

District Energy in Cities: The Big Picture

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THE BIG PICTURE - MARKET TRENDS AND BUSINESS DRIVERS



Societal Trends Driving Energy Sector Change

Changes are sweeping through society that will have dramatic and lasting impacts on the energy sector

- Technological
- Democratization
- Climate



Societal Trends

Technological Change

- Advancement in data processing, communications and manufacturing are making new technologies available and cost-effective to implement.
- Costs for alternatives are rapidly declining with manufacturing scale-up and technology advances



Societal Trends

Democratization of Energy

Consumers are increasingly taking ownership and control of their energy interface and future

- Access to data and information and falling costs for alternatives are empowering customers to act independently and benefit financially
- Customers are increasingly motivated to reduce bills through consumption decisions
- “Trust and loyalty of customers is changing in this new paradigm”



Societal Trends

Climate

- The de-carbonization of our economy is requiring increased efficiency and the development of massive quantities of low-carbon sources of energy

1. Efficiency and Conservation



Energy use per capita
(MMBtu/person)

2. Fuel Switching



Share of electricity &
H₂ in total final energy

3. Decarbonize electricity



Emissions intensity
(tCO₂e/MWh)

4. Decarbonize fuels (liquid & gas)



Emissions intensity
(tCO₂/EJ)

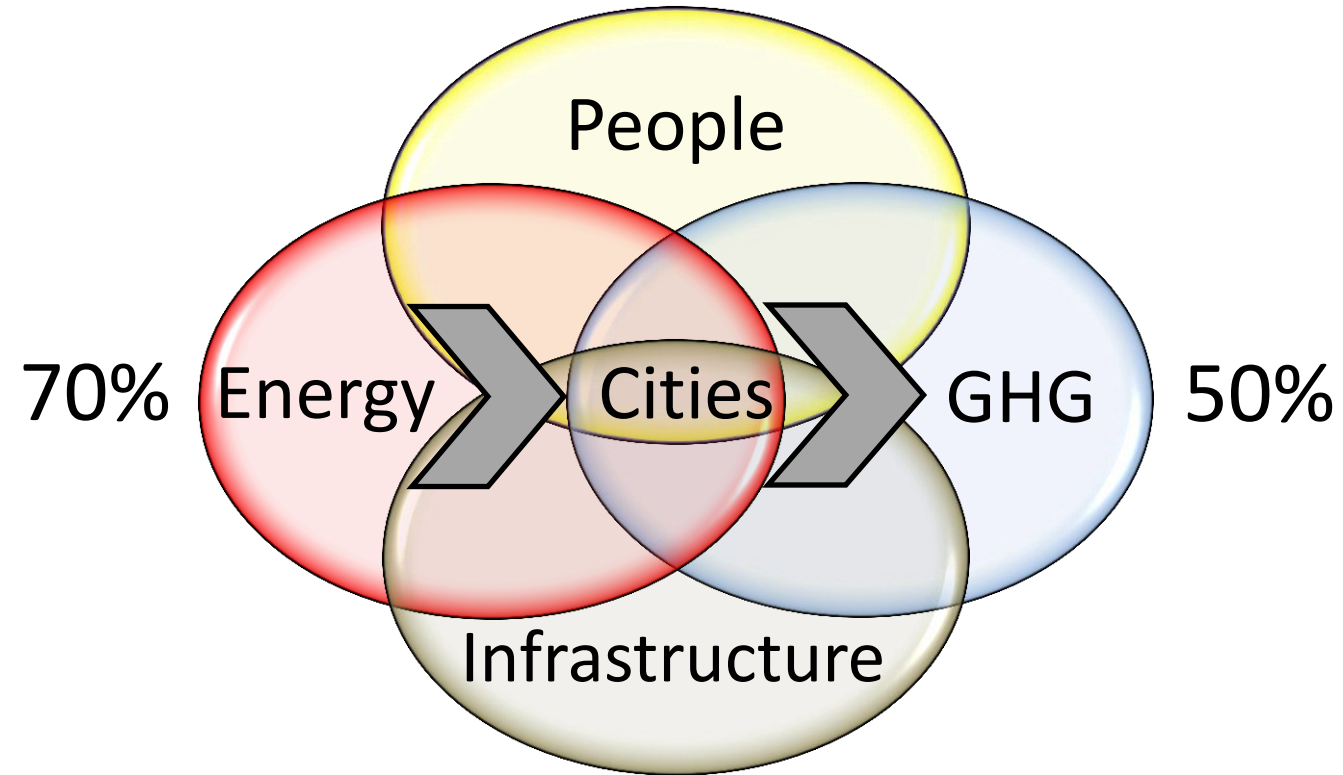


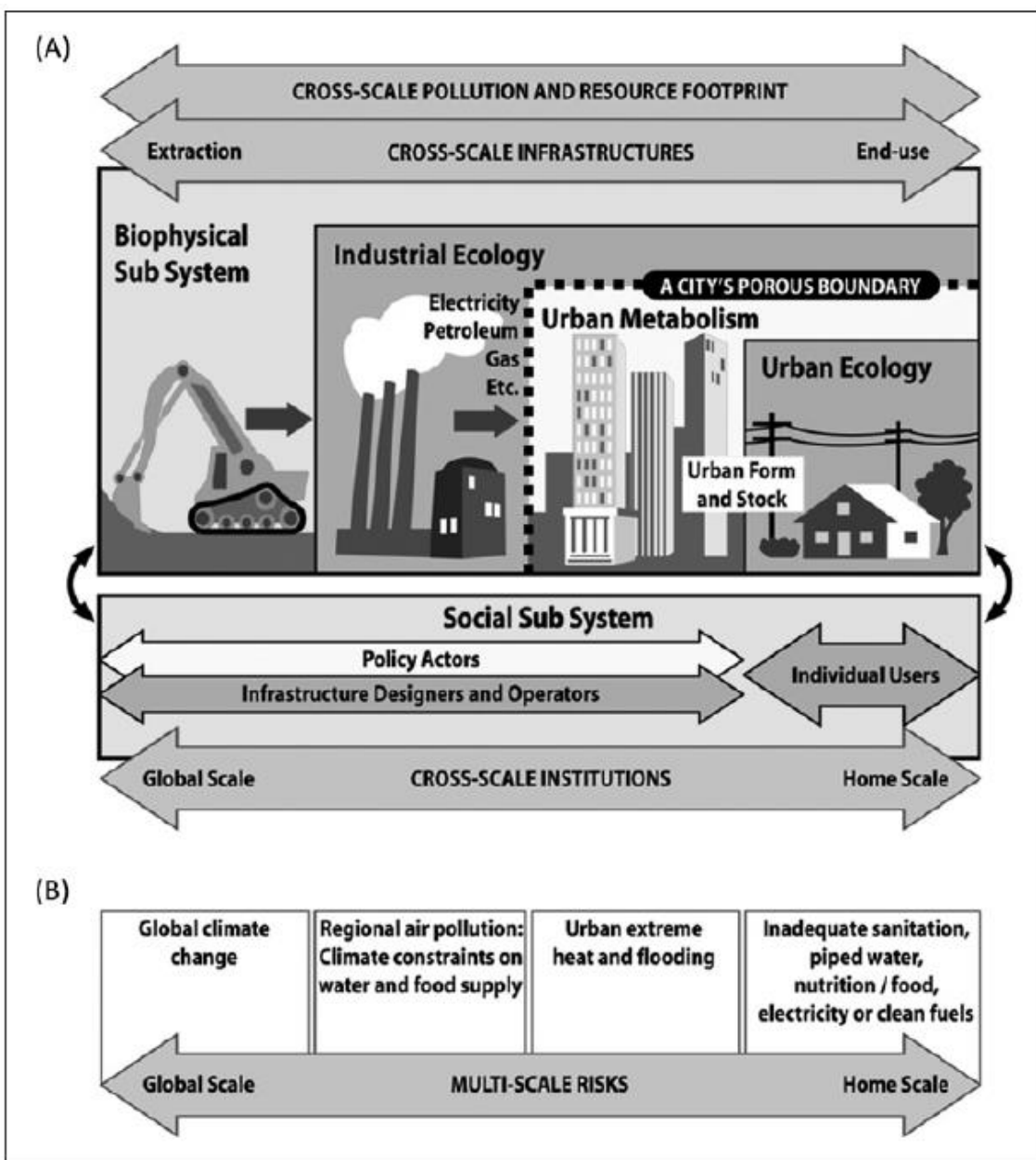
Community Needs and Expectations Are Changing



Growing Awareness

Action is Required





Source: Ramaswami et al. (2014).

