District Energy Systems: An Analysis of Virginia Law

Prepared for the Northern Virginia Regional Commission

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I. EXECUTIVE SUMMARY

This paper describes the legal framework within which public and private parties can develop, own and operate district energy systems (sometimes, "DES") in Virginia. That legal framework is complex. On the one hand, this complexity requires close attention, and may mandate a zigzag path to successful development of a district energy system. On the other hand, these legal issues raise no insuperable barriers to development of a properly structured system.

Because this is a legal analysis and not a policy analysis, we do not assess the validity of claims made by DES advocates or detractors, including those referenced or recited in this paper. Although this is a legal analysis, it does not constitute a formal legal opinion.

A. INTRODUCTION

Energy planning has become a central concern to many state and local government officials. No longer is energy an issue reserved for discussion solely among federal government-level policymakers. Over the past several decades, many energy-related matters such as the sufficiency of energy supplies, energy security, energy costs, energy conservation, energy efficiency, and the environmental impacts of energy use have become important issues for local governments.

Some municipalities own and operate natural gas systems and electricity generation and distribution facilities and, therefore, are constantly engaged in energy matters. Most local governments regularly contend with fluctuating energy costs, typically increasing over time, for their own government facilities, schools, and vehicles. Many local governments are factoring energy considerations into community planning. In doing so, they increasingly consider how energy generation, energy distribution, and energy use interact with routine public infrastructure matters such as zoning ordinances, land-planning, transportation systems, and economic development. Local governments have become cognizant of how their planning actions impact the cost of energy within their jurisdictions.

The Northern Virginia Regional Commission ("NVRC") has been working with a number of its member localities to address many of these energy-related issues. With NVRC's assistance, several local governments have created "community energy plans," with others considering doing so.

Some community energy plans have raised the possibility of establishing district energy systems in suburban or urban areas, or where buildings are sufficiently clustered. However, because DESs are not as common in Virginia, there are many operational and legal questions about them.

The purpose of this White Paper is to provide a legal analysis of district energy systems in Virginia – the statutory authority for creating them; local, state, and federal regulatory processes; the ownership structures that are possible; operational issues; and financing considerations, among other things.

We start, however, with a basic introduction to district energy systems. We also provide overviews of a number of DESs in operation in major cities in the U.S. and abroad.

B. DISTRICT ENERGY SYSTEMS

For several U.S. communities, district energy systems have become a key ingredient in integrated energy planning. A DES is a system for providing heating and/or cooling to multiple buildings from a central plant by way of a connection of pipes, typically underground. In addition to producing steam, hot water, and/or chilled water for buildings, DES central plants can also be designed to generate electricity. DESs are most common in urban and suburban settings, university campuses, and military bases.

Advocates of district energy see numerous advantages over building-based systems for reliability, flexibility, and environmental performance. They claim that DESs increase reliability by generating energy close to the buildings served, by using a broad range of fuel sources, and by reducing demand during peak hours. District energy can be energy efficient and environmentally sound because the DES uses existing heat sources, captures a very high percentage of the heat wasted in conventional electricity production, or utilizes fuel sources otherwise overlooked by conventional energy production.

District energy can also offer direct economic benefits to end-users, property owners, system operators, incumbent utilities, the community, and the state by capitalizing on economies of scale, providing cheaper energy, reducing the capital costs for new or renovated buildings, serving as waste management tools, and stimulating job creation.

The potential risks of DESs include adverse visual impacts on neighborhoods, high capital costs, loss of individual control in buildings, and economic infeasibility outside high-density areas. Although advocates of DES discount these risks, the high capital costs of DESs may present a significant impediment to building DESs in areas without immediate long-term customers as discussed below.

C. EXISTING DISTRICT ENERGY EXPERIENCE

St. Paul, Minnesota; Nashville, Tennessee; Denver, Colorado; and Philadelphia, Pennsylvania have successfully developed DESs, some very long ago. The City of Harrisonburg, Virginia, has also developed an innovative partnership with James Madison University for the district operation formed around a municipal waste-to-energy system. These cities provide helpful models for examination of feasibility, ownership structure, financing, and other factors.

DESs have also been used extensively in Europe, including in Mannheim and Berlin, Germany and in Copenhagen, Denmark. The experiences of these cities offer insights into designing DESs and the legal and regulatory structure to support district energy in communities with distinct backgrounds and varying energy needs.

The Northern Virginia region and its localities possess several of the characteristics that can make DESs feasible and advantageous: a rapidly-growing population, pockets of high-density population, and areas where significant development or redevelopment is anticipated. As Northern Virginia localities engage in community energy planning, it will be helpful both to look at the experiences of the aforementioned cities, among others, and to consider the involvement of the stakeholder groups most crucial to establishing viable DESs in the region: local governments, investor-owned utilities, and private-sector developers.

D. LEGAL FRAMEWORK

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. As noted below, 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.

Key aspects of this legal framework are discussed in detail in Section V of this paper. Because of the nuanced complication of the legal analysis, we strongly recommend that you read Section V with care. However, a brief summary of these key legal concepts is as follows:

- 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. We recommend NVRC consider legislation that would remove any doubt on this question. However, 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.

- 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:
    - (i) 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;
    - (ii) 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;
    - (iii) 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);
    - (iv) 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
    - (v) 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.
- Environmental Regulation: A DES will be subject to a variety of environmental permitting requirements typical for both publicly- and privately-owned energy (and non-energy) facilities. Such requirements are case-specific and depend on the location, the nature of the system, and other factors.
- Planning and Zoning: A DES company will need to navigate comprehensive plans and zoning ordinances in designing a DES similar to the planning and zoning issues that any large project would present. The treatment of DESs under plans and zoning ordinances varies by jurisdiction. A DES with a large central steam or electric generation plant will almost certainly require specific land use approvals.
- Federal Energy Regulation: A DES that produces only thermal energy will not be subject to federal energy regulation. However, a privately-owned DES will be subject to federal energy regulation if it sells electricity at wholesale, or transmits electricity, in interstate commerce, but the federal regulatory compliance burden for wholesale sales is not overly burdensome.

- Eminent Domain: Municipalities and public service corporations (i.e., utilities) have the power of eminent domain. Generally, one entity with eminent domain powers cannot take the property of another entity with eminent domain powers without the consent of the other party or the SCC. Renewable energy generators have certain additional powers to use the public roads. In developing a DES, the rights of different parties with eminent domain powers may find themselves in conflict. However, for a DES in a greenfield development most of these conflicts should be avoidable. For a DES with strong landowner and government support in an already developed area, many of these conflicts should be resolvable through agreement.
- Contractual Relationships: A DES may need or want to enter into a variety of contracts as part of its operations. It may sell its services pursuant to service contracts or tariffs, purchase fuel and thermal energy from third parties, sell electricity to a local electric utility, self-generate energy for its own consumption behind the meter, enter into a development agreement with an experienced project developer or enter into an operation and maintenance agreement with a third-party operator. In addition, to support financing, the DES will likely enter into a variety of financing and related agreements. Each of these contractual arrangements can allow a DES to address specific development, operational and financing issues by accessing the resources or skills of third parties.

E. OWNERSHIP ARRANGEMENTS

The various types of ownership arrangements for a DES include private ownership and operation, public ownership and operation, and mixed public and private ownership and operation. A successful DES can be created in Virginia using any of these ownership structures, although each structure has its own advantages and disadvantages. In addition, the type of services provided by the DES may suggest one choice of ownership structure over another. Of the various forms of public ownership currently available in Virginia, direct DES ownership by a locality or ownership by a Sanitary District offers the most advantages and greatest flexibility in financing, operations, and rate setting.

F. HYPOTHETICALS

The report examines in some depth the development and operation of a DES in two Northern Virginia scenarios: a suburban greenfield scenario and a grayfield scenario with substantial existing development in place. Each hypothetical presents its own issues and opportunities, which vary depending on a variety of factors including whether DES ownership is private, public or mixed, and what type and range of utility services the hypothetical DES will provide.

Hypothetical One looks at the development and operation of a DES as part of a 400 acre dense, mixed-use suburban greenfield development. Because the developer contemplates the use of DES as part of the planning for this development, issues of access, easements, zoning, eminent domain conflicts, and compelled use can be addressed and, where necessary, avoided, at the outset in the development planning process. A DES as part of a greenfield development of this sort could be done as a privately-owned system, a publicly-owned system, or a mixture of the two. Privately owned systems could be owned and developed in a variety of ways, including by the developer itself or, if they and the developer wanted to partner together, by the local incumbent utility. Hypothetical One examines a publicly-owned DES on the assumption that a Sanitary District would be used as the ownership vehicle. A Sanitary District would be exempt generally from SCC regulation (with certain exceptions in the case of electricity generation) and would have the ability to impose rates and taxes in payment for its services to customers.

Hypothetical Two assumes a 1000 acre area with millions of square feet of existing mixed use development which is expected almost to double in size over the next two decades. Hypothetical Two obviously presents

issues of conflicting rights and uses not present in the greenfield scenario. The form of DES ownership is likely to be determined in this scenario by the degree of landowner buy-in. Because a grayfield DES will have an existing customer base, financing for the DES may be easier in a grayfield than a greenfield situation. The regulatory issues faced by a grayfield DES are substantially similar to a greenfield DES. Use of a Sanitary District or direct municipal ownership will avoid most SCC regulation (with certain exceptions) and provide substantial rate and operating flexibility.

In either hypothetical, several viable structures are available for development and operation of a DES in Virginia.

II. INTRODUCTION

The Northern Virginia Regional Commission has for several years been developing for its member localities a roadmap for creating "community energy plans" in order to address, locally and regionally, an array of energy-related challenges, such as energy supply, demand, infrastructure, economic, legal and environmental issues.

These plans contemplate integrating energy efficiency and technological processes into a mostly suburban and urban built environment. This includes improving buildings' energy performance, capturing lost heat from commercial and industrial facilities for redistribution and reuse, effectively deploying renewable energy systems, creating more efficient transportation systems, and designing better land-use plans.

The NVRC staff has been reviewing community energy planning initiatives by other cities throughout the U.S. and abroad, cataloging best practices, and assessing them against certain demographic, technical and performance and other criteria, creating benchmarks for measuring energy planning effectiveness, and using this base knowledge to facilitate local government energy discussions and planning.

With this research and information in hand, NVRC began working with member localities, first Loudoun County and then Arlington County, to prepare community energy plans. The Loudoun County Energy Strategy was drafted in 2008-2009 and approved by its board of supervisors in December 2009 and amended in June 2010. The Arlington County Community Energy Plan was drafted in 2010-2011. The Plan Task Force's report was approved by its board of supervisors in May 2011 with direction to develop a final Plan to be part of the County's Comprehensive Plan.

The success of the Loudoun County and Arlington County community energy plans has provided a basis for NVRC to collaborate with other member localities in the years ahead, with the goal of producing locally written, locally adopted, and locally implemented plans that will integrate energy generation, distribution, conservation, and use with residential, commercial, and industrial facilities being developed across the highly dense suburban and urban region.

NVRC OVERVIEW AND DISTRICT ENERGY SYSTEM INITIATIVE

1. LOUDOUN COUNTY

Loudoun County was the first Northern Virginia local government to collaborate with NVRC to draft a 30-year community energy plan to address energy use, distribution, and supply. Using 2007 as its base year, the county energy strategy assumes population growth from its current 270,000 to 458,000 by 2040. Local employment is assumed to grow from 140,000 jobs to 305,000 over the same period.

This anticipated population and employment growth suggests today's 100,000 residential units will grow by 75,000, and it suggests that an additional 73 million square feet of non-residential space will be added to the existing 69 million square feet.

The majority of electricity used in Loudoun County currently comes from outside its borders. Usage breaks down as follows: 34% residential; 38% commercial and public buildings; and 28% transportation. By 2040, based on a business-as-usual approach, the county energy usage will grow by 46%.

The Loudoun County Energy Strategy, as adopted and amended by its board of supervisors, lays out plans to meet the energy needs of homes and buildings as well as transportation, and to generate a greater percentage of its electricity and heating needs locally.

Meeting these energy needs relies centrally on two electricity generation and distribution initiatives: first, generating 100 megawatts of natural gas-fired Combined Heat and Power ("CHP") by 2040; and second, installing 25 megawatts of solar electricity by 2016, rising to 100 megawatts by 2040.

These two energy generation and deployment strategies will be made more efficient if higher density developments are concentrated around transit hubs. A CHP system also would serve single large

developments of 100,000 square feet or more (commercial or retail complexes, institutional facilities, etc.). Loudoun County projects that, combined with energy efficiency, the solar photovoltaic initiative would reduce summer cooling electricity peaks by approximately one-third compared to the business-as-usual trajectory.

The county's adopted energy strategy anticipates the use of DESs for heating, domestic hot water, and cooling in high-density developments, with CHP being a central generation source.

The Loudoun County Energy Strategy is calculated to meet the total energy needs of the county's projected 2040 population of 458,000 with 21% less energy than today.

2. ARLINGTON COUNTY

Arlington County was the second Northern Virginia locality to collaborate with NVRC to draft a community energy plan. The initiative was launched in 2010 via the Arlington County Energy and Sustainability Task Force. Its goals, generally, were to formulate a plan to generate and use energy more efficiently and reduce greenhouse gas emissions as the jurisdiction's highly dense area continues growing in population. The Arlington County plan looks out over the coming 40 years to 2050.

Using 2007 as its base year, the county energy and sustainability plan assumes population growth in its already dense approximately 26 square mile area from its current 203,000 to 250,000 by 2050, a 23% growth jump. Local employment is assumed to grow by 42% over the same period.

Arlington County produces no significant energy within its borders other than some solar systems. The vast majority of its energy is imported. The county's current energy usage breaks down as follows: 26% residential; 53% commercial and institutional; and 21% transportation. By 2050, based on a business-as-usual approach, the county's energy usage will grow by 46%.

To meet growing energy generation, heating, cooling, and hot water demands over the next 40 years, the Arlington County Community Energy and Sustainability Task Force's plan, as adopted by the County board of supervisors, proposes to concentrate efforts on improving buildings' energy efficiency, including strategically implementing DESs.

In particular, beginning in 2015, the plan calls for requiring renovated residential buildings to be operate 30% more efficiently than a 2007 baseline average while renovated non-residential buildings would have to be 50% more efficient. Also beginning in 2015, newly constructed residential and non-residential buildings should be 30% more efficient than 2007 baseline averages and, starting in 2025, newly constructed residential and non-residential buildings should operate 1% more efficiently every year through 2050.

The Arlington County plan also envisions DESs being utilized in targeted areas to meet heating, cooling, and hot water needs. Local CHP generation would be a central element. The county estimates that up to 50% of its current energy use is in areas with sufficient density to make district energy feasible. The plan also recommends that a "District Energy Company" be formed to invest and manage the DES. The plan lays out a number of ownership options, including public ownership, a public-private partnership, an investor-owned company, and a site-specific (or special purpose) company.

Moreover, the plan calls for 160 megawatts of solar energy generation to be in place by 2025, with some 14 million square feet of solar panels situated atop municipal, commercial, and residential buildings and other structures.

With these and many other recommendations, the Arlington County Community Energy and Sustainability Task Force's plan calculates that in 2050, despite a significant increase in population and employment growth, the energy used will be less than 50% of today's usage.

3. FUTURE NORTHERN VIRGINIA PLANS

The Northern Virginia Regional Commission has been the primary catalyst for Loudoun County and Arlington County to create community energy plans. Considerable resources have been expended, using some of the country's most noted energy experts, to produce sophisticated, long-range energy plans, focusing on power

generation and distribution infrastructure, usage, and efficiency measures. DESs have been a major element of Loudoun's and Arlington's plans.

NVRC has also collaborated on energy planning with Fairfax County, the City of Falls Church, and the City of Alexandria. It is anticipated that these and other Northern Virginia localities will build upon their ongoing energy-related work and move toward creating long-term community energy plans.

NVRC's vision is to integrate land-use and transportation planning with energy planning to create more efficient and sustainable communities. The vision also includes local governments working with local home and business owners, developers, and others in the private sector to demonstrate the economic benefits of smart energy planning, especially with DESs, which can avoid the need for buildings to have individual heating, cooling, and hot water systems.

III. DISTRICT ENERGY SYSTEMS

A. WHAT IS DISTRICT ENERGY?

A DES is one that provides heating and/or cooling to multiple buildings from a central plant by way of an underground connection of pipes. Such systems are typically in urban or suburban settings and serve buildings in a defined area, such as a city's downtown or central business district or on university campuses or military bases. Buildings served can be large or small, and they can be residential, commercial, industrial, and/or institutional. In addition to producing steam, hot water, and/or chilled water for buildings, central plants also can be designed to generate electricity.

The central plant produces heat for the buildings through steam and hot water, and it produces cooling through chilled water. The central plant can be powered by a variety of sources, such as waste heat from existing sources biomass (wood chips, wastewater sludge, food waste), waste-to-energy (municipal solid waste), natural gas, oil, or coal, or a combination of such sources. In conjunction with – or in place of – the central plant, smaller distributed sources may contribute heating and/or cooling to the DES.

DESs are not new. Many European and Scandinavian cities such as Berlin, Mannheim, Vienna, Turin, Milan, Copenhagen, and Helsinki have well developed and highly efficient systems. Some European and Scandinavian systems date to the 19th century. DESs also are growing in Asia; systems can be found in Tokyo, Seoul, Beijing, and in hundreds of smaller cities across the region.

In the U.S., cities with well established DESs include New York (Manhattan), Philadelphia, Boston, St. Paul, Indianapolis, Denver, Seattle, San Francisco, Baltimore, Nashville, Tulsa, Houston, and Austin, to name but a few. (New York City has the largest commercial district heating system in the U.S., and it dates to 1882; Denver has the oldest, continuously operated commercial district heating system in the world, dating to 1880.) The U.S. government also operates a district energy (heating and cooling) system in downtown Washington, DC, serving many federal office buildings and Smithsonian Institution museums along the National Mall. Many of these legacy heating systems are steam based. Newer systems, and renovations of the legacy systems, are hot water based, providing for greater energy and operational efficiencies.

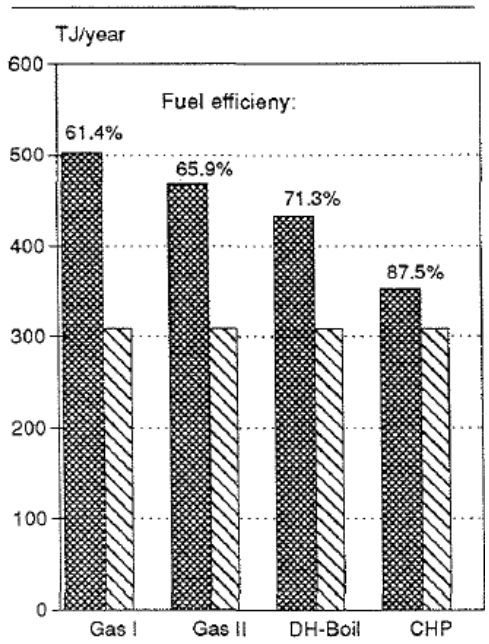
DESs can be owned and operated by investor-owned utilities, municipal governments, independent entities (corporations or non-profit organizations), or public-private partnerships. There are many examples of each throughout the U.S.

B. ENERGY PERFORMANCE

DESs can offer advantages over current building-based systems in terms of reliability, flexibility and environmental performance. Those advantages depend somewhat on the specific energy system and the community, but several advantages are universal.

DESs tend to be stable and reliable. This is true from a technology perspective, as district energy heating and cooling generation and delivery systems have improved over the past century of use in metropolitan areas around the world. DESs have also held up well in extreme weather events. District energy systems in operation in St. Paul, Minnesota, and Nashville, Tennessee, for example, report their respective systems' reliability measures exceeding 98%. (More on these cities' systems, and others, is discussed below.)

District energy can also increase supply security and efficiency by reducing peak power demand created by air conditioning. District systems store water chilled during off-peak hours to distribute to consumers during daytime peak hours. By supplying cooling through highly efficient electric chillers and non-electric, heat-driven chillers, district cooling can reduce peak power demand.



Gas I = Average new gas-fueled individual building furnace technology
Gas II = Best available gas-fueled individual building furnace technology
DH-Boil = District heating based on centralized boilers
CHP = CHP using natural gas turbines with heat recovery for district heat

Figure 1: Fuel Efficiency of District Energy Systems

District energy increases energy efficiency in at least two other ways: by creating economies of scale for thermal energy and by capturing energy that is otherwise wasted.

