ARNOLD & PORTER LLP

Energy Finance

Legal, Policy and Regulatory Considerations

Council of Development Finance Agencies
Intro Energy Finance Web Course

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Key Concepts of Power Generation

Sources of Fuel in US

- Coal - 48%
- Natural Gas 21.4%
- Nuclear 19.6%
- Hydro 6.2%
- Petroleum – 1.5%
- Renewables – 3.06%

Key Concepts of Power Generation

Efficiency

- Efficiency is the percentage of usable electricity that is created from the energy source
- For all fossil fuels and nuclear, heat is created in the process of generating electricity (known as waste heat)
- For most commercial power generation in the U.S., no use is made of the waste heat (single-cycle power plants)
- Average efficiency of all power generation in the U.S. is about 33%
- Combined cycle plants make use of waste heat to make steam for additional power generation – most modern natural gas power plants have efficiencies of 50-55%
- Cogeneration (or combined heat and power) is when electricity and useful thermal energy is generated at the same time; the thermal energy can be in the form of steam (industrial and other applications) or hot or chilled water (heating and cooling)
- Properly configured cogen or CHP plants can have efficiencies of over 80%
- It takes electricity to transmit electricity – average line losses about 10%; can be more in times of congestion

Models for Power Generation

- Central Station Generation
- Distributed Generation
- District Energy

Models for Power Generation

Central Station Generation

- Large Power Plants in relatively remote locations generate electricity
- Electricity is put into the high voltage bulk transmission system
- Electricity is stepped down in voltage for distribution to local customers
- Due to low efficiency of generation (33%) and line losses (10%), huge amounts of primary energy is wasted in the central generation model.

Models for Power Generation

Distributed Generation

- Electricity is generated at or near the source where it is used from small units
- The waste heat is captured to make useful thermal energy
- No transmission or line losses
- Types of distributed Generation
  - Natural gas cogeneration
  - Fuel Cells
  - Solar – Photovoltaic and Thermal
  - Geothermal heat pumps
  - On site wind turbines

Models for Power Generation

District Energy

- Electricity is generated from an anchor power plant or several small units
- Electricity is distributed to users in a defined area (a campus or urban area) through wires owned by the system
- The waste heat from power generation is captured to make thermal energy
- Users is the district are also connected by pipes or conduits through which the thermal energy is distributed to users

Players

- Investor Owned Utilities – currently about 170 in the U.S.
  - Many are essentially distribution utilities after regulatory reforms starting about 12 years ago
  - Others retain power generation
- Independent Power Producers
- Municipal Utilities
- Cooperative Utilities
- Federal or State Power Companies (TVA, BPA, NYPA)
- District Energy Companies (publicly or privately owned)
- Regional Transmission Operators or Independent System Operators

Basic Principles of Regulation

Federal Regulation

- Federal Power Act (jurisdiction over utility mergers and sales of power, administered by FREC)
- Environmental Laws – Clean Air Act, NEPA

State Regulation

- Public Service Laws
- Franchised Service Territories
- Rate Regulation
- Interconnection of generators
- Administered by State Public Service Commissions
- State Environmental Laws

Local

- Permitting and Land Use

RTO/ISO Rules

- Operation of Power Markets

Advantages and Disadvantages – Focus of State Economic Development

Aspect	Central Generation	Distributed Generation	District Energy
Efficiency	Low	High	Highest
Environmental	Undesirable – fossil fuels, carbon and other emissions	Desirable, especially if renewable fuels are used	Most desirable
Reliability	Can be problematic	High, back-up power advantages	Highest
Development Process	Long and complex	Relatively short – permitting not complex – implementation is less than one year	More complex than individual DG units
Up-front Capital Cost	High	Modest	Modest, but costlier than individual DG units
Transmission and Distribution Constraints/Investment	Congestion prevalent, new generation requires significant transmission investment	No additional transmission infrastructure needed; may require distribution system upgrades	No additional transmission infrastructure needed; may require distribution system upgrades
Regulation	Highly regulated	Lightly regulated	State regulatory issues and municipal land use considerations
Local Control	Low	High	High
Economic Development	Regional benefits if cost of power is lowered	Benefits individual host the most	Many local economic development advantages

Federal Support for Renewables

- **Production Tax Credit**
  - 2.1¢ per kWh or 1/1¢ per kWh/depending on type of renewable
  - Placed in service deadline – end 2012 for wind, end 2013 for others
  - 10 year duration
- **Investment Tax Credit**
  - 30% of eligible project cost (10% CHP)
  - Taken when project placed in service
  - Placed in service deadline: end 2012 for wind, end 2013 for others
- **Grant in Lieu of Tax Credit**
  - Cash grant instead of ITC equal to 30% of eligible project cost (10% CHP)
  - Received when project placed in service
  - Construction must commence by end 2011
- **Bonus/Accelerated Depreciation**
  - 100% bonus depreciation for investment property acquired before end 2011
- **DOE Loan Guaranty Programs**
  - §1705 Federal loan guarantee for renewable energy projects
  - §1705 Federal loan guarantee for innovative technologies

Policy Issues

Do we continue to subsidize renewable energy?

