

SAINT PAUL FORD SITE

**RENEWABLE ENERGY
OPPORTUNITIES**

Presented to MN Brownfields on February 3, 2016

Ford Site (2011)



**Hydro
plant**

**Steam
plant**

AREA C dump site

Ford Energy Study (2014-15)



RAMBOLL

THE MCKNIGHT FOUNDATION

3 Concepts Evaluated:

- **Business as usual** - Grid electricity, natural gas heating, and cooling with air conditioning
- **District energy** - ATEs based heat pump/chiller energy production, solar thermal, river cooling, thermal storage, and gas boiler back-up
- **Individual generation** - Solar PV on roof tops, central (ground source) heat pumps for heating and chillers for cooling, and hot water storage

Energy Report Conclusion



“Creating a sustainable and livable community requires looking at the bigger picture, creating livable space, supporting sustainable energy design, building energy efficient structures, and revisiting conventional water infrastructure and transportation. As such, **business as usual in redevelopment practices and energy delivery will not do.**”

Ford Site Solar Feasibility Analysis

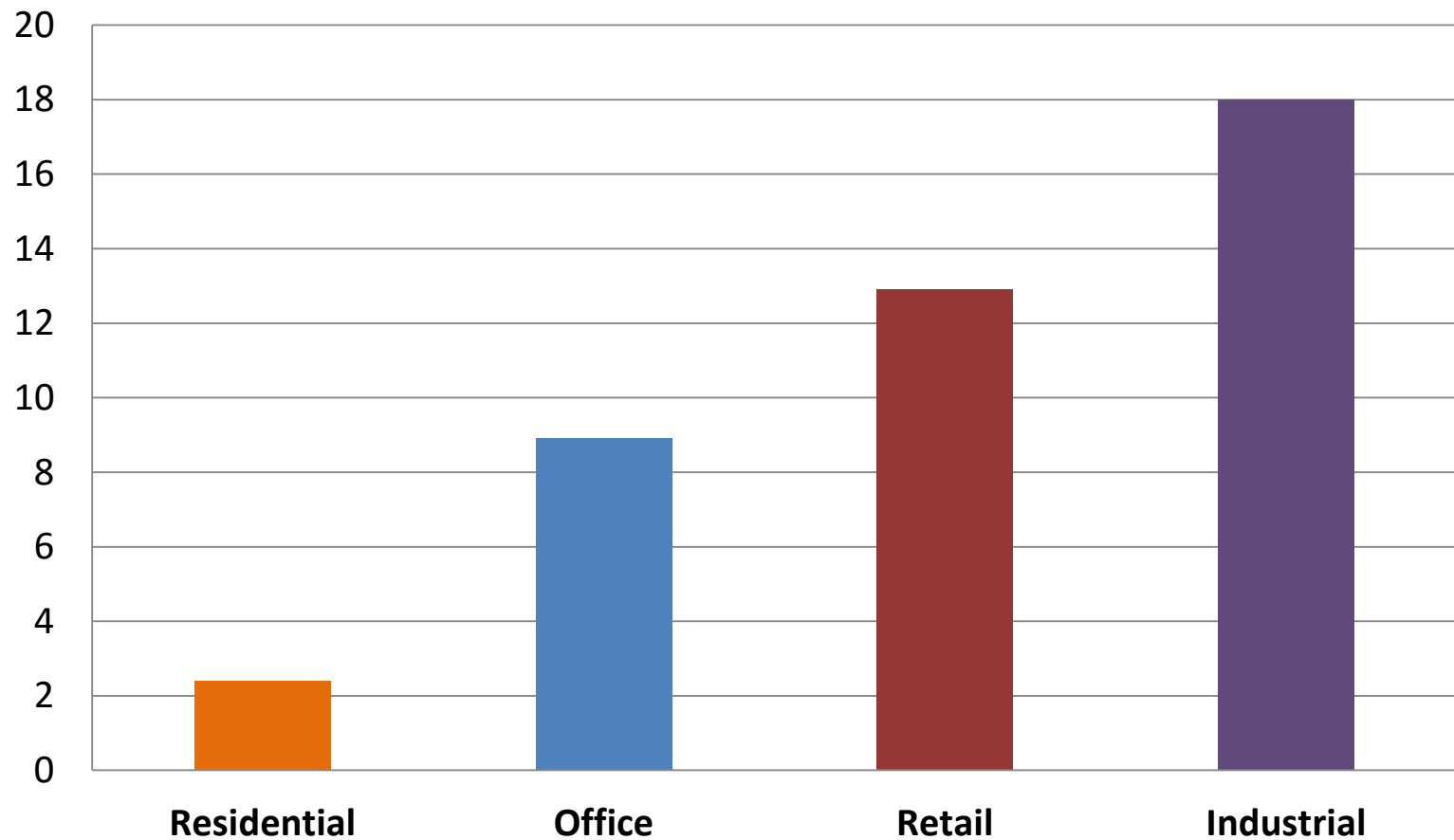
Integration of Rooftop Photovoltaic Systems in St. Paul Ford Site's Redevelopment Plans