Economies of scale may allow DESs to use highly efficient thermal technologies and professional management to maximize reliability, efficiency, and cost savings.

Even with conventional fossil fuels, DESs that use CHP can provide a way to capture energy that would otherwise be wasted. In conventional electricity production, combustion of fossil fuels – coal, oil, or natural gas – produces temperatures much higher than those required for home heating. Conventional electricity production rejects a significant portion of the fuel energy input as waste. DESs that use CHP systems can harness much of this lost heat, which can then be used for building heating and cooling or industrial process heat, displacing the conventional source. Less fuel is required to satisfy the same temperature requirements. As one study said, "[t]he essence of any CHP DES is the use of the low temperature heat demand of densely populated areas as the sink for the rejected heat from standard power cycles."1 Newer CHP systems are often more than 90 percent efficient.2

Because lower temperatures are able to meet heating needs, lower grade heat sources such as biofuels – often available within the community – can be used.

District energy also offers advantages to the environment. Because less fuel is used and cleaner fuels may be available, district energy alternatives can produce lower air and CO2 emissions while providing the same energy services.

C. ECONOMIC BENEFITS

District energy systems produce heating and cooling (and sometimes electricity) and convey it to a cluster of nearby buildings. The cost-effectiveness of this system – relative to more conventional on-site HVAC systems – depends on its efficiency, among other factors. Generally speaking, DESs can produce economic benefits through reduced capital and labor costs as well as through energy savings that come through simplified, centralized systems. Assuming a given DES is run with the normal efficiencies seen in other DESs around the world, district energy systems can be a cost-effective option for generators and consumers alike.

In addition to the potential cost-savings created by energy efficiencies, DESs offer a number of related economic advantages to end-users, property owners, system operators, incumbent utilities, and the community and state.

Residential, commercial, and industrial end-users may gain access to cheaper heating, cooling, and perhaps, electricity. Customers are also freed from the costs and hassles of owning and maintaining their own heating and cooling systems.

[1] Rogner, Hans-Holger (1993) *Clean Energy Services Without Pain; District Energy Systems, Energy Studies Review*: Vol. 5: Iss. 2, Article 5, pg. 15.
[2] International Energy Agency (2009), *Cogeneration and District Energy*, pg. 13.

For property owners, DESs may help reduce the capital costs for new or renovated buildings because there is no need for boilers or chillers in each building, creating more useable or rentable space for owners or tenants. And without on-site HVAC systems, there also are reduced (or eliminated) operational costs, annual HVAC maintenance per manufacturers' recommendations, and periodic equipment replacement. While some of these savings can be offset by increased capital costs of a hydronic distribution system, mechanical system capital costs are typically lower for buildings served by DESs. These kinds of cost-reductions can be particularly helpful for attracting and retaining businesses looking for a cost-efficient and reliable energy supply system.

For incumbent utilities, DESs may offer opportunities for reduced energy losses in transmission lines, reduced transmission line congestion, better use of grid assets (e.g., providing greater capacity for wheeling power), and improved grid reliability.

From the perspective of the larger community, DESs also have been used as waste management tools, utilizing clean combustion technology to dispose of excess wood waste or other biomass while simultaneously producing low-cost heat. This reduces waste disposal problems and may reduce fossil fuel demand. Further, from a community's economic development perspective, there are likely benefits to be realized from being able to offer via a local, centralized DES an arguably less volatile, high-quality energy supply. Such energy supply stability can be increasingly attractive to investors and consumers alike.

It should go without saying that the many stakeholders who may be part of a potential DES should weigh the costs and benefits of a DES versus conventional, on-site HVAC systems. Much literature and many examples suggest that DESs are efficient and cost-effective, but a site-specific feasibility study that takes into account all relevant factors, including risks, is recommended.

D. RISKS

DESs have been designed, funded, constructed, and implemented in many major cities around the world. The ways to own and operate them, whether through public or private entities, are well established. And the ways that they can efficiently serve building owners and consumers are equally well established.

Perceived risks and misunderstandings involved in DESs include such things as neighborhood cosmetics, where heating, cooling, and hot water distribution infrastructure is envisioned to be something more complex than it is; high capital costs, where it needs to be demonstrated that economic efficiencies can make a good business case; loss of individual control in buildings, where technically it can be shown that HVAC-related comforts are not lost; and the notion that these systems only work in high-density areas, where it may not be understood that they also can work in low-density areas that have a concentration of large facilities. These kinds of perceived risks may dissuade communities or established utilities unfamiliar with DESs from giving serious consideration to their creation. However, incumbent utilities and their affiliates have become good partners in establishing and operating these systems. (Constellation Energy, for example, owns and operates the Nashville DES.)

Technical risks associated with DESs are small, owing to more than a century's worth of design and operational expertise from systems in scores of cities the world over.

We note, however, that the financial risks associated with the development of DESs in areas without an immediate long-term customer base may make such systems impractical. This point is discussed in more detail below.

IV. EXISTING DISTRICT ENERGY SYSTEMS EXPERIENCE

A. U.S. CITIES

In the United States, DESs are not new. There are established district heating and cooling systems in all regions of the country. We will highlight four urban district systems in other states: St. Paul, Minnesota; Nashville, Tennessee; Denver, Colorado; and Philadelphia, Pennsylvania.

Additionally, we will highlight one unique DES in Virginia: the City of Harrisonburg, which owns and operates a municipal waste-to-energy system that provides steam to nearby James Madison University.

1. ST. PAUL, MINNESOTA – DISTRICT ENERGY ST. PAUL

District Energy St. Paul, Inc., is an independent, not-for-profit company. It operates a district heating and cooling system that serves hundreds of commercial and residential buildings in the city's downtown area. It also operates a CHP plant that generates electricity for the local incumbent utility. Today, District Energy St. Paul is one of the largest and most successful DESs in the nation.

District Energy St. Paul began in the early 1980s as a pilot project to provide heat to its downtown business district. That pilot project was a public-private partnership between the City of St. Paul, the State of Minnesota, the U.S. Department of Energy, and the downtown business community. It was launched as a result of the 1970s energy crises and the city leaders' desire for a local solution to meet energy security and cost stabilization concerns.

That district heating demonstration project was built out over the 1980s and today has more than 105,000 linear feet (20 miles) of distribution pipes. The district hot-water heating system currently serves more than 185 buildings (31.7 million square feet) and some 300 single-family homes, providing for space heating, domestic hot water, and industrial processes.

In the early 1990s, District Energy St. Paul expanded its operation to include cooling, and today serves nearly 100 buildings (19.3 million square feet) by way of more than 35,000 linear feet (6.6 miles) of supply and returned chilled-water pipes that circulate nearly one million gallons of water. The cooling system has two 6.5 million gallon chilled-water storage tanks, which are cooled at night during off-peak electrical hours without the use of groundwater or CFC refrigerants.

District Energy St. Paul's heating and cooling system historically has been fueled by a blend of fuel sources wood chips, natural gas, oil, and low-sulfur coal. In 2003, however, District Energy St. Paul constructed a CHP plant that uses urban waste wood. The CHP plant has reduced by 70% District Energy St. Paul's use of oil and coal. The plant has six boilers that produce both heat and electricity – 65 megawatts of thermal energy and 25 megawatts of electricity.

District Energy St. Paul is regulated by the Minnesota Public Utilities Commission and has a number of affiliate companies, some of which are public and non-profit and others of which are private and for-profit. These affiliates include St. Paul Cogeneration, which produces and sells electricity to the local electric utility, and District Cooling St. Paul, which provides district cooling service to downtown St. Paul buildings.

District Energy St. Paul continues to operate as a non-profit corporation, without shareholders or owners. It is governed by a board of directors comprised of three city-appointed and three customer-elected members, and a seventh member chosen by the other six. An additional member who serves on the board of District Cooling St. Paul is elected by district cooling customers to serve on the District Energy St. Paul board.

Heating and cooling charges are comprised of two parts, an energy rate and a demand rate. The energy rate is based on the actual cost of the fuel and electricity each company used during the year and the demand rate is based on all other annual non-fuel costs.

2. NASHVILLE, TENNESSEE – METRO NASHVILLE DISTRICT ENERGY SYSTEM

The City of Nashville and its surrounding area are served by the Metro Nashville District Energy System, a system owned by the City of Nashville but privately operated by Metro Nashville District Energy System, a subsidiary of Constellation Energy Projects and Services Group. It is a district heating (steam) and cooling (chilled water) system. The system was founded in 1973 as the not-for-profit Nashville Thermal Transfer Corporation ("NTTC"), and it began operations one year later as a waste-to-energy facility, burning 1,000 tons per day of municipal solid waste to produce heating and cooling. Neither the Metro Nashville District Energy System nor contractors are subject to regulation as public utilities.

In 2002, NTTC closed its waste-to-energy operations and began construction of a new facility which was finished in December 2003. The new system uses natural gas-fired boilers to produce its steam heat and chilled water.

Today, the DES has four boilers that produce 260,000 lbs. of steam for heat and nine chillers that produce 23,400 tons of chilled water for air conditioning. The central plant is connected to 40 downtown buildings by way of 84,000 linear (16 miles) feet of pipes. Each building owner pays for steam and cooling services on the basis of rates set by the City of Nashville, without any stepped-up rate recovery of initial capital costs. The system is highly efficient – nearly all of the chilled water sent from the plant to the buildings for cooling and approximately 70% of the water used for steam to heat the buildings is returned to the plant for recycling. The system does not produce electricity.

The buildings the system serves include LP Field, the stadium that is home to the NFL's Tennessee Titans; Bridgestone Arena, home of the NHL's Nashville Predators; and a number of other private and government buildings. The state government is the DES's largest customer, with 14 buildings, including the State Capitol. Total revenues in 2010 for chilled water and steam were approximately $15.5 million. The efficiency of the new system is projected to save the City of Nashville $66.9 million by 2014, in addition to significantly lowering the energy costs for downtown customers.

The Metro Nashville District Energy System's energy generation facility has operated without any environmental regulatory violation since it became operational in 2003.

Metro Nashville District Energy System is governed by a nine-member advisory board comprised of the City's Director of Finance and Director of General Services; a representative of the DES's initial private customers; a representative of the government of the State of Tennessee; a member of the Metropolitan Government Council; two members of the general public; one member of the business community appointed by the Mayor of Nashville; and the Executive Director of the Metropolitan Development Housing Agency.

3. DENVER, COLORADO – XCEL ENERGY

Denver has the oldest continuously operated commercial district heating system in the world. The system, which began as the Denver City Steam Heating Co. in 1880, is owned and operated by a subsidiary of Xcel Energy, Inc., and provides steam heating to more than 135 customers in downtown Denver.

In addition to the original location, the steam system has two other facilities, and the combination of the three, each located within two miles from the other two, increases reliability for the system as a whole. Xcel Energy leases and operates the state's boiler plant under a long-term agreement with the State of Colorado to provide the nine-building state capital complex with steam. The company also produces steam from its Zuni Station facility, an electrical generating plant built in 1900 and connected to the steam system in 1948.

In 1998, Xcel Energy added chilled-water cooling to the system's services. The Company built the Chilled Water Center in the center of downtown Denver, disguised as an eight-story office building. It contains two ice tanks that store 75,000 ton-hours of cooling and currently provide 21,000 tons of cooling to 29 buildings. The

ice is made at night and allowed to melt during the day to provide the cold water service to customers, reducing demand on the grid during peak hours by about 40 megawatts.

The number of customers plugged into the cooling system is expected to grow as areas close to the Chilled Water Center are developed and as the cooling systems for existing buildings need to be replaced – an expensive process that makes the district system more attractive.

In the past decade, Xcel Energy has worked with the City of Denver to convert a number of city- owned facilities from building-based boilers and chillers to the centralized services of the DES. The list of city facilities now using the district system includes the Colorado Convention Center, the Wellington E. Webb Municipal Building, the Denver City and County Building, the Denver Public Library, the Denver Art Museum, the Denver Center for Performing Arts complex and the Denver Justice Center (courthouse and detention center).

Xcel Energy is a NYSE-listed holding company, with subsidiaries engaged primarily in the utilities business. The company is regulated by state and federal utility commissioners, with rates set according to regulatory compact. Xcel Energy's Denver Chilled Water Center produces no electricity. There is no requirement that customers hook up to the district energy system.

4. PHILADELPHIA, PENNSYLVANIA – VEOLIA ENERGY PHILADELPHIA

Philadelphia's DES is owned and operated by Veolia Energy Philadelphia, a for-profit public utility. The system serves more than 300 customers in the central business district from its three steam and one chilled water production facilities. Major customers include universities, medical schools, healthcare facilities, federal and city government facilities, office buildings, industrial facilities, hotels, and more than 10 million square feet of high-density residential apartments and condominiums. Hook-ups to the district energy system are entirely voluntary. Rate recovery of start-up costs is built into the regulated rate set by the local utilities.

Veolia Energy Philadelphia's steam serves, for example, many galleries and museums, the U.S. Mint, and many of the city's businesses and hospitals. In total, Veolia Energy Philadelphia provides thermal energy to more than 100 million square feet of customer space, for heating, air conditioning, domestic hot water production, and highly-specialized manufacturing processes.

The largest of Veolia Energy Philadelphia's production facilities is the Grays Ferry Cogeneration Facility, a 170-megawatt combined heat and power plant with a 118-megawatt combustion turbine and a 54-megawatt extraction/condensing steam turbine which supplies more than 90% of Veolia Energy Philadelphia district energy network's steam demand. Including Grays Ferry, Veolia Energy Philadelphia's production capacity consists of more than 4 million pounds per hour of steam, 7,000 tons of chilled water, and 26 miles of an underground steam pipe distribution network. All CHP-generated electricity is sold to the local grid at a rate set by the utilities.

Utilization of CHP for steam production has reduced greenhouse gas emissions in the City of Philadelphia for nearly 15 years. The plant began operation in 1998, and earned the Power Plant of the Year Award from Power Magazine in 1999. Grays Ferry has also won the Leadership Award from the U.S. Environmental Protection Agency for its role in reducing greenhouse gas emissions.

5. HARRISONBURG, VIRGINIA – HARRISONBURG RESOURCE RECOVERY FACILITY

The City of Harrisonburg has owned and operated a waste-to-energy facility since 1982. It was upgraded in 2004. The facility's principal fuel source is municipal solid waste.

The Harrisonburg Resource Recovery Facility provides thermal energy to nearby James Madison University. It receives up to 200 tons per day of municipal solid waste and via "mass burn" at 1800º F in two waste heat boilers produces some 57,000 lbs. per hour of saturated steam for the university's central heating and cooling system. (The university's central heating and cooling system is in a building adjacent to the waste-to-energy facility.)

The Harrisonburg/JMU partnership has been deemed successful both economically and environmentally. The facility generates revenue both from the steam it sells to JMU and from the $69/ton tipping fees charged to the city, the county, and surrounding municipalities to accept the municipal solid waste it will burn. The university benefits from getting a better price for steam than it would if generating its own steam from fossil fuel boilers.

The facility has the capacity to generate electricity but currently does not do so. Rates are set through negotiations between the city and the university, and are not subject to any regulatory approval.

B. INTERNATIONAL CITIES

DESs have long been a part of European cities' heating and cooling plans. Such major cities that have them include Helsinki, Vienna, Turin, Milan, Warsaw, London, Tokyo, Montreal, and Toronto, among many others. Highlighted here are the systems in Mannheim and Berlin, Germany, and Copenhagen, Denmark.

1. GERMANY

Germany's large energy market consists primarily of electricity generated by coal and nuclear power, although natural gas produces 11 percent of the country's electricity and is growing, as are renewable sources. The German chemical and mining industries are the main users of CHP, which are usually operated by the industrial host. District heating CHP systems are in place throughout Germany, and Germany has made a strategic decision to become a leader in incentivizing micro-CHP.

The backbone of Germany's CHP policy is the 2002 CHP Law (Kräft-Warme-Kopplungsgesetz). The law was amended in 2008 to set a goal of doubling the total share of CHP electricity to 25 percent by 2020. The new law continues the country's support of CHP through a feed-in tariff for excess energy exported to the grid. The tariff has a guaranteed price for electricity generated and adds bonuses for biomass and CHP generated from agricultural wastes and energy crops. The law also requires network operators not only to connect CHP plants to their system, and to buy the electricity, but to give priority to CHP for grid connection.

2. MANNHEIM, GERMANY

Mannheim's DES is run by a publicly-traded corporation, MVV Energie AG, which is majority-owned by the city. The company provides an integrated system of energy including electricity, gas, district heating, and district cooling, as well as water and transportation.

The district system extends across wide areas of the city and provides the majority of both residential and commercial users with heating and hot water. The bulk of the heat generation comes from very efficient coal generation (80% heat recovery) located close to the city and is supplemented by natural gas, combustible municipal waste, recycled lumber, and some solar energy. Cooling also has been added in the past five years to the downtown area and other specific sites.

One unique feature of Mannheim's system is the city's creation of an industrial enterprise zone on an island in the Rhine River. The zone has a tailored energy supply, including industrial grade steam, which has attracted companies with specific process steam needs.

3. BERLIN, GERMANY

Berlin's district heating network is the largest in Western Europe, with 27 percent of the city's buildings heated through a highly-decentralized system of CHP plants of various sizes located throughout the city.

The city's system is a public-private partnership. The Berlin Energy Agency ("BEA") was founded in 1992 by the state of Berlin and is owned by the Federal State of Berlin, the Vattenfall Europe Warme AG, the GASAG Berliner Gaswerke Aktiengesellschaft and the KFW Bankengruppe, all of which hold equal 25 percent shares of the BEA. The agency organizes solicitations to provide power for pools of buildings. The energy service

provider makes the initial investment, which is then refinanced through the savings in energy costs. The energy provider then manages the properties for a contractually agreed upon term.

Berlin's system is operated by the Swedish energy company Vattenfall and the German-owned GASAG, but federal law also encourages and incentivizes mini and micro-CHP. The German government offers 5.11 cents/KWh generated by a block heat and power plant ("BHPP") for ten years after a project's commencement, including for operators producing only for their own use and not exporting to the grid. There are currently about 300 decentralized mini- or micro- CHP plants of various sizes in operation in Berlin, 70 of which began in 2009 or later. More than 50 of the 300 are BHPPs spread out over 37 different locations in Berlin.

Energy companies use various technologies. Vattenfall, which has 31 generation sites, provides 1.4 million homes in Berlin with district heating, cooling, and electricity. For heat, the company combines gas with steam turbines in five combined cycle gas turbine power stations. The company also uses biomass, natural gas, and solar plants.

Vattenfall recently completed construction of a new district heating grid in the Berlin Municipality of Spandau. Over then next five years, about 121 megawatts (equivalent to about 35,000 households) will be connected to the district heating network from the Reuter cogeneration plant. This includes 111 megawatts of new connections as well as the replacement of an existing oil and gas heat plant with 10 megawatts of capacity.

The Berlin Senate's 2020 Berlin Energy Plan projects that by 2020 the city will have roughly 10,000 small micro-CHP "home power stations" (typically less than 5kW) installed and operating profitably. (Volkswagen is a heavy investor in this ambitious micro-CHP, or home power station, initiative.)

4. COPENHAGEN, DENMARK

Similar to the German government, the Danish government supports CHP-produced electricity through a feed-in tariff. The tariff applies to both natural gas and renewable fuels-based CHPs, although a premium is paid for electricity generated by biogas and biomass. Until 2005, all CHP operators, other than large central CHP plants, benefited from a requirement that customers on the local distribution network buy the electricity produced by local CHP units. That law was revised in 2005 and now the excess electricity is sold on the market.

Denmark also has planning policies that incentivize DESs. Localities have the authority to require all consumers to connect to either a natural gas supply or to a district heating network. The goal is to ensure the critical mass of consumers for building or expanding DESs, thus facilitating financing through commercial loans.

The Metropolitan Copenhagen Heating Transmission Company ("CTR") is a partnership among the municipalities of Frederiksberg, Gentofte, Gladsaxe, Copenhagen and Tearnby. CTR has been in operation since 1984 and provides heat to 270,000 households, about 10 percent of all Danish heat demand.

CTR provides heating needs through CHP plants, a geothermal plant, a waste incineration plant, a steam pool and heating stations that operate during peak periods. These facilities use a mix of coal, oil, natural gas, straw, wood pellets and waste.

The CTR, as well as the West Copenhagen Heating Transmission Company ("VEKS"), also receives power from the Avedore-2 CHP plant, completed in 2002 and located 18 miles from Copenhagen. The plant supplies 485 megawatts of electricity and 570 MWt of heating, meeting the heating needs of 180,000 homes and the electricity needs of 800,000 homes. The plant uses natural gas and biomass and has a fuel efficiency of 95 percent.

