Arlington County
Community Energy & Sustainability Plan

John Morrill CEM, Arlington County Energy Manager
Presentation to MWCOG Energy Advisory Committee
October 21, 2010

Project Timeline

- January 1, 2010 - Project Kick-Off (*Chairman's initiative)*
- Bi-monthly **Task Force** meetings
- Monthly **Technical Working Group** meetings with stakeholders
- Spring - Summer - Energy modeling efforts
- April & October - Community Energy **Town Hall** meetings
- September - Preliminary recommendations presented to Task Force
- Spring 2011 – Community Energy Plan brought before County Board
- Implementation Plan – 2011-2012

Economic, Energy and Environmental Future

Project Task Force – policy guidance
One representative from each

- Businesses
  - *JBG*
  - *Little Diversified Architectural*
  - *Lockheed Martin*
  - *Marriott International*
  - *SRA International*
  - *Turner Construction*
  - *Virginia Hospital Center*
  - *Vornado*
- Citizens
  - *Arlington Civic Federation*
  - *Commissions (three)*
- Educational Institutions
  - *Arlington Public Schools*
  - *Virginia Tech*
- Regional Authorities
  - *Metro Wash. Airports Authority*
  - *MWATA (metro)*
- Energy and Energy Technology Industry
  - *Dominion Virginia Power*
  - *United Solar Ovonics (Uni-Solar)*
  - *Washington Gas*
  - *AES*
- Local, State and Federal Governments
  - *Arlington County Manager*
  - *Arlington County Board Chairman*
  - *The Pentagon*
  - *US EPA*
  - *Commonwealth of Virginia Senator*
- Nonprofits/Associations
  - *Apartment and Office Building Association*
  - *Arlington Chamber of Commerce*
  - *Arlington Partnership for Affordable Housing*
  - *Arlingtonians for a Clean Environment*
  - *Pew Center on Global Climate Change*

Project Technical Working Group

- Arlington County Staff
  - *Laura Conant, energy & climate analyst*
  - *Richard Dooley, AICP, community energy plan project manager*
  - *Joan Kelsch, LEED-AP, green buildings program manager*
  - *John Morrill, CEM, energy manager*
    - *AIRE, Planning, G.I.S., Transportation agency staff -- as needed*
    - *County Manager's office, County Attorney's office – frequently*
- Consultants
  - *Peter Garforth, Garforth International*
  - *Tim Grether, Owens Corning*
  - *MVV-Energie*
  - *Northern Virginia Regional Commission*
    - *John Palmisano, Carbon Positive (carbon registration)*
    - *Ebert & Baumann Consulting Engineers (modeling)*
    - *SAIC (climate inventory, modeling)*

Community Energy Plan – Why?

Competitiveness

- Energy cost
- Employment
- Investment

Security

- Supply security
- Supply quality
- Flexibility

Environment

- Greenhouse Gas Reduction

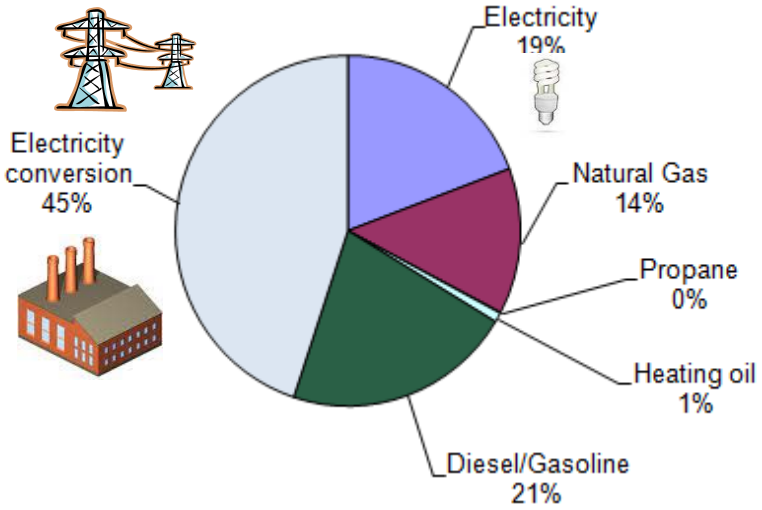
Three Groups of Benefits

Arlington's Energy Use

These totals do not include Federal sites or DCA airport.

