



*TCAAP Energy Integration and
Resiliency Framework*



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ENERGY™**



5 HUN a Yohi8

Process

Policy White Paper

- Energy vision statement
- Energy supply alternatives
- Demand-side management (energy efficiency)
- Policies & regulations
- Next steps

TCAAP Energy Integration
Resiliency Framework Phase 1:
Policy White Paper

RAMSEY COUNTY ARDEN HILLS



EVER-GREEN ENERGY™ Burns & McDonnell SINCE 1898 cee Center for Energy and Environment Fresh Energy

Process

Energy Integration and Resiliency Framework

- Build upon White Paper recommendations
 - Apply to the site
 - Environmental benefits
 - Cost-benefit analysis
 - Implementation planning
- Looking 50 years out

TCAAP's Energy Vision

TCAAP will be a vibrant development that leverages long-term energy conservation and resilience to attract investment and partnership, and achieves sustainable benefits for Arden Hills and the surrounding community.

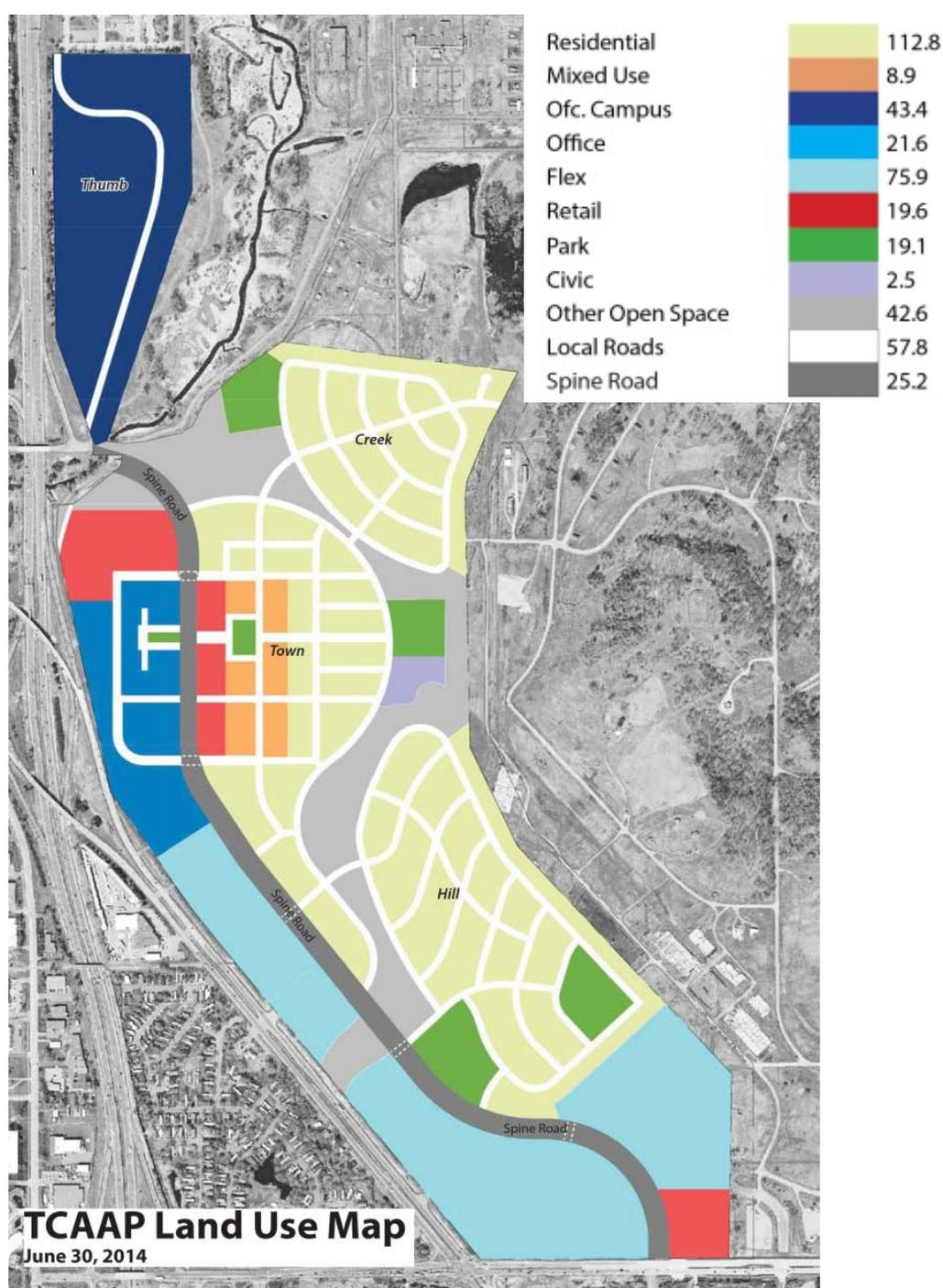
TCAAP's Guiding Principles

- Establish TCAAP as a national model for development of integrated energy systems
- Develop a resilient community for energy and other utilities
- Implement infrastructure solutions that are flexible and scalable over the next 50 years
- Deliver a model of efficient energy and water usage that minimizes TCAAP's impact on the environment
- Create an economically competitive and attractive environment for developers and businesses

