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## Sustainability at MPW

- Beneficial Reuse of By-products
- Energy Conservation
- Powering the Future



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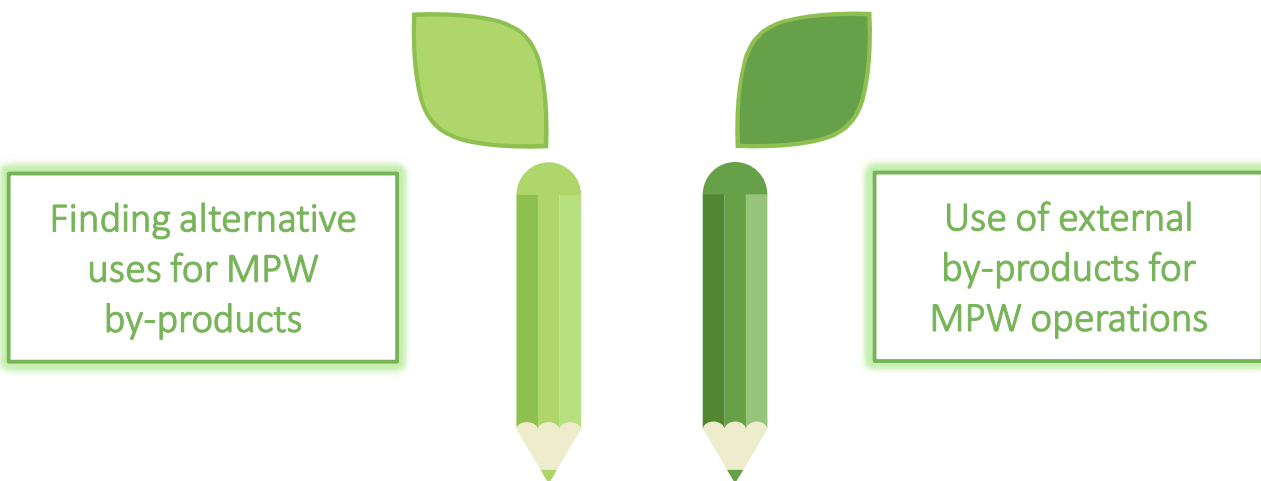
# Beneficial Reuse of By-products



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## Beneficial Reuse of By-Products

MPW has worked on both sides of beneficial reuse



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## MPW By-Product Reuse

- Primary by-products are flyash, bottom ash, and gypsum
- MPW has a long history of finding alternative beneficial reuses for its by-products
  - Flyash - Unit 9 flyash is class C flyash for use in concrete
  - Bottom Ash - Shingles, grit blast media, cement manufacturing
  - Gypsum - Wallboard, soil amendment



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## Investigating Uses of Other By-Products

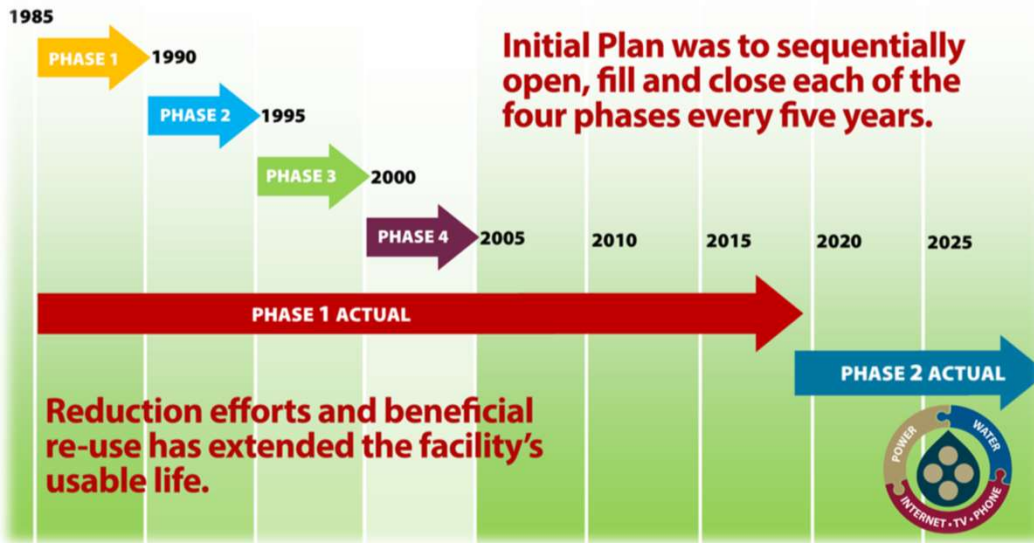
- Expired seed corn
- Tire Derived Fuel (TDF)
- Furniture manufacturing wood waste
- Button shavings
- Miscanthus grass
- Grain drying by-product

