gov/dpwes/forms/solarenergy.pdf>

<sup>65</sup> Code of Virginia 58.1-3221.2

<sup>66</sup> <http://www.vepga.org/index.htm>

<sup>67</sup> <https://www.communicationsmgr.com/projects/1355/docs/sustainability%20guidance.pdf>