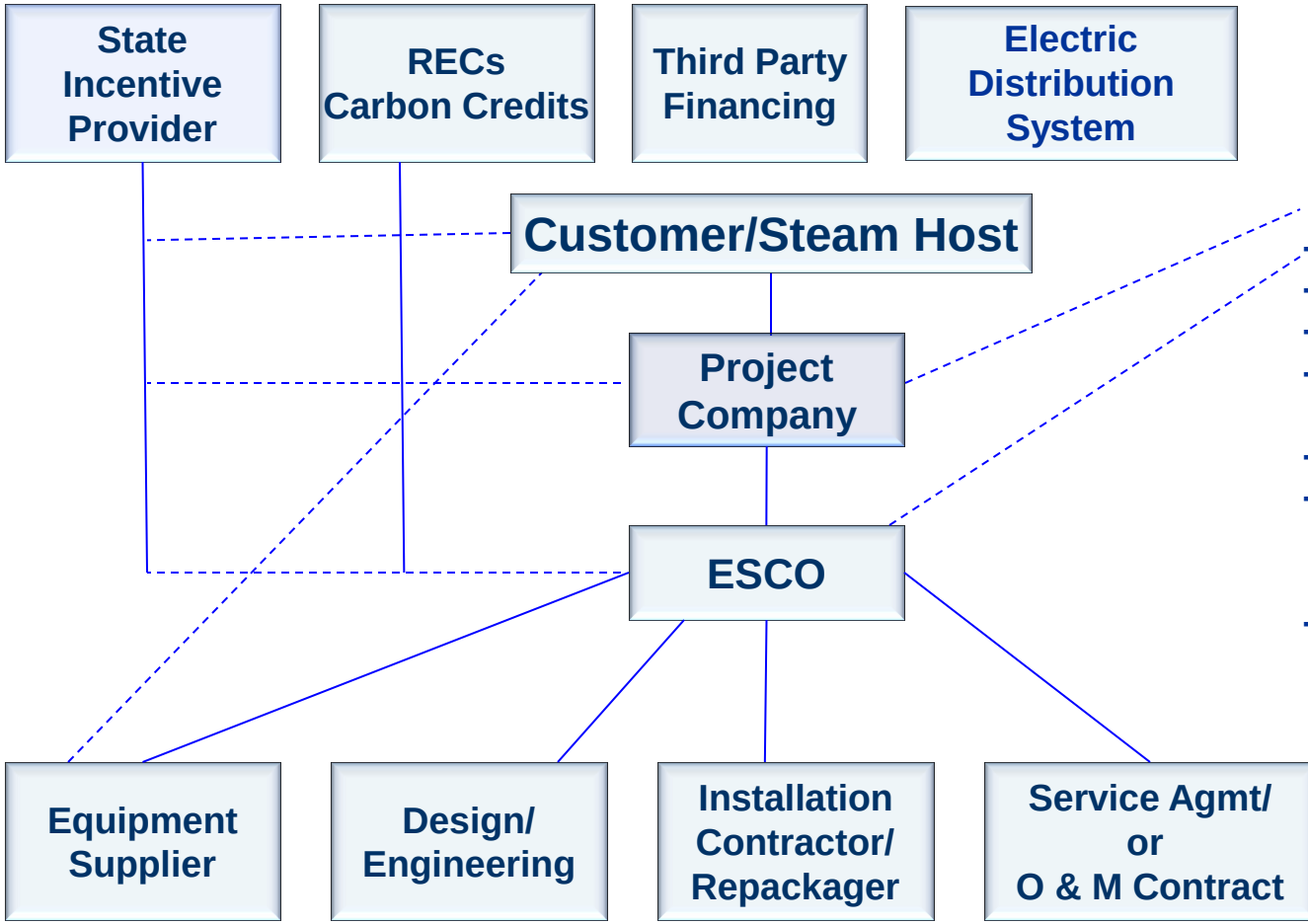
Is natural gas the transition fuel?