Miscanthus grass test burn fuel mix (coal/grass) 2018



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# Landfill Life Extension



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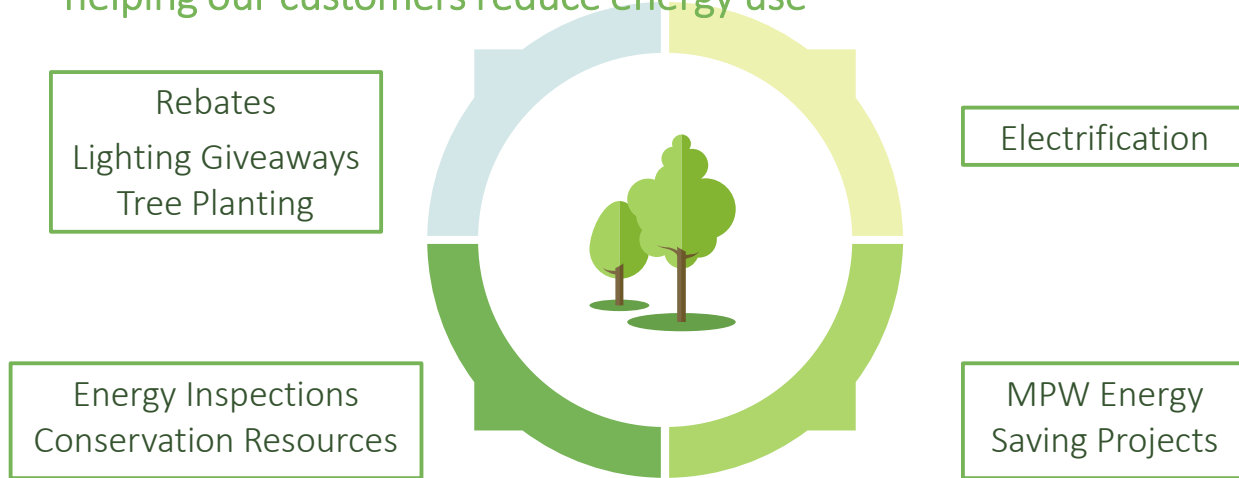
# Energy Conservation



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# Energy Conservation

Mature Energy Services program with 20+ years of experience helping our customers reduce energy use



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# Energy Conservation

## Rebates

- » \$1.5 million in rebates given out over the past 10 years



## Energy Efficiency Customer Savings

- » 52.9 million in annual kWh savings from customer projects completed in the past 10 years
  - Lifetime savings of over 1 billion kWh
- » About \$3.8 million in annual savings through energy and demand reductions

## Dedicated Conservation Resource

- » Dedicated conservation expert on staff
- » Conducts energy efficiency inspections and audits
- » Helps identify and analyze potential upgrades to homes and businesses

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# Energy Conservation

## MPW Projects

- **LED Street Light Upgrades**
  - Phased replacement program dating back to 2011
  - 2,451 street lights upgraded
  - Annual savings of \$78,250 in energy and \$56,500 in maintenance
- **LED Security Light Upgrades**
  - Phased replacement program dating back to 2013
  - 975 of the 1,337 security lights have been upgraded
  - 70% energy savings vs HPS fixtures
    - When complete, will save about 770,000 kWh each year

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# Energy Conservation

## MPW Projects (cont'd)

- **Well Pump VFD Retrofits**
  - Retrofit 18 water well pump motors with Variable Frequency Drives (VFDs)
  - Phased approach between 2004 and 2011
  - Reduced energy usage, peak demand requirements, and maintenance costs
  - Energy Savings Estimate: 18.7%
  - Maintenance Cost Savings Estimate: 38.2%

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# Energy Conservation

## Electrification Activities

- MPW purchased their first all-electric vehicle in 2020 and has approved the purchase of two Ford Lightning all electric trucks
- Created an EV Stakeholders Group comprised of local industry and business representatives as well as vehicle owners
- MPW has installed 4 community charging stations: Musser Public Library, The Merrill Hotel, the Muscatine Mall, and MPW office
- MPW offers rebates to customers for the purchase of EV and charging station installation

