

Community Energy Planning

Creating Globally Competitive Communities



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CEP Framework

Loading Order / Trias Energetica

- Energy efficiency – **If you don't need it don't use it**
 - *Efficient buildings, vehicles*
 - *Urban design for transport efficiency*
 - *Local employment for commuting efficiency*

- Heat Recovery – **It it's already there – use it**
 - *Distributed combined heat and power*
 - *Use existing “waste” heat*
 - *Structure commercial/industrial sites to maximize “waste” heat use*

- 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, district heating, cooling...*
 - *Accepts multiple fuels and energy conversion technologies*
 - *Optimize local / regional investment choices*

Integrated Solution – Tailored for Community

Overall Efficiency Examples

Greenhouse Gas Indicators

- 70% of manmade GHG comes from energy use
- GHG good surrogate for overall energy productivity
- National GHG per capita per year (metric tons CO₂)
 - *USA* **22.8**
 - *Canada* 22.6
 - *Denmark* 14.1
 - *Germany* 11.7
 - *European Union* 10.5
- Municipal GHG per capita per year (metric tons CO₂)
 - *Arlington County VA* **14.6 with 4.5 goal**
 - *Loudoun County VA* **14.2 with 6.0 goal**
 - *Guelph - Ontario* **12.2 with 5.0 goal**
 - *Mannheim - Germany* **6.0 with 4.5 goal**
 - *Copenhagen - Denmark* **3.0 with zero goal**

Communities Embracing Breakthrough Targets

Benchmark Efficiencies by Sector

USA / EU Energy Example

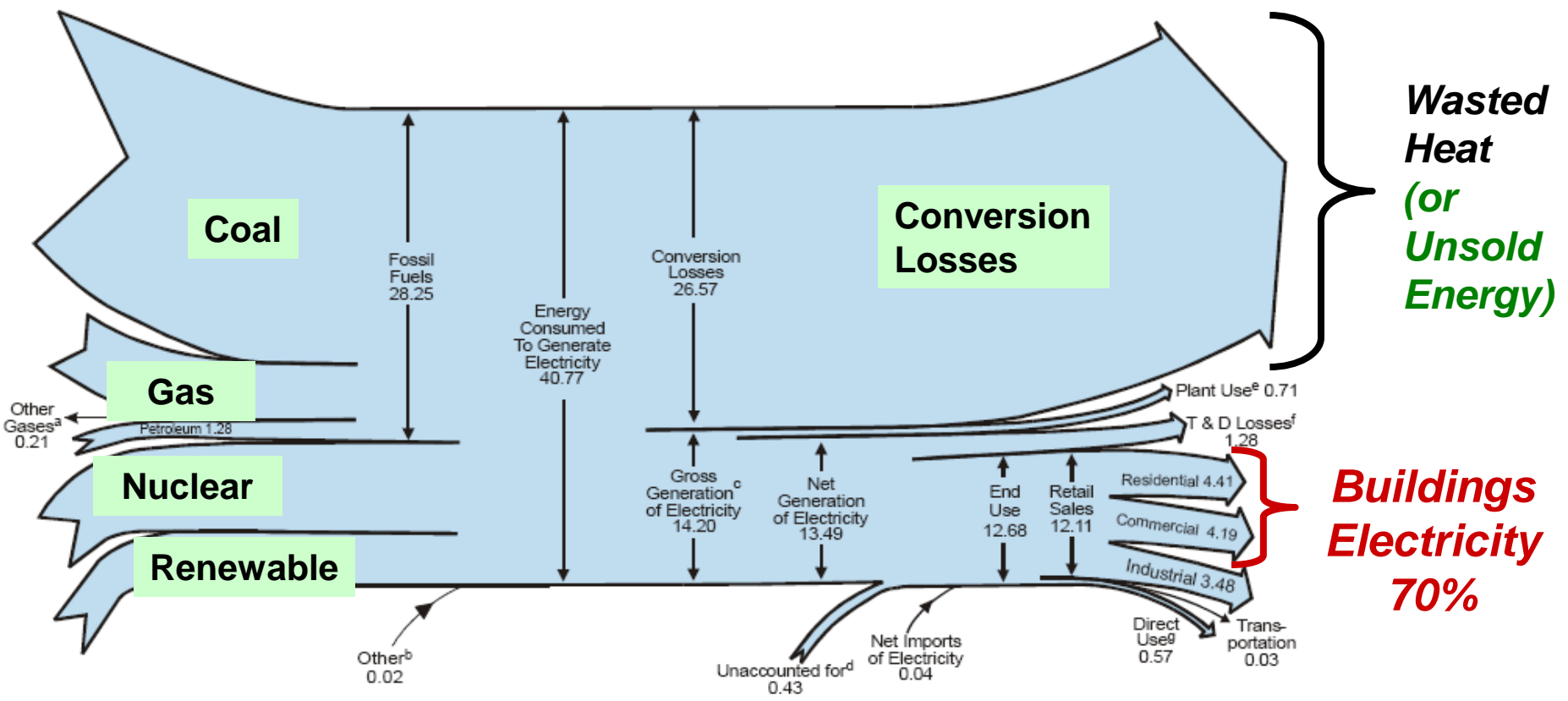
| Sector | Share | Index USA/EU |
|-------------------|--------------|---------------------|
| Industry | 32% | 1.2 : 1 |
| Homes & Buildings | 40% | 2.5 : 1 |
| Transportation | 29% | 1.4 : 1 |

- Most energy lost in range of inefficiencies
- Building efficiency potential often underestimated
- Industrial efficiency potential often overestimated

High potential for productivity gains!