Unique TCAAP Opportunities

Developing a greenfield site in the core of the metro area

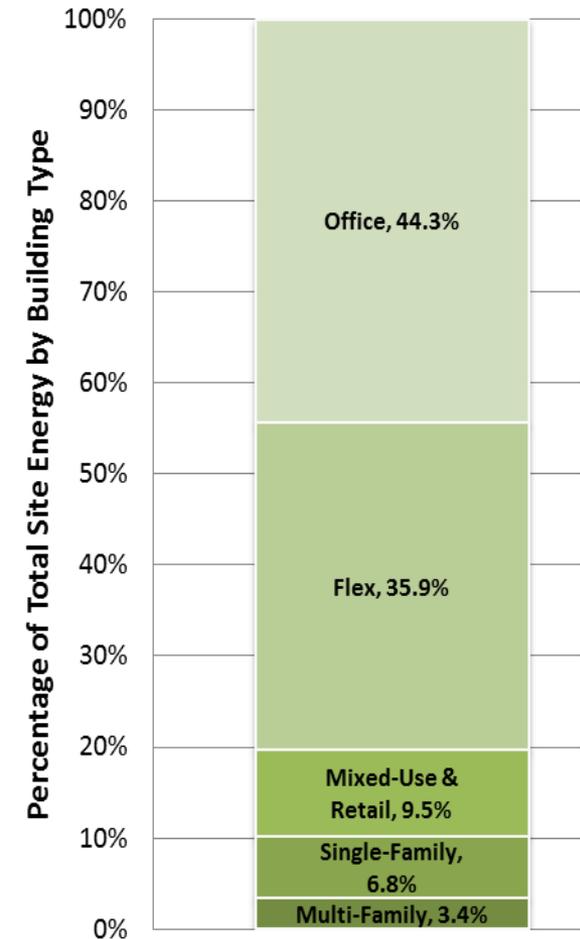
- Infrastructure development
- Direct-fiber broadband
- Partnership
 - AHATS
 - Xcel Energy
 - Others
- Electric vehicle or smart grid demonstration platform
- Geothermal
- Snow and ice melt



TCAAP Land Use Map
June 30, 2014

Expected TCAAP Development

Total Projected Energy Consumption by Area			
Area	Load (Kbtu)	Square Feet	% of Load
Thumb	264,065,599	3,402,907	26%
Office	188,467,390	2,428,703	18%
Retail	63,852,464	682,184	6%
Mixed Use	32,790,602	350,327	3%
Multi-Family	34,990,409	1,599,240	3%
Town (low-density)	46,614,676	1,178,944	5%
Hill	13,775,509	348,400	1%
Creek	9,252,207	234,000	1%
Flex	366,704,807	3,917,786	36%
TOTAL	1,020,513,663	14,142,492	100%



Energy Supply Alternatives

- Solar PV
- Combined heat & power (CHP)
- Water/Ground-source heat pumps
- Microgrid development in collaboration with AHATS
- Storage

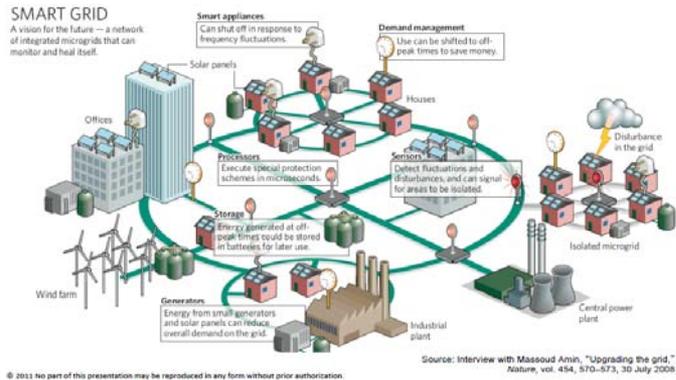
Demand-Side Management



Efficient Design



Building Co-location



Advanced Infrastructure



Occupant Behavior

Policy Recommendations

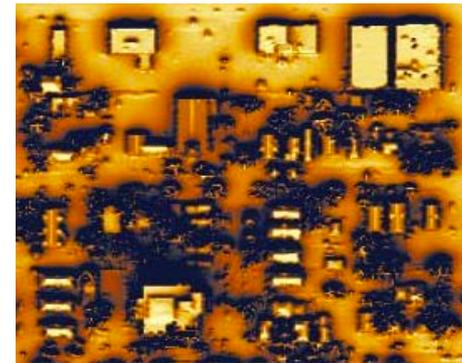
- Coordinate with existing state and utility programs
- Provide TCAAP Redevelopment Code flexibility
- Consider building orientation and shading in site plans
- High-efficiency lighting requirements
- Develop RFP specifications for low-energy use buildings
- Encourage citywide programs for ongoing efficiency



Ecofriend



Eastern Michigan University



University of Minnesota

Next Steps

- Continuing ERAB collaboration
- Policy planning
- Spine Road utility coordination that includes thermal and communication infrastructure
- Partnership outreach and exploration
- Cost-benefit analysis of preferred supply and efficiency options
- Framework completion in March 2015