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# The Virginia Governor's Conference on Energy

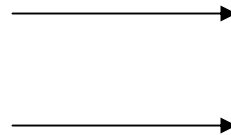
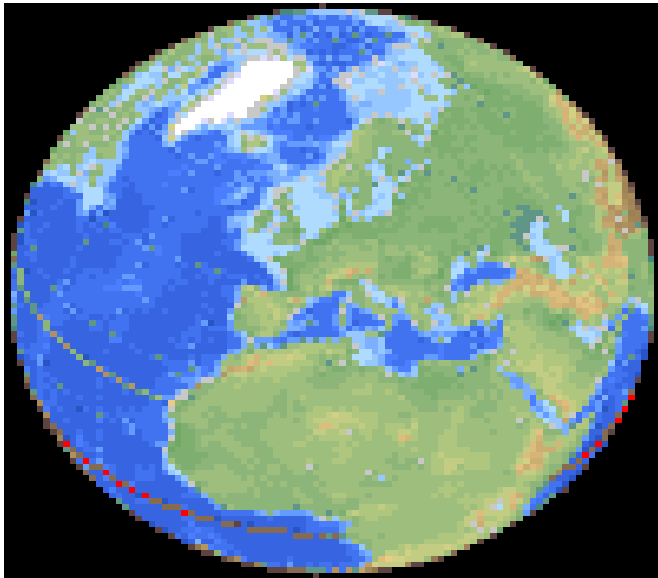
October 14, 2010  
Richmond, Virginia

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Senior Environmental Planner  
Northern Virginia Regional Commission

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# Problem: Demonstrating Domestic Benefits of International Cooperation



# International Work is Marginalized When Domestic Benefits Ignored

Tax Management Plus OUTLOOK

HURRICANE KATRINA: THE AFTERMATH

## Changing Course to Go With the Flow

By Phyllis Kagan

The fate of the city of New Orleans will depend on the ability to raise the nation's water table. On the other side of the Atlantic, the same question is being asked and answered by the people of the Netherlands. There are two main differences between the two nations. The Dutch have a long history of water control. The Dutch have been building dikes and levees since 1000. They have a long history of water control. The Dutch have a long history of water control. The Dutch have a long history of water control.

### Working With the Water

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### Defenses Everywhere

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1935 The Florida Keys

1960 Bay St. Louis, Miss.



**“While the weakest parts of the Dutch system protect inland areas from one-every-1,250-years flooding, Louisiana’s strongest systems are only rated to a 100-year storm.”**

# Case of Northern Virginia

- Greenhouse gas emissions are at approximately 20 metric tons/person of Greenhouse gases (2005)
- 500,000 new residents moving to Northern Virginia by 2020



# Comparative Benchmarks – Global and Domestic

## Total CO2 Per Capita Per Year (Metric tons)

Canada	22
USA	21
Denmark	14
Germany	10
European Union	10

## Municipal CO2 per capita per year (metric tons)

USA – Washington DC	20
Canada – Guelph	12
Germany - Mannheim	5
Denmark - Copenhagen	3

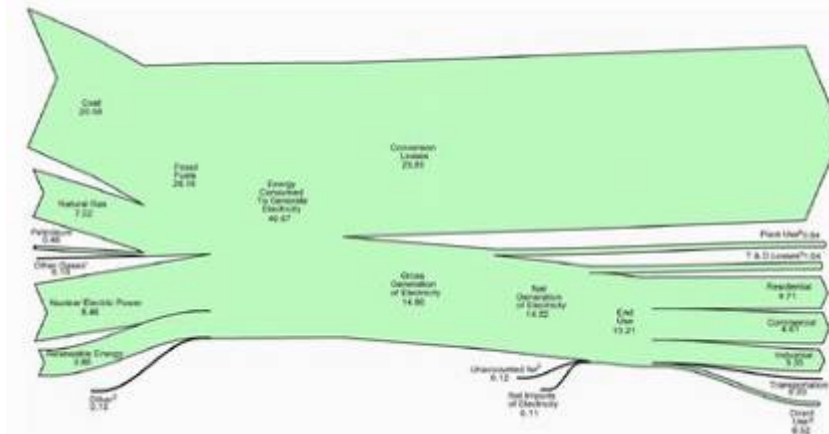
***“You cannot manage what you don’t measure”*** Dr. Edwards Demming

# The Causes/Sources of GHG Emissions



# Most Energy Lost in Inefficiencies

Conversion losses account for 63% of the energy generated (That is, 2/3s of energy in U.S. used to make electricity is lost as heat and another via transmission losses)



Source: (IEA 2008)

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# Renewable Energy Generation in Virginia

	<u>Virginia</u>	<u>Northern VA</u>
<b>Hydro</b>	440,692 kWh	0 kWh
<b>Wind</b>	22 kWh	0 kWh
<b>Solar</b>	435 kWh	112 kWh
<b>Biomass</b>	540,545 kWh	159,400 kWh

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# Lost Investment Opportunities...

