

Renewable Energy Planning at the Community Level



Lessons Learned from Projects in Germany

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Agenda

1 Introduction

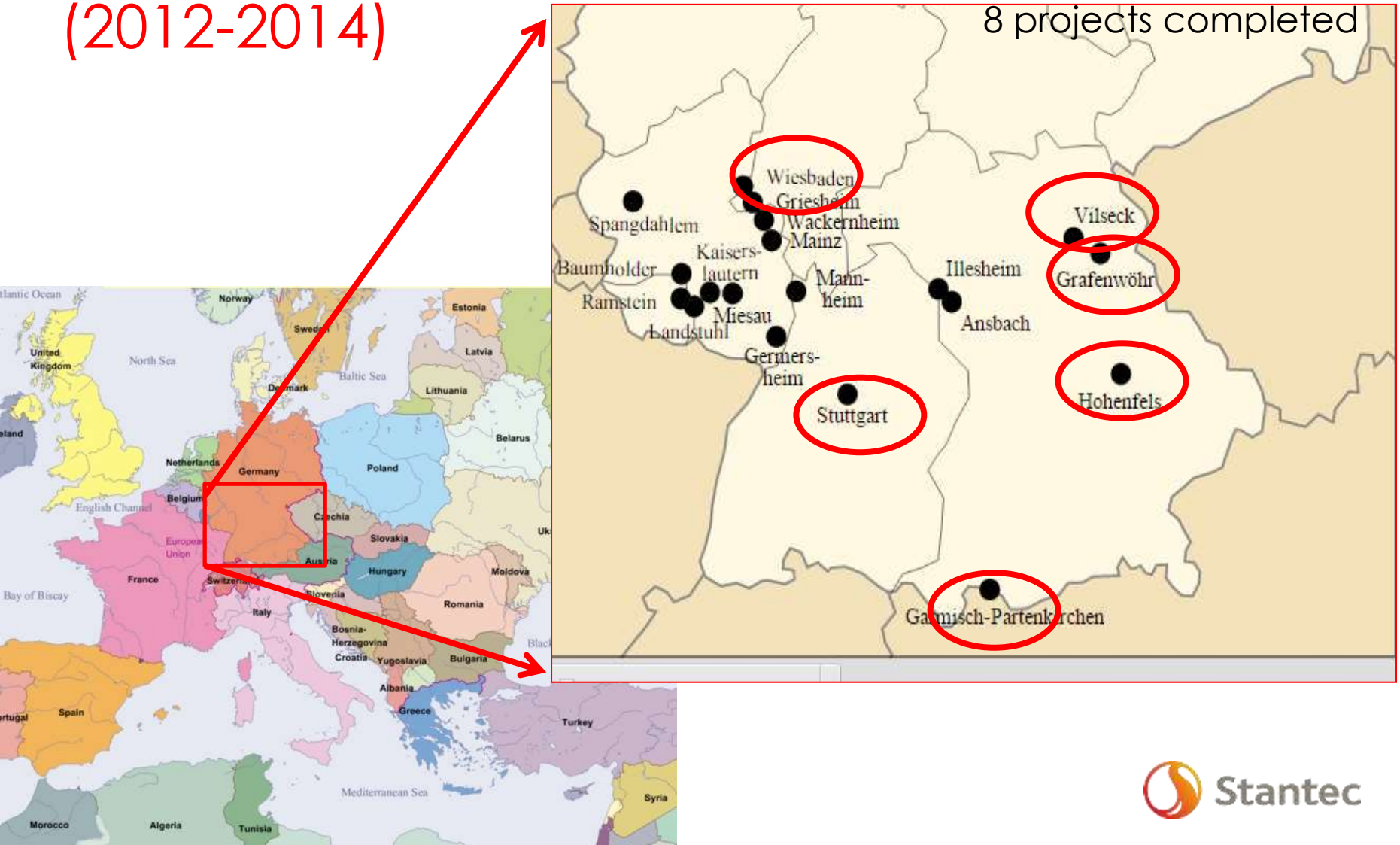
2 Net Zero Overview

3 Planning Approaches

4 Lessons Learned

1 Introduction

Army Communities – Germany (2012-2014)