2007 Fuel Use

448,252,000 $MMBtu_e$ / 14,141,000 MWh_e



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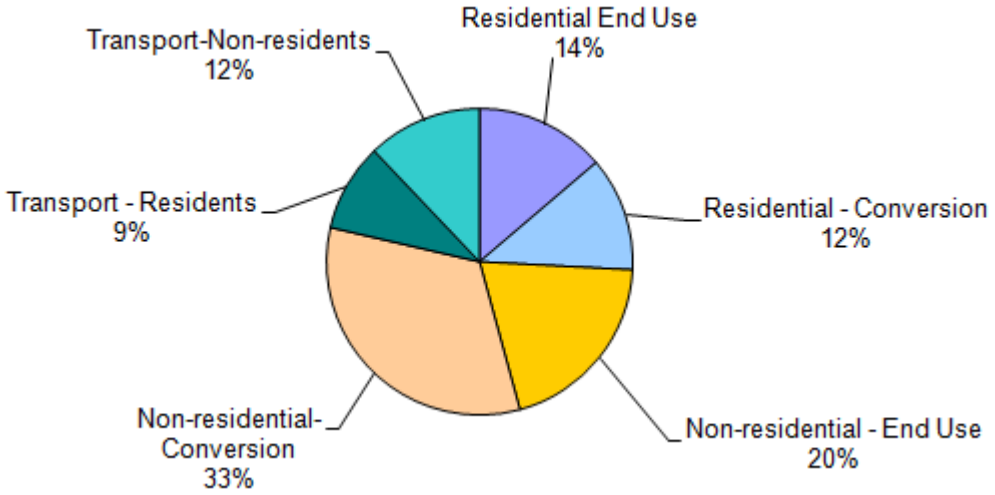


by sector

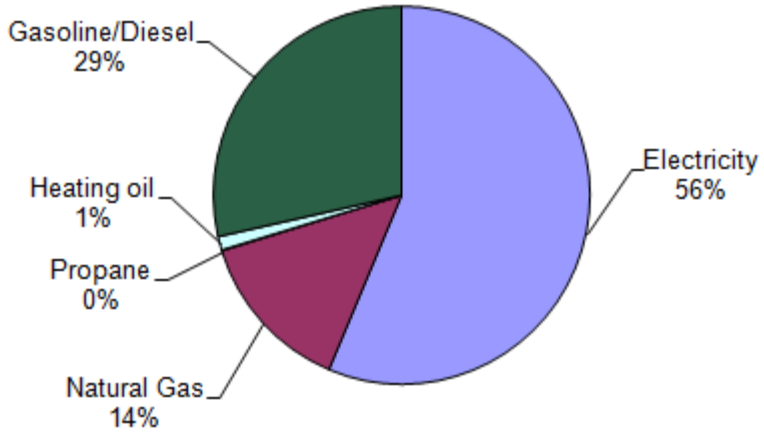
236 $MMBtu_e$ / 69 MWh_e for each Resident

Arlington Community Carbon Footprint

These totals do not include Federal sites or DCA airport.

