

# ***Renewable Energy in the Mad River Valley***

## ***Energy Planning & Implementation Guidebook for Vermont Communities***

**August 30, 2011**







VNRC was founded in 1963 by farmers and foresters, outdoor recreation enthusiasts, tourism industry representatives, and others to protect the natural resources that their lives depended on:

- Productive working farms and forests;
- Ecological health;
- Clean, abundant fresh water;
- Strong, in-tact communities.





With the support of our 4,000 members and activists, VNRC works across four program areas from the grassroots to the Legislature to promote policies and practices that:

- Support **vibrant communities, healthy downtowns and the working landscape**
- Keep Vermont's **water pure, public and plentiful**
- Protect Vermont's **natural areas and forests wild, working and whole**
- Promote a **clean, green and efficient energy future**





# Energy Planning & Implementation Guidebook for Vermont Communities

April 2011



<http://www.vnrc.org/>





# Benefits of Adopting a Municipal Plan (that includes a strong Energy Plan)

- Requires a **comprehensive look** at the community, including the interrelatedness of issues (e.g., land use, transportation, energy and climate change).
- **Engages citizens** in the planning process -- this is a two way street that can inform the public about energy needs and challenges, and involve them in making decisions.
- Provides a structure for **analyzing and documenting current conditions and needs**, and for projecting future trends.
- Creates an opportunity to enact clear **Town policies to guide the actions of local officials** and others in a variety of settings (e.g., Act 250, Section 248, grant programs, capital budgets).
- If done properly, provides an **implementation plan** that sets forth the communities priorities, identifies specific tasks to be undertaken by various municipal (and non-municipal?) people and organizations, and therefore serves as a blueprint for greater energy independence.



# Communities Tackling Vermont's Energy Challenge

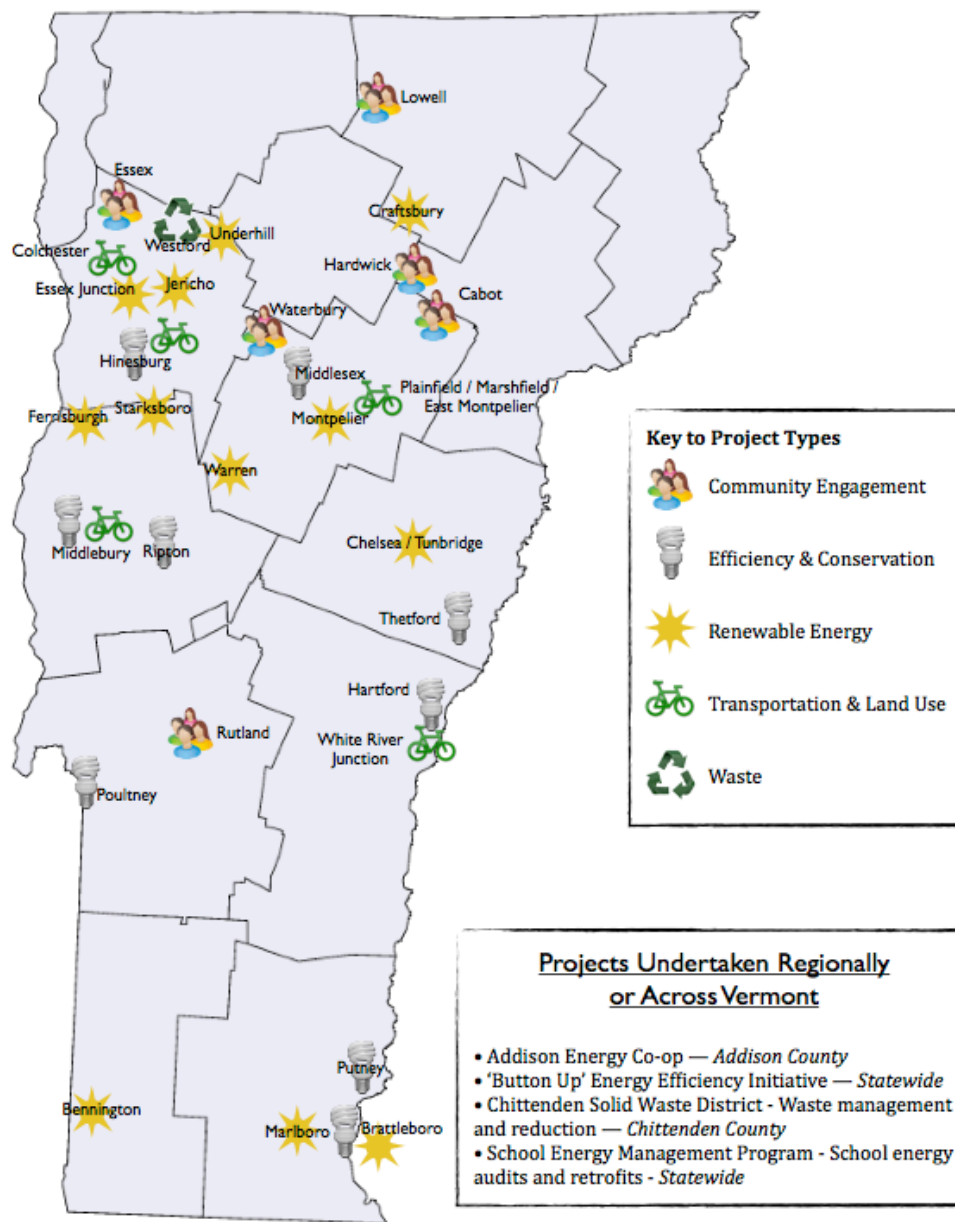
*From Ideas to Action:*  
Implementing Clean Energy Strategies

April 2011





## Clean Energy Implementation Projects Across Vermont



# Where does energy fit in municipal planning in Vermont?

Municipalities are not required to adopt a plan (but 90% have).