1 Introduction

- Planning Priorities:
1. Save Money
 2. Energy Security
 3. Net Zero



2 - US Army Net Zero Program

*Building
consumption
reduced
50 percent*



**Energy
Demand**

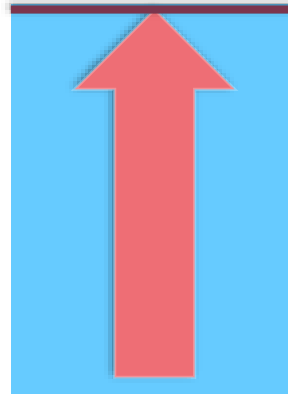
2 - US Army Net Zero Program

*Building
consumption
reduced
50 percent*

*100 Percent of
energy demand
met by renewable
sources*



**Energy
Demand**



**Renewables
Supply**

2 - US Army Net Zero Program

*Building
consumption
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*100 Percent of
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Target: Net Zero Energy Community

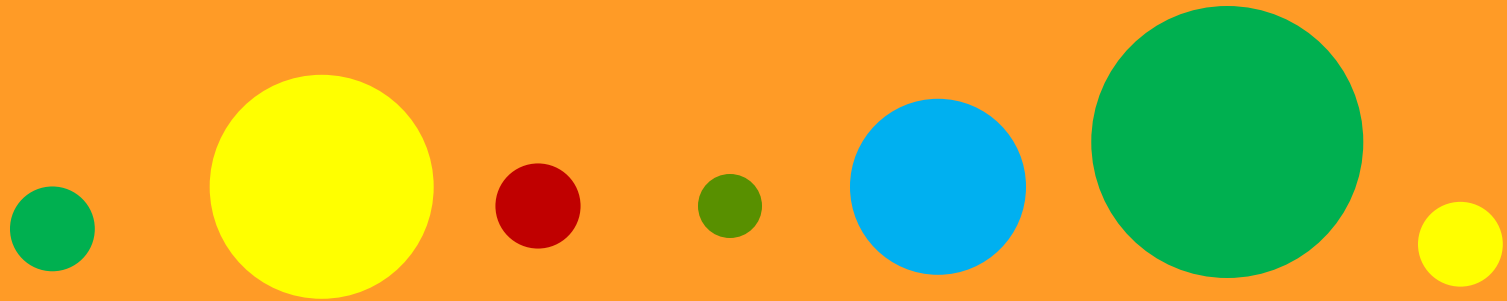


**Energy
Demand**



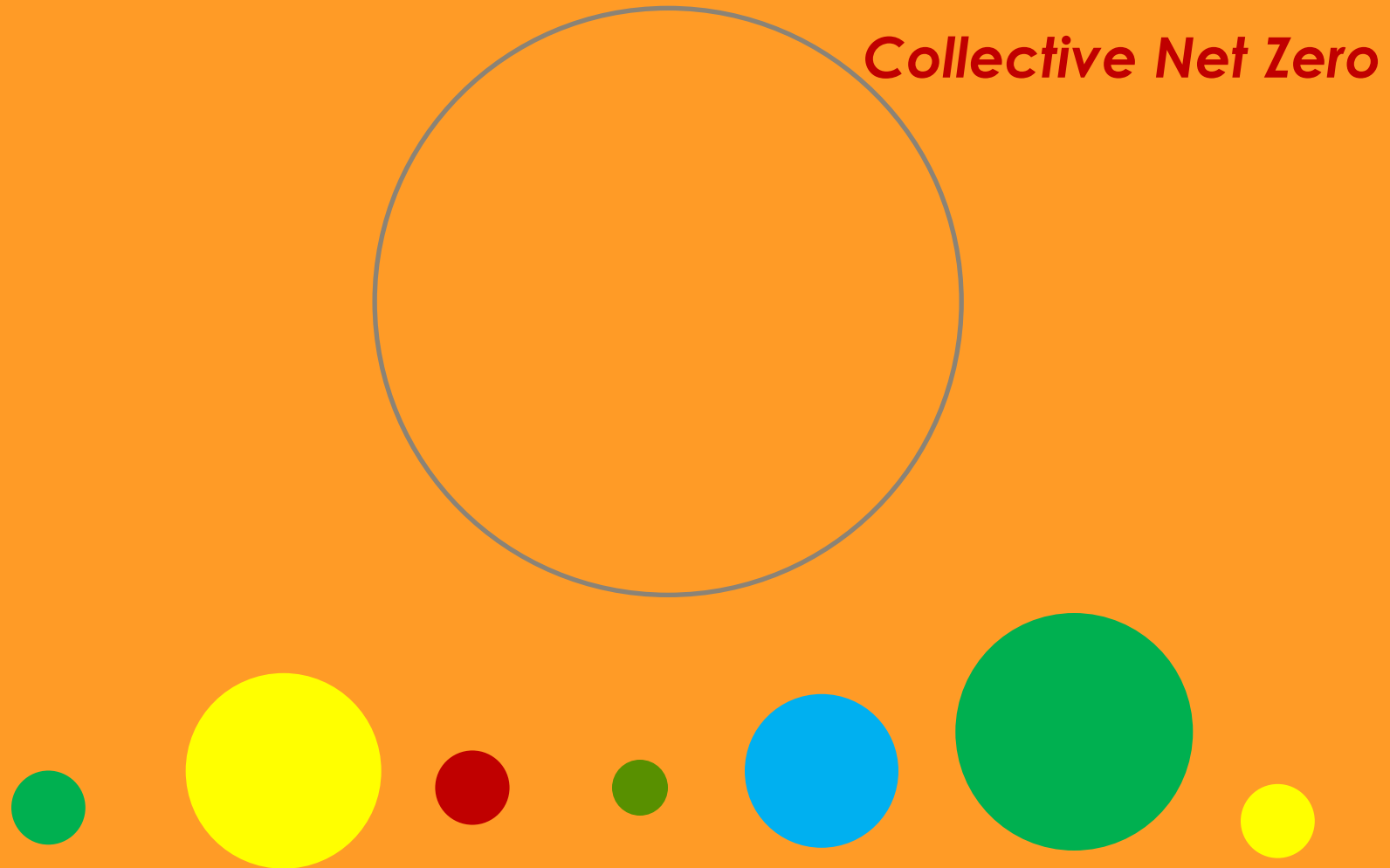
**Renewables
Supply**

2 - Net Zero at the Community Level



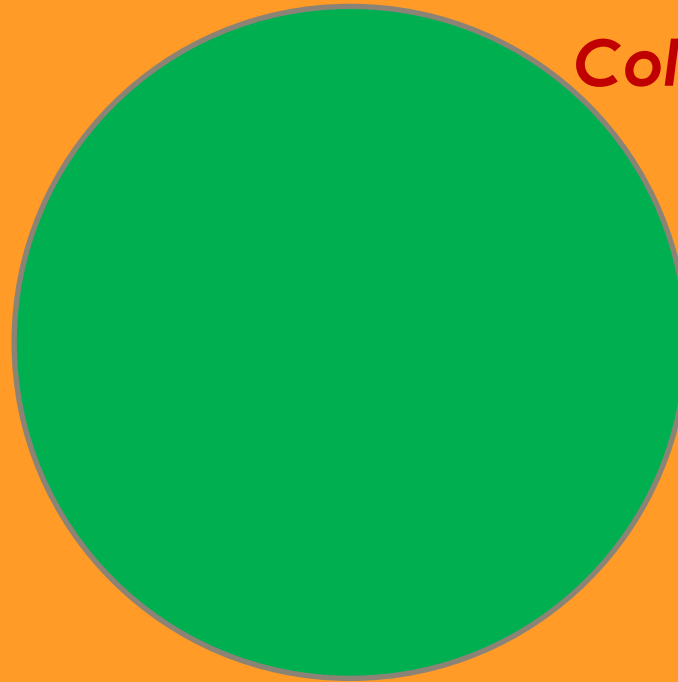
Diverse installations/Regions

Net Zero at the Community Level



Diverse installations/Regions

Net Zero at the Community Level



Collective Net Zero

- Clustered Project planning and funding
- Geographic footprint
- Energy diversity
- Portfolio approach