2007 Greenhouse Gas Emissions

2,730,000 metric tons / 6,020,000,000 lbs CO_{2e}



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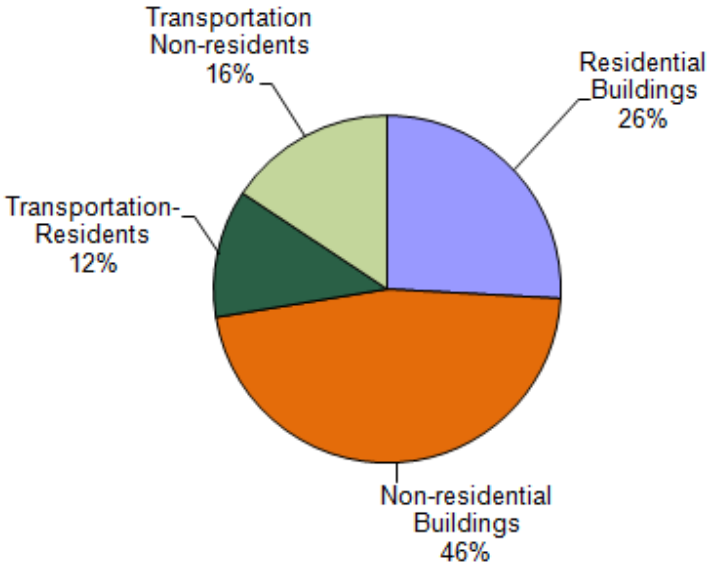


by sector

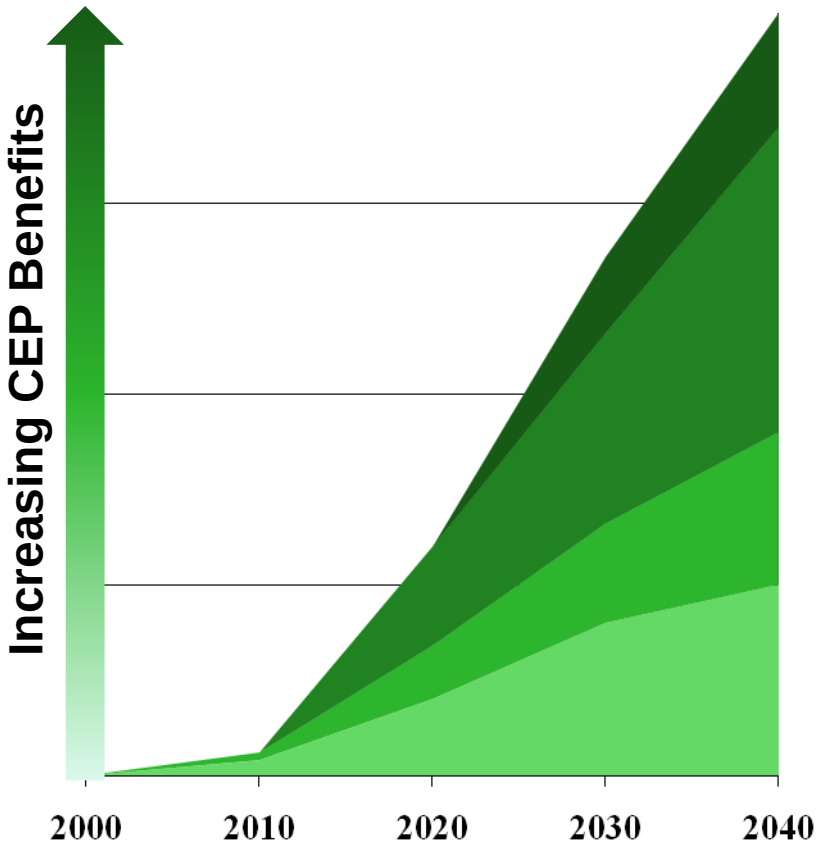
13.4 metric tons for each Resident

CEP Framework ("loading order")

- Energy efficiency – ***If you don't need it, don't use it***
  - *Efficient buildings and vehicles*
  - *Urban design for transportation efficiency*
  - *Local employment for commuting efficiency*
- Heat Recovery – ***If it's already there – use it***
  - *Use existing "waste" heat*
  - *Structure commercial sites to maximize "waste" heat use*
  - *Distributed combined heat and power*
- Renewable energy – ***If it makes sense, go carbon free***
  - *Renewable electricity – Photovoltaic, wind, run-of-river hydro*
  - *Renewable heat - Solar thermal, biomass, geothermal*
  - *Renewable heat and power – waste-to-energy, biomass*
- Energy distribution – ***Invest where it makes sense***
  - *Flexible distribution – electricity, gas, heating, cooling*
  - *Accept multiple fuels and energy conversion technologies*
  - *Optimize local / regional investment choices*