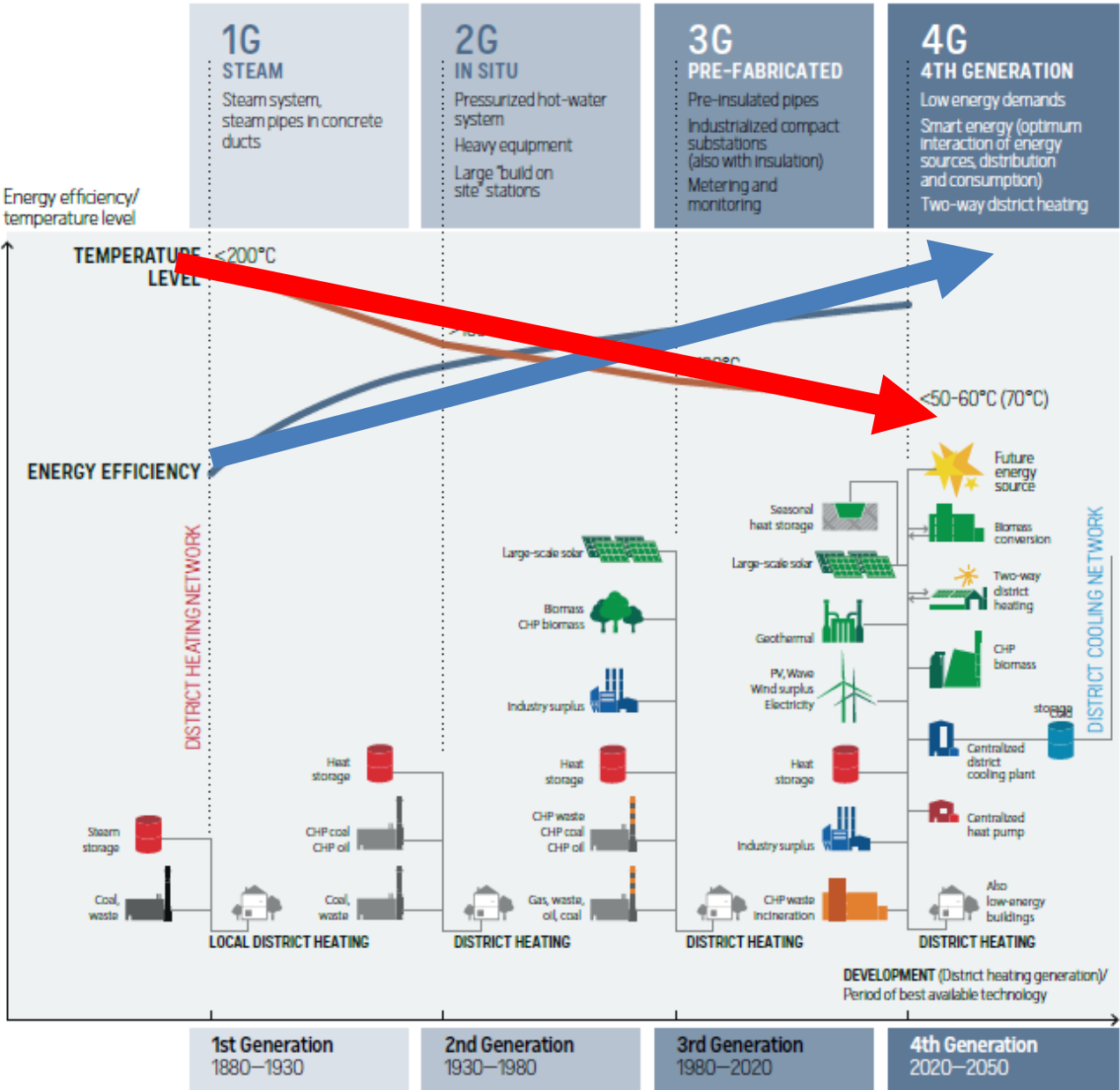
In Response Frameworks Are Evolving

- Increasing emphasis on sustainability and resilience
- Holistic/systems thinking
- Districts and neighborhoods
- Integration of infrastructure
- Determining alternatives that are environmentally beneficial and cost-competitive