Copenhagen is also experimenting with district cooling in its central business district. When completed, the system will connect 16 buildings and will use a mixture of seawater and heat pump-powered chiller units to produce cooling water.

C. APPLICATION FOR NORTHERN VIRGINIA

Northern Virginia is the fastest-growing region of the Commonwealth. According to the George Mason University Center for Regional Analysis, the region's population expanded from 2000 to 2010 by more than 500,000 people, or approximately 24%. Looking ahead, it is reasonable to expect Northern Virginia's current population of 2.6 million to grow by an additional one million people by 2030.

Many Northern Virginia localities have recognized the need to increasingly integrate land-use planning with transportation planning, and some have been among the nation's most progressive in doing so. The NVRC has for decades assisted local governments in these integrated community planning efforts.

Now, a number of regional policymakers are building upon its land-use and transportation planning integration successes by engaging in similar energy planning efforts. Among the key interests in community energy planning are DESs due to their use in other major metropolitan areas, both in the U.S. and abroad.

DESs are most common in highly-dense urban areas. New DESs can be planned for yet-to-be-developed urban areas or in areas where significant new development is anticipated. The Tysons Corner, Moorefield Station, and Crystal City project areas are population-dense and might be considered contenders for DESs.

Additionally, there are many dense, built-out areas, such as the Columbia Pike corridor, where DESs can be integrated into the existing urban infrastructure, particularly where a certain level of redevelopment is anticipated. Retrofitting urban blocks or clusters of buildings to be served by district heating and cooling has been done in many cities.

There are three general stakeholder groups who would be important in any move to foster DESs in Northern Virginia: local governments, investor-owned utilities, and private-sector developers.

As noted, a number of Northern Virginia local governments have engaged in community energy planning exercises. Including energy generation and consumption into overall community and economic planning has been considered necessary in the face of past and anticipated population growth. DESs have been but one part in these community energy planning considerations.

Should any local government decide to implement DESs, the incumbent electric utility will necessarily play a strategic role. It has been demonstrated that utilities across the country can successfully develop, own, and operate district heating and cooling systems – and make money at it. And investor-owned utilities already have shown interest in the community energy planning work NVRC has undertaken over the past several years, though no decisions have been made by such utilities at this time to pursue DES planning or implementation.

Last, should any local government desire to implement a DES – whether via retrofits of existing building concentrations or in medium- to large-scale new developments – it also is a given that Northern Virginia's private-sector real estate development community will be integral to such discussions. It is the real estate development community that will have to see an economic benefit to district heating and cooling systems, such as through freed-up building space otherwise given to large HVAC systems, fuel and other operation and maintenance savings, or other energy efficiencies whose savings will accrue to their project's bottom line.

V. LEGAL FRAMEWORK

A. AUTHORITY - DILLON'S RULE

In Virginia, the power and authority of localities[3] to act is governed by the legal principle known as "Dillon's Rule." This rule of state preeminence over local governments was expressed in an 1868 case by John Forrest Dillon, a state and federal judge in Iowa.[4] As applied in Virginia, Dillon's Rule provides that "municipal corporations and counties possess and may exercise only those powers expressly granted by the General Assembly, powers necessarily or fairly implied from such express powers, and those powers that are essential and indispensable."[5] The General Assembly derives its authority to grant powers to localities from the Virginia Constitution.[6] Dillon's Rule is grounded upon the proposition that localities are simply agencies of the state, so they cannot have any power not "clearly and unmistakably granted by the law-making process."[7] Generally, powers granted to localities are strictly construed, and where "there is a reasonable doubt whether legislative power exists, the doubt must be resolved against the local governing body."[8]

The clearest circumstances are presented when a statute expressly grants a locality the power to take some action. When dealing with express authority, the question of how a locality may implement the power granted is a frequent issue. These situations generally arise when the General Assembly grants a locality the power to do something, but does not specify how that power should be implemented. In those cases, courts have looked to the "reasonable selection of method rule," which gives localities the authority to implement conferred powers if the method selected is reasonable.[9] Doubts regarding the reasonableness are generally resolved in favor of the locality.[10]

Dillon's Rule questions also arise in the context of powers necessarily or fairly implied from express powers. As described in *Marble Technologies, Inc. v. City of Hampton*:

> To imply a particular power from a power expressly granted, it must be found that the legislature intended that the grant of the express also would confer the implied. Questions concerning implied legislative authority of a local governing body are resolved by analyzing the legislative intent of the General Assembly. Legislative intent is determined from the plain meaning of the words used. Thus, [t]he central focus of our analysis [in applying Dillon's Rule] is to ascertain and give effect to the General Assembly's intent in enacting the provisions.[11]

Within the context of public ownership of DESs, the Dillon's Rule analysis is relatively simple. The Code of Virginia expressly provides that localities may own and operate "waterworks, sewerage, gas works (natural or manufactured), electric plants, public mass transportation systems, stormwater management systems and other public utilities within or outside the limits of the locality" and all necessary facilities appurtenant thereto.[12] Because the term "public utility" is not defined, the plain meaning of the term should apply when interpreting

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[3] It should be noted that there is a distinction in the Code of Virginia between municipalities and localities. The term "municipalities" only includes cities and towns, while, "localities" includes counties, cities, and towns. Va. Code Ann. § 15.2-102. Dillon's Rule is applied to counties through a corollary rule that involves an identical analysis. *See Board of Supervisors of Fairfax County v. Horne*, 378 S.E.2d 471, 473, 216 Va.113, 117 (1975).
[4] EUGENE MCQUILLIN, THE LAW OF MUNICIPAL CORPORATIONS § 4-11 (3d Ed. 2006).
[5] *Logan v. City Council of the City of Roanoke*, 659 S.E.2d 296, 302 275 Va. 483 (2008).
[6] Va. Const. art. VII, § 3.
[7] *Marble Techs., Inc. v. City of Hampton*, 690 S.E.2d 84, 88 (2010).
[8] *Id.* (citing *Board of Supervisors v. Reed's Landing Corp.*, 250 Va. 397, 400, 463 S.E.2d 668, 670 (1995)).
[9] *Commonwealth v. County Bd. of Arlington County*, 232 S.E.2d 30, 217 Va. 558 (1977).
[10] *Id.*
[11] *Id.* (internal citations omitted).
[12] Va. Code Ann. § 15.2-2109.

the statute. The provision of electricity, chilled water and hot water should fall within that term, as such services are included within Title 56 (under which public utilities are regulated) either generally ("heat") or specifically (electricity, chilled water, chilled air). Whether the supply of heated and cooled air is included is less clear and depends on the interpretation of "other public utilities" and inferences from other Code sections. To remove any question on this point would require the General Assembly to adopt clarifying legislation to address the regulatory status of the variety of thermal energy services potentially provided by a DES.

For other public ownership entities that are not localities (typically authorities or special districts), the plain language of the statute will determine whether the authority to own and operate a DES has been granted by the General Assembly. Some examples follow.

One or more localities are authorized to create a special taxing service district within the locality or localities "to provide additional, more complete or more timely services of government than are desired in the locality or localities as a whole," including the authority, with respect to such service district, to "construct, maintain, and operate such facilities and equipment as may be necessary to provide . . . heat, light, . . . and power and gas systems . . .."[13]

Certain types of localities (an incorporated city or town owning an electric utility system on January 1, 1979, any incorporated city with a population of 200,000 or more on January 1, 1979, and any locality authorized by the General Assembly after January 1, 1979, to participate in an electric authority) are authorized, upon approval by a majority of voters, to create (separately or jointly) an authority to generate, produce, transmit, deliver, exchange, purchase or sell electric power at wholesale, and to enter into contracts for any and all such purposes.[14]

Only one locality, the Town of Oakton, is authorized to create such an authority without a referendum and to distribute power at retail and then only within the area it served as of January 1, 2006. However, localities can generate, transmit and sell electric power, and effectively operate an electric power utility, within their own borders without creating an electric authority, or by doing so pursuant to other forms of authority and ownership, as described in Section VI below.

Some localities in other states (for example St. Paul, Minnesota) have established non-stock corporations to own DESs. Although the Virginia Code allows housing authorities to form corporations and other legal entities,[15] the Code does not have clear authorization for a locality, or its related authorities, to form and/or participate as a member of a non-stock corporation for a DES. Legislative clarification may be necessary for such an ownership structure for a DES.

B. VIRGINIA PUBLIC UTILITY REGULATION

The regulation of utility services is a complicated topic addressed below. The applicable regulation varies based on a number of factors including:

(i) the entity providing the services (e.g., a public service company or a municipality);

(ii) the type of activity involved (e.g., construction of a generation facility or providing of utility service);

(iii) the type of utility service being provided (e.g., electricity, heating or cooling services); and

(iv) the type of customer being served (e.g., retail or wholesale).

Within this general framework, the sections below cover four key areas. The first section describes the general statutory scheme for the creation and regulation of public utilities and the role of the Virginia State Corporation

[13] Va. Code Ann. §§ 15.2-2400 and 15.2-2403 1.
[14] Va. Code Ann. § 15.2-5400, *et seq.*
[15] Under Va. Code Ann. § 36-19(12), housing authorities are authorized, with approval from the local governing body, to form corporations, partnerships, joint ventures, trusts, and other legal entities on the authority's behalf or with any public or private entity.

Commission in regulating them. The second section discusses the exclusive franchise granted to a public utility within its specified service territory, the restrictions on competing with a certificated utility within its service territory, and exceptions to those restrictions. The third section covers utility systems that do not provide services "to the public." And the fourth section describes the SCC process for granting CPCNs. Some key items to note in these sections are that: (i) the SCC heavily regulates electricity generation wherever it has jurisdiction to do so; (ii) the SCC regulates the construction of virtually all electric generation facilities but regulates not at all the construction of thermal (heating and cooling) generating facilities; (iii) the SCC regulates the provision by a private utility of cooling services but does not yet regulate the provision of heating services; and (iv) other than with respect to the construction of electric generation facilities, the SCC has relatively little authority over a municipality that provides thermal or electric services within its own boundaries.[16]

1. APPLICABILITY, AUTHORITY, LIMITATIONS

Non-governmental entities that provide public utility service such as electric power, gas and water can be seen as functioning under two types of authority: organizational authority and operational authority.

Organizational authority relates to limitations arising from the entity's form of organization. A public utility serving customers in Virginia is not required to be organized as a corporation, but if it is incorporated, it must be incorporated in Virginia as a Virginia public service corporation, which imposes certain limitations but also confers certain powers.[17] A Virginia public service corporation is permitted to conduct in Virginia, in addition to the public service business stated in its articles of incorporation, other business that is related or incidental to its stated public service business, and public service corporations formed after 1985 generally cannot conduct more than one kind of public service business.[18] As discussed in more detail below, however, public service corporations are granted the power of eminent domain.[19]

A Virginia public utility's operational authority is based on what it is permitted to do by statute or regulation, usually after first obtaining approval of the SCC. The SCC is the agency of government granted the power, and charged with the duty, of "supervising, regulating and controlling all public service companies," as defined in Virginia Code § 56-1, "doing business in Virginia, in all matters relating to the performance of their public duties and their charges therefor," and for "correcting abuses therein by such companies."[20] The term "public service company" or "public service corporation" is defined in § 56-1 to include "gas, pipeline, electric light, heat, power and water supply companies, sewer companies, telephone companies, and all persons authorized to transport . . . property as a common carrier" but does not include "a municipal corporation, other political subdivision, or public institution owned or controlled by the Commonwealth."

Certain types of public service companies are also "public utilities" regulated by the SCC under Title 56 of the Virginia Code as to rates and terms and conditions and quality of service under Chapter 10,[21] as to acquisition

[16] This section addresses the major regulatory coverage of a DES. Additional regulations may address areas such as the "Miss Utility" Rules for Enforcement of the Underground Utility Damage Prevention Act (20VAC5-309-10 et seq).
[17] Va. Code Ann. § 13.1-620 D. This requirement also applies to a corporation organized under the laws of another state, which may require incorporation as a public service corporation in Virginia, as well as incorporation in any other state in which the corporation is organized. Va. Const. Art. IX, § 5.
[18] Va. Code Ann. § 13.1-620D.
[19] § 56-49 2.
[20] § 56-35; see also Va. Const. Art. IX, § 2 and Va. Code § 56-12.
[21] For the purposes of Chapter 10, the term "public utility" is defined to mean every person or organization that owns, manages or controls "any plant or equipment . . . within the Commonwealth for the . . . production, transmission, delivery, or furnishing of heat, chilled air, chilled water, light, or power . . . either directly or indirectly, to or for the public"). § 56-232.A 1. It does not include (a) an entity engaging in the production, transmission, or retail sale to non-residential consumers, of electric power as a qualifying small power producer not exceeding 7.5 MW and using renewable or nondepletable primary energy sources ("SPP") within the regulations adopted by the Federal Energy Regulatory Commission ("FERC") under the Public Utility Regulatory Policies Act of 1978 (P. L. 95-617) not exceeding 7.5MW; (b) any chilled water air-conditioning cooperative serving residences in less than a one square mile area; or (3) certain other activities also exempt from regulation under Va. Code § 56-265.1, as discussed below. Va. Code § 56-232 B and D. Subsection B of § 56-232 states that "[N]otwithstanding any provision of law to the contrary," no such SPP

and dispositions of utility assets, changes of control and mergers under Chapter 5,[22] and as to facilities and competition under Chapter 10.1 (discussed in more detail below); as well as "public service companies" as to issuance of securities under Chapter 3 and as to affiliate relationships under Chapter 4.[23]

Since 2009, the Virginia Electric Utility Regulation Act (the "Regulation Act"), contained in Chapter 23 of Title 56, has provided a revised structure for rate and other regulation of "incumbent electric utilities" (defined in § 56-576 to mean "each electric utility in the Commonwealth that, prior to July 1, 1999, supplied electric energy to retail customers located in an exclusive service territory established by the [SCC]"), which means only investor-owned electric utilities and cooperatives. However, the Regulation Act also contains provisions that apply to "electric utilities," defined to mean "any person that generates, transmits, or distributes electric energy for use by retail customers in the commonwealth, including any . . . electric utility owned or operated by a municipality."[24]

2. PARTICIPATION BY / COMPETITION WITH ELECTRICITY AND GAS UTILITIES

Chapter 10.1 of Title 56, the Virginia Utilities Facilities Act (the "Facilities Act"), regulates the facilities of, and competition between, public utilities. Va. Code § 56-265.2 provides that a public utility may not construct, enlarge or acquire, by lease or otherwise, any facilities for use in public utility service,[25] except ordinary extensions or improvements in the usual course of business, without first having obtained a certificate of public convenience and necessity from the SCC. For the purposes of the Facilities Act, the term "public utility" is defined to include any company[26] that owns or operates facilities within Virginia "for the generation, transmission or distribution of electric energy for sale, for the production, storage, transmission, or distribution, otherwise than in enclosed portable containers, of natural or manufactured gas or geothermal resources[27] for sale for heat, light or power, . . . " subject to a series of exemptions discussed below. The SCC has held that the furnishing of a public utility service, such as electric power, to one or more customers in Virginia, whether at wholesale or retail, makes the furnishing party a public utility subject to regulation by the Commission.[28]

In addition to the CPCN required by § 56-265.2, however, § 56-265.3 provides that no public utility may begin to "furnish" public utility service in Virginia without first obtaining a CPCN from the SCC authorizing it to provide such service. These service CPCNs are issued by the SCC to the public utility for a geographic service

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"shall be deemed a public utility or public service company." It is not clear whether this language also creates a corresponding exemption for the purposes of Chapter 10.1, discussed below, or other chapters of Title 56.

[22] For the purposes of Chapter 5, the term "public utility" means any person or organization that owns or operates "facilities within the Commonwealth for the generation, transmission or distribution of electric energy for sale . . ." § 56-88.

[23] For the purposes of Chapters 3 and 4, the term "public service company" means any person or organization "engaged in business in this Commonwealth as a public utility and subject to regulation as to rates and service by the [SCC]." § 56-55. This means that public utilities regulated by the SCC as to rates and service under Chapter 10 are also regulated as to issuance of securities and affiliate relationships.

[24] § 56-576.

[25] The term "service" is not defined for the purposes of the Facilities Act. It is defined in § 56-233 of Chapter 10, for the purposes of regulating the rates and terms and conditions and quality of service of public utilities under that chapter, "in its broadest and most inclusive sense and includes not only the use and quality of accommodations afforded consumers or patrons, but also to any product or commodity furnished by any public utility and equipment, apparatus, appliances and facilities devoted to the purposes in which such public utility is engaged and to the use and accommodation of the public." It is not clear whether the SCC would apply this definition beyond Chapter 10.

[26] For the purposes of the Facilities Act, the term "company" is defined to mean a corporation, a limited liability company, an individual, a partnership, an association, a joint stock company, a business trust, a cooperative, or an organized group of persons, but not a municipal corporation or a county (except for those that hold certificates to provide a CPCN to provide local exchange telephone service. Va. Code § 56-265.1(a).

[27] "Geothermal resources" are defined in § 45.1-179.2 to mean "the natural heat of the earth and the energy in whatever form, present in, associated with, created by, or which may be extracted from, that natural heat, as determined by the rules and regulations" of the Department of Mines, Minerals and Energy.

[28] *Application of Patowmack Power Partners, L.P.*, Case No. PUE910081, Order Denying Application issued October 17, 1995, 1995 S.C.C. Ann. Rept. 268, 269.

territory in which it provides retail service. The SCC also is authorized to allot territory for future development of public utility service by issuing a CPCN if it finds such action to be in the public interest.

A CPCN issued to an electric public utility under § 56-265.3 grants to the holder an exclusive geographic service territory within which no other public utility providing the same service may "operate", unless it can be shown that the incumbent is providing inadequate service and unless the incumbent, after being given reasonable time and opportunity, fails to remedy the inadequacy.[29] This exclusive franchise includes the distribution service territorial rights of incumbent electric utilities, defined to mean the delivery of electric power to retail customers.[30] This standard represents an extremely high hurdle to overcome for any challenger to an incumbent utility. The Virginia Supreme Court has held that a CPCN "is a franchise and is a property right . . . entitled to protection by the courts."[31] The SCC has been a strong supporter of these exclusive franchises and has enjoined violations by one electric utility of the exclusive franchise of another.[32]

Careful attention must be paid to the definitions and exemptions found in § 56-265.1 because they determine whether an activity is prohibited by the exclusive franchise or permitted by an exemption. The following subsections of § 56-265.1(b) may be relevant to district heating projects because they exempt: (1) "any company furnishing . . . geothermal facilities . . . to less than 50 customers"; (2) "any company generating and distributing electric energy exclusively for its own consumption"; and (3) "any company (A) which furnishes electric service together with heating and cooling services, generated at a central plant installed on a premises to be served, to the tenants of a building or buildings located on a single tract of land undivided by any publicly maintained highway, street or road at the time of installation of the central plant, and (B) which does not charge separately or by meter for electric energy except as part of a rental charge," provided that, if it furnishes such service to more than 100 lessees, the quality of its electric service will be subject to regulation as a public utility.[33]

As applied by the SCC, the generation and/or delivery of steam, hot air or hot or chilled water has not been regulated by the SCC as public utility service that would violate the exclusive franchise of another utility under the Facilities Act. However, the rates, terms and conditions for provision of chilled water service by a public utility have been regulated by the SCC under Chapter 10 of Title 56, indicating that the SCC may regulate these aspects of thermal service by a non-governmental DES.[34] Legislation may be advisable to resolve the question of the SCC's jurisdiction to regulate the rates, terms and conditions of other types of thermal service.

Generally, the federal and state governments, and their arms, subdivisions and agencies, are not public service corporations or public utilities under Virginia law, meaning their provision of electric service does not conflict with the exclusive franchise of electric public utilities. There is a statutory exception, however, providing that a municipal corporation may not provide electric public utility service, nor may its facilities for that purpose be constructed, enlarged or acquired, outside its political boundaries in territory allotted to a public utility, except in territory served by the municipality on June 26, 1964, unless the affected utility consents.[35] This statute also contains a corresponding prohibition against a public utility extending its public utility service or facilities, by

[29] Va. Code Ann. § 56-265.4. An exception to the exclusive franchise is provided for the sale of electric power by an SCC-licensed competitive retail supplier to two limited types of retail customers (a customer purchasing power provided 100% from renewable energy and, under certain circumstances, a customer whose demand exceeded 5 MW during the previous calendar Va. Code § Section 56-577 A 3 through 5. However there is no exception to the incumbent utility's exclusive franchise to distribute such power to the customer, meaning the power must be delivered to the customer by the incumbent utility. The SCC's regulations applicable to retail access to competitive suppliers of electricity are contained in 20VAC5, Chapter 31.