Army Communities - Infrastructure



Army Communities - Residential



Army Communities

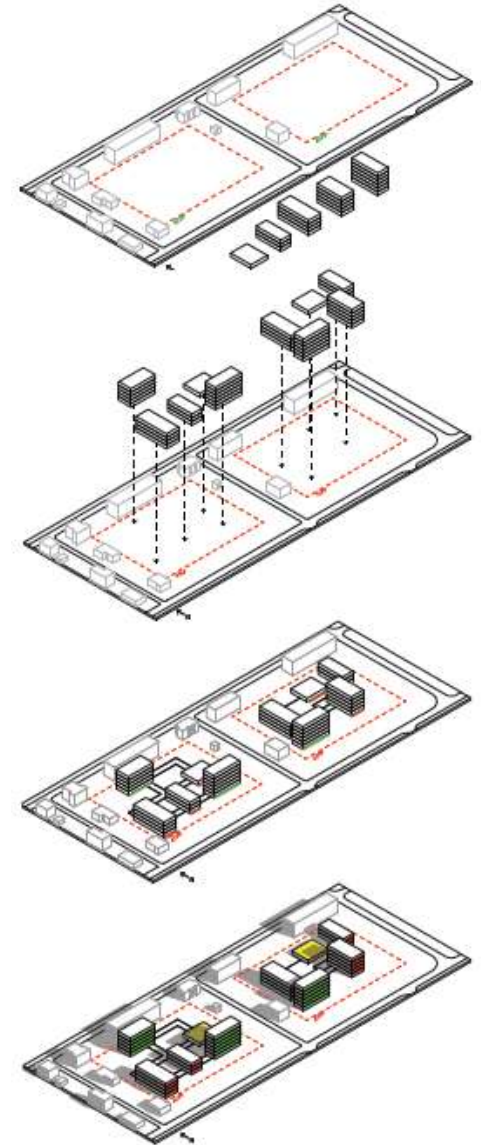




Master Plan Conflicts

Open Space Planning for Energy

- Solar infill design
- Parking canopy PV
- Biomass fuel storage areas
- Energy storage battery arrays
- **Geothermal open spaces**



3 - Planning Approach

SCREENING

- Solar PV
- Wind
- Biomass/Biogas
- Geothermal
- Hydropower
- Solar thermal



ENERGY MODELING:

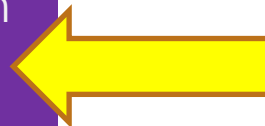
- Distributed rooftop PV
- Utility ground-mount PV
- Utility Wind power
- CHP retrofits to biomass
- Ground loop/heat pumps
- Biogas/Landfill gas
- Microhydro



Roadmap

ACTION PLAN:

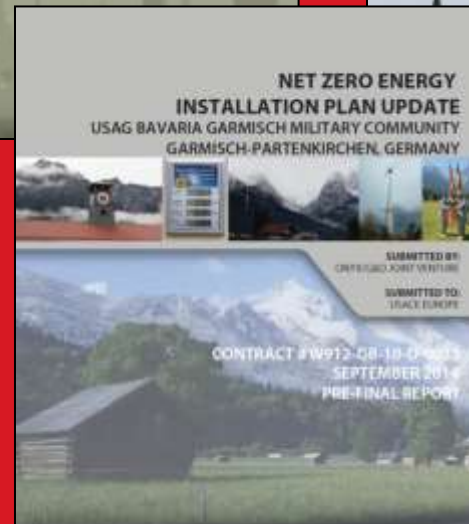
- Project identification
- Funding
- Project ranking
- Community support



SUSTAINABILITY:

- Environmental
- Social impacts
- Economic benefits/costs
- Stakeholders

End Results – Real Action Plans



- Consistent approach
- Data and reasoning
- Community input
- Roadmap and projects