These plans must include 10 elements:

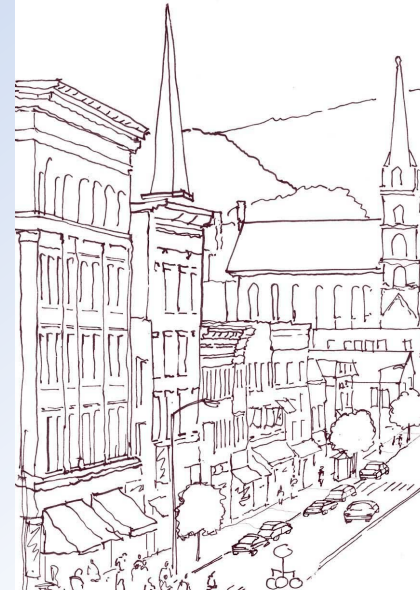
1. A **land use** plan
2. A **transportation** plan
3. A utility and facility plan
4. A statement of policies on the preservation of rare and irreplaceable natural areas, scenic and historic features and resources
5. An educational facilities plan
6. A housing element
7. An **energy** plan
8. A statement indicating how the plan relates to development trends and plans for adjacent municipalities, areas, and the region
9. A statement of objectives, policies, and programs
10. A recommended program for (plan) implementation



# Vermont Planning & Development Goals

## First and foremost

1. To plan developments so as to maintain the historic settlement pattern of compact villages and urban centers surrounded by rural countryside



# Vermont Planning & Development Goals

...And

4. To provide for **safe, convenient, economic and energy efficient transportation systems** that respect the integrity of the natural environment, including public transit options and paths for pedestrians and bicyclers
7. To encourage the **efficient use of energy** and the **development of renewable energy resources**, including wind, solar, hydro, and biofuels





... and to encourage **citizen participation** at all levels of the planning process, and to assure that decisions shall be made at the most local level possible commensurate with their impact.



Cabot School Energy Literacy Program



Hardwick Energy Fair

# Key components of an Energy Plan



An Energy Plan *must* include:

- An analysis of energy resources, needs, scarcities, costs and problems within the municipality
- A statement of policy on the conservation of energy, including programs (such as thermal integrity standards for buildings) to implement that policy
- A statement of policy on the development of renewable energy resources
- A statement of policy on patterns and densities of land use likely to result in conservation of energy
- And may address other related issues.