[30] Va. Code §§ 56-580 E and 56-576.

[31] *Town of Culpeper v. Virginia Elec. and Power Co.*, 215 Va. 189, 194, S.E.2d 864,868 (1974).

[32] *Petition of Prince George Electric Cooperative*, Case No. PUE960295, Order on Petitions for Declaratory Judgment issued June 25, 1998, 1998 S.C.C. Ann. Rept. 344; *Petition of Kentucky Utilities Company*, Case No. PUE960303, Final Order issued March 31, 1999, 1999 S.C.C. Ann. Rept. 368.

[33] The remaining exemptions apply to certain non-utility sales of natural gas; any company, other than a public service corporation, that provides compressed natural gas at retail for the public; certain landfill gas projects; and certain farms that generate electric energy from waste-energy technology.

[34] *Application of Reston Lake Anne Air Conditioning Corporation*, Case No. PUE-2009-00129, Opinion issued March 30, 2011, 2011 Va. PUC LEXIS 403, and Opinion issued October 29, 2010, 2010 Va. PUC LEXIS 815.

[35] § 56-265.4:1.

construction, enlargement or acquisition (including by lease), "in territory served exclusively by a municipal corporation or other governmental body on June 26, 1964," unless the municipality or other governmental body consents. The SCC is to decide questions as to the scope of the territory served by the municipality or other governmental body on that date. Nothing in the statute prevents any municipal corporation from constructing or maintaining facilities in county areas for the purpose of generating or purchasing electric power to be transmitted into its service area.

3. ENERGY "NOT FOR THE PUBLIC"

A single property owner providing district energy to itself behind the meter – not "for the public" – is not regulated by the SCC as a public utility. Net metering, "inside-the-fence" self-generation of electric power, and campus-based energy production facilities utilize this opportunity. Some entities have explored joint ownership of DESs serving multiple properties. Under such an ownership structure, each property owner would own an undivided interest in the whole system, based on the theory that an individual property owner arguably would be providing district energy to itself, not "for the public." However, the question whether such an arrangement, could be implemented without violating the exclusive franchise of electric public utilities has not been tested in Virginia.

Under § 56-580 D of the Regulation Act, a CPCN must be obtained from the SCC authorizing the "construction and operation of electrical generating facilities in Virginia." This requirement applies to anyone constructing and operating such facilities, regardless of the size of the facility and whether the constructor/operator is a public service company, public utility or electric utility,[36] except for certain "small renewable energy projects" (an electric generating facility (i) with a capacity not exceeding 100 megawatts that generates electricity only from sunlight, wind, falling water, wave motion, tides, or geothermal power; or (ii) with a capacity not exceeding 20 megawatts that generates electricity only from biomass, waste or municipal solid waste) under the "permit by rule" process implemented by the Department of Environmental Quality ("DEQ") under Article 3 of Title 10.1, as discussed below.[37] A public utility regulated by the SCC under Title 56 may utilize the DEQ permit by rule ("PBR") process for a qualifying small renewable energy project to resolve permitting and environmental impacts but must also obtain a CPCN under § 56-580 D.

4. STATE CORPORATION COMMISSION PROCESS

As noted above, except for small renewable energy projects owned or operated by a non-public utility, a CPCN must be applied for and obtained from the SCC under § 56-580 D by any person or entity proposing to construct and operate an electric generating facility as part of a DES. All applicants are required by the statute to show that the proposed generating facility and associated facilities (such as transmission lines) (i) will have no material adverse effect upon reliability of electric service provided by any regulated public utility and (ii) are not otherwise contrary to the public interest. Electric utilities are required to show further that the proposed facilities are required by the public convenience and necessity. An applicant that is an electric utility with a geographic service area certificated by the SCC also must show that the proposed facilities are required by the

[36] The SCC has held that this requirement, which became law in 1999, supersedes as to construction and operation of power generation facilities the Facilities Act's broad, pre-existing CPCN requirement for construction of facilities for use in public utility service, as well as another pre-existing statute in Chapter 10, § 56-234.3, requiring SCC approval before a public utility may construct a generating facility of 100 MW or more. *Commonwealth of Virginia ex. rel. State Corporation Commission Ex Parte: In the matter of amending requirements for applications to construct and operate electric generating facilities*, Case No. PUE010313 and PUE010665, Order Adopting Rules and Prescribing Additional Notice issued December 14, 2001, 2001 S.C.C. Ann. Rept. 585.

[37] We note that, unlike the Facilities Act, which defines the term "public utility" to exclude self-generation, § 56-580 D does not itself provide a corresponding exemption of self-generation from the CPCN requirement. Va. Code § 56-576 defines "generator," for the purposes of the Regulation Act, to mean "a person owning, controlling, or operating a facility that produces electric energy for sale." The SCC has not addressed the question whether this constitutes an exemption from the CPCN requirement of § 56-580 D for self-generators, so we have assumed that a CPCN is required for self-generation.

public convenience and necessity. Note, however, that the SCC does not require a CPCN for a thermal-only utility facility.

The SCC has adopted regulations, contained in 20VAC5, Chapter 302, specifying the filing requirements for applications for a power generation CPCN. Applications require comprehensive, detailed information for projects with rated capacities in excess of 50 megawatts and more streamlined filing requirements for projects with rated capacities equal to or less than 50 megawatts but more than 5 megawatts. Persons desiring to construct a project with a rated capacity of 5 megawatts or less need only submit a letter stating the location, size and fuel type of the facility and comply with all other requirements of state or federal law.

As noted above, small renewable energy facilities owned and operated by a non-public utility can utilize the alternative PBR process, which contemplates an expedited permitting process under which (i) the criteria that must be met are stated up front, (ii) the applicant submits documentation certifying that the project meets the criteria, (iii) DEQ reviews the documentation and, (iv) if it is complete DEQ notifies the applicant that the project is authorized. Unlike a CPCN, a PBR is not an individual permit for a site-specific location based on a case-by-case technical analysis. DEQ's PBR regulations for wind-powered small renewable energy projects are contained in 9VAC15, Chapter 40. PBR regulations for other types of small renewable energy projects are due to be completed by July 1, 2012.

A non-governmental entity proposing to construct or operate other types of public utility facilities, as defined above (such as electric transmission, substation or distribution facilities not associated with generation facilities) would be a public utility for the purposes of the Facilities Act. As such, unless the facilities are ordinary extensions in the usual course of business,[38] the entity would be required to first obtain a CPCN from the SCC authorizing such construction or acquisition under §§ 56-265.2 and 56-46.1, as well as a CPCN authorizing the furnishing of such service under § 56-265.3, based on a showing that the facilities or service is required by the public convenience and necessity. An applicant for a CPCN to provide service in the service territory of an incumbent public utility would also have to overcome the exclusive franchise established in § 56-265.4.

For all CPCN applications, the SCC is required by §§ 56-580 D and 56-46.1 to give consideration to the effect of the facility and facilities on the environment and establish such conditions as may be desirable or necessary to minimize adverse environmental impact, and by § 56-46.1 to (i) receive and give consideration to reports on the proposed facility by state environmental protection agencies, (ii) consider the effect of the facility on economic development within Virginia and consider any improvements in service reliability that may result from the proposed facility, and (iii) if requested by any county or municipality in which the facility is proposed to be located, to give consideration to such locality's local comprehensive plan.

Assuming the application provides the necessary information required by the SCC's rules and meets the statutory criteria, the SCC process, which will include the filing of prepared testimony, notice to local officials and the public and a public hearing, can be expected to take approximately 9-12 months from filing to final order.

C. ENVIRONMENTAL REGULATION

Any DES will be subject to various local, state, and federal environmental regulations. Regulation will depend on case-specific analysis of the location, the nature of the system, the system inputs and outputs, and other factors. Moreover, the various arrangements of potential DESs – distributed facilities, connecting to existing facilities for waste heat, using multiple fuel sources – may complicate the regulatory treatment. The following discussion summarizes some commonly applicable environmental regulations and permits related to air emissions and impacts on water resources. The application of these and other regulations[39] will vary depending on the location and type of system.

[38] A DES proposing to transmit or distribute electric power will require a CPCN for at least the initial facilities it seeks to construct, which will not be ordinary extensions in the usual course of business.

[39] Additional regulations may address brownfields remediation, hazardous waste management, endangered species, historic resources, fuel storage, above-ground and underground tanks, stormwater management, and erosion and sediment control and a variety of other matters. For example, solid waste regulations may apply to DESs using certain

1. AIR EMISSIONS

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")).

In attainment areas, new "major" sources and modifications must obtain a Prevention of Significant Deterioration ("PSD") Permit. In nonattainment areas, such as Northern Virginia, new major sources and modifications must obtain a major New Source Review ("NSR") permit for nonattainment pollutants and a PSD permit for attainment pollutants. Northern Virginia has been designated as a nonattainment area for ozone, 1 hour (severe); ozone, 8 hour (moderate), and $PM_{2.5}$. 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.[40] Note that greenhouse gases are now covered by the PSD program and must be taken into account.

Regulations provide certain exemptions for new and modified sources.[41] Additionally, sources with emissions below certain levels are exempt from new source review.[42]

Facilities may also be subject to a Title V Federal Operating Permit[43] or a State Operating Permit.[44] 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.

A DES may obtain some or all of its energy from waste heat from an existing permitted source of air emissions. Such action may trigger new permitting requirements for the existing source. As discussed above, the new source review applies to New and *Modified* Stationary Sources. The term "modification" is defined to mean "any physical change in, change in the method of operation of, or addition to, a stationary source *that would result in a net emissions increase of any regulated air pollutant* emitted into the atmosphere by the source . . .

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wastes as fuel sources. A permit-by-rule is available for qualifying waste to energy, thermal treatment, or incineration facilities. 9 VAC 20-81-400 et seq. Moreover, as discussed previously, DEQ has issued regulations for permits-by-rule for wind energy sources, and will be issuing regulations for permits-by-rule for other renewable sources, including generation of electricity from geothermal power, biomass, energy from waste, or municipal solid waste. Va. Code Ann. § 10.1-1197.5.

[40] 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.

[41] 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.

[42]

Pollutant	Exemption Levels (tons per year)	
	New Source "potential to emit"	Modified Source "net emissions increases"
Carbon Monoxide	100	100
Nitrogen Oxides	40	10
Sulfur Dioxide	40	10
Particulate Matter	25	15
Particulate Matter (PM_{10})	15	10
Volatile organic compounds	25	10

[43] 9VAC5-80-50 *et seq.*

[44] 9VAC5-80-800 *et seq.*

."[45] In determining if an action is a "modification" one must first consider whether there is a physical or operational change. It is likely that regulatory agencies would find that adding components to capture waste heat is a "physical change in [or] change in the method of operation of" the stationary source. Next, the agency considers reasonable emissions projections. The mere action of capturing waste heat likely will not result in any net increase in emissions. However, the related circumstances may well create increased emissions. For example, the DES contract for waste heat could establish a minimum availability rate for the heat that requires additional operation of the facility. The analysis of any emissions increase must be made on a case-by-case basis.

Aside from the permitting issues, note that the capture and use of waste heat from an existing source could potentially create carbon credits to be sold. This would require third-party certification.

A DES designed with multiple sources (either existing or new) contributing to the heating and cooling demands of the system might be treated as a single stationary source. If so, emissions of the overall system could cross an emissions threshold from exempt to minor, or from minor to major.

The determination of whether various sources are treated as a singular source for permitting purposes is a fact-based inquiry into nature of the emissions, location and proximity, and control/ownership. The term "stationary source" is defined to mean "any building, structure, facility or installation which emits or may emit any regulated air pollutant. A stationary source shall include all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control)."[46] Moreover, ownership and geography may not be used to avoid regulation. The provisions for applicability of Permits for New and Modified Stationary Sources provides that: "Regardless of the exemptions provided in this article, no owner or other person shall circumvent the requirements of this article by causing or allowing a pattern of ownership or development over a geographic area of a source which, except for the pattern of ownership or development, would otherwise require a permit."[47] Such language may require that a network of boilers be treated as a single source for permitting.

On the other hand, the act of networking existing boilers into a DES may not trigger permitting requirements. As discussed above, by definition a "modification" requires a net emissions increase. In theory, the connection of existing boilers would not result in a net emissions increase, and, thus, would not trigger permitting as a modification. As noted, however, this requires a fact-specific determination.

2. WATER

A DES may involve various activities impacting water resources, including water withdrawals, encroaching on public water bodies, and discharge into public waters. Such activities may require permitting.

Surface water withdrawals from state waters are permitted under the Virginia Water Protection ("VWP") Program.[48] Surface water withdrawals of less than 10,000 gallons per day do not require a VWP permit, subject to certain limitations. Virginia manages ground water within specified Ground Water Management Areas ("GWMA"), but Northern Virginia is not currently specified as a GWMA.[49] Systems using water from public water supply systems may need to meet requirements from the system operator.

For facilities that encroach upon wetlands or public water bodies – including water intake facilities and river or lake cooling loops – federal, state, and local permits may be required. The United States Army Corps of Engineers regulates activities in waters of the United States, including wetlands, under Section 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act of 1899, and Section 103 of the Marine Protection Research and Sanctuaries Act of 1972. The Virginia Marine Resources Commission issues permits for any

[45] 9VAC5-80-1110 (emphasis added).
[46] 9VAC5-80-60.
[47] 9VAC5-80-1100.F.
[48] 9VAC25-210 *et seq.*
[49] Va. Code § 62.1-254 *et seq.*

person to build or encroach upon or over State-owned submerged lands.[50] The Virginia Department of Environmental Quality regulates activities in state waters and wetlands under Section 401 of the Clean Water Act, and under the State Water Control Law. And, to the extent applicable, local wetland boards regulate activities in tidal wetlands and dunes/beaches under Code of Virginia Title 28.2, Chapters 13 and 14. A Joint Permit Application may be used to apply for permits from the various agencies. Applications are subject to independent, concurrent review by federal, state, and local bodies.

The discharge from a point source of any pollutant, including the discharge of cooling waters, into the surface waters of the Commonwealth are subject to the permitting requirements under the Virginia Pollutant Discharge Elimination System. Certain noncontact cooling water discharges are subject to a general permit.[51] The general permit covers discharges of non-contact cooling water and cooling equipment blowdown less than 50,000 gallons per day, provided the dischargers meet standardized effluent limitations and monitoring requirements. The general permit does not apply for categories with effluent guidelines, such as steam electric generating stations. If the DES will handle waste and wastewater in a manner that does not involve discharging to sewage treatment works or to state waters, a Virginia Pollution Abatement Permit may apply.[52]

D. PLANNING AND ZONING

The treatment of DESs under comprehensive plans and zoning ordinances varies by jurisdiction, with some containing very strict limitations and others permitting their development by-right. Every locality in Virginia is required by state Code to adopt a comprehensive plan to guide the physical development of land within its boundaries.[53] Generally, comprehensive plans are deemed to be mere guides for a locality and are not binding on a governing body when making a land use decision.[54] The one significant exception is for public facilities under the so-called "2232 Review."[55]

All public facilities, including public utility facilities and public service corporation facilities (whether publicly- or privately-owned), must be shown on an adopted comprehensive plan.[56] If the comprehensive plan includes the proposed facility on a map or within the text, then it may be deemed a "feature shown" and in many cases approval may be granted administratively. However, if the facility is not a feature shown, it may only be constructed, operated, or authorized after approval by the jurisdiction's Planning Commission.[57]

One way to avoid delays caused by "2232 Review" is for localities to adopt sections within their comprehensive plans dealing with DESs. If such a section is drafted in a manner that permits DESs, even with conditions, then it is highly likely that the review can be completed administratively and a public hearing avoided.

DESs must also comply with zoning ordinances. Every locality may adopt a zoning ordinance to regulate development within its jurisdiction.[58] Because localities have broad authority to categorize and restrict land uses, each jurisdiction in Northern Virginia treats public utility facilities differently. Similarly, jurisdictions vary throughout Virginia. However, in most cases the running of utility lines is permitted by-right or exempt from the zoning ordinance. For example, in Fairfax County, all "[w]ires, cables, conduits, vaults, laterals, pipes, mains, valves or other similar equipment for the distribution to consumers of . . . electricity [or] gas . . .

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[50] State-owned submerged lands are "the beds of the bays, rivers, creeks and the shores of the sea within the jurisdiction of the Commonwealth." Va. Code Ann. § 28.2-1200.
[51] 9VAC25-196; VAG 25.
[52] 9VAC25-32.
[53] Va. Code Ann. § 15.2-2223.
[54] *Board of Supervisors of Stafford County v. Safeco Ins. Co. of Am.*, 310 S.E.2d 445, 448, 226 Va. 329, 335 (1983)
[55] John H. Foote, *Planning and Zoning*, HANDBOOK OF VIRGINIA LOCAL GOVERNMENT LAW (7th Ed., 2010). "2232 Review" refers to the process under Section 15.2-2232 of the Code of Virginia.
[56] Va. Code Ann. § 15.2232.
[57] *Id.* It should be noted that underground electric distribution systems not owned by a locality are exempt from this requirement. *Id.*
[58] Va. Code Ann. § 15.2-2280.

operated or maintained by a government entity or a public utility" are exempt from the zoning ordinance when located in an easement less than twenty-five feet wide.[59] Therefore, in many jurisdictions the pipes associated with government entity or public utility's DES would not require specific land use approval by a locality prior to installation.

A central plant would likely require specific land use approvals. This is even the case for a DES owned by the locality, unless that locality has exempted its own facilities from the zoning process. Whether land use approvals are required and the extent of those approvals depends upon the type of DES proposed and the specific requirements of the locality in which it is located. For localities planning to adopt district energy policies, it will be helpful to review their zoning ordinance and address such systems directly. Most DESs function differently from other regulated utilities and deserve specific treatment within a zoning ordinance. Zoning issues relating to DESs include: the treatment of self-generation energy facilities (e.g. placement of solar PV or thermal); the treatment of the sale of energy (on-site or off-site); and treatment of transport, storage, and use of various fuel sources; and any preferred locations for DESs. The ordinance definition of "utility" may need to be revised to address particular aspects of DESs.

Zoning regulation can provide for as little or as much oversight over DESs as a governing body would like. A locality could conceivably permit DESs by-right, which in most cases would eliminate the need to hold public hearings. On the other end of the spectrum, a locality could require a special exception approved by the governing body prior to establishing a DES. This would give the locality tighter control and permit the imposition of development conditions to further regulate the use. A DES, depending upon the specific language in a locality's zoning ordinance, could be permitted by-right as an accessory use. However, even as an accessory use, it is likely a locality would place specific conditions on any DES to protect neighboring uses from any real or perceived negative impacts. Additionally, under most zoning ordinances, for a DES to qualify as an accessory use it would need to be exclusively used to serve the primary building on the same lot.

E. FEDERAL ENERGY REGULATION

Under Subchapters II and III of the Federal Power Act (the "FPA"),[60] the Federal Energy Regulatory Commission ("FERC") regulates (i) the sale at wholesale of electric energy in interstate commerce; (ii) the transmission of electric energy in interstate commerce; (iii) all facilities for such sale or transmission; and (iv) any person or entity (other than federal, state or local governments, or subdivisions, or their subdivisions, units or agencies, and cooperatives financed by the Rural Utilities Service) that owns or operates such facilities, who are "public utilities" under the FPA. Electric power is in interstate commence if the facilities for its sale or transmission are interconnected with the interstate electric grid, which means essentially all electric power in the lower 48 states, excluding most of Texas.[61] However, FERC's jurisdiction does not include facilities used for the generation, local distribution, or intrastate transmission of electric power or for the transmission of electric energy consumed wholly by the transmitter, which are left to the jurisdiction of the states. In addition, the generation, sale and transmission of thermal energy, and facilities for such generations, sale and transmissions, are not regulated under the FPA or otherwise by the FERC.

This means that the non-public owner or operator of a DES that is generating power and interconnected, directly or indirectly, with the interstate grid and makes sales of power at wholesale, such as to the electric utility with which it is interconnected or into a FERC-regulated regional transmission organization market such as PJM, or that transmits power, is a public utility under the FPA and subject to FERC regulation. Primarily, FERC has exclusive jurisdiction to regulate the rates and terms and conditions for such sales at wholesale and transmission, and operation of the facilities used for them, to ensure that they are just and reasonable and not unduly discriminatory.

