

# Multi Housing Charging work in Minnesota

- ▶ Majority of work was part of the Advancing Alternatives for Minnesota Drivers Initiative
- ▶ Partnership with Twin Cities Clean Cities Coalition; PlugInConnect, LLC – subcontractor
- ▶ Project began in 2013
- ▶ This project is based upon work supported by the Department of Energy under Award Number DE-EE0006008

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# Past and present work:

- ▶ Plug-in vehicle market and business development

[www.PlugInConnect.com](http://www.PlugInConnect.com)

- ▶ PEV charging at condos and apartment buildings

[www.MultiHousingCharging.com](http://www.MultiHousingCharging.com)

- ▶ PEV charging at workplaces

[www.WorkplaceCharging.com](http://www.WorkplaceCharging.com)

- ▶ MN Plug-in Vehicle Owners' Circle

[www.pluginconnect.com/mnpevowners.html](http://www.pluginconnect.com/mnpevowners.html)



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# Market situation in Minnesota



- ▶ About 3500 PEVs sold
- ▶ Twin Cities has 100 public Level 2 charging station locations and 20 DC Fast Charging station locations.
- ▶ 2<sup>nd</sup>/3<sup>rd</sup> tier market for car and EVSE manufacturers
- ▶ Utility companies generally supportive, but not actively pushing programs
- ▶ Multi housing market is very strong
- ▶ Apartment buildings and condominiums have ample parking
- ▶ MN Multi Housing Association plays important role

# MN Multi Housing Charging workgroup

- ▶ Diverse group of participants
  - MN Multi Housing Association
  - Developers, property owners and managers
  - Utility companies
  - Local government representatives
  - PEV advocates
  - Electricians
- ▶ Shared interests and benefits
  - Being proactive, learning and educating
  - Reduced friction
  - Future proofing properties
  - Business opportunities



# Reach out to decision makers and key stakeholders



- ▶ Multi housing developers and owners
- ▶ Management companies
- ▶ Plug-in Vehicle owners
- ▶ Utility companies
- ▶ Government representatives
- ▶ Architects



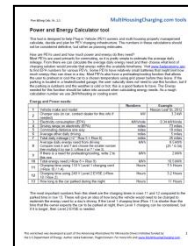
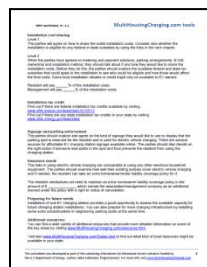
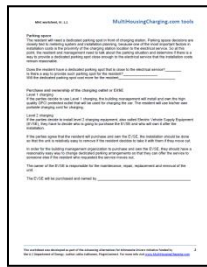
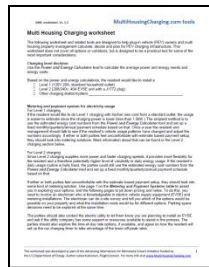
# Practical and simple approach

- ▶ Simple tools to explain the concepts and help find easy and affordable solutions.

[www.multiphasingcharging.com/tools.html](http://www.multiphasingcharging.com/tools.html)

Multi Housing Charging worksheet

Power and Energy Calculator tool



Metering and Payment Systems Table

System	System Name	System Description	System Type	System Status	System Location	System Date	System Notes
1	...	...	...	...	...	...	...
2	...	...	...	...	...	...	...
3	...	...	...	...	...	...	...
4	...	...	...	...	...	...	...
5	...	...	...	...	...	...	...
6	...	...	...	...	...	...	...
7	...	...	...	...	...	...	...
8	...	...	...	...	...	...	...
9	...	...	...	...	...	...	...
10	...	...	...	...	...	...	...