Do we encourage hydro-fracking?

Models for Delivering On-Site Generation: Self-Manage or Hire ESCO?

- Considerations regarding use of ESCO, value added, extra cost
- Design Build
  - Essentially a Construction Contract
- Energy Sales / Solar PPA
  - ESCO procures, installs, commissions, owns, operates and maintains equipment
  - Facility owner buys electricity from ESCO from power generation equipment located on site.
  - Price of electricity sales: Fixed, grid rate or some discount?
  - Availability Factor – who takes equipment risk?
  - Term of 7 to 15 years; at end of term either ESCO removes equipment or it reverts to owner (Solar PPA)
  - Allocation of benefit of incentives, tax advantages, carbon credits

IPP Distributed Generation Project Structure



Energy Services Agreement/Solar PPA

- Assess energy usage
- Study feasibility of DG
- Design system/propose EEMS
- Apply for incentives
- Obtain interconnection approval/permits
- Supply/install system
- Sell electricity/steam (at utility price or discount)
- Service (maintain system)

Site Lease:

-Right to use site
-Fixture issues
-Record interest

Issues with Distributed Generation

- Interconnection (induction vs. synchronous)
  - Single greatest impediment to greater use of on-site generation
  - NY SIR up to 2 MW
  - NY requirements to net meter commercial and industrial solar systems up to 2 MW
- Relationship with Utility (standby tariffs)
- Land Use/Permitting Issues (clean air, local building permits)
- Performance Risk of Equipment (Importance of O&M)

Distributed Generation Regulatory concerns

Federal

- Exemption from application of Federal Power Act by obtaining QF status (no regulation of sale of power)
- Clean Air Act – usually a minor source state