Although all such public utilities were historically heavily regulated by FERC, including detailed cost-based review and approval of rates for jurisdictional sales and transmission of power, FERC has developed a regime for pre-authorizing public utilities to charge negotiated, market-based rates ("MBR") for such sales and

[59] ZONING ORDINANCE OF FAIRFAX COUNTY, VIRGINIA, art. 2, § 2-104.
[60] 16 U.S.C. § 824, *et seq.*
[61] *New York v. FERC*, 535 U.S. 1, 7, n.5, 122 S.Ct. 1012, 1018, n.5, 152 L. Ed 2d 47, 56 n.5 (2002).

transmission upon showing the absence of market power in relevant markets. A DES could be expected to qualify for MBR authorization, which avoids the most onerous forms of FERC regulation (such as pre-approval of rates and issuance of securities), but still imposes certain filing, reporting and pre-approval requirements that add a layer of cost, delay and risk to operations and certain transactions.

F. EMINENT DOMAIN

1. AUTHORITY

The power of eminent domain is an incident of sovereignty inherent in the state. The power and the time and manner of its exercise are vested solely in the General Assembly, subject to constitutional restrictions that no person shall be deprived of property without due process of law and that the General Assembly shall not pass any law whereby private property shall be taken or damaged for public uses without just compensation.[62] The General Assembly is permitted to delegate the power of eminent domain to subdivisions and subordinate agencies of the state and local governments and to state institutions, as well as to private corporations for the purpose of constructing works of public utility.[63]

In addition to the authority granted to localities by charter provision or by general law, whenever a locality is authorized to acquire real or personal property interests for a public use, it may do so by exercise of the power of eminent domain, specifically including for the purposes of acquiring property outside its boundaries in connection with constructing and operating "electric plants" and "other public utilities," as noted above.[64]

Each Virginia public service corporation is granted the power to acquire by eminent domain "any lands or estates or interests therein, sand, gravel, water or other material structures, rights-of-way, easements or other interests in lands, including lands under water and riparian rights, of any person, which are deemed necessary for the purposes of" constructing, operating and maintaining "its lines, works, facilities or works, and for all its necessary business purposes incidental thereto, for its use in serving the public. . . ."[65] The term "person" is defined to exclude "municipal corporations, other political subdivisions, and public institutions owned or controlled by the Commonwealth."[66] Under certain circumstances, a public service corporation that is also a public utility, as defined in Va. Code § 56-1, may be required to obtain a CPCN from the SCC before it may exercise the power of eminent domain.[67]

Whether the entity exercising the power of eminent domain is a government body or a public service corporation, the condemnation itself is conducted under the criteria and process provided in Title 25.2. Of particular note is Va. Code § 25.1-102, which provides that "no corporation or electric authority may file a petition to take by condemnation proceedings any property belonging to any other corporation possessing the power of eminent domain" unless, after notice and opportunity for hearing, the SCC "shall certify that a public necessity or that an essential public convenience shall so require, and shall give its permission thereto; and in no event shall one corporation take by condemnation any property owned by and essential to the purposes of another corporation possessing the power of eminent domain." Although counties are not corporations, they are treated as corporations for the purposes of this provision.

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[62] Va. Const. Art. I, § 11 and U.S. Const., Amend. XIV, Section 1.
[63] 7A M.J. Eminent Domain § 8 (2006).
[64] Va. Code Ann. § 15.2-1901.
[65] Va. Code Ann. § 56-49 1.
[66] Va. Code Ann. § 56-1.
[67] *VYVX of Va., Inc. v. Cassell*, 258 Va. 276, 519 S.E.2d 918 (1999).

2. RIGHT OF WAY FOR RENEWABLE V. CONVENTIONAL ENERGY PROJECTS

As part of the Virginia Energy Plan, every person that operates a renewable generator,[68] but does not have the power of eminent domain granted to public service corporations, is granted the authority, with the consent by ordinance of the particular board of supervisors or council, to occupy and use the public roads, works, turnpikes, streets, avenues, and alleys in any locality.[69] Renewable generators pay a set use fee of $135 per mile and are entitled to expedited action on a request for authority. No locality may impose on renewable generators, by ordinance, franchise or otherwise, terms and conditions for use of the public rights-of-way that are unfair or unreasonable or that are greater than those imposed on providers of electric or natural gas utility service.[70]

Other statutes give renewable energy generators the rights of a public service corporation to request to cross the works of another public service corporation and to joint use of the existing right-of-way of another public service corporation, with the opportunity to seek relief from the SCC in the event of a dispute.[71]

3. FEDERAL / STATE RIGHTS OF WAY

Neither the Commonwealth, nor any of its subdivisions, agencies or institutions, nor any public service corporations, has the power of eminent domain granted by Virginia law to acquire, without the consent of the federal government, any interests in property owned by the federal government.[72]

4. MUNICIPAL RIGHTS OF WAY

A corporation organized for the purpose of "(1) constructing, maintaining, and operating an electric railway, or works, (2) supplying or distributing electricity for light, heat or power, (3) producing, distributing and selling steam, heat, or power, or compressed air, (4) producing or selling gas made of coal or other materials, . . . [or] (6) piping cold air outside its plant . . . " is permitted to occupy and use the public rights-of-way in Virginia for the erection of "poles and wires, or cables, or the laying of underground conduits," with the consent of the local governing body or, if the right-of-way is in the State Highway System or secondary system of state highways, from the Commonwealth Transportation Board.[73] Such consents from localities are obtained by ordinances called franchises and from the Commonwealth Transportation Board by agreement.[74]

Municipal corporations, but not counties, are permitted to grant such franchises by ordinance for the use of the public rights-of-way in a manner not permitted to the general public, but none shall be granted for a period of longer than 40 years, and no such franchise may be granted for more than five years without public notice, receipt of bids and a bond.[75] Such franchises often impose a substantial franchise fees and other significant conditions.

A locality may, of course, occupy the public rights-of-way within its own boundaries and, as noted above, may condemn private property under § 15.2-2109 for municipal public utility rights-of-way inside and outside its boundaries, but may not condemn property owned by another corporation with the power of eminent domain

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[68] For the purposes of the legislation implementing the Virginia Energy Plan, a renewable energy facility is (i) an electrical generating facility that produces not more than 2 MW generated only from a renewable energy source as defined in Va. Code § 56-576; (ii) a steam reduction facility with a rated generating capacity of not mare that 5,000 mmBtus generated only from such a renewable energy source; or (iii) a solid waste management facility permitted by the DEQ from which landfill gas is transmitted or distributed off premises. Va. Code § 67-1100.

[69] Va. Code Ann. § 67-1100, *et seq*.

[70] Va. Code Ann. §§ 67-1101 though 67-1103.Va. Code §§ 67-1101 though 67-1103.

[71] Va. Code Ann. § 56-17 through 56-21 and 56-259 E.

[72] *Minnesota v. United States*, 305 U.S. 382, 386-7, 59 S. Ct. 292, 294, 83 L.Ed. 235, 240 (1939); *Utah Power & Light Co.*, 243 U.S. 389, 403-405, 37 S. Ct. 387, 389-90, 61 L.Ed. 791, 816-17 (1917).

[73] Va. Code Ann. §§ 56-256, 56-458.

[74] Va. Code Ann. §§ 56-460 through 462.

[75] §§ 15.2-2100 B and.15.2-2101 through 15.2-2104.

without approval of the SCC under § 25.1-102, or, without the consent of the General Assembly, condemn property owned by the Commonwealth or its political subdivisions or institutions.[76]

G. OPERATIONS

1. NET METERING AND SUB-METERING

As required by Va. Code § 56-594, the SCC has established by regulation a program that affords eligible customer-generators the opportunity to participate in net energy metering. Net energy metering means measuring the difference, over any net metering period, between electricity supplied to the eligible customer-generator from the grid and the electricity generated and fed back to the grid by the eligible customer-generator. An "eligible customer-generator" is generally defined to mean a customer that owns and operates an on-premises, interconnected generating facility with a capacity of not more than 20 kW for residential customers, and not more than 500 kW for nonresidential customers, that uses as its sole source of fuel renewable energy as defined in § 56-576, and is intended primarily to offset all or part of the customer's own electricity requirements. In 2011, Va. Code § 56-594 was amended to require any eligible customer-generator with a generating facility of over 10 kilowatts to pay to its utility supplier a monthly standby charge in addition to other charges authorized by law. The SCC has issued detailed regulations to facilitate the provision of net energy metering, which are found in 20VAC5 Chapter 315.

Va. Code § 56-1.2 exempts from SCC regulation any person who owns or operates property and provides electricity, natural gas, water or sewer service to residents or tenants if (i) the service is purchased from a public utility or a county, city or town or other publicly regulated subdivision or public body; (ii) the landlord charges to the tenant only that portion of the landlord's utility charges attributable to usage by the tenant; and (iii) the landlord maintains three years of billing records. However, Va. Code § 56-245.2 later required the SCC to promulgate regulations under which any owner, operator, or manager of an apartment house, office building or shopping center, which is not individually metered for electricity or gas for each dwelling unit or nonresidential unit, may install submetering equipment or energy allocation equipment for the purpose of fairly allocating among the units the cost of electric or gas consumption for each unit and electric or gas demand and customer charges made by the utility. This section provides that such an owner/operator may not impose any charges over and above the cost per kilowatt hour, cubic foot or therm, plus any demand and customer charges, where applicable, which are charged to the owner/operator by the applicable utility, including sales, local utility or other taxes. The owner/operator is permitted to collect a service charge to cover its administrative charges and billing and must maintain, and make available for reasonable inspection, adequate records regarding submetering and energy allocation equipment. The section provides further that no such owner/operator shall be considered a public utility or public service corporation engaged in the business of distributing or reselling electricity or gas except for the purposes of SCC enforcement of its regulations implementing that section, which are found in 20 VAC5, Chapter 305. Because the submetering exemptions provided by §§ 56-1.2 and 56-56-245.2 are limited to electric, gas, water sewer, legislation may be required to clarify that the exemptions cover submetering by an owner/operator of thermal service that otherwise may be subject to SCC regulation as to rates, terms and conditions and quality of service.

Complementing the treatment of submetering of these sections in Title 56, the Virginia Landlord and Tenant Act, specifically § 55-226.2, permits a landlord, if clearly stated in the lease, to submeter and bill the tenant for electric, gas, water and sewer service purchased from the utility serving the building by using energy submetering equipment, water and sewer submetering equipment, energy allocation equipment and ratio utility billing systems that meet the SCC requirements. The landlord may not mark up the service for a profit but may, if the lease provides, charge and collect from the tenant additional service charges, including, but not limited to, monthly billing fees, account set-up fees or account move-out fees, to cover the actual costs of administrative expenses and billing charged to the building owner, manager, or operator by a third-party

[76] *Continental Casualty Co. v. Town of Blacksburg,* 846 F.Supp. 486, 488 (W.D.Va. 1994).

provider of such services. Landlords may also estimate energy use and include a charge in the rent to cover such costs. This section provides no exemption from SCC jurisdiction.

2. PRICING

Each public utility whose rates, terms and conditions and quality of service are regulated by the SCC (which may include a non-governmental DES) is required to furnish reasonably adequate service and facilities at reasonable and just rates to any person, firm or corporation (excluding the federal and state government)[77] along its lines desiring such service and to charge uniformly all such persons, corporations or municipal corporations using such service under like conditions.[78] The public utility is required to file with the SCC a tariff containing rate schedules and terms and conditions of service available to customers.[79] A tariff can be thought of as a universal offer of service at the rates, and under the terms and conditions, in the filed tariff, which is accepted when a customer requests service, and/or executes a service agreement that incorporates the tariff. For public utilities that provide electric, gas, water or sewer service, the initial tariff is approved at the time the SCC grants a CPCN authorizing the public utility to construct its facilities for public utility service and furnish service in a geographical service area. A non-governmental DES providing thermal service would not require a CPCN but is likely to require approval of a tariff before public utility service commences.

A public utility's SCC-jurisdictional rates are considered to be just and reasonable only if it has demonstrated that its rates in the aggregate provide revenues not in excess of the aggregate actual costs incurred by the public utility in serving customers within the SCC's jurisdiction, including such normalization for nonrecurring costs and annualized adjustments for future costs as the SCC finds can be reasonably predicted to occur during the year following the effective date of the rates, and a fair return on the public utility's rate base used to serve jurisdictional customers. The aggregate actual costs can be roughly summarized as, for a prior 12-month test period, the total of operation and maintenance expense, deprecation expense, taxes and return on rate base, with return equaling the utility's weighted average cost of capital (including a fair return on equity capital as determined by the SCC) multiplied times rate base (generally total investment in the utility expressed as net utility plant, valued at original cost less depreciation, plus an allowance for working capital plus certain other asset items). The utility must also show that the rates contain reasonable classification of customers, which means the design of the rates and charges to recover the aggregate costs is reasonable and fairly allocates cost recovery among classes of customers (residential, commercial, industrial, etc.). Rates are proposed by the utility and approved by the SCC after thorough investigation by the SCC's Staff and a public hearing.

This process can be problematic for smaller public utilities, such as developer-owned water and sewer utilities, that need to build out their systems (as may be required to obtain local zoning approval) before a large enough customer base is in place to pay the fully-distributed cost, including a return on the capital invested in rate base.[80] The SCC will look to include in rates costs attributable to the components or percentage of the system actually "used and useful" in providing service to current customers. A similar issue can be presented where more capital investment in utility plant is required to provide adequate service. Under such circumstances, the SCC will be sensitive to the "rate shock" that customers would experience if they had to pay the true cost of service, again including a return on investment, and may approve rates that are only sufficient to recover current operating expenses until more customers are receiving service. The SCC's policy is to exclude from rate base any plant that has been contributed to the utility by the developer, based on the theory that such costs should be recovered through revenues from sales/lease of the real estate and not from utility customers.

The SCC may take a similar approach to rate design, as it may disfavor recovery of system capital costs though "availability fees" payable to the utility by lot owners before their lots are connected to the utility system and

[77] Va. Code §§ 56-234 and 56-232 E.. . . exempt contracts between a public utility and the state government (including localities and other constituent parts thereof) and the federal government from SCC regulation as to rates, terms and conditions of service.
[78] Va. Code § 565-234.
[79] Va. Code § 565-236.
[80] Such proceedings also are problematic for smaller utilities because the "soft costs" of preparing and litigating a rate case (accounting, consulting, legal, etc.) can be significantly out of proportion to the amount of revenue being requested.

may limit rate recovery to a cost-based connection fee (actual cost to connect the customer to the system), customer charge ("dial tone" fixed cost of having the customer on the system) and usage charges, which may be metered or unmetered.

By comparison, pricing of utility-type service (electric, gas, water, etc.) provided by a public DES entity would not be regulated by the SCC. Pricing is set by localities through the political process, meaning the locality's utility staff develops a proposal for new or revised rates and terms and conditions of service and, after opportunity for public input, it is approved or rejected by vote of the governing body. If the customers are unhappy with the result, they can vote to remove their representatives. A similar procedure would play out in special districts where the members of the governing body control the entity. Pricing for special purpose authorities or other public entities not directly controlled by an elected governing body, would be set by the entity's governing body in a fair and reasonable manner. Customer's who are unhappy with the result could lobby the governing body responsible for appointing the entity's board to remove the offending members.

3. SERVICE QUALITY CONTROL

The SCC would have broad authority and discretion to regulate the terms and conditions and quality of service of a DES public utility under Chapters 1 and Chapter 10 of Title 56, including requiring reports, informal and formal responses to complaints, conducting investigations, adjustment of rates, requiring changes in practices and policies, and even requiring the utility to show cause why it should not be required to cease operations and go out of business, as necessary to protect customers and the public interest. As means of enforcement, the SCC has the powers of a court of record, including the powers of subpoena, injunction and contempt.[81]

As with pricing, regulation of terms, conditions and quality of DES service provided by public entities is provided by the political process, either directly through the ballot box or indirectly through political pressure that results in replacement of representatives appointed to operate other types of public bodies. In addition, regulation can also occur through enforcement of contracts for service that are binding on DES entities that are not regulated by the SCC.

4. IN-EXTREMIS SERVICE OPERATION

As noted above, the Virginia Code requires each public utility to provide reasonably adequate service to customers. Consistent with that standard, public utility tariffs typically do not guarantee uninterrupted service and disclaim liability for interruptions beyond the utility's reasonable control. The standard of service provided by a public DES entity would be generally governed by contract. A County owning a DES would likely be immune from liability under the theory of sovereign immunity. Cities and other public entities would likely only have immunity if the operation of a DES is deemed a governmental rather than a proprietary function. Because of uncertainty in the law regarding sovereign immunity for entities such as special purpose authorities, issues of liability would most likely be taken care of through contract.

The SCC has broad powers to address *in-extremis*, or emergency, conditions that threaten or prevent the provision of adequate utility service, such as hurricanes and other disasters. As an example, during the natural gas shortage crisis during the 1976-1977 winter, when schools and workplaces were required to close due lack of gas supply, the SCC established constant communications with Virginia's gas utilities, including mandatory daily meetings with the gas companies to coordinate a statewide response to the crisis. Today, curtailment of natural gas is governed by the SCC Natural Gas Priorities and Rules[82] and the State Emergency Operations Plan, Emergency Support Function 12, Energy ("ESF 12"). Shortages of other fuel sources, such as biomass, would be governed by other portions of the ESF 12 plan. A locality operating a DES would likely have the police power to act in response to an emergency on its system, while the response of other public DES entities to act in response to an emergency would be governed the enabling legislation of the Virginia Code provisions.

[81] Va. Code § 12.1-13.
[82] 20VAC5-300-110.

H. TAX TREATMENT (STATE AND FEDERAL)

A DES owned by a Private Company (as defined in Section VI.A. below) will be able to take advantage of certain federal and state tax benefits available to owners of qualified energy projects. The principal federal tax incentives for renewable energy projects include the Section 45[83] production tax credit ("PTC"), the Section 48[84] investment tax credit ("ITC"), the ability to elect ITC in lieu of PTC for most Section 45 based projects, a federal cash grant in lieu of an ITC or PTC (the "cash grant")[85] and accelerated depreciation schedules.

1. PTCS

Section 45 of the Internal Revenue Code (the "IRC") provides a PTC for the production of electricity from qualified energy resources at qualified facilities that is sold by the taxpayer to an unrelated person during the taxable year. Qualified energy resources include wind, closed and open loop biomass, geothermal energy, solar energy, small irrigation power, municipal solid waste, qualified hydropower production, and marine and hydrokinetic renewable energy. Qualified facilities are facilities that produce electricity from qualified energy resources.

The taxpayer is allowed the PTC for the 10-year period beginning on the date the facility was originally placed in service.[86] In 2011, the inflation adjusted rate PTC is 2.2¢ per kilowatt hour of electricity produced and sold. The PTC for projects that utilize open-loop biomass, municipal solid waste (including landfill gas), and certain other renewable resources is reduced by 50%, for a 2011 inflation adjusted rate of 1.1¢ per kilowatt hour. The amount of the PTC allowable with respect to any project is reduced to the extent the project is financed with grants, tax-exempt bonds, or subsidized energy financing.

2. ITCS

Section 48 of the IRC provides an ITC for qualified energy property placed in service anytime before January 1, 2017 for certain types of qualified energy property, including a 10% ITC for combined heat and power systems.[87] The amount of the ITC is calculated by multiplying the specified percentage (e.g., 30% in the case of solar energy property or 10% in the case of combined heat and power systems) by the tax basis of the qualified energy property, which must be depreciable and must either be constructed by the taxpayer or the original use of the property must commence with the taxpayer. The depreciable basis of any qualified property for which the ITC is received must be reduced by one-half of the amount of the ITC.[88] In addition to the federal ITC, some states (for example, North Carolina and South Carolina) provide corresponding state investment tax credits for certain qualifying facilities that produce electricity from qualified renewable sources.

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[83] Unless otherwise indicated, all Section references are to the Internal Revenue Code of 1986, as amended (the "IRC"). The Section 45 PTC was originally enacted under the Energy Policy Act of 1992 (P.L. 102-486). See http://www.law.cornell.edu/uscode/html/uscode26/usc_sec_26_00000045----000-.html.

[84] See http://www.law.cornell.edu/uscode/html/uscode26/usc_sec_26_00000048----000-.html.

[85] The cash grant is provided for by Section 1603 of the American Recovery and Reinvestment Act (the "Recovery Act").