Integrated Solution – Tailored for the County

Goals: *Transformative or Incremental*



Integrated policy
County wide norms
•New "business-as-usual"

Scale Projects
•Neighborhood size
•Local changes in "policy"

Stand alone projects
•Fewer larger initiatives
•Minor changes in policy

Community Activity
•Many initiatives
•No changes in policy

Transformative

Incremental

Framing Goal Indicators Needed Early

Preliminary Recommendations
Built-environment - 1

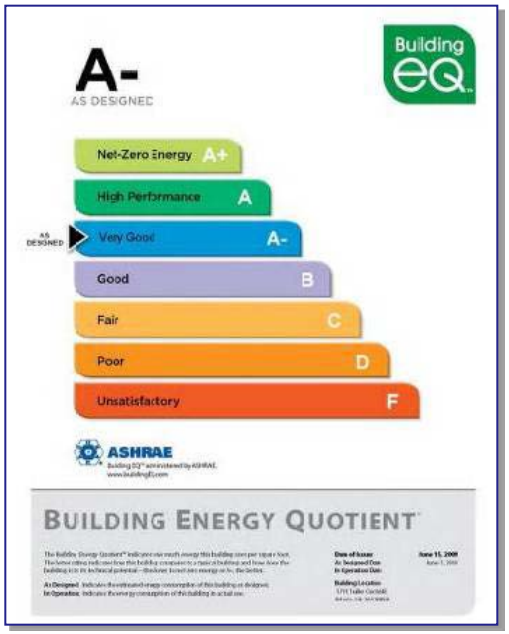
- 75% of all energy use in Arlington occurs in homes and other buildings.
- Buildings in Virginia are, by and large, very inefficient with huge potential savings

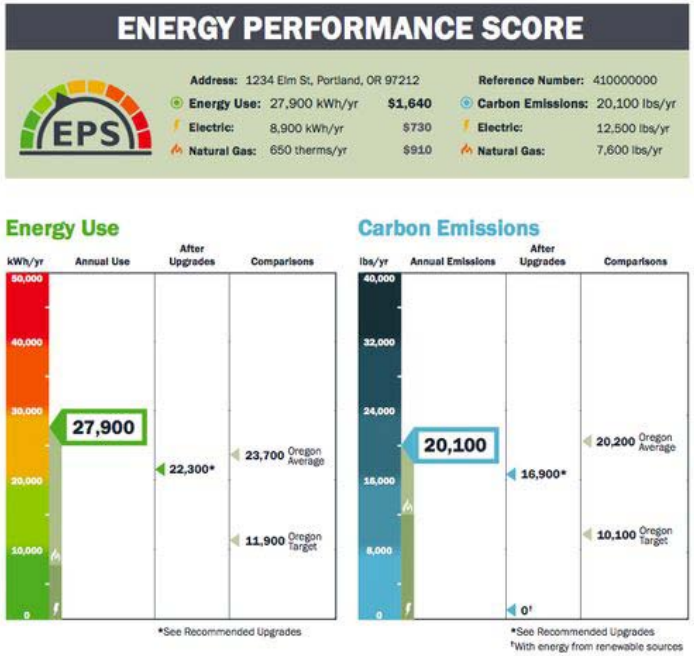
Recommendations –

- Renovation of existing homes and buildings
  - *Average renovation rate 2% to 3% per year*
  - *Renovate to operate 30%-50% more efficiently from 2015*
  - *Continue efficiency increases after 2015*
- New construction
  - *Build to operate 30% more efficiently than current code by 2015*
  - *Continue efficiency increases of about 1% per year from 2016*
  - *Include energy narratives in planning request*

