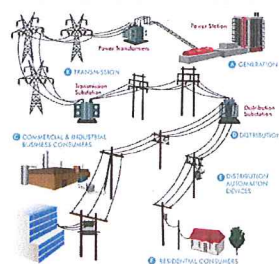


## Tree-centric Approach to Undergrounding

UFTF Discussion 11/1/2018

## The Energy Grid



## Types of Power Lines

Three phase (double circuit)



One Phase (single circuit)



## Types of Power Lines

One Phase



One phase connected to three phase



### "V" shaped pruning- three phase vs. one phase

Three phase pruning



One phase pruning



### Currently large canopy trees and power lines coexist

Honeylocusts on Rutledge & Dickenson- Marquette Neighborhood



### Currently large canopy trees and power lines coexist



Hoard & Kedzie St.-  
Emerson East Neighborhood



West Lawn Ave.- Dungeon Monroe

### Streets that lose canopy take decades to recover



Jenifer Street- between Few & Baldwin

## Streets that lose canopy will never fully recover under current tree planting policy



► Spaight & Baldwin

## Trees should to be treated as INFRASTRUCTURE

- The only infrastructure that gets more valuable with age.

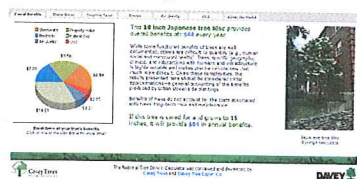
### National Tree Benefit Calculator



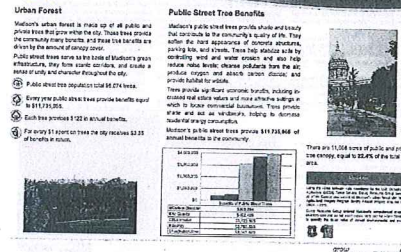
## Trees should to be treated as INFRASTRUCTURE

- The only infrastructure that gets more valuable with age.

### National Tree Benefit Calculator



## City of Madison, Wisconsin 2010





### Full undergrounding

#### Pros

- ❖ Best option for aesthetics
- ❖ Increases options for large trees
- ❖ Eliminates need for tree pruning
- ❖ Eliminates weather-related power line outages

#### Cons

- ❖ Cost prohibitive
- ❖ Hard to coordinate even when done in conjunction with street reconstruction.
- ❖ Businesses and residences need to have upgraded and undergrounded connections in place.
- ❖ Where do the boxes go?

### Partial undergrounding

#### Pros

- ❖ Less expensive
- ❖ Less disruptive
  - ❖ Pneumatic Bore
  - ❖ Transformers can remain on poles
  - ❖ You do need individual residences and businesses to be undergrounded
- ❖ Increases option for large trees
- ❖ Eliminates need for tree pruning
- ❖ Eliminates tree-related power outages

#### Cons

- ❖ Poles and lines remain
- ❖ Less cost than full undergrounding but still expensive

### Partial or full undergrounding on arterial streets can have challenges

- Terrace width not sufficient for large trees
- Zero setback structures more common on commercial streets vs. residential streets
- Three Phase (double circuit) lines more difficult to underground

### Tree-centric approach to deciding what streets are eligible for partial undergrounding

1. Analyze the list of residential street reconstruction projects for 2019.
2. Focus on single phase residential areas where terrace width is sufficient for large trees.
3. Then analyze the following...
  - Is there an opportunity to plant on the private property adjacent to the sidewalk?
  - What is current canopy cover coverage on the affected blocks?
  - Are the residential streets also being used as a bike boulevard or pedestrian travel route?

### Example of streets that would not meet criteria for partial undergrounding



Fair Oaks Ave.-  
Hawthorne Neighborhood



Seminole Hwy. - Near the UW  
Laboratory

### Example of streets that would not meet criteria for partial undergrounding



Spaight Street-  
Hawthorne Neighborhood



### Jenifer Street- Partial Undergrounding amendment approved

- ▶ During the 2016 Jenifer Street reconstruction 40 large mature trees were scheduled to be removed from 4 block area.
- ▶ There is limited space for replanting on private property.
- ▶ Jenifer Street is a residential street but also considered an arterial street since it is on a bus route. It is also a bike boulevard and a popular pedestrian route.

### Jenifer Street- Lack of space for planting trees on private property



### Jenifer Street- Lack of space for planting trees on private property



### Recommendations

- ▶ Partial Undergrounding Pilot Project in 2019 to get a more accurate estimate of cost.
  - Jenifer Street plus 2-3 other current proposed street construction projects.
- ▶ Funding source would be a yearly stipend from the city similar to Sustainable Madison's \$1 million fund for energy efficiency projects.

### Partnership with MG&E to reduce "Peak Load"

- ▶ Reducing electric system peak will help us build and maintain an electric system that is only as big as we need to meet customer load.
- ▶ Air conditioner use is the primary driver of peak load.
- ▶ Large canopy trees can significantly reduce temperature and cooling cost.