[86] The Recovery Act extended for an additional three years the placed in service date requirements for facilities that generate electricity from wind, closed and open-loop biomass, geothermal deposits, landfill gas, municipal trash, and hydropower. Wind facilities must be placed-in-service before January 1, 2013, while the other facilities must be placed-in-service before January 1, 2014. Section 45(d)(1) – (7).

[87] Other types of energy property eligible for an ITC include solar energy property and qualified fuel cell property (30% ITC); geothermal energy property and qualified microturbine property (10% ITC) and ITC for small commercial wind property (30% ITC).

[88] Before enactment of the Recovery Act, the total amount of the ITC was reduced if the energy property was financed by federal, state, or local subsidized financing programs or through private activity bonds. The Recovery Act removed this limitation, which will benefit projects eligible for tax-exempt financing (such as municipal waste and landfill gas) as well as projects that receive subsidized energy financing from various federal, state, and local programs designed to conserve or produce energy.

3. ITCS IN LIEU OF PTC

Taxpayers that own facilities that are eligible for the PTC may instead elect to receive a 30% ITC in lieu of the PTC that would otherwise be available. Specifically, Section 48(a)(5) of the IRC provides that a 30% ITC is available for the basis of any qualified property which is part of a qualified investment credit facility. A qualified investment credit facility includes, in relevant part, closed and open-loop biomass facilities, geothermal or solar energy facilities, landfill gas facilities, and trash facilities. As with the ITC described above, the ITC in lieu of PTC is calculated by multiplying 30% by the tax basis of the qualified property of the qualified investment credit facility. If the taxpayer elects to receive ITC in lieu of PTC, the depreciable basis of the qualified property must be reduced by 50 percent of the amount of the ITC.

4. CASH GRANT

Perhaps most significantly, the Recovery Act allows a taxpayer that owns and places in service a qualified facility to elect to receive a cash grant in lieu of the ITC or PTC. The cash grant program was enacted to shore up the significantly diminished tax equity market and the reduced demand for energy tax credits as a result of the economic crisis[89].

Under Section 1603 of the Recovery Act, taxpayers have the option of electing to receive a one-time cash grant from the Treasury Department in lieu of the ITC or PTC that would otherwise be available. Currently, for projects to be eligible for the cash grant in lieu of ITC or PTC, construction has to begin before the end of 2011 and the amount of the grant corresponds to the amount of the ITC or ITC in lieu of PTC that would otherwise have been available with respect to the project (e.g., in the case of a biomass facility that elects ITC in lieu of PTC would be eligible to receive a 30% cash grant in lieu of the ITC). In many respects, this cash grant is the equivalent to an immediately refundable ITC. All projects that are eligible for the ITC or the ITC in lieu of PTC are eligible for the cash grant.[90]

5. ACCELERATED DEPRECIATION

Besides ITCs, PTCs and cash grants, the IRC allows taxpayers who place in service certain tangible assets of a DES to depreciate such assets over a period of time that is shorter than the actual economic lives of such assets. For example, depending on the classification of the tangible property at issue, such depreciation schedules can range from 5 years (for solar property) to 7 years (for small biomass facilities). Moreover, currently taxpayers are permitted to claim additional "bonus" depreciation for many tangible assets; namely, (i) 100% depreciation for many tangible assets that are placed in service on or before December 31, 2011 and (ii) 50% bonus depreciation for many tangible assets that are placed in service on or before December 31, 2012. However, as noted above, the depreciable basis of any qualified property for which the ITC or cash grant is received must be reduced by one-half of the amount of the ITC before taking any depreciation deduction the remaining cost basis of such property.

6. OTHER CONSIDERATIONS

How income and losses of a Private Company that owns a DES will be treated for tax purposes will depend on whether the Private Company is a corporation taxable at the corporate level, or whether the Private Company

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[89] See Molly F. Sherlock, "Energy Tax Policy: Historical Perspectives on and Current Status of Energy Tax Expenditures", CRS Report (May 7, 2010).

[90] In general, the cash grant program mimics the operation of the ITC under Section 48 of the IRC. Accordingly, for example, the depreciable basis of any qualified property for which the cash grant is received must be reduced by one-half of the amount of the ITC. The cash grant program, however, is more restrictive than the ITC in that no cash grant is allowed to any partnership (or pass-through entity taxed as a partnership) that has a tax-exempt or governmental entity as a partner (ITCs may be received by such partnerships provided that the allocations to the tax-exempt and/or governmental entity partners are "qualified allocations"). See Section 168(h)(6). A copy of Section 168 may be found at http://www.law.cornell.edu/uscode/html/uscode26/usc_sec_26_00000168----000-.html.

is a partnership, limited liability company or other pass-through entity that is not taxable at the entity level. In the latter case, income and loss will be determined at the entity level but will be allocated to the owners/members of the entity in accordance with their ownership agreement and such members will be required to report such items of income and loss on their respective income tax returns. In this respect, the federal and state tax consequences associated with a Private Company's ownership of a DES will be largely the same (insofar as most states follow the IRC in determining a taxpayer's taxable income for state tax purposes).

The federal tax treatment of depreciation and the availability of ITCs and cash and other tax benefits for combined heat and power and other types of energy projects is very much in flux. Many of the federal tax incentives enacted in 2008 and 2009 to encourage renewable energy investment in the face of the recession are beginning to expire. The so-called cash grants in lieu of ITCs will not be available for projects the construction of which did not commence during 2011. In addition, as noted above, the 100% bonus depreciation available for tangible equipment acquired in 2011 falls to 50% in 2012 and no bonus depreciation (aside from the accelerated depreciation referenced above) is scheduled to be available for equipment purchased after 2012. However, it is possible new tax benefits may be enacted before the DES is constructed that will change the applicable rules.

PTCs, ITCs, and in some cases, accelerated depreciation, may be monetized by utilizing certain ownership and operating structures. These structures could include lease structures where the DES project is owned by one entity and leased to another entity that then operates the project. Alternatively, the DES project could be owned and operated by a single pass-through project entity with a so-called flip ownership structure in which certain investors in the project entity receive substantially all of the items of income and loss (including the available investment tax credits) of the entity in the early years of the project, with a different set of investors (typically, the developer) receiving substantially all of the items of income and loss in the later years of the project after a certain return hurdle has been achieved. However, whether any particular deal structure makes sense for the DES project will depend on very specific factors applicable at the time, so no suggestions or conclusions can be reached on tax structures at this time.

If the DES is owned by a municipal corporation, an authority or another tax-exempt organization, then DES income and loss will not be taxed, but most of the tax credits and tax benefits available to for-profit entities will not be available. To the extent that significant tax benefits are available at the time to private owners, ownership structures that will allow for the use of those tax benefits may effectively reduce the net cost of the DES project. Mixed public-private ownership structures may be a way of achieving this, but will introduce transactional complexity that will inevitably have its own costs.

I. CONTRACTUAL RELATIONSHIPS

In addition to the specific contractual arrangements noted below in Part VI on Ownership Arrangements, this Section summarizes some of the generally applicable contractual terms that would apply under the scenarios described below.

1. SERVICE CONTRACTS

If the DES is owned by a public entity that is exempt from rate and service regulation by the SCC, and the DES serves a relatively few large customers, then the DES may want to use service contracts between the DES and each customer. Among other benefits, this may be an advantageous structure for financing the DES. Each service contract would include the terms and conditions of service and the method of setting the price for service. It might also cover which party owns the environmental attributes (ERCS, RECs, etc.) generated by the overall DES system. In that scenario, each DES customer should expect to execute a long-term "service agreement" pursuant to which it bears a portion of the fixed costs (both capital and operating) associated with implementing the DES, typically called a "capacity" charge. This capacity charge could be based upon a given customer's pro rata maximum usage of the DES and would not change based on actual usage, i.e. the capacity charge would apply even if the customer purchases no services over a stated period of time. In addition, the customer would pay an "energy" charge based on actual usage to cover the DES's operation and maintenance

expenses, fuel costs, and other variable expenses. In other circumstances, a service contract approach is not likely to be practical or even legal. In those circumstances, the DES would employ a more traditional utility model in which the service contract would be much more limited in scope and a typical rate-setting process would be used.

2. THIRD-PARTY HEATING AND COOLING SOURCES

A DES may be able to purchase heating and cooling services from its neighbors and resell those services to customers served by the DES in at least two settings. First, there is a suburban type setting where land or a private lake is available near the DES on which a geothermal cooling loop could be built by the DES or the adjacent landowner. If the loop were built by the DES, then the DES would need both an easement for the system and appropriate contracts for the use of the cooling medium from the system and perhaps the sale of cooling services to the owner of the land on which the system is located. Of course, the landowner may, instead, want to own and install the system and sell cooling services to the DES. A third option would be joint ownership between the DES and the adjacent landowner, with shared cooling services. In any of these cases, the appropriate contracts would need to deal with construction, maintenance, replacement, system interruptions, conflicting development by the adjacent landowner, and, if services were provided by one party to the other, the terms and rates for service.

A second example of third-party heating and cooling sources could be where an existing generator of thermal energy has excess thermal energy available that it either wants to make use of or needs to treat for compliance purposes. Perhaps a nearby power plant generates hot water that it needs to cool before returning to a river. Or perhaps an industrial facility is generating significant heat that it would otherwise send up the stack.

In either case, these heat sources provide an opportunity for the DES to acquire thermal energy and either reduce the cost and capacity of its own generating capacity or reduce its ongoing fuel costs. Where a DES relies on a third-party source such as this for a significant portion of its thermal energy supply, then the contractual arrangements with the heat source will become quite critical and complicated. To take the obvious case, if the DES is purchasing hot water from a power plant and sizes its own thermal generation to reflect those third-party purchases, and the power plant then shuts down or is temporarily off-line, the DES could be in a serious fix. This situation will create a difficult negotiation with the third-party supplier in which the DES in some fashion will need to obtain contractual or financial protections against such service interruptions. Where the third party is supplying a less material amount of heat to the DES, the issues will be proportionately less critical and complicated.

3. ELECTRICITY SALES TO ELECTRIC UTILITIES

If the DES operates a combined heat and power system that generates both thermal energy and electricity, the DES may wish to sell the electricity at wholesale to the local electric utility or another wholesale electric purchaser. Although this type of sale could take many forms, the most likely one under these circumstances would be a bilateral power purchase agreement ("PPA") between the DES and the offtaker. A typical PPA would cover term, availability, dispatch, synchronization, change in law risk, force majeure, default, ownership of Renewable Energy Certificates ("RECs") and a variety of other matters.

4. ELECTRICITY FOR OWN USE BY DISTRICT ENERGY ENTITY

Any steam generating or chilling facilities (other than geothermal) will require a substantial amount of electricity to operate. In lieu of purchasing electric power from the local utility to meet its needs, the DES may wish to self-generate. Many self-generating systems use natural gas as a primary fuel. However, like an increasing number of other DESs around the country, the DES may wish to use power generated exclusively from renewable energy sources as a matter of policy. Green power so generated may enhance the DES's ability to market its services and may be a selling point for the community at large. Self-generation, whether renewable or not, may also improve the DES's ability to project its electricity costs in the future, although the DES will face the same uncertainty about fuel prices (except for solar and geothermal) as would any other

generator. As noted above, electricity generated from an appropriately configured CHP system will enhance the overall efficiency of the DES's generation facilities.

If the DES generates electricity for its own use behind the meter instead of for sale to the local electric utility, it might use a central or series of smaller CHP plants. It could also consider installing its own solar photovoltaic ("PV") panels on its facilities and/or on any available rooftop or ground space sufficiently close to the generation system. The economics of PV generation will be determined by the available tax credits, the market for Solar Renewable Energy Certificates ("SRECs"), projections of future utility electric bills, and the capital cost of the PV assembly. If economical, solar PV facilities would generate power during the daytime, have no fuel costs, and require almost no operation and maintenance. Such power likely would be insufficient to serve all of the DES's electricity needs, but it could offset purchases from the local utility and/or the costs of firing its own CHP facility. Certain tax incentives are available to a tax-paying (i.e., private) DES to help finance the installation of solar PV, but any DES, whether publicly-owned or privately-owned, could monetize RECs and the other environmental attributes that may be associated with the generation of solar and other renewable forms of electric power.

As discussed above, the construction of electric generation facilities for self-generated power requires a CPCN from the SCC unless an exemption is available. Small renewable generating facilities such as rooftop solar would typically qualify for such an exemption. The SCC does not otherwise regulate self-generators and the use of self-generated power does not conflict with the incumbent electric utility's exclusive franchise (regardless of whether the generator is publicly- or privately-owned) unless the generator sells or delivers that power to a third party. The complicated regulation of third-party sales, and the different rules applicable to sales by a publicly-owned DES and a privately-owned DES, are also discussed above.

For obvious reasons, the use of self-generated power by a DES will require few if any contracts other than those related to the construction of the DES facility. There may be an opportunity for a self-generating DES to utilize the demand response control programs offered by PJM Interconnection LLC, (the FERC-regulated regional transmission organization that operates the transmission system and wholesale electric markets in Virginia) to create an additional revenue stream.

5. THIRD-PARTY OPERATIONS

Regardless of whether a private or public entity owns the DES, the DES owner may decide to hire an experienced third-party operator to operate and maintain the facility. This is particularly true where the DES lacks internal expertise in operations and maintenance ("O&M") of large, complex energy infrastructure assets. In addition to service rendered after the project is built and operational, a third-party O&M operator would typically be involved before commercial operations, thus providing pre-mobilization and then (just before commercial operations) mobilization services.

If a third-party O&M operator is engaged, they will enter into an O&M agreement with the DES that will address, among other things, the following:

- Scope of authority; budget: The DES and the operator will need to set and agree upon a budget and the operator should not be able to incur expenditures outside of the budget (within a negotiated level of tolerance) without prior written consent of the DES.
- Insurance: The DES will want to scrutinize the operator's insurance and ensure the policies include a number of specific endorsements to benefit the DES, including adding it as an additional insured and ensuring no policy can be terminated without providing the DES with at least 30 days' notice.
- Force Majeure: The DES will want to ensure that the force majeure provisions of the O&M agreement synch with covenants in the service agreements – the DES must be able to be excused from its delivery obligations to its customers if the O&M operator is excused from ensuring plant delivery.
- Liability; Alignment of Interests: The operator will not accept liability under the contract in excess of some small multiple of its annual fee (except maybe with respect to its third-party indemnification

obligations). Instead, the DES and operator should align their interests through (i) proper incentives and (ii) liquidated damages based on superior and poor plant performance, respectively.

- Termination Rights: Beyond incentives and liquidated damages, the DES should have the right to terminate the agreement if, among other things, (i) the operator reaches its annual liability cap; (ii) in one or a specified number of years, the operator is subject to the maximum amount of liquidated damages based on poor plant performance; (iii) operating costs exceed the budget by more than X% in any given year; or (iv) other performance-related failures.

VI. OWNERSHIP ARRANGEMENTS

A. PRIVATE OWNERSHIP AND OPERATION

For the purposes of this discussion, we have defined "private ownership" as ownership by a privately-owned, for-profit entity. Private ownership could take many forms, although only two are discussed in this paper.

A private owner could be a limited liability company or corporation (either, a "Private Company") formed for the purposes of developing and owning the DES. If there is more than one DES system across Northern Virginia, there could be different Private Company or public owners of each or several of these different systems. A Private Company DES owner could either be a special purpose entity ("SPE") created for the purpose of owning the DES or a subsidiary or affiliate of a larger energy company. An SPE would typically have a large sponsor that contributes equity, handles development, and arranges debt. Likely Private Company owners or sponsors include companies now in the utility business, or in the thermal energy and CHP business. A Private Company owner of a DES would almost certainly be considered a public utility under applicable Virginia law (as discussed above; note also that companies that sell electricity at wholesale will be public utilities under Federal law as noted above) unless perhaps the Private Company only generates thermal or only generates electric energy for sale at wholesale to a municipal authority or other entity for distribution and resale of that energy to retail customers. Another option, discussed more below, would be for a Private Company to own the generation assets of the DES, and to sell all of its thermal energy and/or electric energy at wholesale to a local government or other type of public ownership vehicle that is exempt from SCC regulation. The public entity would then sell the thermal and/or electric energy at retail to individual building owners, tenants or whatever.

A Private Company would need to be able to finance the development, ownership and operation of the DES. Typical debt levels for a project such as this would be somewhere between 60-75% of the DES costs, although debt levels may be lower if the Private Company is established with the 50% debt ratios more typical of public utilities. Higher debt levels may be possible depending on the nature and certainty of the revenue stream available to the Private Company. And while higher debt levels create risks of disruption and foreclosure if the DES encounters development or operational issues, the availability of more debt will increase the likelihood that the project can and will be built.

For a Private Company, one key issue will be the nature of its arrangements for the sale of energy produced by the DES. Either the Private Company will need to have sufficient contracts in place to finance development and operation of the DES, will need to have sufficient rate payers and associated rate revenue, or else there will need to be alternative mechanisms in place to provide the revenue stream to pay debt service. The difficulty of having such arrangements in place may vary depending on whether the DES is serving an existing built-up area or an area under development with a long development cycle ahead.

As discussed above, a Private Company would probably enter into an O&M agreement with either an affiliate or a third-party O&M contractor to operate the DES.

A second possible form of Private Company ownership is ownership by an existing certificated local utility, particularly if the DES plans to generate electricity. Since the DES will be operated as a utility anyway, ownership by a utility that already serves the DES jurisdiction may make for a relatively easy transition and avoid conflicts with that utility.

The cost and rate structure of third-party utilities, their willingness to undertake projects that the DES communities consider important even if not immediately economical, and other cultural and economic issues mean that project ownership by a local private utility will need to be carefully thought out and negotiated to be sure that the sponsoring jurisdictions get the DES benefits they anticipate getting when they initiate a DES project. A local utility would have similar concerns about the terms of a franchise agreement as would any other Private Company. However, a local utility would probably finance its development and ownership of the DES differently than a non-utility Private Company. Instead of financing the development and ownership

of the DES as a separate financing for this particular DES project, a utility would typically finance a new asset at the corporate level (as compared to the project level). Because utilities are in the utility business already, they would not typically hire an outside O&M contractor but would self-perform the O&M functions.

However, an existing public utility that already serves the DES area and other areas in Virginia may have difficulty in "rate-basing" its DES-related expenditures because those expenditures are designed to serve only a local group of customers and, principally, for thermal service only. In this case, the utility could face considerable difficulty in financing the DES project, particularly in an area where significant upfront capital costs were needed but development and customer growth were going to be spread over a number of years in the future. This question – how to finance necessary upfront capital costs when customers and customer revenues may be years away – will plague any DES ownership structure or format.

For a locality that sought private ownership of the DES, the Public-Private Education Facilities and Infrastructure Act[91] (the "PPEA") could offer an effective means of achieving that goal. The PPEA includes a category of permissible areas of activity that fall within the Act. A DES would be a "qualifying project" in the category of "utility and telecommunications and other communications infrastructure."[92]

The PPEA specifically authorizes a private entity to take ownership of various public properties to accomplish the qualifying project. The public entity (or entities) involved may dedicate to the qualifying project any property interest owned by the public entity including land, improvements, and tangible personal property, so long as it will serve the public purpose.[93] The PPEA also can provide greater procurement flexibility than is otherwise available under the Virginia Public Procurement Act (the "Procurement Act"). Typically, any arrangement that would involve a public body contracting with a private party to construct, operate, maintain and/or manage the DES would be subject to the Procurement Act's requirements for competitive sealed bidding.[94] The PPEA provides broad authority, however, for public entities to contract with private parties as deemed appropriate for a given qualifying project.[95] Public bodies may thereby bypass the competitive sealed bidding rules (instead employing "competitive negotiation"),[96] and they are allowed to select a proposal other than the lowest price.[97]

B. PUBLIC OWNERSHIP AND OPERATION

Public ownership could take various forms, including direct ownership by a city or county or ownership by one of the types of authorities or special districts authorized by the Virginia Code.

From a regulatory point of view, the principal advantage of public ownership is that the SCC does not regulate public entities. So the SCC could not require a CPCN for the DES unless the DES included electric generation, and the SCC could not regulate the rates and standards of service of the DES. Avoidance of SCC regulation would reduce development costs and operating costs, and increase the DES's operational flexibility.

However, the benefits obtained by avoiding SCC regulation would need to be balanced with the additional costs attendant on public ownership, including, in some cases (such as municipal ownership) public procurement rules, hearing requirements and the other typical procedural requirements and practices of public bodies.

