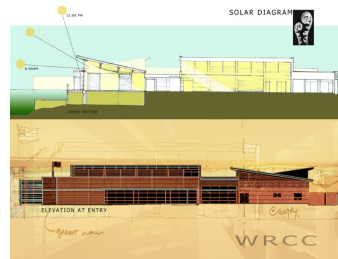


Rappahannock-Rapidan Regional Commission



***Applying Innovative
Urban Environmental
Policies From Abroad***

Dale Medearis, Ph.D.
June 11, 2009
Culpeper, Virginia



The Challenge



Greenhouse Gas Emissions in Northern Virginia are at approximately 20 metric tons/person of CO₂ (2005)

By 2020, CO₂ emissions are estimated to rise to 33.6 million metric tons and to 44.1 million metric tons by 2030 under “business as usual scenario”

500,000 new residents moving to Northern Virginia by 2020

The Causes



Greenhouse Gas Emissions by Sector

Transportation	34 %
Commercial Aviation	6 %
Industrial Fuel	7 %
Residential Fuel	10%
Energy and Electricity Generation	30 %
Other	13%

Renewable Energy Generation

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

Source: Renewable Sources in Virginia

<http://www.energy.vt.edu/vept/renewables/RenewPlants.csv>

Recognizing That

COUNTRY	ENERGY INDEX*
United States	5.1
EU 25	2.6
Sweden	3.5
Germany	2.6
China	0.5
India	0.2

*The relative average per capita energy use – the energy use of each region's inhabitants relative to the energy used on average by all the world's inhabitants

Positive Responses



- **80% Reductions in GHG Emissions by 2050**
- **Inventorying Fairfax County Government GHG Emissions**
- **Implementing Fairfax County Transit Program / Metrocheck / Teleworking**
- **Preserving 45 % of County Tree Canopy**
- **Purchasing 5.8 million kWh of Wind Energy**
- **Methane Recapture**
- **County Projects Greater than 10,000 Square Feet to be LEED Certified**

Are Current Initiatives Adequate?

What are the Short-Term, Quantifiable Benchmarks That Will Help Align Long-term Reductions Goals?

What Does Success Look Like After 12-months, After 2 Years, After 10 Years?

Are We Satisfied with Progress and Aspirational Goals?

Elements of Community Energy Planning

Energy Efficiency

Heat Recovery

Renewable Options

Energy Distribution

Leadership and Community Engagement

Transparency and Outreach

World-Class Energy Efficiency Targets

Integrated Utility Approach

Large-Scale Planning

Continuous Improvement and Updating and Monitoring

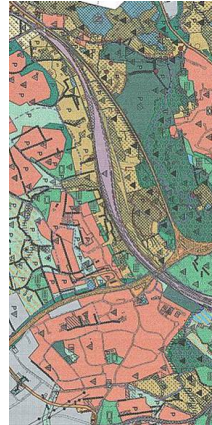
In Germany: Compact Urban Form...



It is national policy in Germany to reduce sprawl development by 25% over the next 15 years

Landscape Plan

Regional Plan



Multi-modal Transportation Systems...



Over 60% of trips in Stuttgart (and most German cities) are on bike or public transit

System Design



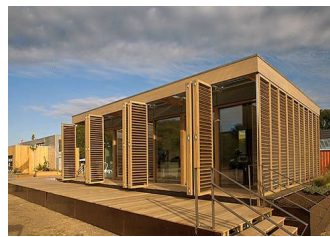
Multi-modal Transportation Systems



Pedestrian and Bike-Friendly Transportation Systems



Energy Efficient Homes and Renewable Energy Policies...

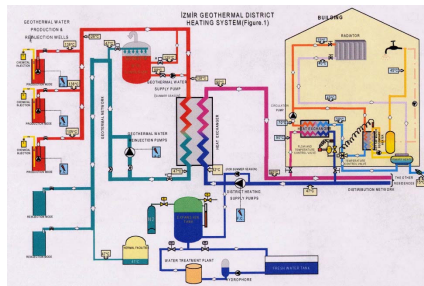


Germany is the largest producer of installed PV and wind energy in the world

Stuttgart – Scharnhauser Park



District Heating and Combined Heat/Power Systems



Energy Performance of Buildings Directive

Creates an energy performance certificate for sale/rent of buildings

ENERGIEAUSWEIS für Nichtwohngebäude
gemäß den §§ 15 ff. Energieausweisverordnung (EiEV)

Erstellt am: _____ Aushang

Gebäude

Hauptnutzung / Gebäudekategorie	
Adresse	
Gebäudeart	
Baujahr Gebäude	
Baujahr Wärmeerzeuger	
Baujahr Klimaanlage	
Nutzungsfläche	

Gebäudeart (freiwillig)

Primärenergiebedarf „Gesamtenergieeffizienz“

Dieses Gebäude: kWh/(m²·a)