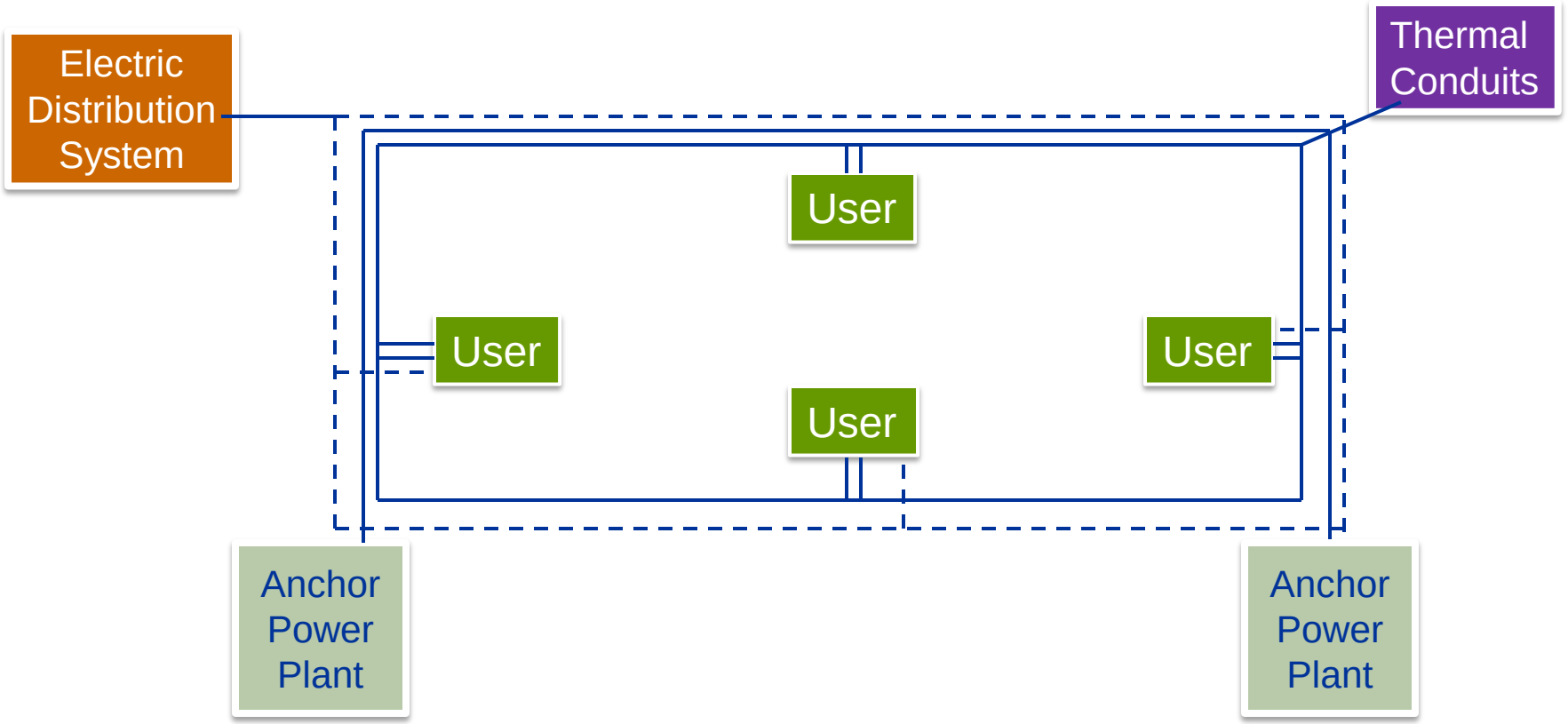
Local

- Land use/permitting

ISO/RTO

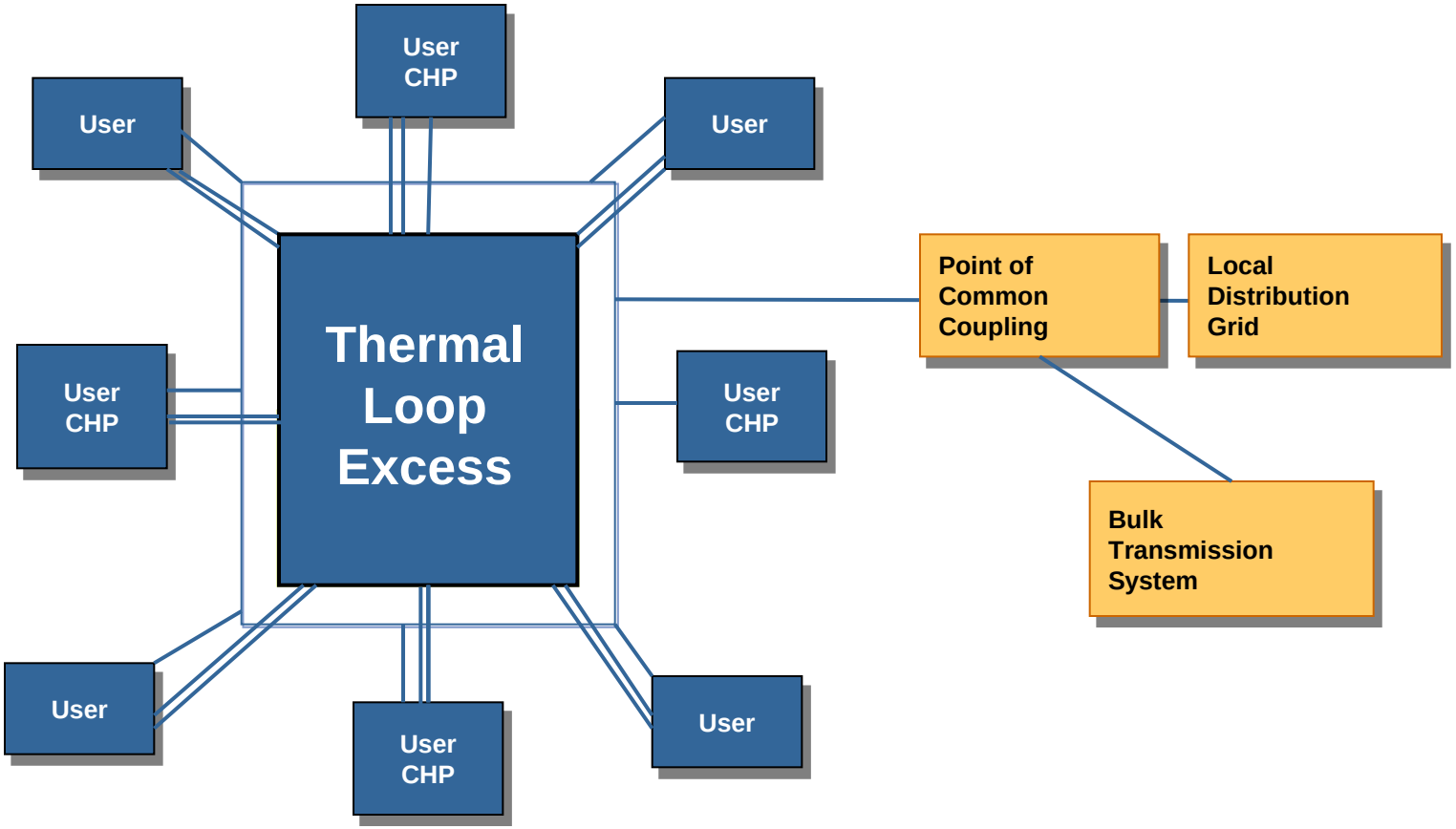
- Following Local Utility or ISO/RTO interconnection

District Energy System



Microgrid

(multiple distributed generators)



District Energy in the U.S.