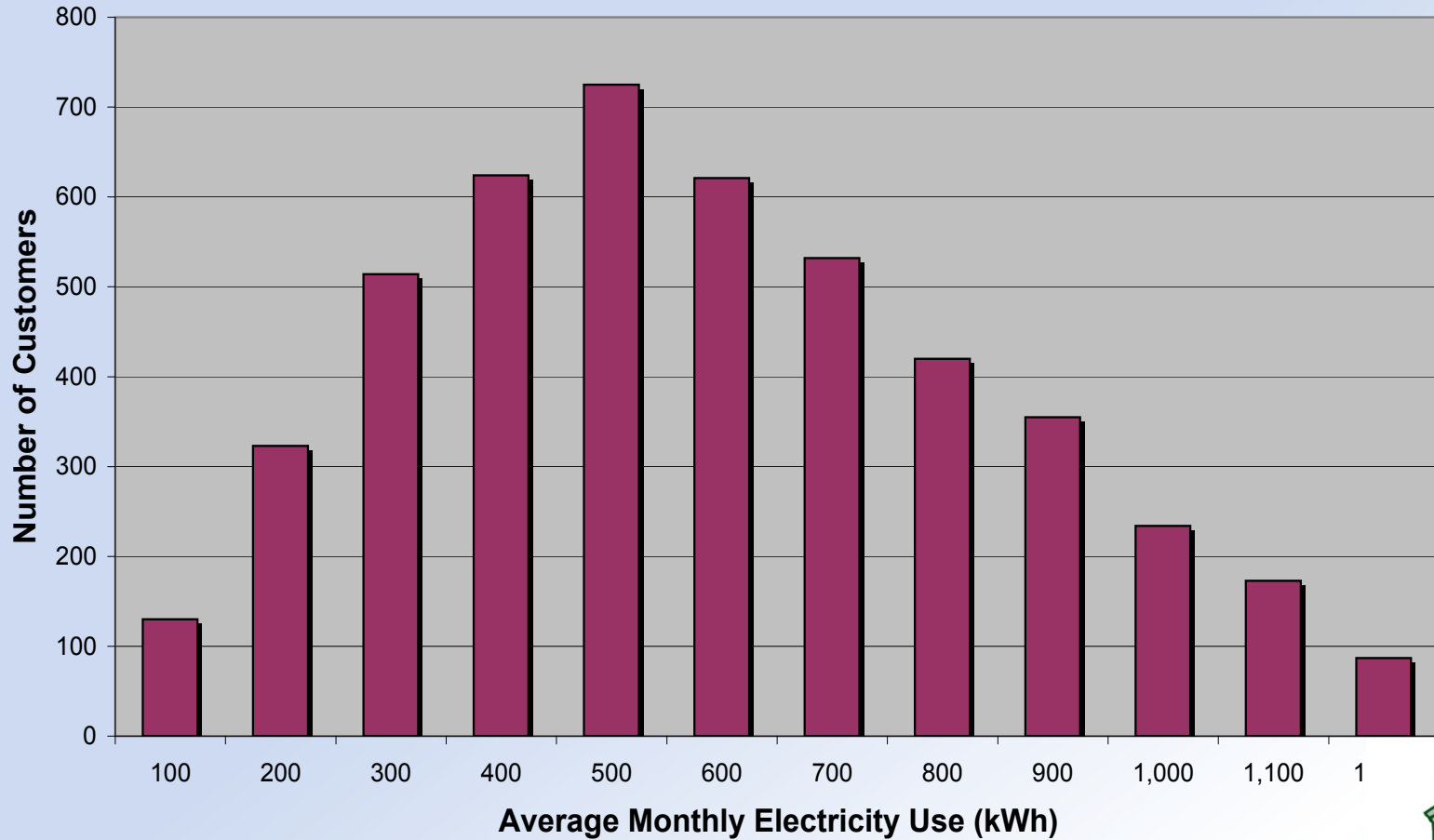


# *An analysis of energy resources, needs, scarcities, costs and problems...*

... would ideally include:

- **Energy use** in government operations and community as a whole – to document trends and establish benchmarks
- **Projected future demand** for energy in municipal government and the community
- **Availability of energy resources**, including local sources, suppliers, potential renewable resources (e.g., wind potential)
- **Fiscal impacts** (costs) of energy consumption for local government and community as a whole, based on current and projected costs
- **Current or future problems or scarcities** (e.g., security or reliability of various energy sources, transmission capacity)

## Residential Electricity Use Town of Essex







A Vermont Home Energy Savings Campaign



## *A statement of policy on the development of renewable energy resources*



Under State Law (30 VSA §248), before the public service board issues a certificate of public good ... it shall find that the purchase, investment or construction:

(1)with respect to an in-state facility, (the board shall find the proposed facility) will not unduly interfere with the orderly development of the region with due consideration having been given to the recommendations of the municipal and regional planning commissions, the recommendations of the municipal legislative bodies, *and the land conservation measures contained in the plan of any affected municipality.*



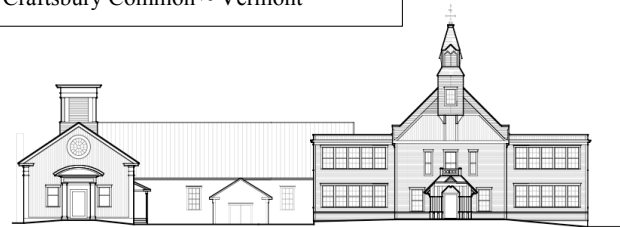






## Craftsbury Academy

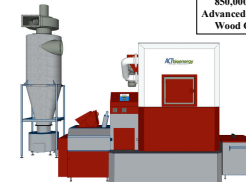
Craftsbury Common ~ Vermont



### ACT's Combination Wood Chip Pellet & Boiler

- Offset of 25,000+ gallons annually of Heating oil
- Heating 26,000sq. ft. School & Gym
- Annual savings to exceed \$18,000
- Craftsbury Academy and it's community are committed to being carbon natural...
- Deep Energy retrofit underway as well.

850,000 Btu ACT Boiler  
Advanced Climate Technologies  
Wood Chip / Pellet Boiler



BAST & ROOD ARCHITECTS  
187 WINDROW LANE  
PO BOX 220  
HINESBURG, VT 05461

TEL: 802 - 482 - 5200  
FAX: 802 - 482 - 3455  
EMAIL: bastrood@gmvt.net



# *A statement of policy on patterns and densities of land use likely to result in conservation of energy*

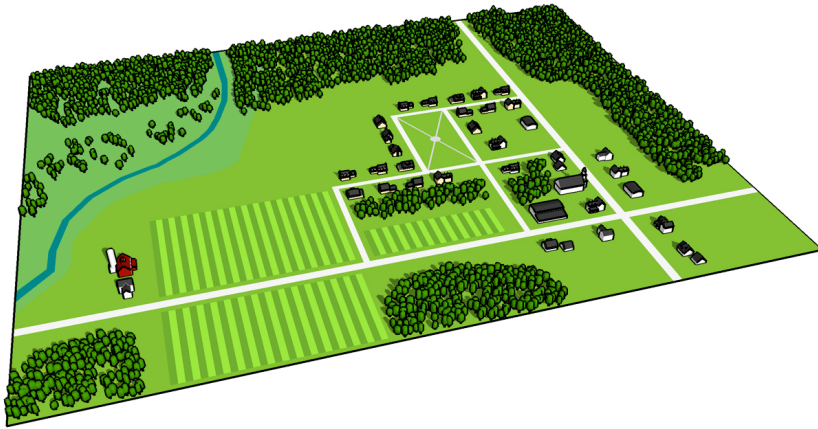


A **land use plan** (shall) consist of a map and statement of present and prospective land uses, indicating:

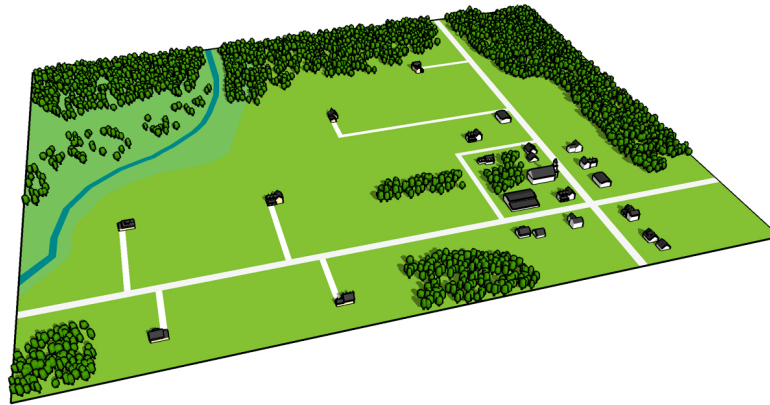
- those areas proposed for forests, recreation, agriculture, residences, commerce, industry, public and semi-public uses and open spaces reserved for flood plain, wetland protection, or other conservation purposes; and
- setting forth the present and prospective location, amount, intensity and character of such land uses; and
- the appropriate timing or sequence of land development activities in relation to the provision of necessary community facilities and service.

# Promote Smart Growth

This ...



... not this.



Images: Smart Growth Vermont

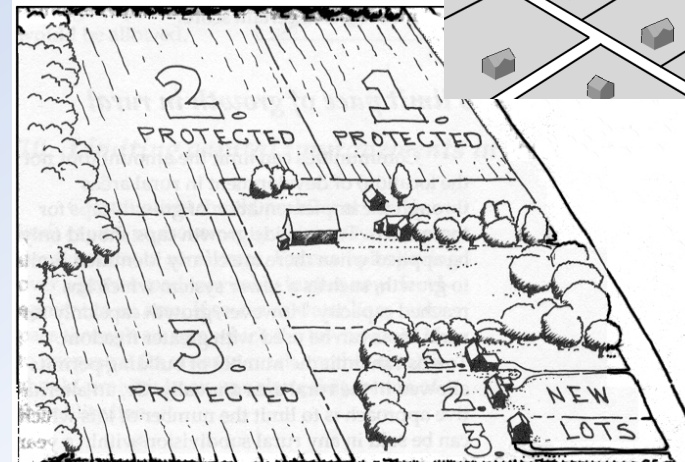
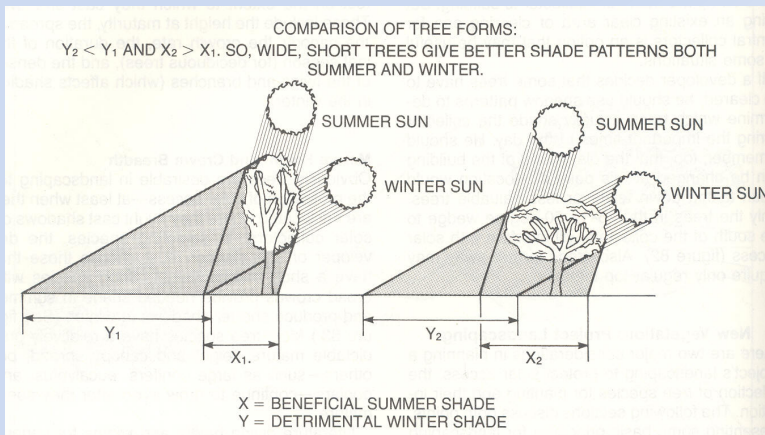
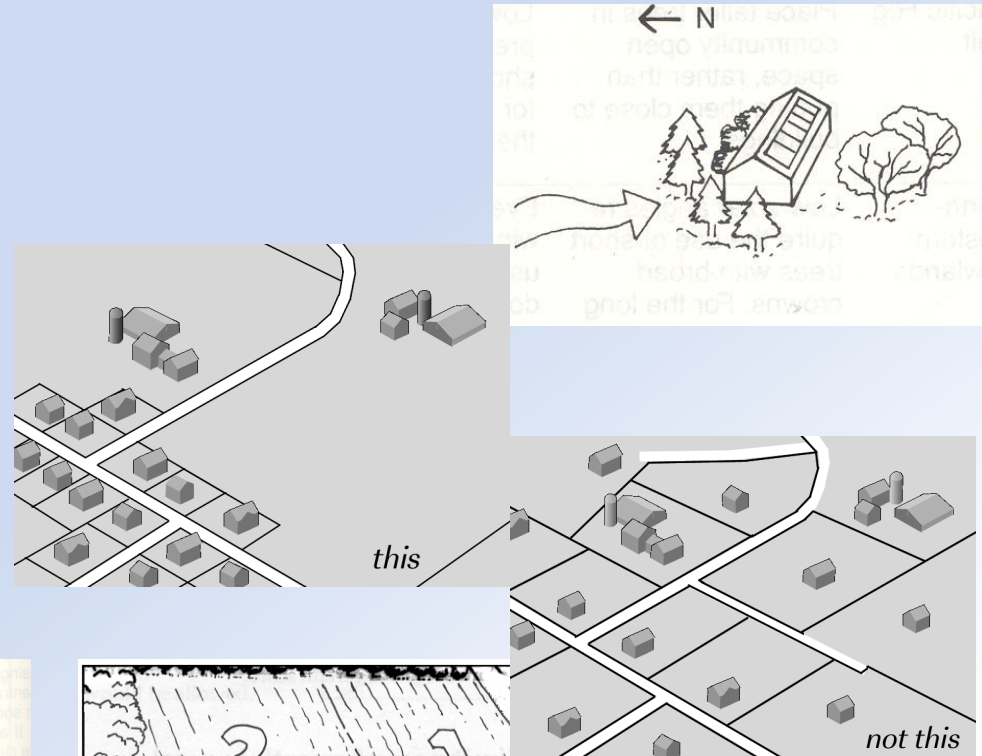