## Metering and Payment Systems table

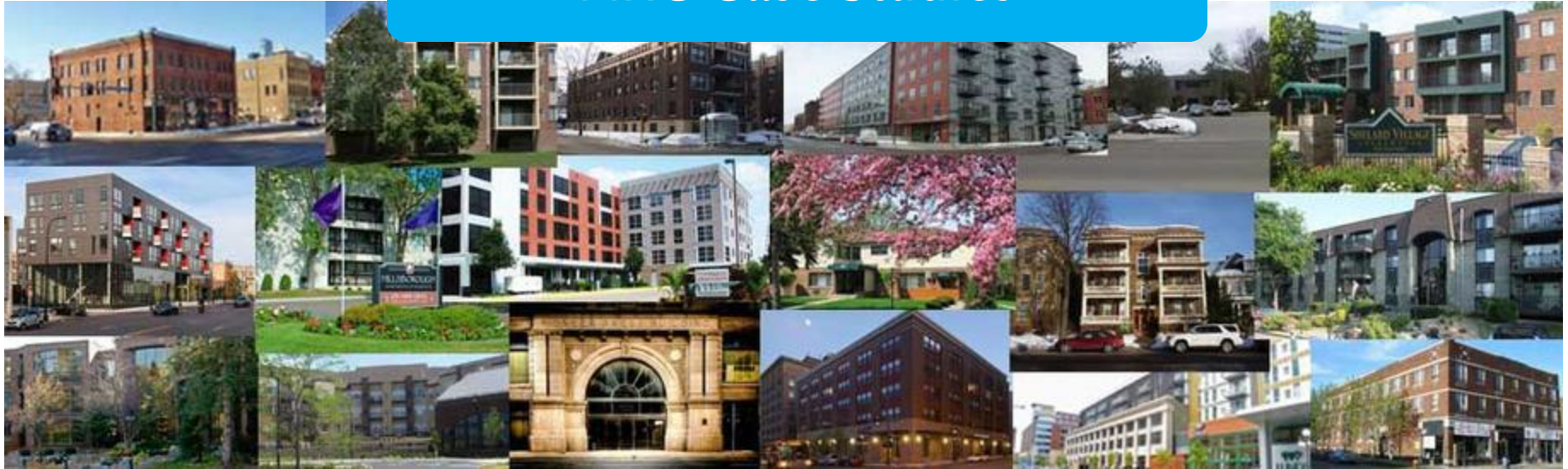
	Description	Who does billing	Components needed	Communication connections	Installation costs	Extra ongoing costs	Time of Day metering possible	Pros	Cons
1	Connected to homeowner's existing meter	Utility	Conduit and wiring	No	Low	No	Yes	Simple, no extra costs	None
2	New, EVSE dedicated, utility meter	Utility	Meterbox, meter, conduit and wiring	Utility company covers	Moderate, depending on utility company setup charges	Monthly service charge from utility	Yes	Relatively simple, utility does the metering and billing	Some extra installation and ongoing costs
3	Submetering	Building manager	Meterbox, meter, conduit and wiring	Depending on the type of meter used	Higher, extra cost from submeter	Potentially communication costs, billing labor	Yes	As accurate as utility metering	Building manager has to do the metering and billing
4	Flat billing with annual submetering based adjustment	Building manager	Meterbox, meter, conduit and wiring	Depending on the type of meter used	Higher, extra cost from submeter	Potentially communication costs	Yes	As accurate as utility metering in the long term, but less billing labor than option 3	Building manager has to do the metering and billing
5	Flat billing with estimate	Building manager	Conduit and wiring	No	Low	No	No	Simple, cheap system	Inaccurate, no time of day option, does not take into account charging outside of home
6	Third party system and billing	Service provider	Conduit, wiring and advanced EVSE	Yes	Varies based on the service provider	Yes, often consisting of flat annual service fee + percentage of billing	Yes	Simple for building manager and user, provides more data, enables multiple users	Expensive, ongoing costs can in some cases be more than electricity costs



# Sharing experiences

- ▶ Over 20 case studies from the Twin Cities

## MHC Case Studies



[www.multiphasingcharging.com/case-studies.html](http://www.multiphasingcharging.com/case-studies.html)



# What we have learned

- ▶ Getting business association(s) involved is very valuable.
- ▶ We need requests from existing and future PEV owners
- ▶ Decision makers and stakeholders are very receptive to EV charging once they have received enough information.
- ▶ Simple and cost effective solutions happen
- ▶ PEVs charging in common garage multiply





# Q&A

For more information visit:  
[www.MultiHousingCharging.com](http://www.MultiHousingCharging.com)