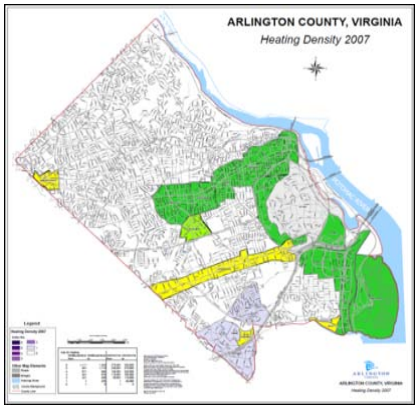
Preliminary Recommendations
Built-environment - 2

- Efficient Neighborhoods / Scale Projects
- Incentivize developments meeting CEP goals
- Enhance awareness and capability on efficient operation
- Widespread voluntary Energy Performance Labeling





Preliminary Recommendations
Built-environment - 3



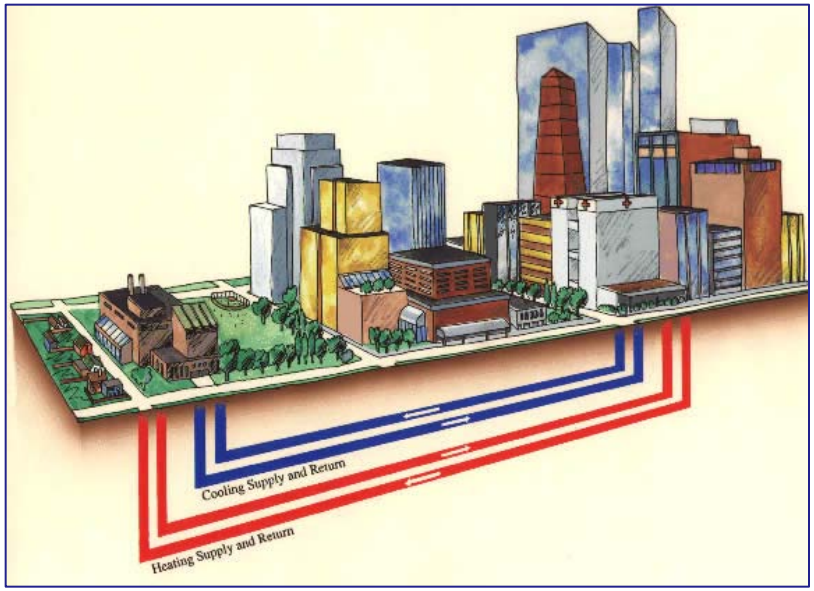
- High-density neighborhoods
  - *Create legal frame for DE utility*
  - *Designate DE targets*
  - *Migrate to District Energy starting with 4 Scale Projects and Aquatic Center*
  - *Implement 10% renewable heat including possibly waste-to-energy*

- Lower-density neighborhoods
  - *Maximize individual solar, biomass, geothermal installations to supply 50% of DHW and 20% of space heating*
  - *Evaluate local-area energy solutions for building clusters*

Preliminary Recommendations
Built-environment - 4

- Enhance energy supply security
  - *Reduced grid loads*
  - *146 MW Cogeneration*
  - *Install 160MW Solar PV to reduce summer peak demand and cut emissions*
  - *District cooling using absorption chillers for non-electric cooling*

What is District Energy?