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Powering the Future



**MPW**

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# Powering the Future

## A Balanced Approach



## Strategic Initiatives

- Expand renewable portfolio
- Investigate replacement local resource
- Reduce environmental impact
- Transition reliably and safely

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# Renewable Portfolio

## South Fork Wind

- Nameplate Rating: 13 MWac
- Annual Output: ~50,000 MWh  
(*about 5.6% of native system needs*)
- Located in Jackson County, MN
- Renewable Energy Certificates (RECs) are made available to customers
  - Allocated on an annual basis
  - Priced based on index, with 10% discount



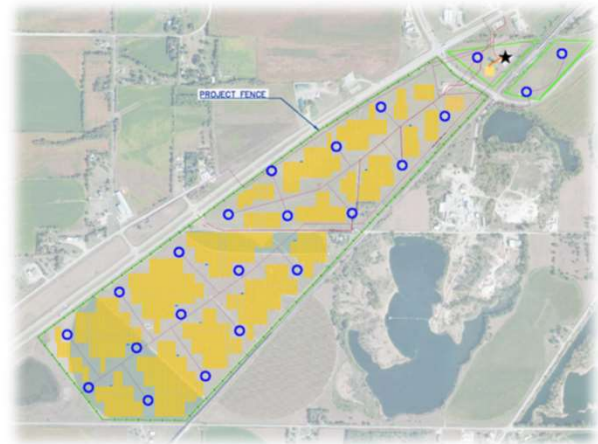
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# Renewable Portfolio

## Muscatine Solar 1

- Nameplate Rating: 24 MWac
- Projected Output: 52,800 MWh  
(about 5.8% of 2025 native system needs)
- To be located in MPW's Grandview Ave. Wellfield
- In-Service likely in 2025



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# Meeting Customer Goals

## Choose Green Business Program

- Promotes the expansion of local renewable energy
- Rates are designed to pass renewable energy project costs on to Program participants
- Rates include Renewable Energy Certificates (RECs)
- Long-term commitment/agreement



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# Powering the Future

## Impact of Behind the Meter Projects on Rates

- Municipal utility structure
- Cost of Service based rates
- We'll be here to serve your load around the clock under a wide array of unplanned contingencies

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# Powering the Future

## Green Energy Project Experience

- Hurdles
  - Basis risk and why the contract price is only half the story
  - Land use (Location, lease costs, county land use restrictions, etc.)
  - Interconnection process timelines
  - PPA negotiation challenges
- Current Market Influence



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# Powering the Future

## Combined Heat and Power (CHP) Unit

- MPW has over 20 years of experience partnering with a customer on CHP system
- Leveraged existing assets, process efficiencies, and fuel diversity to provide a win-win solution

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# Powering the Future

## Combined Heat and Power (CHP) Unit

- MPW Unit 10
  - Clean natural gas
  - Lower Water usage
  - Useful steam output
  - Potential for future use of green hydrogen fuel

*Note: Still in study phase*

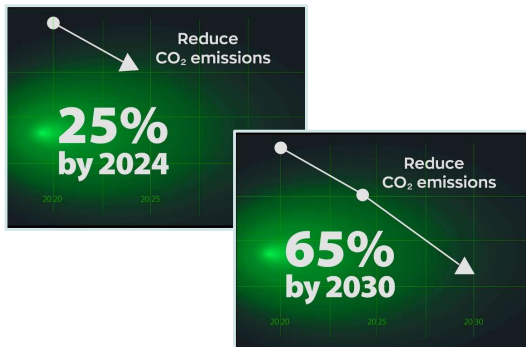


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# Powering the Future

## Reduce Environmental Impact

- Reduce coal-fired operations
- Reduce emissions



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# Powering the Future

## Transition reliably and safely

- Importance of current generating units and staff
- Maintain unit and compliance until retirements



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## Partnering on Sustainability



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## Why Partner?

- MPW has a long, proud history of partnering with customers and other stakeholders to provide sustainability solutions
- We look for opportunities to continue these partnerships as sustainability increases in importance
- Look for ways to partner that let us focus on what we do best (*e.g. steam/electricity production, reliable supply, etc.*) and let you focus on your core business
  - Use your capital investment resources to grow your operation and let us help meet your sustainability targets
- As a municipal utility, our margins go right back to you through lower rates
  - Our customers already own the utility, so it's really a matter of "doing it yourself"

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Thank You!



**MPW**