

# ArcGIS Analysis of MassDEP Boiler Database for Clean Energy Strategies

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## PROJECT DESCRIPTION

The main goal of this project is to determine viable power plants and industrial boilers around the state that are candidates for innovative energy strategies including district heating, combined heat and power, and switching to renewable fuels. Our main data source for this project is the MassDEP Boiler Database. This has the information for just under 7,000 permitted boilers around the state. Key information in the database included: location, contact information, fuel type and use, boiler size and age. Using this information we formed search criteria (listed in the methods section for each map) to select boilers that demonstrate potential to implement these different energy strategies.

Determining the locations around the state that would be good candidates for these different energy strategies, will allow us to conduct outreach to the selected boilers and, in some instances, proximate boilers, to discuss with them the potential feasibility for these energy strategies. By doing so there are two major benefits that can accrue to the boilers and the surrounding areas. The first is greater efficiency and a reduction in greenhouse gas emissions. The second is new business opportunities and cost savings to Massachusetts industry.

## METHODS

The project first focused on identifying the energy strategies listed above and establishing criteria to target appropriate boilers. These criteria include the following:

### Fuel Switching and District Heating:

- No.6 Oil
- Installed Pre-1985
- Fuel throughput of 700 million BTU/year

### Power Plants (utilizing waste heat for District Energy):

- Plants under the NAICS code for fossil fuel electric generator

### Combined Heating and Power:

- High utilization (min. 6,500 hrs./year)

Using the MassDEP boiler database in MS Excel we first filtered the data to establish a list of the targeted boilers for each of the energy strategies. These lists were then transferred to ArcGIS and plotted on the map. For district energy opportunities we established a 1 mile radius around each targeted boiler to determine other proximate boilers and heating loads. Using the satellite layer, from Mass GIS, allows for further evaluation of each site with regard to the feasibility of installing district heating.