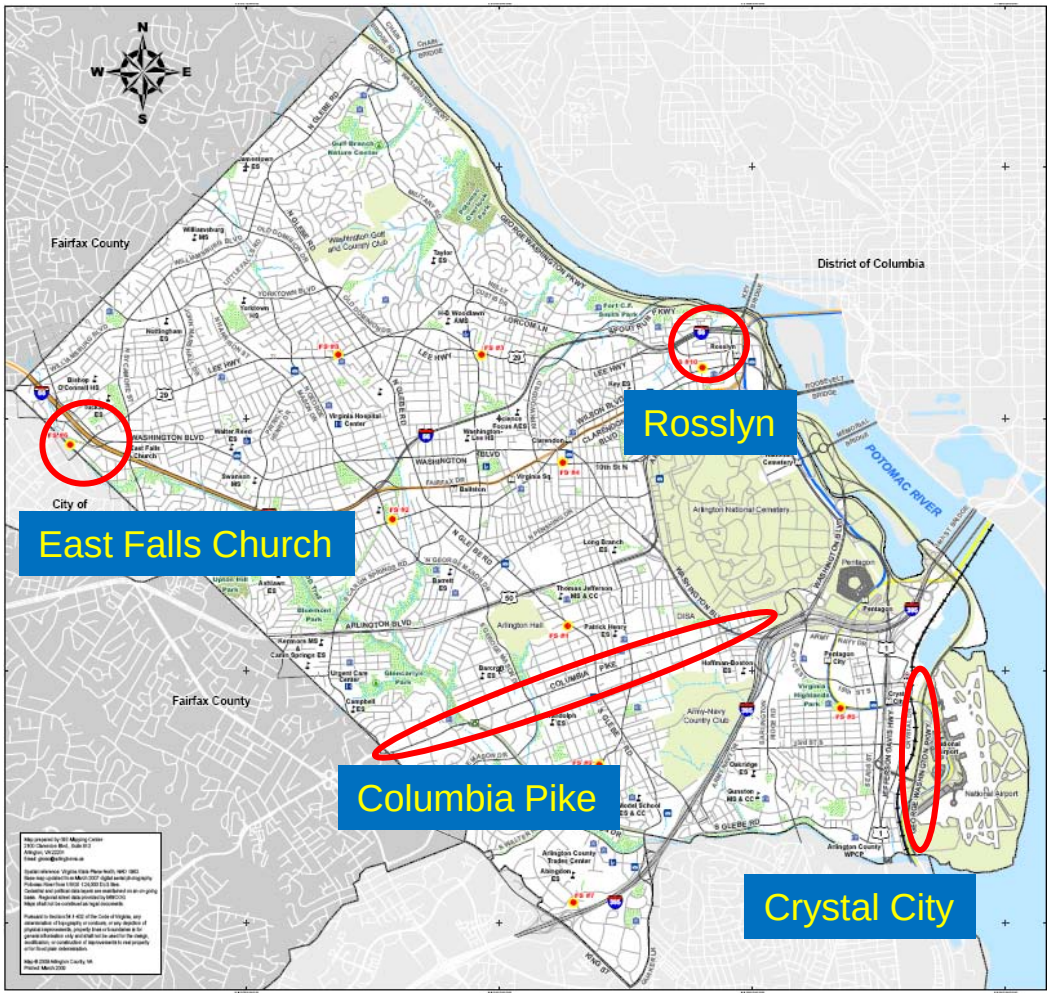
Centralized supply and delivery

- *Heating*
- *Cooling*
- *Domestic hot water*

- Distribution to many homes and buildings
- Closed network of highly insulated pipes
- Optimized energy supply from multiples sources
  - *Combined Heat & Power*
  - *Boilers/Furnaces*
  - *Absorption Chillers*
  - *Electric Chillers*
  - *Solar and Biomass*
  - *Waste heat recovery*
- Typically operated by dedicated DE-Utility