In Response

Industry is Responding



Integration and Renewables

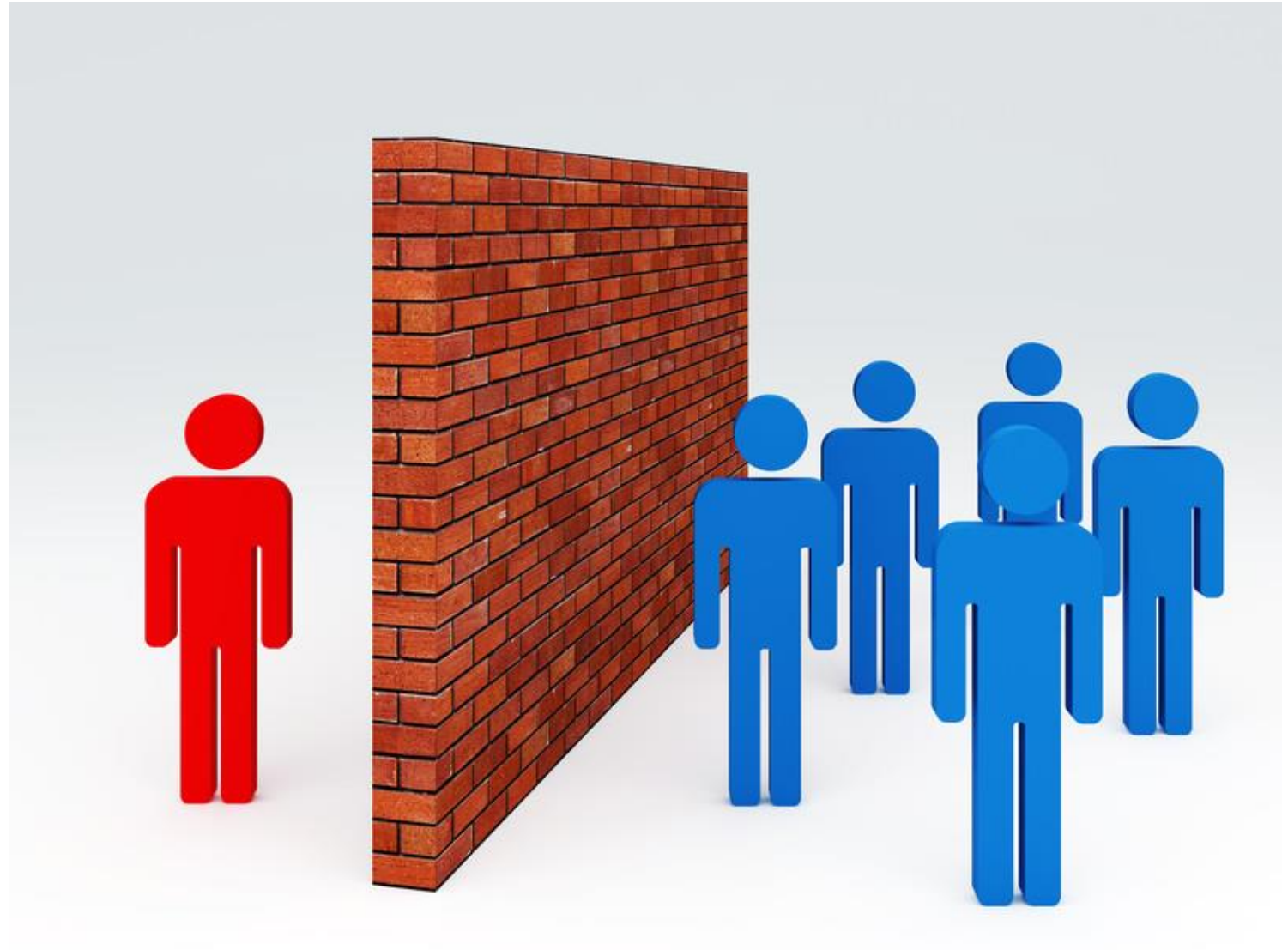
Carbon/GHG

Source: Aalborg University and Danfoss District Energy, 2014



Barriers to Transformation Remain

- Inertia of Current System – Business As Usual
- Absence of Collaboration and Partnership
- Gap in Local Leadership
- Lack of Shared Vision