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

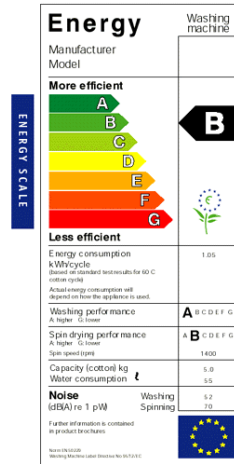
EiEV-Anforderungswert: _____

Aufteilung Energiebedarf

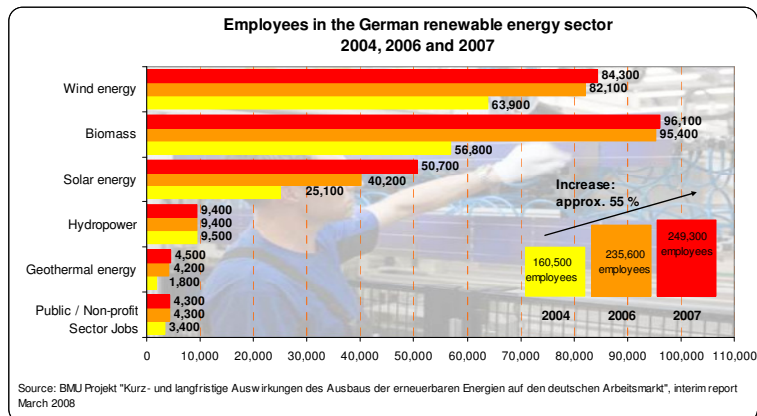
Heizenergie, Endenergie, Primärenergie „Gesamtenergieeffizienz“

Abteilung: _____

Unterschrift des Ausstellers: _____

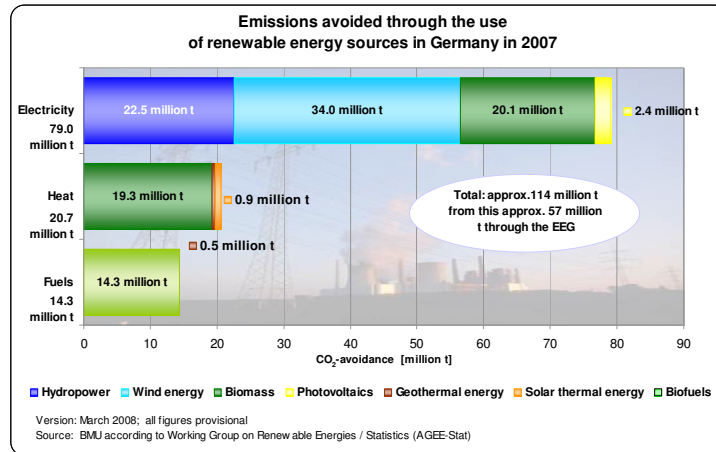


Over 215,000 Jobs Created in German Renewable Energy Sector. Will Reach 500,000 by 2020



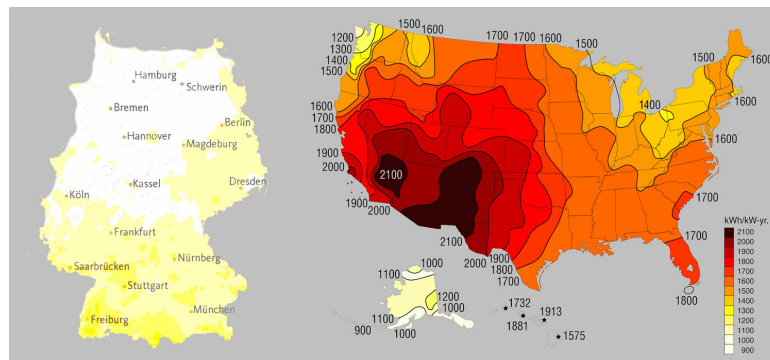
Source: BMU, March 2008.

Germany Has Reduced Emissions of Greenhouse Gases Substantially



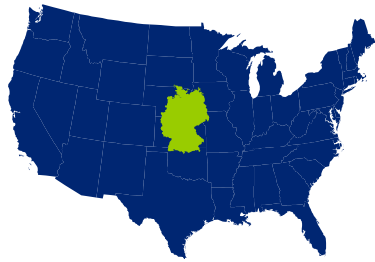
Source: BMU, March 2008.

Comparison of Solar Resources



Virginia has high solar PV potential (over 11,000MW) compared to world leader Germany

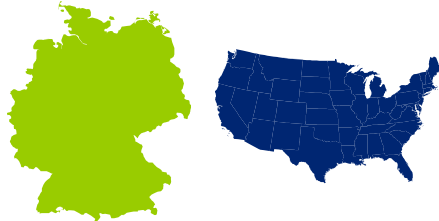
Landmass vs. Wind Capacity (MW) Germany and Continental U.S. (2007)