- Campus Systems
  - 5800 around the U.S.
- Urban Systems
  - 68 systems (noteworthy examples: Nashville, Tennessee; St. Paul, Minnesota; Austin, Texas; and the Trigen Systems – Trenton, New Jersey is an example)
- New York Steam System
  - World's largest district energy system

Legal Structures for District Energy

- Regulated Utility
- Private Company (LLC or Other)
  - New cogeneration exceptions
- Municipal Utility
- Cooperative
- Special Taxing District
- Business Improvement Districts
  - In most cases state enabling legislation does not allow for electricity sales

West 96th Street

East 89th Street

Con Edison

Steam System

2003

Battery Park

Legal Structures for District Energy

- Campus System
  - Generally speaking, no legal restriction on distribution of either electricity or thermal energy on a single landowner's property
- Urban Systems (without local electric distribution)
  - No federal restriction on sale of thermal energy
  - Generally speaking, state law does not restrict sales of thermal energy
  - Main legal issue re thermal energy is local permits for conduits (assuming the anchor power plant can otherwise be permitted)
  - One or more anchor plants must interconnect into the existing DSCO grid (or bulk transmission grid)
    - Local DSCO interconnection difficult
    - Bulk transmission system
    - ISO queues

Urban Districts (with electric distribution)

- Electric distribution infrastructure and sales of electricity – Complex array of federal, state and local laws and regulations that have the effect of creating serious obstacles to the development of district energy in the U.S.
- Power Sales to Users in District
  - Franchised utility
    - Franchises granted either by state or municipality
    - District Energy company can be an investor-owned utility, like Con Edison in New York
  - May or may not be exclusive
    - If exclusive, no possibility of additional distribution wires in territory
    - If not exclusive, theoretically possible to install new wires but many states require a demonstration of the necessity and convenience of the (partially redundant) system before the state public service commission
    - Some states require consent of adjoining utility

District Energy Structures

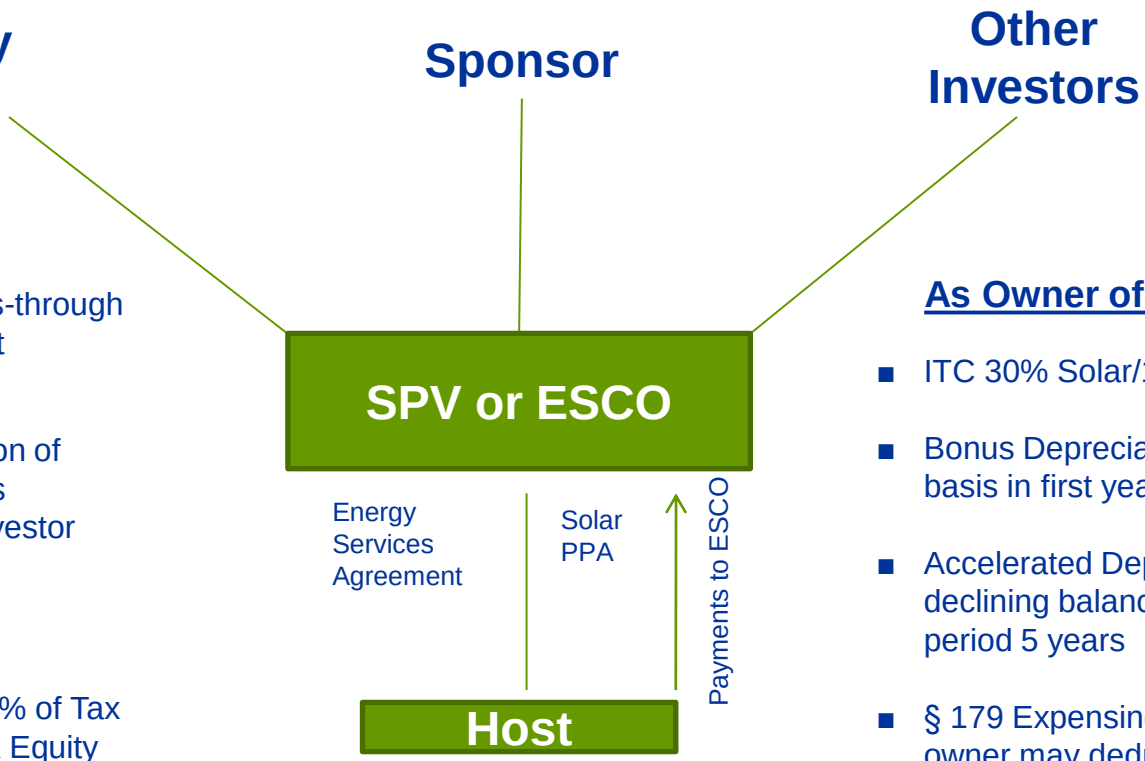
- Municipal Utility
  - Most state laws allow municipalities to create their own utilities
    - Usually no obstacle to installing power generation to serve public buildings
    - Installation of distribution wires across public ways subject to same exclusivity considerations mentioned above
  - Municipalities can in theory create a parallel public utility or municipalize existing infrastructure
    - Most state laws require public referendum to create a municipal utility