# Keep the Working Landscape Working





# Considerations Under Development Review



# Key Components of Transportation Plans



A transportation plan (shall) consist of a **map and statement of present and prospective transportation and circulation facilities** showing existing and proposed highways and streets by type and character of improvement, and where pertinent, **parking facilities, transit routes, terminals, bicycle paths and trails**, scenic roads, airports, **railroads** and port facilities, and other similar facilities or uses, **with indications of priority of need**;





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**[www.vnrc.org](http://www.vnrc.org)**

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**Stephanie Smith, AICP**  
**89 Main Street, Suite 4**  
**Montpelier, VT 05602**

**[www.vlct.org](http://www.vlct.org)**

**800-649-7915**



# Implementation of the Transportation Plan



## Government Operations

- Encourage car pooling, transit use by municipal employees
- Provide telecommuting option for municipal employees
- Station police on bicycles
- Use alternative fuel vehicles in fleets and transit

## Community Strategies:

- Promote trip reduction programs, incentives for car / van pooling and public transit use
- Create park & Ride Lots
- Improve bicycle and pedestrian infrastructure
- No-idling ordinances



*A statement of policy on the conservation of energy, including programs (such as thermal integrity standards for buildings) to implement that policy*

### **Municipal Government programs might include:**

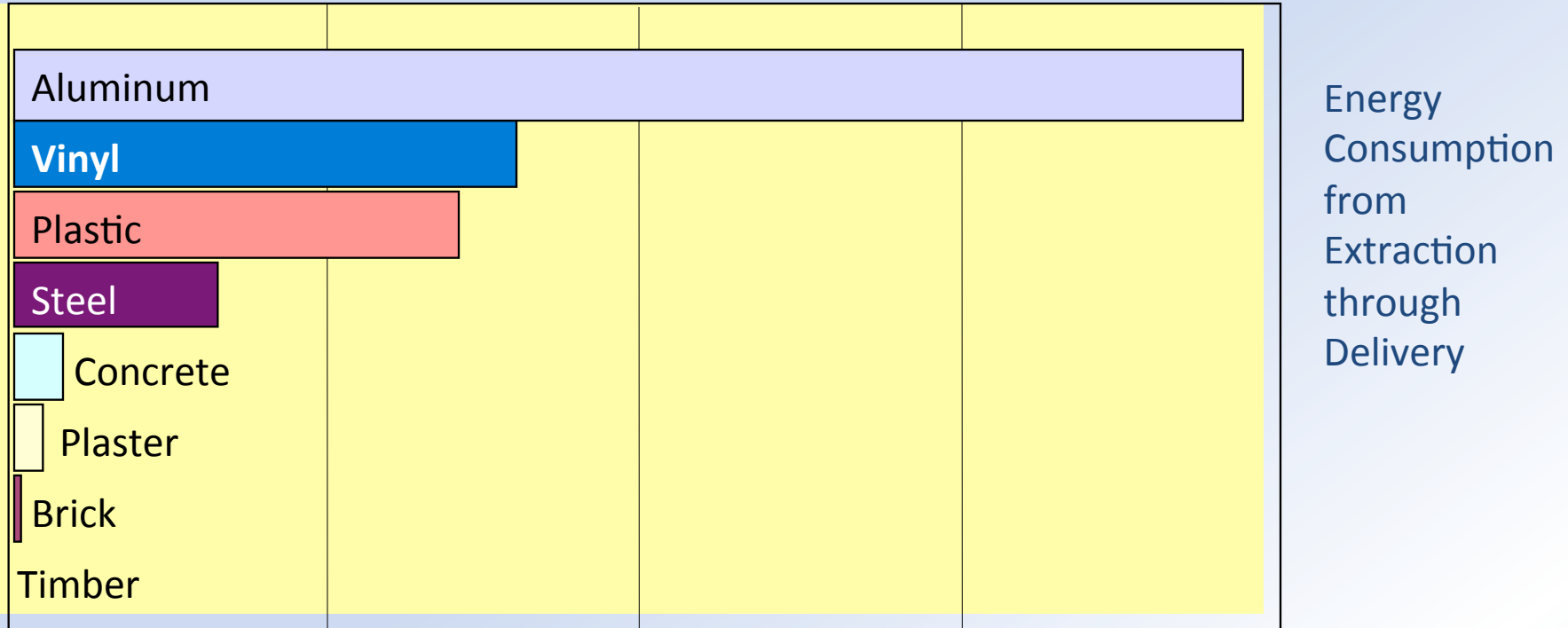
- Energy audits/improvements for municipal buildings
- Life-Cycle costing for new equipment
- Lights out policies (nigh-time, not-in use)
- Green procurement policies/building design
- Street light retrofits (high pressure sodium vapor, LED traffic signals)
- Water treatment efficiency retrofits (gray water reuse, high efficiency pumps)