Area

Germany: 357,030 km²
US*: 8,154,157 km²

*23 times larger, without Alaska



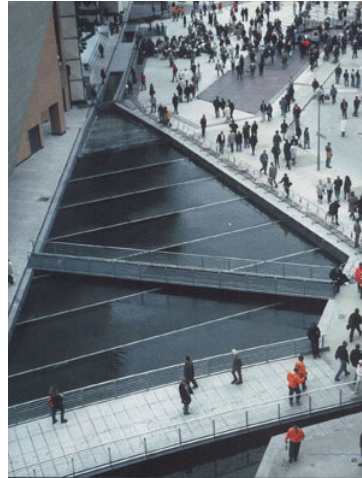
Installed Capacity

Germany*: 22,247 MW
US: 16,818 MW

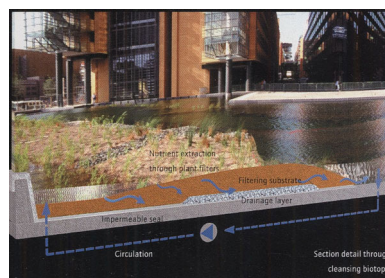
*1.3 times larger



Low-Impact Development

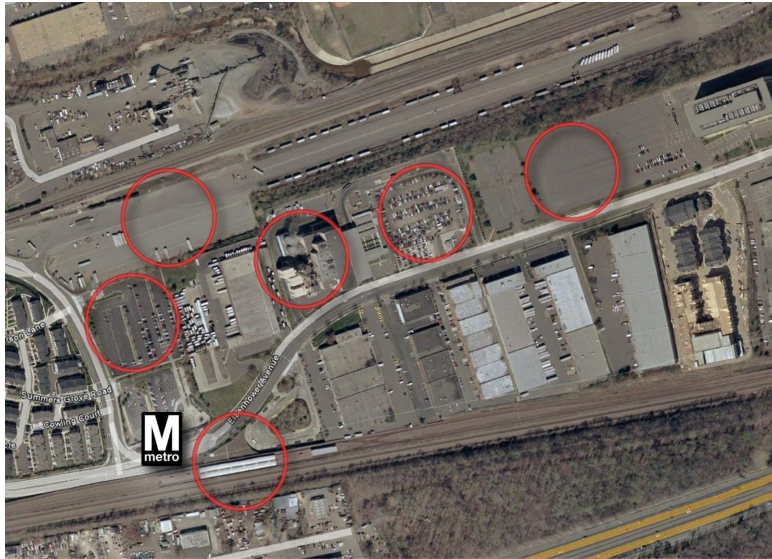


Low-Impact Development









Climate Adaptation -Lessons Transferring to Northern Virginia



**“Green” Rooftops in
Stuttgart, Germany**



**“Green” Rooftops in
Arlington, Virginia**

**Perspective Before –
Mt. Vernon Ave. to West**



**Perspective After –
Mt. Vernon Ave. to West**



Perspective Before – Mouth of Long Branch



Perspective After – Mouth of Long Branch



Mt. Vernon Ave Plaza



Brownfields Emscher Park – Tetrahydron



Emscher Park – Duisburg Nord



Emscher Park – Zeche Zollverein



Other Precedents for Harvesting Lessons: Industrial Ecology



Building One, the first building in the Sustainable Technology Park.
The stormwater retention and filtration pond is in the foreground.

Cape Charles Ecological Industrial Park

CEP Tools From Abroad:

Energy Performance Building Labels

ENERGIEAUSWEIS für Nichtwohngebäude
gemäß den §§ 16 ff. Energieausweisverordnung (EnEV)

Erstellt am: _____ Aushang

Gebäude

Hauptnutzung / Gebäudekategorie	
Adresse	
Gebäudeart	
Baugjahr Gebäude	
Baugjahr Wärmespeicher	
Baugjahr Klimaanlage	
Nutzungsfläche	

Gebäudefläche (Bruttowert)

Primärenergiebedarf „Gesamtenergieeffizienz“

Dieses Gebäude: _____ kWh/(m²·a)

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

EnEV-Anforderungswert
Mindestwert

EnEV-Anforderungswert
Maximaler Abbau

Aufteilung Energiebedarf

Heizenergie	Endenergie	Primärenergie
_____ kWh/(m²·a)	_____ kWh/(m²·a)	_____ kWh/(m²·a)

Heizung elektr./GK, Wärmepumpe
Lüftung
Eingebaute Beleuchtung
Wärmespeicher
Klimaanlage

Aussteller: _____ Unterschrift des Ausstellers: _____

Energy Washing machine

Manufacturer Model: _____

More efficient

A B C D E F G

Less efficient

Energy consumption kWh/cycle
Based on standard test results for 60 °C cotton cycle
Actual energy consumption will depend on how the appliance is used

Washing performance A B C D E F G

Spin drying performance A B C D E F G

Capacity (cotton) kg 5.0

Water consumption l 5.5

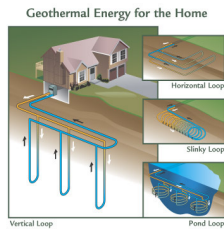
Noise (dB(A) re 1 pW) Washing 5.2 Spinning 7.0

Further information is contained in product brochures

ENERGY SCALE

European Union

CEP Tools From Abroad



Stuttgart – Scharnhauser Park