## MAPS

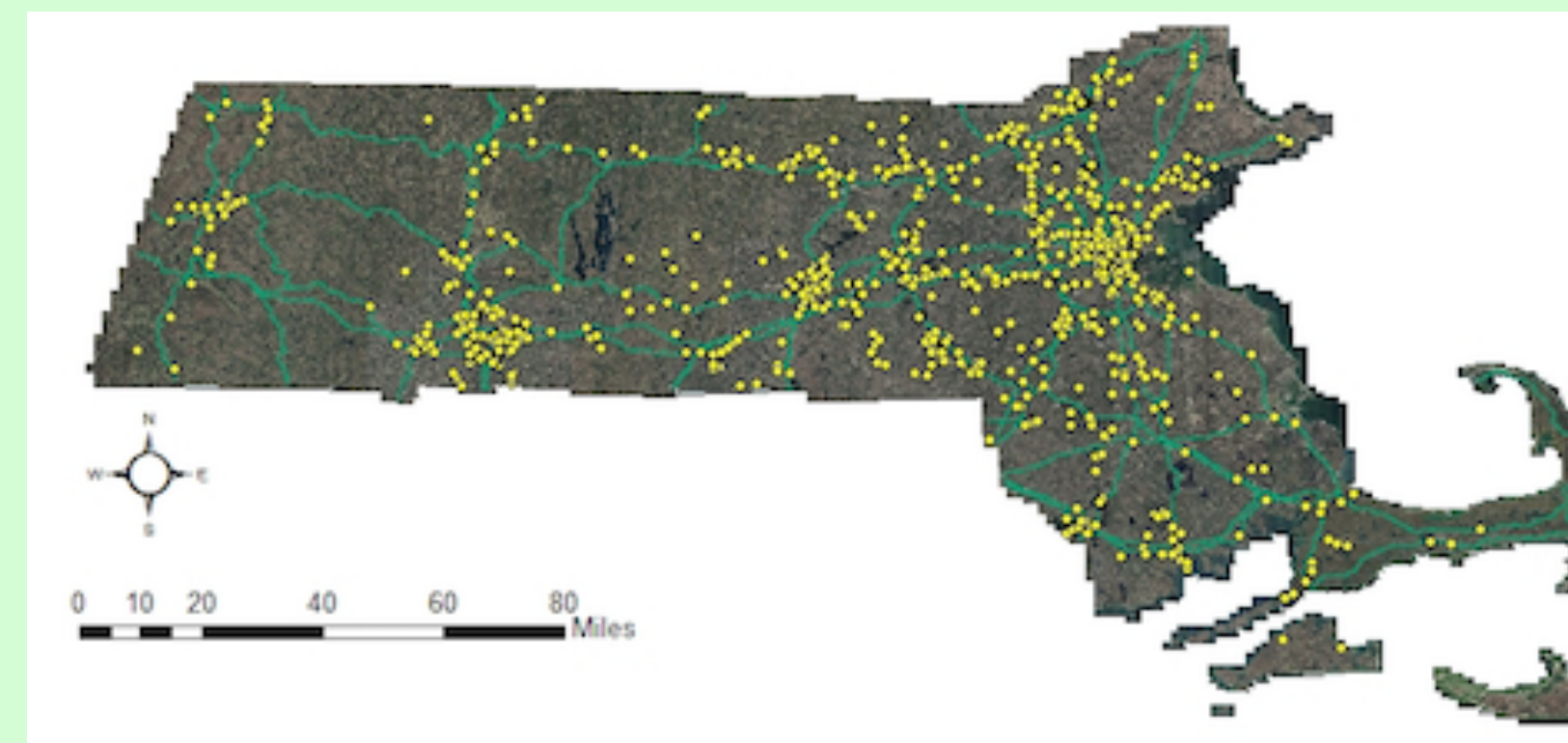


Figure 1 (above): Complete data of all the boilers that are listed from the Mass DEP database



Figure 2 (above): All the boilers that fall under the fuel switch/ district heating criteria