### **Community programs might include:**

- Home weatherization programs
- Light bulb exchange programs (compact fluorescent)
- Energy efficiency challenge for residences and businesses (10% Challenge)
- Efficient appliances (Efficiency VT rebate on energy star rated appliances)
- Building Efficiency Standards (building codes, zoning incentives)

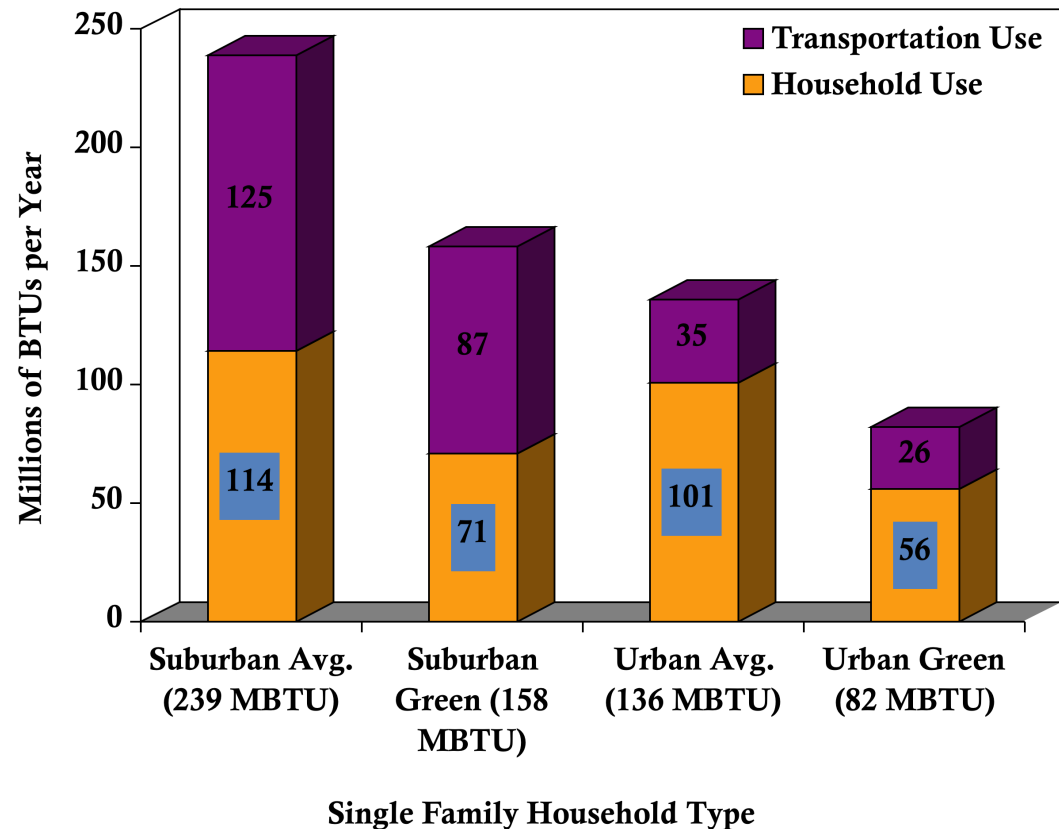
# Reduce, Reuse, Recycle first.

Less energy is required to revamp existing buildings than to produce the materials for new buildings, offsetting the savings from even “green” new buildings



Slide courtesy of Donovan D. Rypkema, PlaceEconomics, (altered from original)

# Land Use, Energy, & Transportation Connection



Soure: Jonathan Rose Companies, LLC for NRDC



# Regulatory implementation of the Town Plan – putting energy into local bylaws

A “proposed **conditional use** shall not adversely affect:

- **(v) Utilization of renewable energy resources.**

“In reviewing **site plans**, the [board] may impose appropriate conditions and safeguards with respect to:

- **...circulation and parking, landscaping and screening; the protection of the utilization of renewable energy resources.**

“**Subdivision** bylaws may include:

- **(C) Specific development standards to promote the conservation of energy or to permit the utilization of renewable energy resources, or both.**

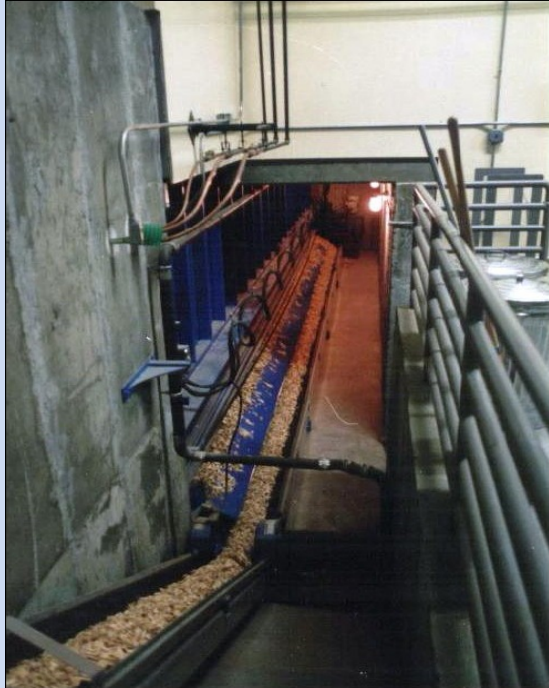
## **Planned Unit Development:**

Any municipality may adopt zoning regulations providing for planned unit developments to encourage new communities, **innovation in design and layout, and more efficient use of land.**