We note here that NVRC may want to consider proposing legislative fixes to existing Virginia authority legislation to give at least one of these authorities all of the powers and rights that are needed for a practical, financeable DES. At the moment, the Sanitary District would appear to include essentially all of the needed rights and powers.

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[91] Va. Code Ann. § 56-575.1 *et seq.*
[92] Va. Code Ann. § 56-575.1.
[93] Va. Code Ann. § 56-575.7.
[94] Va. Code Ann. § 2.2-4303.
[95] Va. Code Ann. § 56-575.5; 56-575.16.
[96] See Va. Code Ann. § 56-575.16(2) and 2.2-4301.
[97] See Va. Code Ann. § 2.2-4303.B; § 2.2-4301.

1. LOCALITY OWNERSHIP

Localities in Virginia are expressly authorized to acquire, establish, maintain, operate and enlarge gas works, electric plants, waterworks, sewerage, and other public utilities within or outside the limits of the locality.[98] The broad powers include the right to acquire and maintain any rights-of-way, rails, pipes, poles, conduits or wires connected therewith, or any of the fixtures or appurtenances of a public utility.[99] The term "public utilities" is undefined within this title of the Code of Virginia. However, it seems likely that a DES would fall under the term based on its common usage. Note that this discussion concerns direct ownership by the locality, as compared to ownership through an authority, special district, or other indirect public ownership (discussed below).

A locality owning or operating a public utility may acquire property within or outside its territorial boundaries.[100] Property may be acquired in any manner, including by eminent domain.[101] In cases where eminent domain is used, certain restrictions are placed upon localities. First, localities may not condemn the property of any corporation possessing the right of eminent domain without first obtaining permission from the SCC.[102] In addition, a locality does not have the right to condemn the property of a public utility owned or operated by another political subdivision of the Commonwealth.[103]

There are limitations on a locality's power to acquire or displace an existing natural gas or electric public utility within the locality's jurisdiction.[104] Except where the utility consents, prior to completely acquiring a public utility's facilities within the limits of the locality or to taking over or displacing, in whole or in part, the utility services provided by an existing gas or electric public utility, a locality must obtain approval from a majority of voters in a referendum.[105] In addition, as noted above, the SCC would have to approve a locality's exercise of the power of eminent domain to acquire the property of a corporation possessing the power of eminent domain, including a public service corporation.[106]

The Code of Virginia does not place special restrictions related to financing or contracting rights on a locality when it owns or operates a public utility. Generally, any funding mechanism available to the locality may be used to construct or maintain a DES.

2. ELECTRIC UTILITY AUTHORITY

Another possible, though less attractive, mechanism for public ownership and operation of a DES is through the Electric Authorities Act.[107] This act authorizes localities, acting jointly or separately, to form an authority "to provide facilities for the generation, transmission, and distribution of electric power and energy."[108] Unfortunately, the restrictions in the act limit the ability of an authority to own or operate a DES. First, the particular localities that may create Electric Authorities are very limited. The act defines governmental units, which are the entities permitted to form an authority, as cities or towns owning electric generation facilities on January 1, 1979, cities with populations over 200,000 on January 1, 1979, or counties, cities, or towns expressly authorized by act of the General Assembly to participate in an authority.[109]

Further, the purpose of an Electric Authority is to provide electricity to its member localities. To that end, Electric Authorities are not permitted to distribute energy for retail sale.[110] However, there is a provision permitting the sale of energy not required by the member localities, so long as that sale does not constitute a

[98] Va. Code Ann. § 15.2-2109(A).
[99] *Id.*
[100] *Id.*
[101] *Id.*
[102] Va. Code Ann. § 25.1-102.
[103] Va. Code Ann. § 15.2-2109(A).
[104] Va. Code Ann. § 15.2-2109(B).
[105] *Id.*
[106] Va. Code Ann. § 25.2-102.
[107] Va. Code Ann. § 15.2-5400 *et seq.*
[108] Va. Code Ann. § 15.2-5401.
[109] Va. Code Ann. §§ 15.2-5402, 5403.
[110] Va. Code Ann. § 15.2-5406.1.

retail sale. There is no definition in the act for retail sales; however, using the definition provided in the Regulation Act, this would encompass "electric energy sold for ultimate consumption to a retail customer."[111] Therefore, absent a situation in which a locality was setting up a DES solely for the purpose of providing energy to its own buildings, the use of the act appears to be of limited value.

All of that said, Electric Authorities are subdivisions of the state and are bodies corporate and politic.[112] They may acquire property by purchase or by eminent domain.[113] In addition, they may borrow money and issue revenue bonds, which are exempt from Virginia and local taxes. [114] Further, these authorities have broad powers to contract with any other party in the exercise of its powers.[115]

3. WATER AND SEWER AUTHORITY

The use of authorities created under the Virginia Water and Waste Authorities Act (the "VWWAA")[116] are a valuable tool for providing necessary public services in a number of different contexts. The VWWAA authorizes localities to create water, sewer, sewage disposal, stormwater control, or refuse collection and disposal authorities.[117] An authority created under the VWWAA is a body politic and corporate.[118] Authorities may be created by one locality or jointly by two or more localities[119] and are controlled by an authority board made up of members appointed by the locality creating the authority.[120]

The applicability of VWWAA to DESs is somewhat limited. With the exception of community development authorities (see discussion below), the only viable type of authority is one authorized to operate a refuse collection and disposal system.[121] However, such authorities could only operate a DES in very limited circumstances. Under the VWWAA, refuse collection and disposal authorities may recover and use energy from refuse.[122] An authority exercising such power could conceivably operate a DES using the energy recovered from refuse. However, such systems would be regulated under the Utilities Facilities Act set forth at § 56-265.1.[123]

The utility of using a refuse collection and disposal authority is somewhat blunted in situations where the authority will displace a private company. Prior to beginning operations, an authority must make one of four specific findings regarding the existing private company.[124] In addition, if an authority displaces a private company it must provide the company with five years notice of its decision to operate a system.[125] In the alternative, it may avoid the notice period by paying the company an amount equal to its preceding twelve months' gross receipts for the displaced service.[126] However, displacement would typically only apply if the private company were prohibited from competing with the authority for customers.[127]

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[111] Va. Code Ann. § 56-576.
[112] Va. Code Ann. § 15.2-5402.
[113] Va. Code Ann. § 15.2-5406.
[114] Va. Code Ann. §§ 15.2-5412-21.
[115] Va. Code Ann. § 15.2-5406.
[116] Va. Code Ann. § 15.2-5100 *et seq.*
[117] Va. Code Ann. § 15.2-5102.
[118] Va. Code Ann. § 15.2-5101(A).
[119] Va. Code Ann. § 15.2-5102(A). Authorities are generally created by ordinance, resolution, or agreement, but in certain circumstances may require a referendum approved by the voters.
[120] Va. Code Ann. § 15.2-5113(A). Members of a locality's governing body may be appointed to serve on the authority's board. *Id.*
[121] One could argue that the creation and distribution of steam is included in the authorization to supply and distribute water. However, because of the ambiguity in whether steam distribution falls under the term "water" and the significant capital at stake, the better course is probably to seek clarification from the General Assembly through an amendment rather than attempt to shoehorn district energy systems into the existing VWWAA.
[122] Va. Code Ann. § 15.2-5101.
[123] Va. Code Ann. § 15.2-5102(B).
[124] Va. Code Ann. § 15.2-5121(A).
[125] Va. Code Ann. § 15.2-5121(B).
[126] *Id.*
[127] Va. Code Ann. § 15.2-5121(C).

Assuming a DES could be owned and operated under the VWWAA, authorities created under the act have broad powers, which are expressly provided in the Code of Virginia. These include the right to acquire property through purchase or eminent domain; the right to sue and be sued; and the right to fix, charge, and collect rates and fees for the services furnished. [128] In addition, authorities have a broad range of contracting rights related to construction, operation, or use of any project and for the collection of amounts due.[129] This includes the express authority to enter into public-private partnerships with private entities.[130]

In addition, authorities may issue revenue bonds and may borrow at such rates of interest as authorized by general law.[131] However, such bonds are not obligations of the locality that created the authority and the locality may not pledge its full faith and credit in the same.[132] Authorities also are exempt from all taxes and assessments on any system it acquired or constructed.[133] Additionally, the bonds issued by the authority are free from taxation within the Commonwealth.[134]

As currently drafted, authorities created under the VWWAA can only be used in the DES context in very limited circumstances. However, the authority structure is one that is suited to the district energy concept. For that reason, the VWWAA presents a case where an amendment by the General Assembly would be an easy way to expressly authorize DESs. Such an amendment would eliminate the need to create a new type of ownership entity and would facilitate the introduction of DESs via a structure with which most local governments are already familiar. Additionally, such an amendment could provide an exemption from the Procurement Act similar to the exemption for industrial development authorities.

4. COMMUNITY DEVELOPMENT AUTHORITY (CDA)

In addition to the authorities discussed above, the VWWAA also authorizes the creation of community development authorities ("CDA").[135] CDAs are very similar to other authorities under the VWWAA, but differ from them in some important ways that could make them more likely vehicles for owning DESs. The most significant difference is the express authority to own and maintain gas and electric lines.[136] An argument can be credibly made that certain DESs fall under this power as the powers given to a CDA are listed as "…including but not limited to….".

Assuming a DES could be owned by a CDA, most of the powers are identical to other authorities created under the VWWAA. One significant difference with CDAs is how they are formed. CDAs require a petition signed by the owners of 51% of the land area or assessed value of land within the proposed CDA boundaries.[137] The petition is then considered by the locality and may be approved by ordinance.[138] One major financing benefit of a CDA is the ability to levy a special tax on properties within the CDA. Once formed, a CDA may request annually that the locality levy a special tax on the property within the CDA not to exceed $.25 per $100 of assessed value.[139] The revenue generated by that special tax may be used solely for the purposes for which the CDA was created.[140] The special tax, when combined with the revenue bonds permitted to all authorities, make the CDA a powerful tool for implementing and financing a DES.

[128] Va. Code Ann. § 15.2-5114.
[129] Va. Code Ann. § 15.2-5114, 5115.
[130] Va. Code Ann. § 15.2-5114.
[131] *Id.*
[132] Va. Code Ann. § 15.2-5131.
[133] Va. Code Ann. § 15.2-5132.
[134] *Id.*
[135] Va. Code Ann. § 15.2-5121 *et seq.*
[136] Va. Code Ann. § 15.2-5158.
[137] Va. Code Ann. § 15.2-5153.
[138] Va. Code Ann. § 15.2-5155.
[139] Va. Code Ann. § 15.2-5158.
[140] *Id.*

5. SERVICE DISTRICTS

Another possible ownership entity is a service district. Service districts may be created by one or more localities to provide additional, more complete, or more timely governmental services than are desired in the locality as a whole.[141] Governmental services under the service district statutes expressly include heat, power, and gas systems. [142] A DES would appear to fit within this definition of governmental services.

One of the most significant features of service districts is the authority to require owners and tenants of any property in the service district to connect to the systems.[143] That ability provides a very useful tool for making sure that DESs reach an adequate number of properties and buildings. Additionally, service districts have the authority to acquire property through purchase or eminent domain.[144] Further, they have the express authority to contract with any person to provide the governmental services and to construct, operate, and maintain any facilities that are necessary or desirable in connection with the governmental services.[145]

Service districts are financed by the levy of an annual tax upon property within the services district.[146] The taxes must be used to pay the expense and charges for providing the governmental service.[147] In addition to taxes, a locality may contribute money from its general fund to pay for the governmental services.[148] There is no authority for service districts to issue bonds. However, a locality creating a service district may not obligate its general tax revenues or pledge its full faith and credit toward the construction or operation of facilities and services provided by the service district.[149] One distinction from other types of ownership is that the Code of Virginia contains no express authority to fix, charge, and collect rates for use of systems in a service district. This limitation could lead to unintended consequences where a party that uses a significant portion of the services is charged the same tax as someone who uses little or no services.

6. SANITARY DISTRICTS

A sanitary district could be utilized to facilitate public ownership and operation of DESs. Sanitary districts, which are run by the governing body of a locality in which they are located, may construct, maintain, and operate heat, light, power, and gas systems for the public benefit.[150] Much like a service district, a DES appears to fit cleanly within the authority of a sanitary district.

As with service districts, a sanitary district can require owners and tenants to connect to the systems within the district.[151] Within such districts the governing body may acquire real estate and facilities through purchase or condemnation.[152] In addition, the governing body has the express authority to contract with any party related to the authorized purposes of the district.[153]

Sanitary districts also have a number of financing alternatives. First, they can levy a tax on all properties within the district to pay for expenses and charges incident to constructing the systems.[154] Second, they can fix and prescribe rates and charges for use of the systems.[155] And third, they can issue bonds in an amount not to

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[141] Va. Code Ann. § 15.2-2400.
[142] Va. Code Ann. § 15.2-2403.
[143] *Id.*
[144] Va. Code Ann. §§ 15.2-1800, 2403.
[145] Va. Code Ann. § 15.2-2403.
[146] *Id.*
[147] *Id.*
[148] *Id.*
[149] *Id.*
[150] Va. Code Ann. § 21-118.
[151] *Id.*
[152] *Id.*
[153] *Id.*
[154] *Id.*
[155] *Id.*

exceed 18% of the assessed value of all real estate in the district.[156] These mechanisms create multiple sources of revenue to establish and operate a DES.

A disadvantage of a sanitary district is that it must be exclusively governed by the Board of Supervisors or City Council. This means that property owners within the Sanitary District would not be able officially to participate in its governance. However, a sanitary district can be combined with private ownership in ways that may enable a DES to utilize the taxing and rate making attributes of the sanitary district while still providing private parties affected by the sanitary district a significant voice in DES affairs. In such a combined structure, the private entities would own some or all of the DES assets within the sanitary district, and the sanitary district would assess and collect taxes and utility rates for those privately owned assets.

C. MIXED PUBLIC/PRIVATE ARRANGEMENTS

1. NON-STOCK CORPORATION

Potentially, a DES could be owned by a Virginia non-stock corporation formed by one or more Virginia municipal corporations[157] to own and operate the DES. This model has been implemented in other states. As discussed above with regard to Dillon's Rule, the Virginia Code grants limited authority for certain public entities to form corporations,[158] but the Code does not provide express authority for such an arrangement for DESs. Clarifying legislation may be appropriate.

Such an entity technically has no owners. It is controlled by a board that is either elected by the company's members (if it has members) or is a self-perpetuating board that elects its own successors. The charter of the non-stock company will determine its organizational form. The charter might specify, for example, that the board will be composed of members representing specific classes of people, such as three members appointed by the county or city government, two members appointed by the DES's customers, and two appointed by building owners. The DES system in St. Paul, Minnesota is owned and organized in this manner. If the non-stock corporation was formed by and controlled entirely by municipal entities, the SCC may nevertheless seek to regulate the entity as a "public utility," but the SCC's power to do so is not clear. Of course, as discussed above, a DES that constructs electric generation facilities is generally subject to the SCC's CPCN requirements regardless of the form of ownership, and a DES that provides only thermal services is subject to only limited SCC regulation.

A non-stock corporation by definition cannot have stockholders and cannot pay dividends. The use of this ownership structure, like most of the authority and district structures discussed below, would allow a participating municipality corporation to keep the debt used by the non-stock corporation to finance the DES off of the municipality's balance sheet. Any liabilities associated with the ownership and/or operation of the DES would be compartmentalized in the non-stock corporation such that the other public assets of the municipal corporations would not be at risk. In addition, the stringent procurement rules of the Procurement Act may not applicable to a non-stock corporation, as the Procurement Act technically is applicable only to "public bodies."[159] However, the Procurement Act's express purpose is to set forth policy on "governmental procurement,"[160] so if the non-stock corporation receives funds from and is controlled by officials of Virginia

[156] Va. Code Ann. § 21-122.
[157] Under Virginia law, these are called "non-stock" corporations. Most other state statutes simply refer to them as "non-profit" or "not-for-profit" corporations.
[158] Under Va. Code Ann. § 36-19(12), housing authorities are authorized, with approval from the local governing body, to form corporations, partnerships, joint ventures, trusts, and other legal entities on the authority's behalf or with any public or private entity.
[159] A "public body" means "any legislative, executive or judicial body, agency, office, department, authority, post, commission, committee, institution, board or political subdivision created by law to exercise some sovereign power or to perform some governmental duty, and empowered by law to undertake the activities described in this chapter. 'Public body' shall include any metropolitan planning organization or planning district commission which operates exclusively within the Commonwealth of Virginia." Va. Code Ann. § 2.2-4301.
[160] Va. Code Ann. § 2.2-4300.B.

localities, a court potentially could determine that the non-stock corporation is subject to the Procurement Act. Finally, to the extent the use of a statutory "authority" is not available or otherwise is not workable, the non-stock corporation structure may be useful for implementation of a DES that crosses jurisdictional borders.

2. PUBLIC OWNERSHIP, PRIVATE OPERATION

A DES could be owned by a public entity such as a municipality or sanitary district, but operated by a private party under the terms of an operations and maintenance agreement. The Nashville DES uses this form of ownership and operation. Typical terms of such an O&M agreement are discussed in Section V.I.4 above. The principal advantage to the DES of having a third party operator is that a skilled operator may provide operational and maintenance expertise not otherwise available to the DES. As a political matter, the operator may also provide a buffer between DES customers and the DES's municipal owners.

As noted above, the PPEA specifically authorizes the dedication of public property interests in furtherance of a "qualifying project." The public bodies involved could convey necessary property interests to the private party (which, again, could include a non-stock corporation controlled by public bodies) to effectuate the DES. The private party might finance and construct the new generation assets and lease existing real property and/or physical assets such as pipelines and/or underground tunnels from the affected localities to implement the distribution system. A private entity also will need to execute "franchise agreements" (discussed below) with the various localities over which the DES footprint lies to implement the DES distributions system under the public roads and other public rights-of-way of such localities. The Virginia Code requires localities granting such rights to follow certain procedures in doing this, including posting ads to request bids.[161]

3. FRANCHISE AGREEMENTS

Franchise agreements commonly regulate the relationship between utilities and cities in Virginia and two counties including Arlington County. The franchise agreement has benefits to both the utility and the municipality. The franchise agreement gives the utility clear authority to make use of such locality's public lands and rights-of-way for the installation of the DES distribution system. The franchise agreements also may specify the franchise fee, if any, that the utility is required to pay. A locality will need to consider the extent to which it wants to benefit financially from the implementation of the DES. That is to say, having a private party finance and construct the DES provides a service to the localities – the question is how much of a financial benefit do the localities require for the granting of a franchise over its lands. In general, a lower franchise fee will lead to a more financeable project. Another approach would be to provide no or reduced franchise fees in early years as a financial incentive to the DES, as was done by St. Paul, Minnesota.

The localities may want to use the franchise agreement to exert some reasonable control over the level of service provided to the DES's customers. The locality may include a general standard of service that the DES must provide to its citizens. A material breach of this covenant would provide the localities with a right to terminate the agreement and perhaps purchase the DES, pursuant to appropriate provisions governing the manner in which the DES property would be valued and purchased. Besides ensuring acceptable service to its citizens, the localities also would want to be indemnified by the private parties for any claims and damages arising from or in any way relating to the DES.

In the remaining counties, use of the public rights-of-way is secured from the Commonwealth Transportation Board by agreement. Use of other public lands owned by counties is also by agreement.

4. JOINT OWNERSHIP

A DES could be developed as a joint ownership structure, with public entities and private entities owning undivided interests in the same facilities. An example of this might be a thermal DES system that provides significant utility services to municipal buildings and to privately owned buildings. The initial developer of the DES would presumably need to be a private party who would make arrangements in advance to create

[161] Va. Code Ann. § 15.2-2101.B.

"condominium" interests in the DES or sell undivided tenancies in common and sell the appropriate units or interests to the municipality and to each appropriate building owner. In most cases, the benefits of this approach are not readily apparent, except as another possible financing mechanism, if other mechanisms are not available. If the DES generated electricity and ownership of the electric generating assets were shared by each electric user, practical implementation of such a scheme would be difficult unless each user's electric consumption at all times exceeded its "share" of the DES's electric production. A more likely target of joint ownership might be a geothermal loop that serves the DES and an adjacent parcel, as discussed above. The question whether a joint ownership arrangement could be implemented without violating public utility exclusive franchise rights has not been tested.

5. SPLIT OWNERSHIP

A DES could be developed with a private company owning the thermal assets that in turn sold steam to a public entity that owned the electric generating assets. There would be three purposes for this approach. First, it would spread capital cost and financing risk. Second, it would place the electric generation in a largely unregulated public entity. And third, it would allow for the recovery of the electricity-related capital costs through rates.