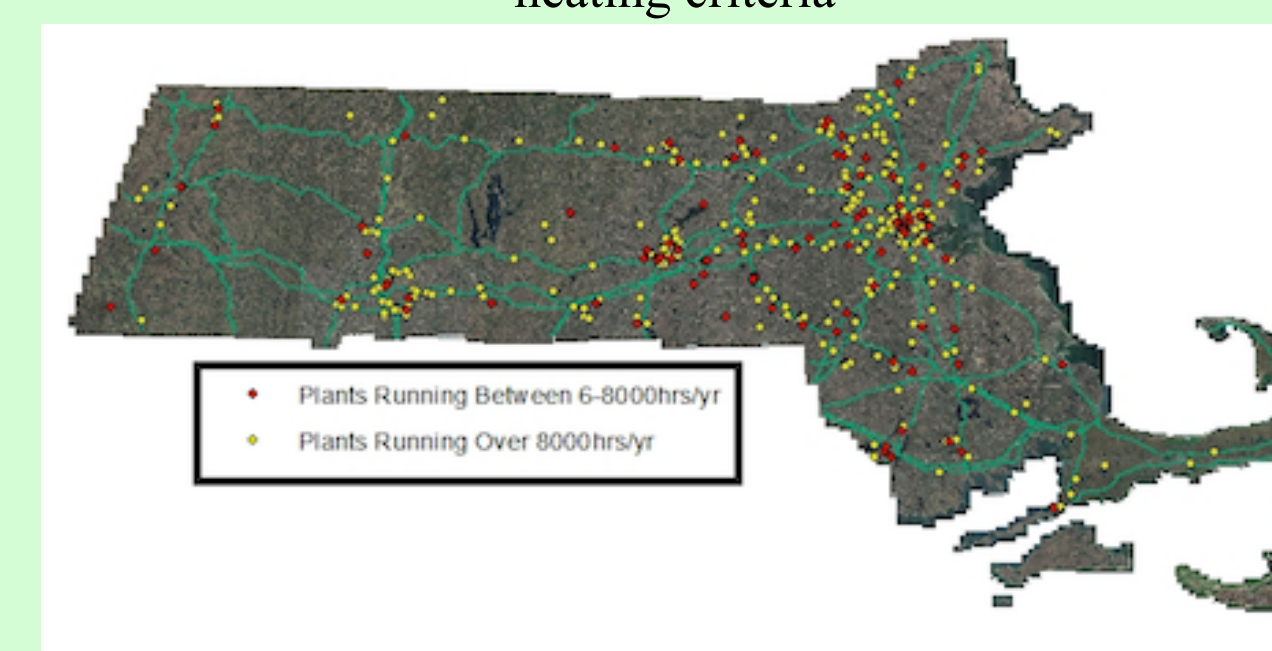


Figure 4 (above): All the boilers that fall under the CHP criteria

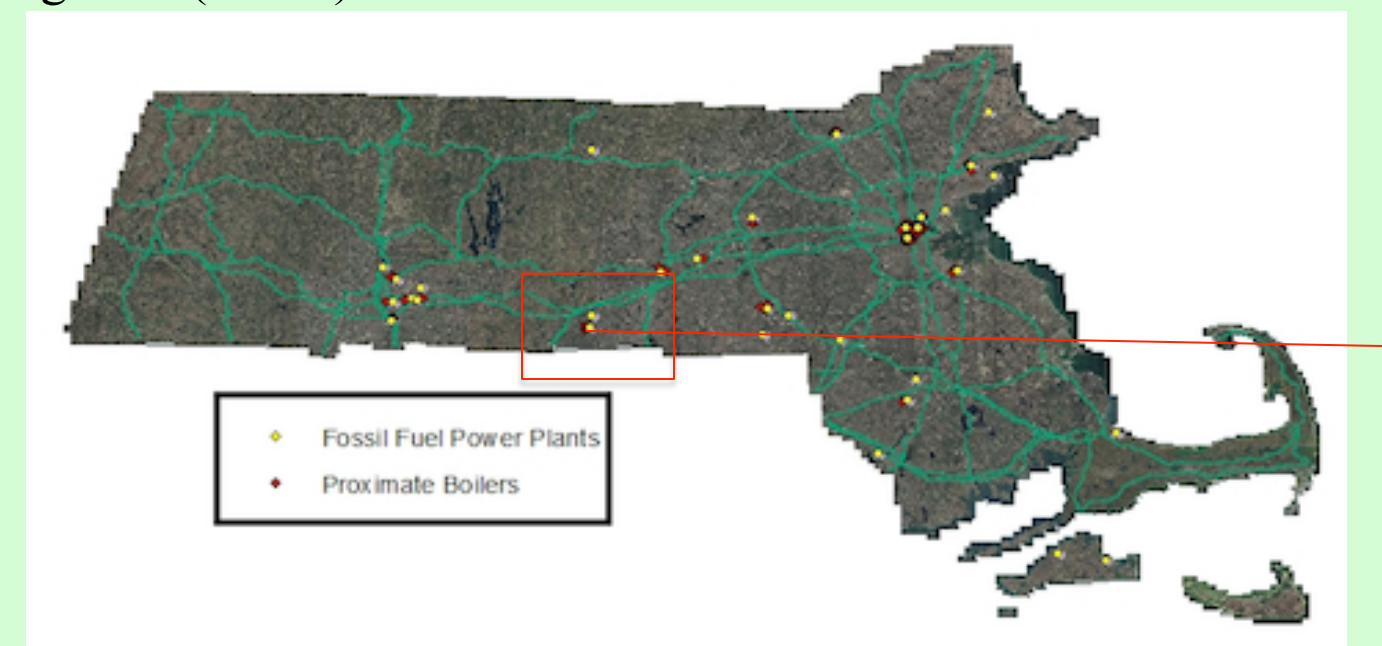


Figure 3 (above): All the boilers that fall under the Power Plant criteria

## OUTCOMES AND IMPLICATIONS

The use of ArcGIS identified boilers with opportunities for new energy strategies. These results were used to develop a list of facilities and contact information to enable an outreach effort. For the 48 power plants in the database we established a contact list of all proximate boilers which may be conducive for district energy. For the older No.6 oil boilers that are candidates for fuel switching, we determined that 23 met our criteria and many of these had proximate boilers that might support district energy. A contact list of these boilers was developed. The final query for combined heating and power resulted in an unmanageable number of boilers and further analysis to better target CHP opportunities will be completed.

While this MassDEP Boiler Database is in the public domain for the purpose of emissions permitting, it has never been used as a tool to determine innovative energy opportunities to reduce greenhouse gas emissions and support economic development. This analysis provides the UMass Clean Energy Extension with the opportunity to target outreach and bring these opportunities to the industry.

## FUTURE WORK

This analysis provides UMass Clean Energy Extension with the opportunity to efficiently target a strategic outreach effort to large Massachusetts energy users regarding innovative energy strategies.

## ACKNOWLEDGEMENTS

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