## **Energy Incentives:**

- Any municipality may adopt zoning and subdivision regulations to encourage energy conservation and to protect and provide access to [renewable energy resources]

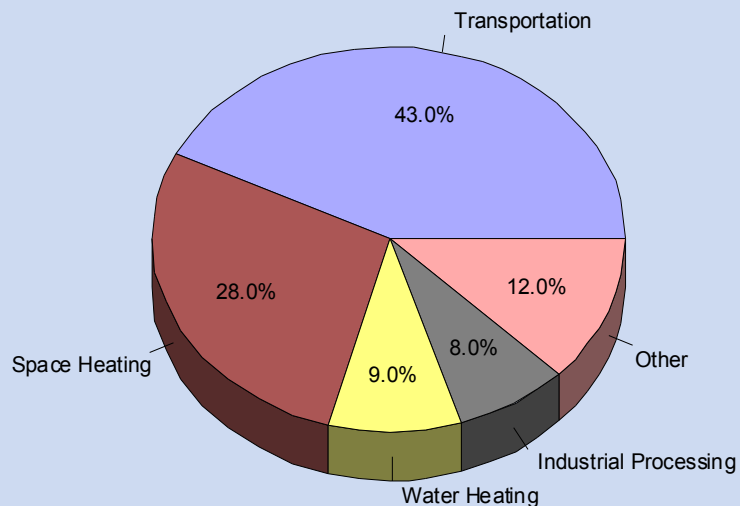
# Converting to Biomass in Public Schools



- Over 40 schools in Vermont use wood heat (principally wood chips)
- Saved an average of \$59,000 per school
- Over 50% average cost savings compared to fossil fuels

*Contact School Energy Management Program at VT Superintendents Association [www.vtvsa.org](http://www.vtvsa.org) and Biomass Energy Resource Center [www.biomasscenter.org](http://www.biomasscenter.org)*

**Fig. 11.1 Vermont Energy Use**



**Table 11.2 Waitsfield Home Heating Fuel, 1990-00**

Heating Fuel	Households (#)		(+/-)	% Change
	1990	2000		
Gas	144	373	229	159.0%
Electricity	89	86	-3	-3.4%
Fuel Oil/ Kerosene	176	198	22	12.5%
Coal	0	0	0	0.0%
Wood	161	77	-84	-52.2%
Solar	0	0	0	0.0%

Source: U.S. Census [from sample data].

**Table 11.1 Valley Commuter Trends, 1990-2000**

	Drive Alone (%)		Car pool (%)		Walk/Work at Home (%)	
	1990	2000	1990	2000	1990	2000
Waitsfield	71.1	74.0	11.1	10.6	16.5	14.3
Fayston	75.6	75.2	9.8	7.9	11.7	14.6
Moretown	70.9	75.6	15.2	12.9	12.7	11
Warren	74.8	77.9	9.9	9.3	12.9	11.9
Washington Co.	73.1	74.1	12.3	12.5	12.5	12.1

Source: U.S. Census [from sample data].



# Roles Responsibilities and Relationships

## Legislative Body

- Adopts policies, bylaws and ordinances
- May create public bodies and appoints individuals to serve, prepares budgets, and authorizes expenditures
- Provides leadership in the municipality

# Roles Responsibilities and Relationships

## Planning Commission

- Plans for the municipality
- May engage in the Capital Budgeting process
- Engage the public in the planning process

# *Energy Planning & Implementation Guidebook for Vermont Communities*

- Collaboration between Vermont Natural Resources Council and the Vermont League of Cities & Towns
- Designed to assist municipalities (Energy Committees, Planning Commissions) to develop comprehensive energy plans, focusing on energy elements of the municipal plan
- Identifies data and information resources, available programs, and implementation tools and strategies
- Emphasizes Vermont success stories



# Roles Responsibilities and Relationships

## Energy Coordinator

- Appointed by the Legislative Body
- The local expert on local energy issues
  - to study both public and private energy use,
  - Coordinate actions with local planning commission, regional, state, federal
  - To evaluate existing energy sources and encourage the development and utilization of alternative energy resources, and to promote municipal energy conservation efforts.
  - Reports to the legislative body. 24 V.S.A. § 1131.
- Ex officio, non-voting member of the Planning Commission