Widely deployed proven technology

Task Force Recommendations
Strong Candidates for Scale Projects



Decision-Grade IEMPs Necessary*

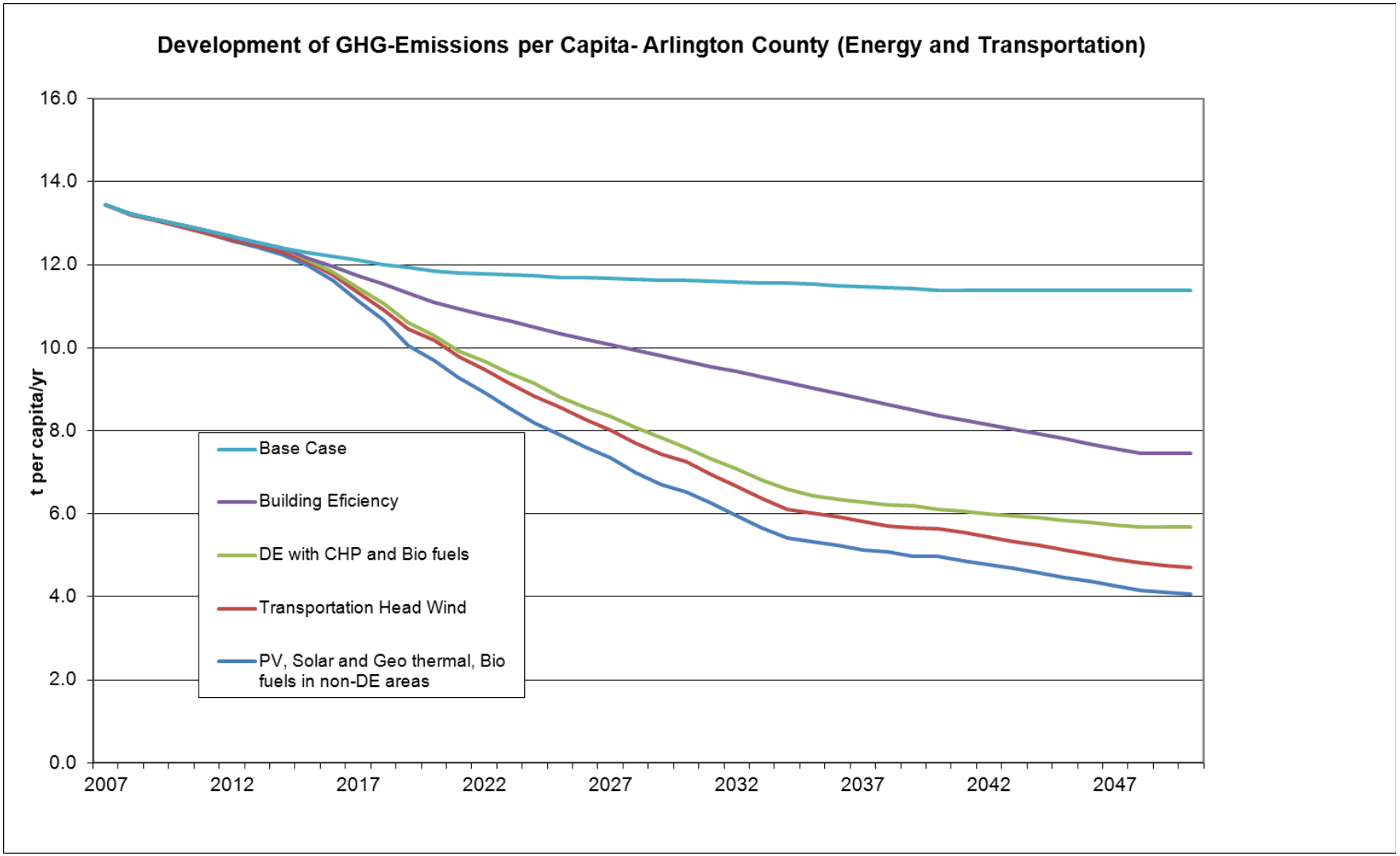
Community Energy Plan

**IEMP=Integrated Energy Master Plan*

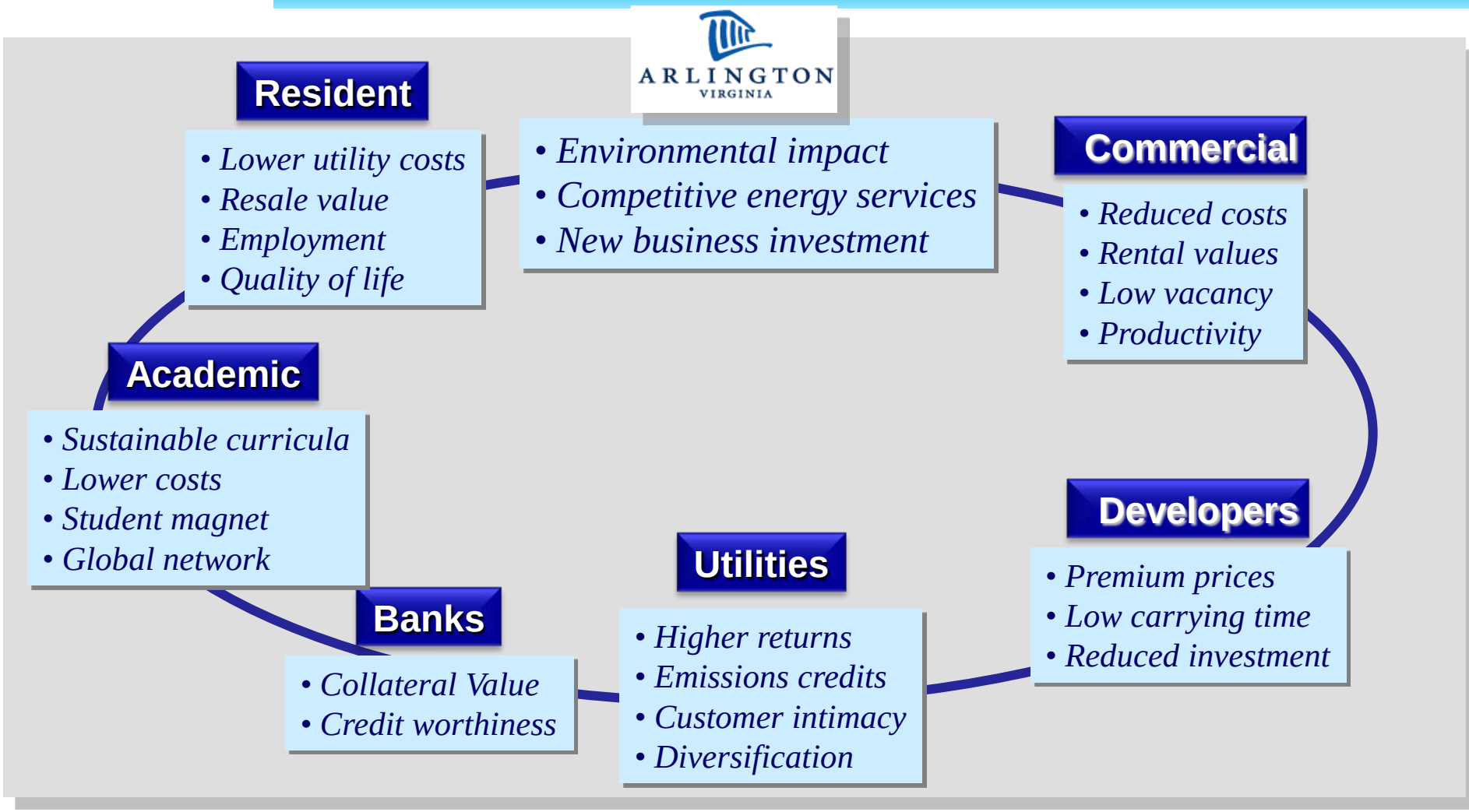
Preliminary Recommendations
Transportation

- Growth creates 15% “headwind”
- Build upon existing comprehensive transportation strategies
  - *Multi-modal nodes to increase transit usage*
  - *Urban design to reduce journeys*
- Industry and Market factors
  - *Materials, drive train, fuels evolution*
  - *Consumers choosing smaller vehicles*
- Additional measures for TF consideration - not yet recommended:
  - *Road pricing based on emissions rating*
  - *Parking fees based on emissions rating*
  - *Prioritize allocated road space*

Results 2007 to 2050
GHG emissions per capita



Benefits of Winning!



New Relationships – New Rules

Community Energy Plan

Project Updates & More Information:
www.arlingtonva.us/energyplan