- Dan Olis and Gail Mosey



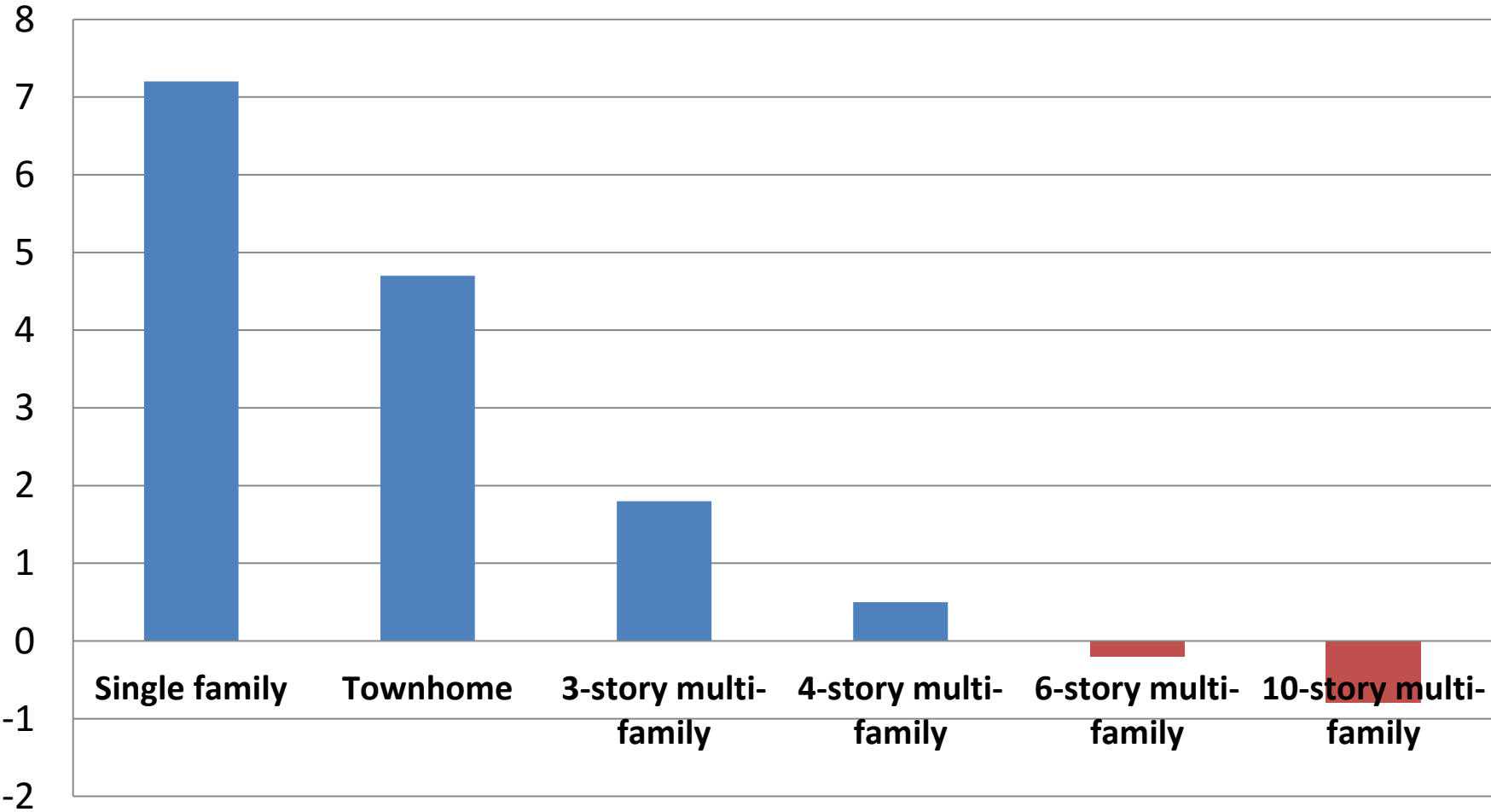
Electricity Demand by Land Use

Annual Electricity Use (kWh/Sq Ft)



Residential Solar Potential

PV Excess or Shortfall per Unit Type (kW/unit)



Potential for PV to meet site energy

12.1 MW



57% met by rooftop – 5.2 MW shortfall

6.8 MW



63% met by rooftop – 2.5 MW shortfall

9.1 MW



50% met by rooftop – 4.6 MW shortfall

6.5 MW



49% met by rooftop – 3.3 MW shortfall

Solar garden on dump site?



Solar PV installation on the “Area C” pad (about 3.5 acres) could supply 0.6 MW / year

NREL Report Recommendations

- ❖ Street layout east – west to maximize solar access
- ❖ Maximize passive solar opportunities in building design and orientation
- ❖ Minimize building-on-building shading
- ❖ Minimize tree canopy shading of roofs
- ❖ Solar-ready building and rooftop design

Next Steps for Ford Energy Solution

- Require compliance with Saint Paul's Green Building Standard for all buildings on site (tied to any funding)
- Consider incentives / programs for even higher efficiency
- Use zoning and master plan to maximize solar access
- Study ATES (Aquifer Thermal Exchange System) potential
- Continue conversations with Xcel and Ever-Green Energy to pursue an energy system solution for the site
- Keep Ford and potential developers abreast of energy concept and implementation steps



The 1924 Ford steam plant may be part of the site's future energy solution