# Roles Responsibilities and Relationships

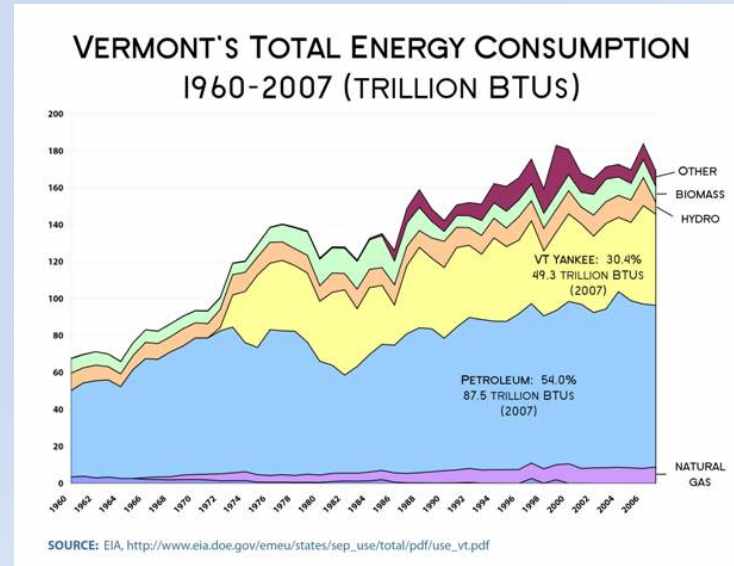
## Energy Committees

- Grassroots or advisory committee
  - different rules regarding creation, membership, function, funding, and role in municipal government.
  - the area it will serve (local or regional), and its primary activities, the reasons for creating the committee, and funding sources
- All should have a mission or purpose statement
- Engage the public

# Energy Plan Format

Energy plans should include:

- An overview
- An energy profile
  - Statewide conditions
  - Current conditions
- Energy resources with attention paid to renewable energy resources
- The Energy plans relationship to other plan elements
- Statement of policies, goals and objectives.





# An analysis of energy resources, needs, scarcities, costs and problems...

... would ideally include:

- Energy use in government operations and community as a whole
- Projected future demand for energy in municipal government and the community
- Availability of energy resources, including local sources, suppliers, potential renewable resources (e.g., wind potential)
- Fiscal impacts (costs) of energy consumption for local government and community as a whole, based on current and projected costs
- Current or future problems or scarcities (e.g., security or reliability of various energy sources, transmission capacity)

## Improving Municipal Building Efficiency – City of Montpelier:



Annual energy bill -- \$560k (FY08) of:

- electricity      \$320k,
- space heat      \$195k
- fleet fuel      \$45k

Total cost of energy investments: \$462k:

- lighting retrofit      \$264k;
- controls upgrades      \$120k
- building envelope      \$49k

Anticipated annual energy savings: \$60k (projected  
payback period --10 years)

*Contact Efficiency VT [www.encyvermont.com](http://www.encyvermont.com)  
for list of energy auditors*

# Reasons for Energy Planning

- Municipal Cost Savings
- Build Efficient and Healthier Communities
- Influence over Local Energy Facility Location
- Build a Stronger Local Economy



# Roles Responsibilities and Relationships

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# Roles Responsibilities and Relationships

## Advisory Energy Committees

- Assist in preparing, adopting, and implementing the municipal plan
- Assist with the implementation of the municipal plan
- Created by charter, voters, or resolution selectboard
- No fewer than three members who must be residents
- Terms and membership set by selectboard
- Must comply with Vermont's Open Meeting Law

# Roles Responsibilities and Relationships

## Grassroots Energy Committees

- Typically a group of stakeholders in a municipality or region with an interest in energy issues.
- Bound by its own rules of procedure and membership qualifications
- May participate and support municipal energy planning activities
- Flexibility



# State Planning Process Goals

1. Establish a coordinated, comprehensive planning process...to guide decisions by municipalities, regional planning commissions and state agencies
2. Encourage citizen participation at all levels
3. Consider the use of resources and consequences of growth
4. Encourage municipalities to work together to develop and implement plans

# State Planning Content Goals

1. **Maintain historic settlement pattern of compact village and urban centers**
2. Provide **strong and diverse economy**
3. Broaden access to educational and vocational training
4. Provide **safe, convenient, economic, and energy efficient transportation system**
5. Identify and preserve important natural and historic features
6. Maintain and improve quality of air, water, wildlife, and land resources
7. Encourage **efficient energy use and develop renewable energy resources**
8. Maintain and enhance recreational opportunities
9. Encourage and strengthen agricultural and forest industries
10. Provide wise and efficient use of natural resources
11. Ensure availability of safe and affordable housing
12. Provide an efficient system of public facilities
13. Ensure availability of safe and affordable child care

# Where does energy fit in municipal planning in Vermont?

Municipalities are not required to adopt a plan.  
These plans must include 10 elements:

1. A **land use** plan
2. A **transportation** plan
3. A **utility and facility** plan
4. A statement of policies on the preservation of rare and irreplaceable natural areas, scenic and historic features and resources
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# Statewide Trends Data Sources

- *State of Vermont Comprehensive Energy Plan*
- *Vermont Department of Public Service*
- *U.S. Energy Information Administration*
- *U.S. Census*
- *University of Vermont's Transportation Research Center*
- *Efficiency Vermont*
- *Regional Planning Commission*



# Municipal Street Lighting Change-Out



- Street lighting can account for 1/4 of municipal electric bill
- Most towns can reduce electrical usage by 30% or more
- Town of Hartford expects to save over 50%(\$64,000) by removing some lights and switching to LED with dimming ability.
- Town of Thetford conducted a street light inventory; turned off 1/4 of its streetlights and saved 4400 kilowatt hours and \$1,760 in annual costs

*Contact Efficiency Vermont  
[www.efficiencyvermont.com/](http://www.efficiencyvermont.com/)*