*The Washington Post*

**“AES, Private-Equity Firm  
To Build Solar-Energy  
Farms”...In Germany**

## Virginia Energy Plan 2007

*“Eight PV manufacturers have expressed locating in Virginia, but none have committed...they invested in Germany”*



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# **„Governments to Cooperate and Companies to Compete“** Michael Eckert

**“Business between Europe and the U.S. exceeds \$ 3.75 trillion annually and accounts for over 14 million ‘on-shored’ jobs every year. Overall investment by Europe in China is less than German investment in New Jersey and that total European investment in India is less than half of German investment in individual U.S. states such as Missouri or South Carolina”**

**- Hamilton and Quinlan (2009)**

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# Energy Productivity Differences

## Units of Energy to \$ Units of GDP

(U.S. uses 40% more energy than EU for every \$ unit of GDP)

Region	Population	GDP	Energy	Energy /Capita	Energy /GDP
USA	4.6%	18.9%	19.5%	100	100
EU	7.5%	25.1%	14.8%	47	57
Japan	1.9%	8.8%	4.3%	52	47
China	20.0%	4.5%	16.3%	19	355
India	17.0%	1.5%	4.9%	7	317
World	100%	100%	100%	23	97

Source: (Garforth International 2010)

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# **Too Many Aspirational Goals and Piecemeal Efforts...**

**80% reductions of greenhouse gases by  
2050**

**U.S. Conference of Mayors**

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# Community Energy Planning

“Community energy planning as the integration of energy efficient buildings and housing, generation and distribution of renewable energy, mixed and compact land-uses built around transit centers and enveloped in **quantitative** short- and long-term energy efficiency and greenhouse gas emissions reduction targets”

## Typology:

**Energy Efficiency (If you don't need it, don't use it)**

Efficient homes and buildings/transportation

**Heat Recovery (If it's already there, use it)**

Distributed combined heat and power

**Renewable Energies (If it makes sense, do it)**

PV, solar thermal, wind,

**Energy Distribution & Scale (Invest where it makes sense)**

Flexible distribution with multiple fuels

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# Energy Efficiency

**ENERGIEAUSWEIS** für Nichtwohngebäude  
gemäß des § 16 E Energieparaverordnung (EiEV)

Ordnungsnummer: **Aushang**

**Gebäude**

Nutznutzung / Gebäudekategorie		Gebäudefoto (Kategorie)
Adresse		
Gebäudeart		
Baujahr Gebäude		
Baujahr Wärmeerzeuger		
Baujahr Klimaanlage		
Nettogrundfläche		

**Primärenergiebedarf** „Gesamtenergieeffizienz“

Dieses Gebäude: **KWh/(m²·a)**

0 100 200 300 400 500 600 700 800 900 1000 >1000

EiEV-Anforderungswert Neubau ↑ EiEV-Anforderungswert modernisierter Altbau ↓

**Aufteilung Energiebedarf**

Heizung über dgl. Beleuchtung  
Lüftung  
Einzelne Beleuchtung  
Warmwasser  
Heizung

Nettoenergie Endenergie Primärenergie „Gesamtenergieeffizienz“

Aussteller: \_\_\_\_\_

Unterschied des Ausstellers: \_\_\_\_\_



# Heat Recovery & “Scale”



# Cogeneration and Renewable Energies





# CEP in Loudoun & Arlington Counties

**NVRC**



**Garforth International**

# Loudoun County Energy Strategy

**BAU track means by 2040 Loudoun County needs 46% more energy**

**Or follow the CEP and:**

**Encourage all new construction from 2011, to be 30% more efficient than current code and encourage all major retrofits to be at least 25% more efficient than the current County average and incremental increase targets every four years by about 4%;**

**Implement 100 Megawatts of natural gas-fired Combined Heat and Power (CHP) by 2040 around higher density developments (district energy systems);**

**Implement 25 Megawatts of solar electricity by 2016 rising to 100 Megawatts by 2040 (reduce summer cooling peaks and reduce transmission capacity, mixed residential and commercial**

**If done, then:**

**County could meet needs of 271,000 existing residents and anticipated 186,000 new residents with 21% less total energy and reduce greenhouse gas emissions by 22% to under 10 tons per person**

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# Potential Applications in Northern Virginia



(Don't just sell electricity from cogeneration – sell the heat too, and make **\$\$\$**)

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Thank you!

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