OVERCOMING OBSTACLES



Collaboration and Leadership is Key



Mayor Coleman – Saint Paul



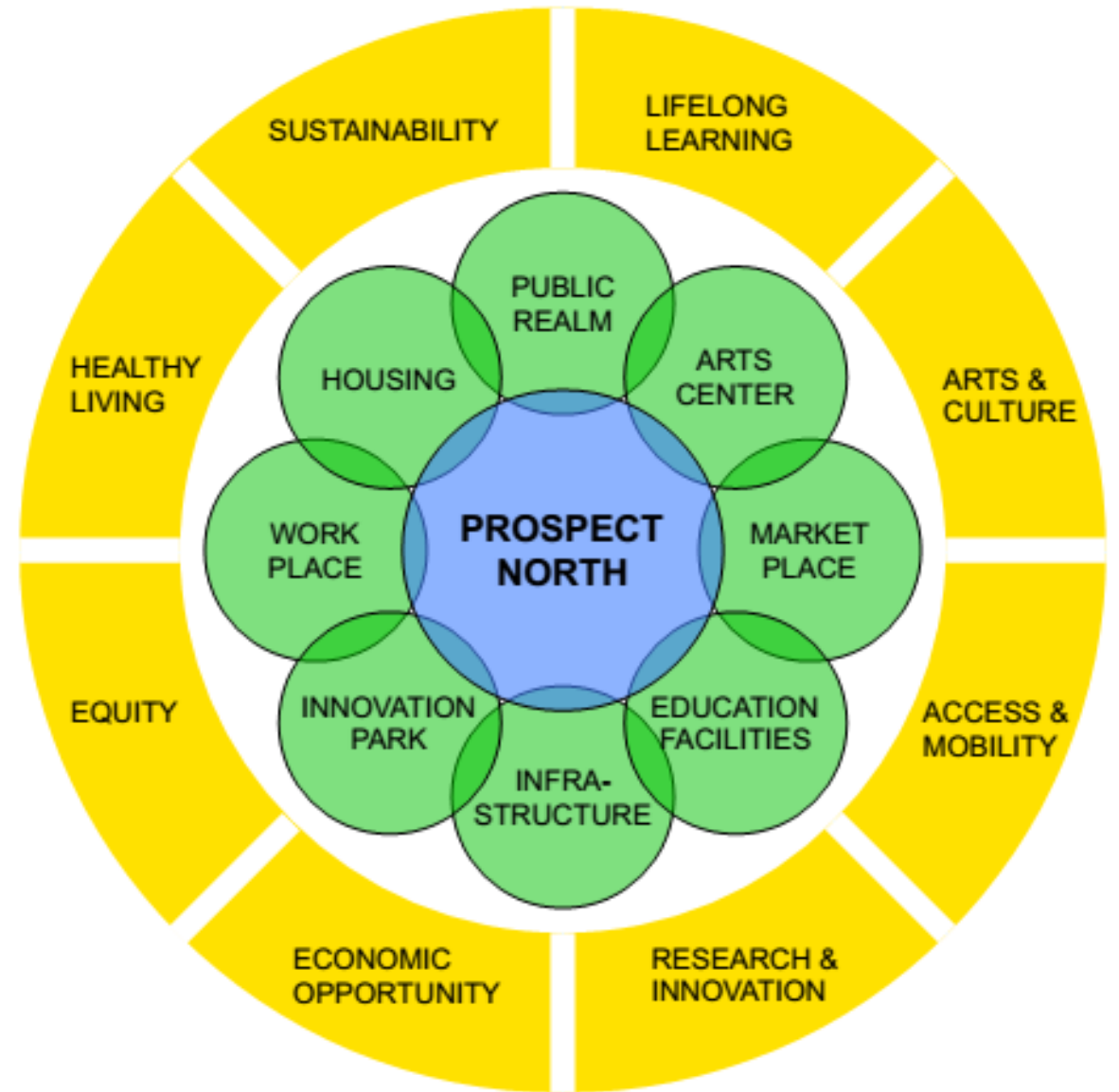
Heather Worthington – Ramsey County



Mayor Larson – Duluth

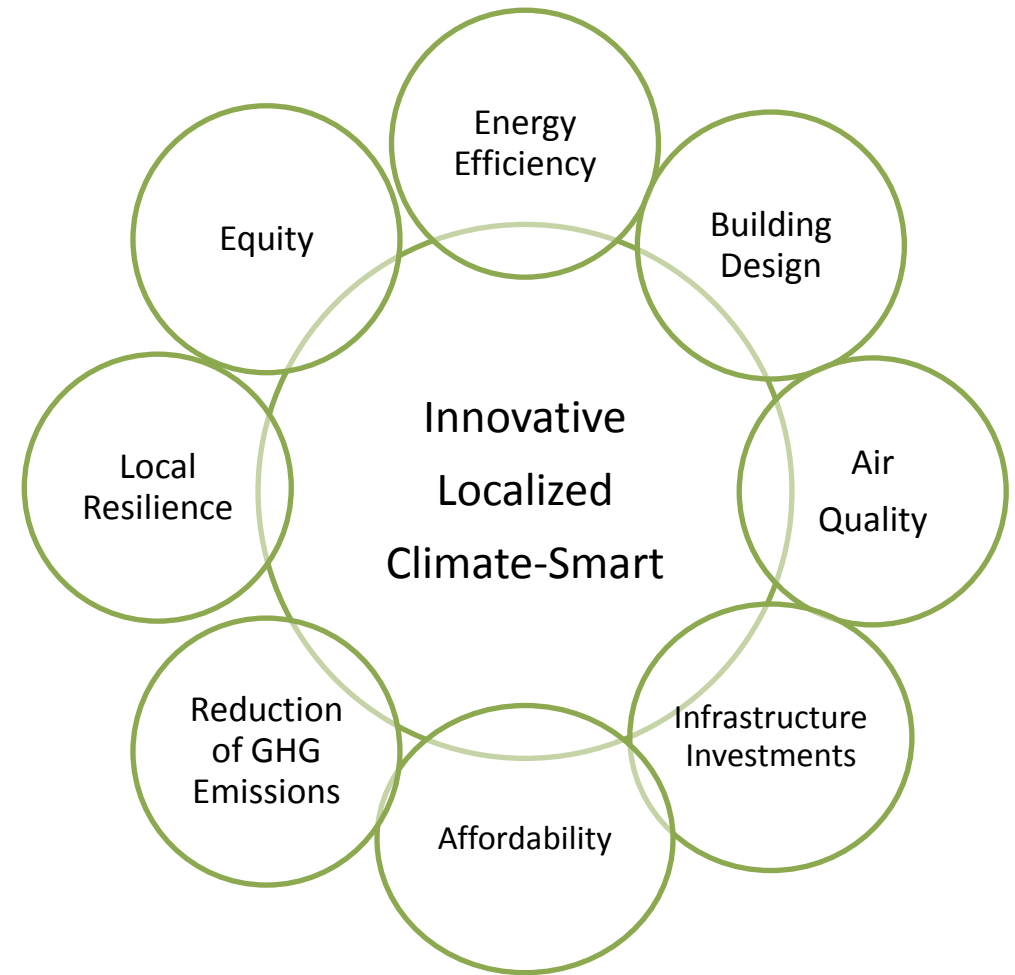


ESTABLISHING GOALS AND A SHARED VISION



Breakout Session - Getting Alignment

- Describe your project
- What are the goals and values?
- Are they universally shared by the participants in the process?
- If not, how do they differ?
- What is missing?



WHAT ARE THE OBSTACLES TO
MOVING FORWARD?



Questions for Breakout Session

Getting Aligned is Critical to Success

- What are the project values and drivers?
- What are the project goals?
- Who are the critical stakeholders?
- Are there obvious obstacles to getting started?
- What can help you get past these initial hurdles?
- What resources are going to be necessary upfront?
- What advantages does this project already have in place (existing infrastructure, assets, other investments, available funding)?
- What solutions have you found to get past project challenges?



ADDITIONAL SLIDES