4 - Lessons Learned

1. Performance benchmarking



2. Master plan conflicts



3. Unintended consequences



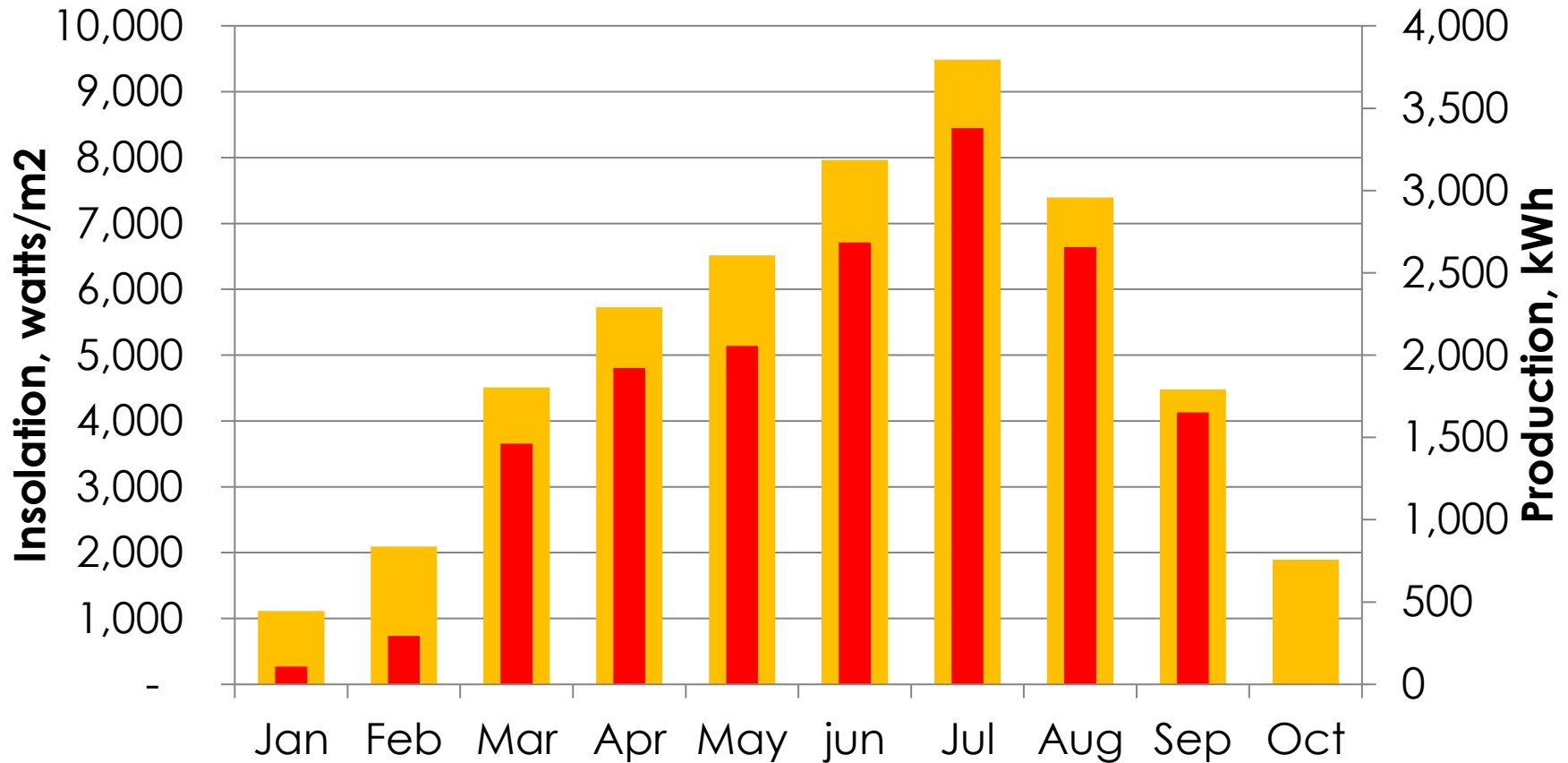
4. Stakeholder opinions





Performance Benchmarking

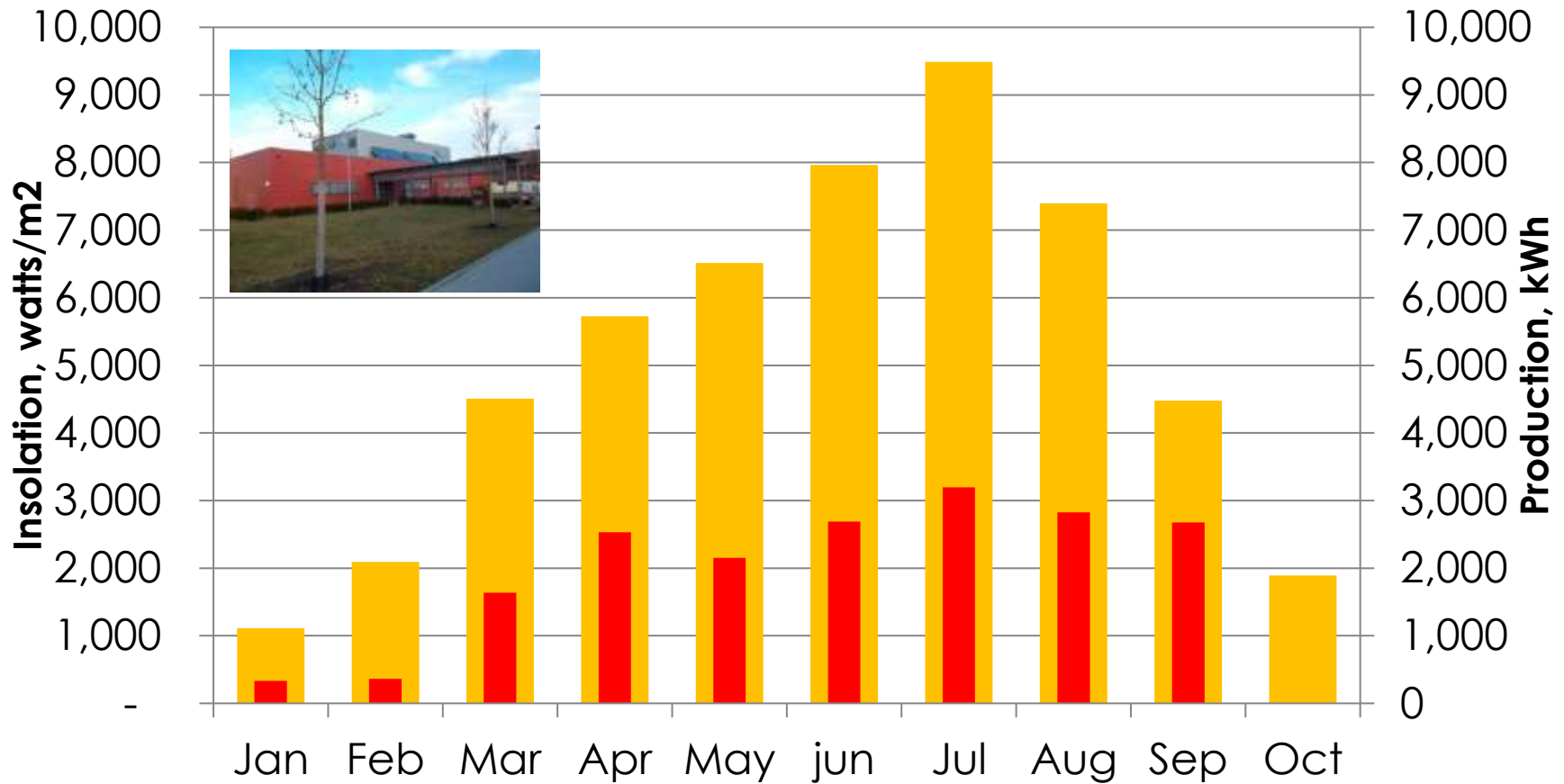
2013 Monthly Average Solar Radiation vs. Electricity Production, Building 3052





Performance Benchmarking

2013 Monthly Average Solar Radiation vs. Thermal Production, Building 120



Geothermal Siting Analysis



Environmental precluded



* Consider multiple technologies in planning.
But you will still have conflicts.



This?



Or this?



Ideal = Both

3. Unintended consequences



Biogas and Biomass options

- Agricultural feedstock
- Community owned and private facilities
- Plant siting is controversial



** Consider impacts beyond your own neighborhood.*



- Sustainable harvesting?