VII. HYPOTHETICALS

A. HYPOTHETICAL ONE: GREENFIELD, SINGLE LAND-OWNER SITE

For this case, we have assumed a 400-acre undeveloped site owned by a single land-owner who intends to develop a mixed-use project (the "Project") in phases over a 15-year development period. The Project's first phase will be relatively small, with a much larger second phase when rail improvements reach the site. We have assumed that the locality's comprehensive plan recommends the proposed project, including provision of a DES. In addition, we have assumed that all zoning approvals to permit the Project have been obtained and that the project meets all site plan and subdivision requirements. Within this assumption is the understanding that the locality's zoning ordinance permits, either by-right or with special exception, a DES. Additionally, we have assumed that at the time of legislative approvals (assuming it will not be permitted by-right) various proffers and development conditions will be imposed to require a DES. The uses include office space (50%), commercial and retail space (25%) and residential space (25%). The office space is principally high-rise or medium rise multi-tenant buildings, the commercial and retail space is either part of the office buildings or in shopping centers, and the residential is either large scale multi-story apartment buildings or town houses. The Project also will include public buildings such as a school and/or library. The Project area is currently served by an incumbent electric utility and an incumbent natural gas utility. We also have assumed that the developer adopts and records covenants and restrictions binding on the entire site, before any development or land sales occur, which establish and reserve easements for utility lines and impose on subsequent owners or users of the site the obligation to hook up to, and buy thermal energy services from, the DES.[162]

Three basic DES ownership structures are considered in this case. The first such structure is ownership by a third-party Private Company other than either the electric or gas utility. The second structure is public ownership through a CDA or other authority. And the third structure is a combination of public and private ownership.

This case is conceptually the easiest situation in which to develop and use a DES, but it highlights the common practical problem of financing infrastructure when customer revenues may be years away. This mismatch between the timing for needed capital expenditures and the timing of development has, for example, been problematic for a number of small water utilities in Virginia and other states. Except where noted, we have assumed a thermal-only DES, with no generation or sale of electricity.

1. PRIVATE COMPANY OWNERSHIP

A thermal-only DES in this case could provide heating and cooling services to all users in the Project. To do that, it would be established as a public service corporation and would operate as a public utility subject to the jurisdiction of the SCC to the extent the SCC exercises jurisdiction and oversight of a thermal only utility. Like other utilities, the DES would establish tariff rates for its services. Thermal services could be provided to building owners or to individual building tenants. The SCC should not require a CPCN for facilities that generate thermal energy or for the extension of service lines to the entire site. However, the SCC may regulate the rates and the terms and conditions of thermal service. As noted above, the SCC currently exercises such jurisdiction over a private entity in Northern Virginia that provides chilled water service, Reston Lake Anne Air Conditioning Corporation, but has not previously regulated the provision of steam or hot water. Therefore, the SCC may regulate a thermal DES.

Because of the up-front capital costs of the DES, and the problem that phased development presents for supporting those costs, the DES may need a unique rate and hook-up fee structure that reflects accrued interest and other capital costs that cannot practically be imposed only on the initial customers. Given that the availability of the DES services should result in the ability of building owners to avoid substantial HVAC costs,

[162] Using restrictive covenants in this setting is consistent with the SCC's views and was the manner in which similar issues were handled when Reston was developed.

it is appropriate for utility rates and hook-up fees to capture a portion of those avoided costs as a means of paying for the capital costs of the DES. However, the SCC has not been generally sympathetic to the efforts of developer-water/sewer utilities to recover these types of costs in their rates. The SCC has viewed these costs as properly recoverable in the price of the property and not through rates. In the absence of clarifying legislation, or the ability to convince the SCC to view the issue otherwise for DESs, the SCC's view of this issue poses a major problem to a private DES for a Greenfield project unless a well capitalized developer is able to recover those costs from future land sales. This means that rates for the DES services may not fully reflect capital costs and related financing costs for the DES. We note, however, that even if such rates and fees were implemented, they do not necessarily solve the problem of paying for the initial capital costs before a means of repayment is at hand; the right to recover such costs through rates is only valuable if customers can be found and land sold to customers who then have sufficient demand for utility services. Developers often face similar issues in jurisdictions with limited funding for expansion of their water and waste water systems and even in requirements for the construction of substations in connection with the extension of electrical services to large scale projects. Pre-sale of the hook-up rights to the developer, careful phasing and creative financing from vendors of large scale equipment are all tools used to address these issues. In this case, and in the other cases described below, the ability to phase the development of the DES infrastructure and related costs through incremental construction and additions, is another way of addressing the financing issues.

To the extent that the DES system required electricity for its own thermal generation facilities and operations, the DES could generate electricity for its own use as long as it did not sell any of that electricity at retail to its customers. The construction of the power generation facility would require a CPCN from the SCC. The local incumbent electric utility in this case would continue to provide electric service to electric users in the Project and the natural gas utility would continue to provide natural gas for purposes other than heating and cooling, such as for gas stoves and, perhaps, as fuel for the DES itself. If the DES produced thermal energy for sale, and electric energy only for self-generation purposes, then it would be exempt from federal regulation. To the extent the Private Company DES was owned by the initial developer, and the developer owned some or all of the buildings developed on the Greenfield project, then the DES may be entitled to the self-generation exemption for a variety of utility services, much as a college now generates and distributes energy services on its campus.

If the DES was established as a public service corporation, then it would have the power of eminent domain, although that power would be subject to SCC regulation in the event the DES sought to condemn property of a locality or another public utility. However, by properly reserving easements and other rights in the Codes, Covenants, and Restrictions ("CC&Rs") and initial site plan before public roads are built, the developer should be able to minimize issues associated with eminent domain by avoiding existing roads and public utility lines. Rights of way for public streets and electric and gas utility lines can be granted across reserved easements for the DES services, or a variety of uses can be included within the reserved DES easement areas. If the developer retained ownership of the roads in a private entity, that also could avoid conflicting use and ownership issues.

If the DES sold its utility service to building owners only, then the building owners would need to resell those services to their tenants. Under applicable Virginia law discussed above, landlords have the ability to submeter for electric and gas utility services purchased from a public utility, and to charge their tenants an administrative fee to cover the cost of submetering and administering the submetering system, but cannot otherwise mark up the wholesale utility charges (although this issue is not clear in the case of heating services that a building owner purchases at wholesale from a DES and submeters to its tenants).

A DES for the Project could use a variety of fuel sources. As noted above, the use of renewable sources may have tax benefits and create carbon credits or other saleable environmental attributes that could help defray project costs. Woody biomass is used by DESs in St. Paul and in many European cities. For a central steam plant biomass or biogas is the most likely renewable fuel source. Any fuel source can be combined with geothermal systems to reduce the cost of heating and cooling. If the Project includes significant on-site waste-treatment facilities, then biogas extracted from those facilities could provide some or all of the fuel for the Project. However, if the biogas facilities are owned by an entity other than the DES, then the sale of that biogas to the DES may create conflicts with the exclusive franchise of the incumbent natural gas utility to sell and deliver gas in its service area. In some cases, natural gas will be the most efficient fuel source for this Project. The use of natural gas for the DES would probably mitigate potential conflicts with the local natural

gas utility and access a fuel source already available in the locality. Moreover, if biogas were also available as an option, adding that biogas to a natural gas fired system would probably create fewer technical hurdles. A geothermal loop could be used in conjunction with any active fuel source to reduce the fuel costs for thermal services, and solar facilities could be used as part of an electric self-generation system.

Third party heating and cooling sources would probably not play a significant role in the Project because, as noted above, we have assumed that the DES would be the sole supplier of thermal energy within the Project.[163] The DES would need to be sure that the use of those types of systems would not reduce usage of the DES's services in a manner that impaired revenues. Accordingly, the Project should be structured so as to limit to the extent possible the ability of non-DES persons at the Project to install and use such systems without the DES's consent. To the extent thermal needs in the Project were being met by the DES, such owner-installed systems would necessarily reduce DES revenues and should therefore be prohibited. Over time, if occupants of a Private Company DES "join" the DES solely because they are compelled to do so under applicable CC&Rs, and enforcement of rates or other charges is a function of a property owner's or similar association, these mechanisms may face practical and legal enforcement issues. Thus, a consensual approach to signing up DES customers that does not rely exclusively on implementation through CC&Rs is likely to be more effective and enforceable. If the thermal needs of the Project served by the DES grew over time to a level above that served by the initial or specified DES development, then provisions could be made for DES members to add thermal facilities or other means of self-generation pursuant to agreed upon rules and parameters that did not unduly impair demand for DES services. To be clear, building owners should retain the right to add energy saving equipment and, perhaps, building mounted ancillary energy generation equipment such as PV arrays that do not disrupt DES economics.

2. PUBLIC OWNERSHIP

In Hypothetical One, a Sanitary District would seem to be the most suitable form of public ownership. Three reasons in particular recommend this form of ownership. First, a Sanitary District can charge rates for actual service. Second, a Sanitary District has significant financing alternatives. It can issue bonds based on either tax revenue or rate revenue or both, although, depending on the cost of the system and assessed value of the property in the district, the 18% of assessed valuation bond limitation might present a problem in a Greenfield project with limited initial development. Third, a Sanitary District has the power to require occupants of the district to connect to the services provided by the District. Other forms of ownership, such as ownership by a locality, would certainly provide many of the same benefits as ownership by a Sanitary District. Municipal ownership would provide financing flexibility, the ability to collect rates, the ability to require connection to the municipally provided utility service, and a relatively broad grant of authority and contracting powers (although, as noted above in the Dillon's Rule discussion, the ability of a municipality to provide certain thermal services is not entirely clear). However, debt incurred by a municipality for a DES would be carried on the books of the municipality, whereas debt of a Sanitary District would not. This would make the Sanitary District debt more expensive, but it would have the benefit of being off the balance sheet of the municipality. In addition, the Sanitary District can impose taxes on its members without imposing taxes on all citizens of the locality, an outcome that may be politically more acceptable for a DES serving only the Project.

The owner of the Project would work with the locality to form the Sanitary District before development and land sales began. The Sanitary District would face many of the same financing issues as the Private Company example because of the fact that, even with the power to impose taxes and rates, the Sanitary District will need to construct a central DES facility before it has customers and customer revenue – a familiar financing concern for any infrastructure. The Sanitary District can finance at tax exempt rates, which will reduce the cost of the financing. But the fundamental phasing issue still remains. One way of addressing this issue is to finance not only the capital costs, but also the interest costs of the DES system for some initial period of time. A carefully structured debt offering might include financing with capitalized interest or interest-only debt payments for, say, three years after completion, with funded interest and principal payments beginning after anticipated land sales and building construction have created customers and attendant revenues to pay interest and principal.

[163] We note here the discussion above about the use of third party thermal sources such as geothermal where they are available, but they are not included within this hypothetical.

This general approach would be consistent with those seen in other municipal and authority financings. Another potential source of financing support could be an obligation by the owner of Greenfield to pay some specified amount of Service District taxes beginning at some time in the future. This could provide a financing buffer for slower than expected development and slow growth in Sanitary District tax and rate revenues. Also, as discussed above, the developer of the Greenfield project could retain ownership of some or all of the DES assets without losing the benefits of the Sanitary District approach. In addition, as noted above, because a public entity's rates would not be regulated by the SCC, a public entity can include in its rates for DES services capital costs that a privately-owned DES could not.

As with the Private Company, a DES owned by a Sanitary District could potentially address a portion of its financing issues by generating electricity through a CHP plant and selling that power at wholesale. Assuming there is an attractive market for that power, such sales can generate revenue immediately for the DES without regard to the pace of property development within the District. However, such a CHP system will effectively require that the thermal generation facility be operated all the time, even if there is no market initially for the thermal energy. The additional capital costs associated with a CHP facility and the problems of initial operation before a steady thermal load is available may make the CHP impractical, but it certainly deserves consideration. Additionally, a DES developer may avoid some capital costs by harvesting waste heat generated by third parties, such as a nearby manufacturer, power plant, or even sewer trunk.

Because the Sanitary District would be a political subdivision, the rates and quality of service of the DES would not be subject to regulation by the SCC. If the DES built only a thermal generation facility, then the construction of that facility would not require a CPCN. However, if the Sanitary District built electric generation facilities, then a CPCN would be required even if the electricity was only used by the District and was not sold to any one else. Note, however, if the electric generation is less than 5 MW then no CPCN is required, and if the electric generation is more than 5 MW but less than 50 MW, then the CPCN requirements are less stringent. As noted above, certain renewable energy generation projects can avoid a CPCN if proceeding under the DEQ rule by permit process. Of course, if the Sanitary District received a CPCN, it could generate power, sell it at wholesale to an electric utility or other wholesale purchaser such as a power marketer, and potentially (subject to the various caveats noted above in Section V), sell it at retail to occupants of the Sanitary District.

Because we have assumed in this Case that the DES for Greenfield is implemented before significant development begins, the issues of easements, eminent domain and conflicting uses can be avoided with Sanitary District ownership in the same was as Private Company ownership described above. Similarly, the environmental permitting issues for the Sanitary District should not differ materially from the Private Company ownership example. After development had been undertaken, the Sanitary District would have the power of eminent domain to acquire necessary easements and rights of way that had not initially been identified, although as discussed above, that process may involve complications where conflicting uses are involved.

In terms of services, for DES thermal customers, "competitive" generation within the District, there should be no appreciable difference between the Private Company as discussed above and the Sanitary District. However, because the Sanitary District is not subject to SCC rate regulation for rates and terms and conditions of service, the district would have considerably greater flexibility than the Private Company in setting rates, etc.

The difficult financing issues discussed above might be addressed through a combination of structures. In this approach, a locality might build and own the thermal or CHP generation. Because the locality has the ability to finance on its balance sheet and support that financing with general tax and utility revenues, the problems associated with the lag in tax and utility revenues faced by both a Private Owner or a Sanitary District could be avoided if the locality was willing to incur the indebtedness. The locality could then sell the thermal energy to a Sanitary District at wholesale, who would then resell it to occupants of the Sanitary District. Once Sanitary District development reached a pre-determined stage, the Sanitary District could buy the generation station from the municipality. At that point, projected District tax revenues and utility revenues would be sufficient to permit the Sanitary District to finance the purchase of the facility. Under those circumstances, the taxes and rates charged by the district to its users could include the acquisition costs and related financing costs.

B. HYPOTHETICAL TWO: GRAYFIELD URBANIZED MULTIPLE LAND-OWNER

In most respects, the legal and regulatory issues applicable to a Greenfield site are the same as those applicable to a Grayfield site. However, the practical application of those rules in a Grayfield site is considerably more complicated. A Grayfield site may, however, present at least one major advantage over a Greenfield site – the immediate availability of DES customers to support the capital expenditures required to implement a DES.

For the purposes of Hypothetical Two, we have assumed a large suburban mixed use development that is heavily developed over approximately 1,000 acres but is entirely within one locality. Current uses include over 25 million square feet of office, with expected growth of another 20 million or so square feet in the next 20 years. The area's growth will be transit oriented around a metro hub and the intersection of large highways. The area has multiple land-owners. Road and rail improvements will be under construction for a number of years as the land is further developed. The area will contain civic buildings such as schools, libraries, etc. Incumbent electric and natural gas utilities serve the area.

Land use issues for a Grayfield project are likely to be quite complicated. If the Comprehensive Plan does not contemplate development of a DES in the Grayfield area, then the plan will need to be amended to avoid 2232 Review. Even if the Comprehensive Plan is amended, changes to the zoning ordinance will probably be required in order to identify a stand alone DES as a permitted use in the relevant area. Fragmented ownership of land will pose problems for comprehensive implementation of a DES. A locality could require lot consolidation prior to zoning approval, which will create larger redevelopments and more opportunities for a DES to be implemented. Additionally, development conditions and proffers could be placed on the Project to require inclusion of a DES. Another complicating factor is that redevelopment may occur through the addition of new buildings to sites with existing buildings. In those cases the existing buildings would likely need to be retrofitted to accommodate a DES.

Regardless of its ownership structure, the Grayfield project could present difficult issues of eminent domain. To the extent that the locality where the Project is located supports the Project, that locality can obviously consent to the use of streets and public rights of way for utility lines serving the Project. Where those utility lines encroach onto easement rights of the incumbent gas and electric company, or other public utilities, then the issues may become difficult. However, as a general proposition, to the extent that the DES lines can be located within public streets and rights of way of a supportive locality, or if a utility has been brought into the development early in the process so easement issues can be addressed through a partnership or other agreement, the eminent domain issues should not be insuperable.

The Project will also need easement rights or similar use rights on and over the property of building owners to allow for connection of the DES pipes to the various building HVAC systems. Gaining these rights will be complicated by the fact that the buildings will be subject to existing mortgage liens that will probably be superior to the DES's easement rights. The easement rights granted the DES from the building owners would need to include the right to connect to the building's systems, and include the right of access to the building and the interconnection point at least for the purposes of access, maintenance, inspections, metering and the like. There is nothing technically difficult about these arrangements, but they may entail s detailed negotiation.

If the Grayfield DES is owned by a public owner, then the degree of buy-in by local landowners may determine the form of public ownership. If the landowners agree to the creation of a Sanitary District, then that form of ownership may be best for Grayfield for the same reasons as detailed for the Greenfield project. However, if landowner support is less than unanimous and a Sanitary District is hard to implement, then direct municipal ownership may be more practical. As with a Greenfield project, the ability to compel landowners to connect to the system is a substantial benefit of both direct municipal ownership and Sanitary District ownership. That benefit is not as important in the case of a Greenfield project where the initial developer can effectively achieve the same result through his initial development planning and covenants. However, where landowners agree to be served by the DES in a Grayfield project, the question of compelled connection becomes less important. The issue then becomes whether the DES can strike agreements with enough landowners to generate the revenue needed to support the initial capital costs and ongoing operating costs of the DES. This consensual approach should be available to either a Private Owner or a public owner.

The owner of the Grayfield DES would have the same rate and regulatory issues as the Greenfield project. Those issues should not change because Hypothetical Two is a Grayfield rather than a Greenfield. The principal difference in terms of rate issues is that the Grayfield DES will have customers in place from the date that the DES commences commercial operations. This is a significant practical advantage for a non-public DES and will allow for rate setting that will be more likely to support financing for the DES. In addition, to the extent the DES's rates are regulated by the SCC, there is a better chance the SCC will allow rate recovery for the capital costs of the Grayfield DES – a significant benefit over a Greenfield setting.

An additional advantage of having customers in place when operations begin is that CHP becomes much more feasible. The developer will have a good sense of thermal demand and the expected variations in that demand over the course of a day, which will enable a CHP facility to be designed for efficient operations. The variations in thermal load will determine the efficient size and capacity for electric generation in a CHP configuration.

Again, the non-public DES could not sell power at retail, so would need to use the power generated by the CHP either for its own parasitic load or for sale at wholesale to a electric utility or other wholesale purchaser.

The permitting issues for a Grayfield project may become complicated if the central generating system and the buildings served by the DES are considered one source. If that source is a large source of air emissions in a non-attainment area like Northern Virginia, that will create its own significant permitting issues.

A Grayfield DES may have third party sources of thermal energy generated by its customers. To the extent that existing building systems are maintained in operating condition, then the DES may contract with those building owners to be able to dispatch the building HVAC systems in certain peak load situations. Alternatively, the DES could purchase the HVAC central equipment from the building owner and control its dispatch. If the DES had HVAC capacity through dispatch of existing building systems, this may enable the DES to construct a smaller central plant that was sized for a smaller peak load than would otherwise be the case, but building owners may not want to incur the costs to continue to maintain their legacy HVAC systems. The DES may also want to contract with building owners to use their land or buildings to site solar thermal, site specific geothermal, or other alternative means of generating thermal or electric energy. Also, as discussed above, a Grayfield project may be near significant heat sources which need a means of cooling their heated water or would like to take advantage of heat energy generated by their industrial process. These sources of thermal energy could be piped to the DES, used by the DES to reduce its generation requirements and reduce overall energy consumption in the area.

VIII. CONCLUSION

District energy systems may be established and operated in Virginia, subject to a complex legal framework. Depending on the ownership arrangements and the characteristics of the system, a DES may be subject to the limitations on powers of localities, SCC regulation, and land use and environmental regulation. DESs have an array of opportunities and constraints for finance and contractual arrangements. While legislation or other legal clarification may be appropriate to resolve certain issues of authority for and regulation of DESs, there are clear existing paths for public and/or private establishment, ownership, and operation of DESs.