District Energy Structures (cont'd)

- Special Taxing Districts
- Private Company (LLC)
- Recent Developments in Cogeneration
  - N.J. Stat. Ann. § 48:3-51
    - Enacted in 1999 to exempt from regulation electricity sales by on-site generation facilities to "contiguous" end use customers, which includes customers separated by *an* easement or public thoroughfare.
    - Amendment effective January 16, 2010 extended the definition of "contiguous" to include end use customers purchasing thermal energy services wherever such users are located.
  - N.Y. Pub. Serv. Law § 2
    - Exempts from regulation cogeneration facilities 80mw or smaller and the distribution of energy to users located at or near such facilities.
    - Burrstone Energy Center 2007 declaratory ruling by the N.Y. Public Services commission - determined that cogeneration facilities were permitted to distribute energy to multiple end users and that the facility's distribution lines were permitted to cross public streets in order to do so.

Financing

- Design Build Model:
  - Owner must provide own financing
- Energy Sales Model
  - LLC - Equity Investment
  - Allocation of Incentives
  - Tax flips



LLC – elects pass-through treatment

Special Allocation of Tax Benefits to Tax Equity Investor

Tax Flip

1st 5 years – 99% of Tax Benefits to Tax Equity Investors then transition to 5%

Agreement needs to be set up as a Services Contract for SPV or ESCO to claim all tax benefits

As Owner of On-Site Equipment

- ITC 30% Solar/10% CHP
- Bonus Depreciation – 50% of adjusted basis in first year
- Accelerated Depreciation – double declining balance sheet – recovery period 5 years
- § 179 Expensing – in lieu of depreciation, owner may deduct entire cost of property in the year it is purchased for use in active trade or business

Other Tax Considerations

- Services Contract under § 7701(e)(3) IRC – Special Rule if contract involves the sale to a service recipient of electrical or thermal energy produced by an alternative energy facility or a cogeneration facility
- True Lease if not services contract
- Do not allow it to be an installment sale – no tax benefits
- If an Owner or ESCO installs a system, and there is no tax equity investor, it can be sold and leased back within 90 days of installation to a tax credit buyer

Cash Grant in Lieu of Credit

- 30% for Solar
  - Geothermal (includes heat pumps)
  - Fuel cells
  - Small wind
- 10% for CHP
  - Microturbines
- For projects placed in service in 2010 and 2011 or for projects on which construction has commenced in 2010
- Applications must be submitted by October 1, 2011

Incentives – Solar Example – New York

- Rebates (PON 1050)
  - $1.75/watt up to 50kW per site/meter(residential/commercial/non-profit) not to exceed 50% of total installed system cost
  - Due Date June 30, 2010
  - NYSERDA can waive caps on case-by-case basis

NYSERDA CHP Programs

- Existing facilities incentives for peak demand reduction

Use of Federal Tax Credits

- 30% investment or production tax credit for solar electric and thermal, fuel cells, small wind
- 10% investment tax credit for micro turbine and CHP property.

Example (without state incentives):

Cost of system	=	100
Federal Tax Credit		30%
Reduces taxable basis by ½	-	85
Bonus Depreciation (first year):		42.5
Accelerated Depreciation		
(five years)		42.5