- Agriculture effects?
- Fuel security?
- Noise and traffic?
- Air emissions/odors?



4. Stakeholder Opinions

ARGUMENTS AGAINST-



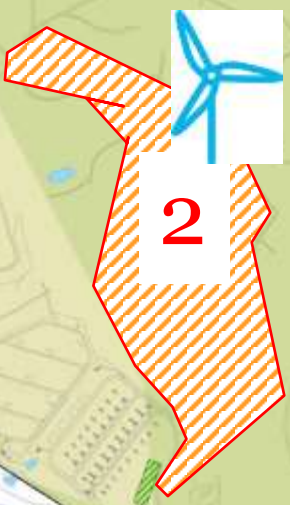
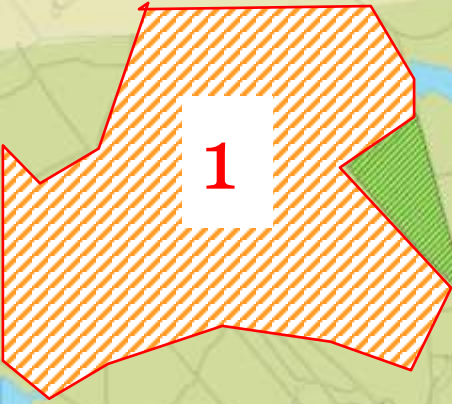
JOEY BLER © 2011 GREEN MATH PRESS AND THE



Appropriate Siting



Potential Wind Siting Solutions



Legend	
	New Paving Areas
	New Construction
	Facility Demolition (as of June 2011)
	Facility Renovation
	Project Area
	300m Buffer AFN Tower
	Env. Compensation Areas (as of Oct. 2011)
	Proposed Env Information Center
	Water Expanse

Making Choices – Process is Key

- Consistent methods of analysis
- Stakeholder engagement and education
- Broad community perspective
- Long-term vision
- Shared roadmap to success

Questions?

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