Electricity in USA

Most used in Homes and Buildings



Largest User is Least Efficient

Dysfunctional Energy Supply Chain

From fuel to service

Uses 70% of all energy



25%



5%

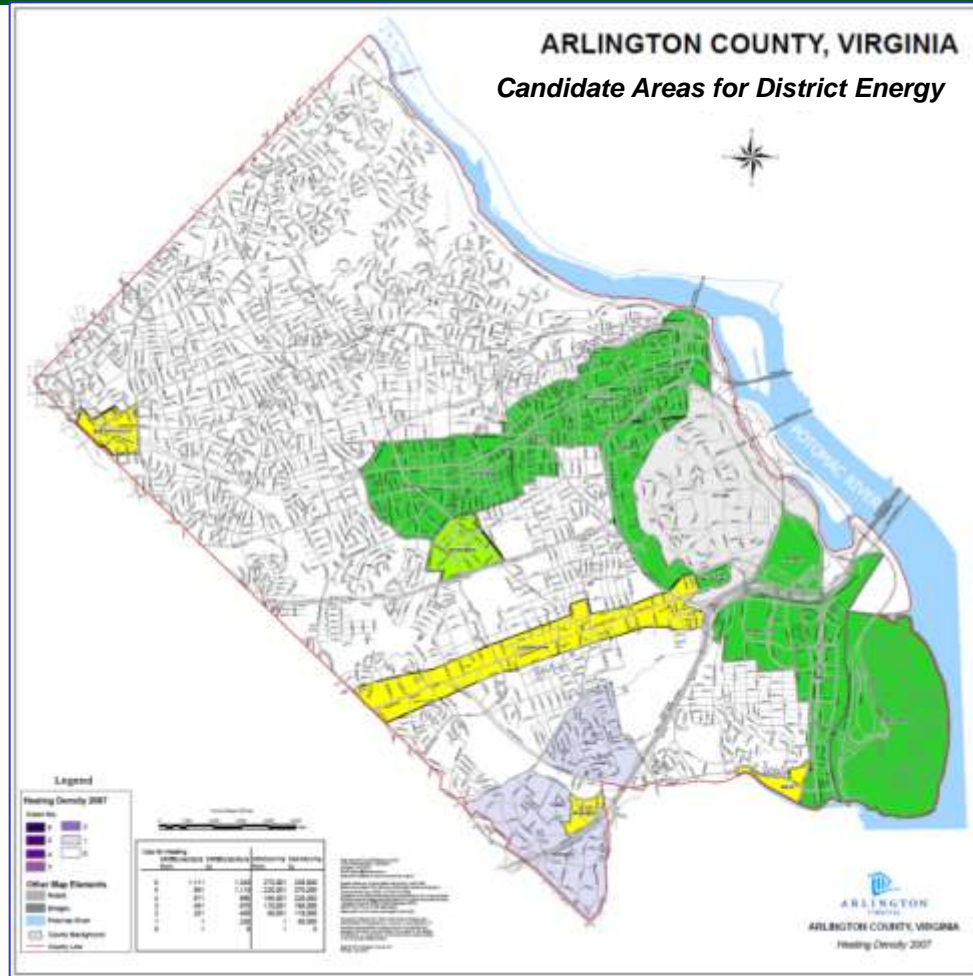


- High-cost low returns
- High risk
- High greenhouse gas

Pay 100 for fuel - Get less than 10 in services

District Energy

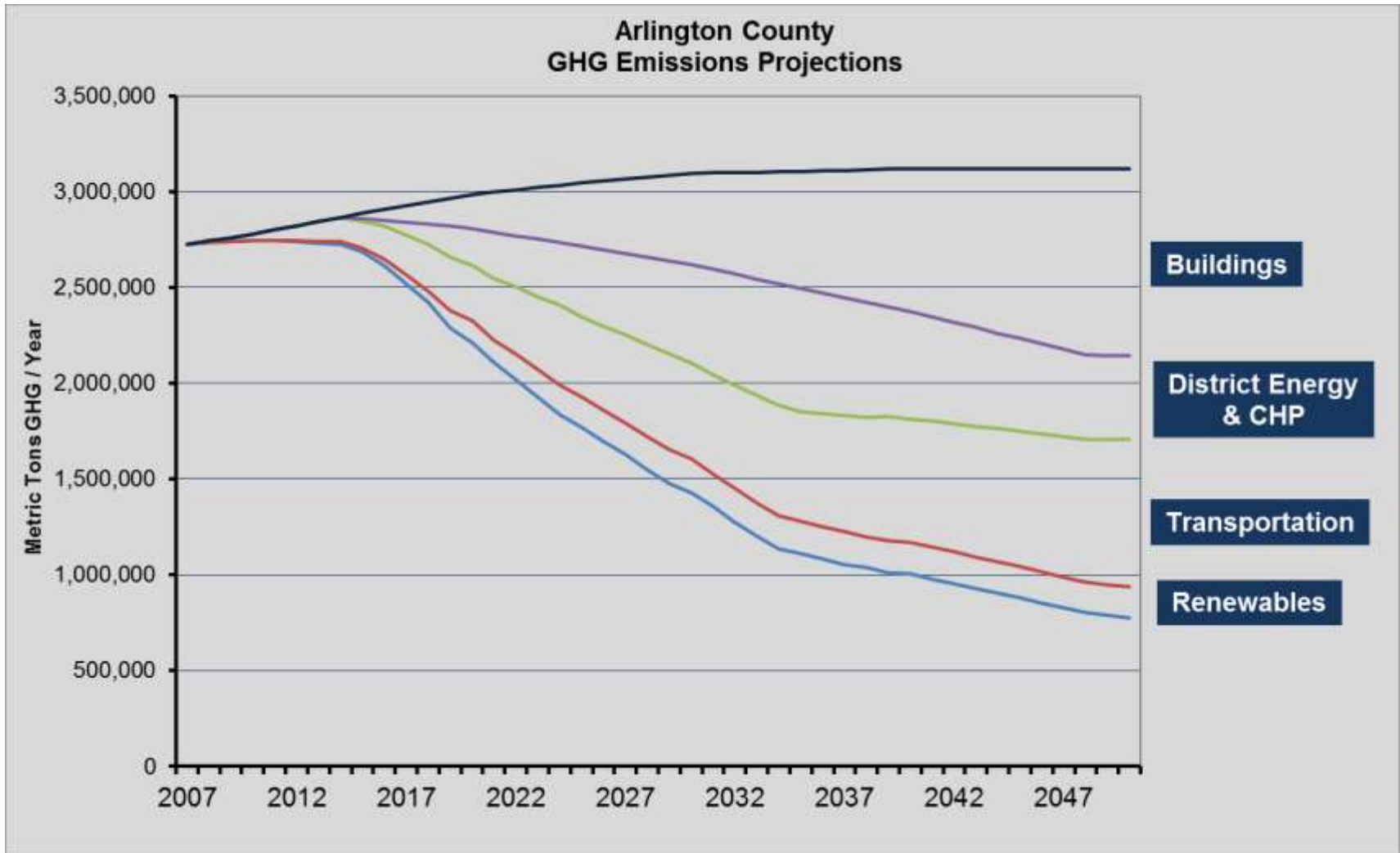
Possible Areas for Implementation



Reliable – Flexible – Clean - Economic

Create Clear Year-on-Year Goals

GHG Targets – Arlington Example



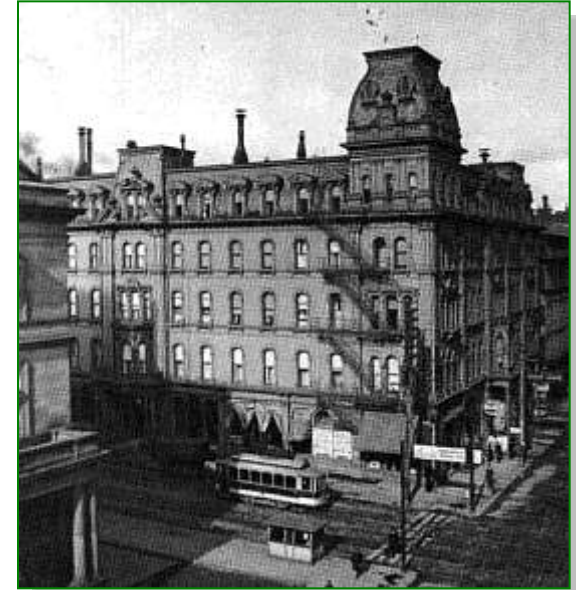
International District Energy Association

Founded in Toledo 1909

IDEA Celebrates More Than 90 Years

It was high summer in Toledo, Ohio, July 15, 1909. Horse-drawn carriages shared the streets with the occasional new Model T. Businessmen in high, starched collars and wool suits tipped their derby hats to ladies twirling parasols to shield themselves from the noonday sun. In spite of the heat, work in the unair-conditioned buildings went on, and the Ohio Electric Light Association gathered for its 14th annual convention inside the old Boody House Hotel.

The convention was held in a room off the hotel's steamy, unventilated upstairs corridor. After lunch, some of the attendees used the room for a special meeting: They wanted to talk about "the formation of an organization of central station men interested in district heating." "It was a pretty hot day to consider that subject," noted the association secretary in later chronicles.



Coming Home in Modern Clothes!

Thank You