



# *Dufferin Eco-Energy Park*



**East Luther Grand Valley  
Council Presentation**

**March 25, 2008**

**The County of Dufferin**



# History

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- By-law 93-16; a by-law in which the County became “the proponent and owner of the new landfill site as identified in the Waste Management Master Plan.”
- Waste Management Master Plan was submitted to the MOE
- The site identified in the plan as the preferred site, was in East Luther Township
- Received EAA Approval
- Received Draft Provisional C. of A.
- By-law 2000-32 was unanimously passed, empowering the County to assume composting authority for Dufferin County



# Time Line for DEEP

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- Formed association with Fairfield Group (H<sub>2</sub>)
- Entered MOU with York Region
- Received an expression of interest from Bulrush Clean Energy
- Partnering with post-secondary institutions



# DEEP Vision

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- Between the lab and commercial scale facility
- Attract new and innovative technologies
- Create energy from waste using various alternative energy solutions
- Create Energy Management utilizing H<sub>2</sub>
- Stimulate local economy with industrial spinoffs



# Process to Date

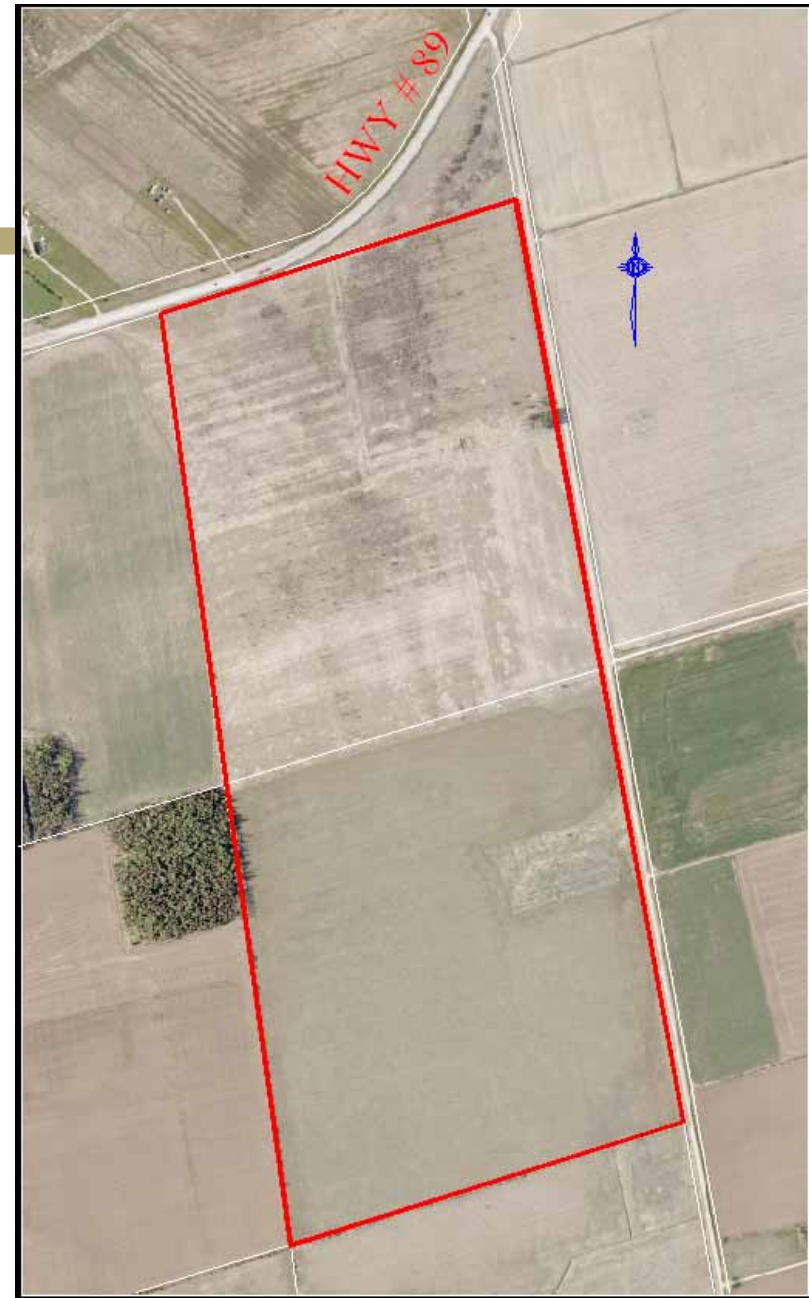
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- REOI June 2005 for Composting and EFW
- 32 submissions received (18 Comp.-14 EFW)
- Genivar hired to assist with the process
- RFQ for Composting issued August 2006
- Four were short-listed
- RFQ for EFW issued October 2006
- Two Short-Listed
- Three proposals were received for the treatment of the Source Separated Organics (SSO) and have been reviewed
- Preparing RFP for EFW facility due out in mid-April



# Subject Property

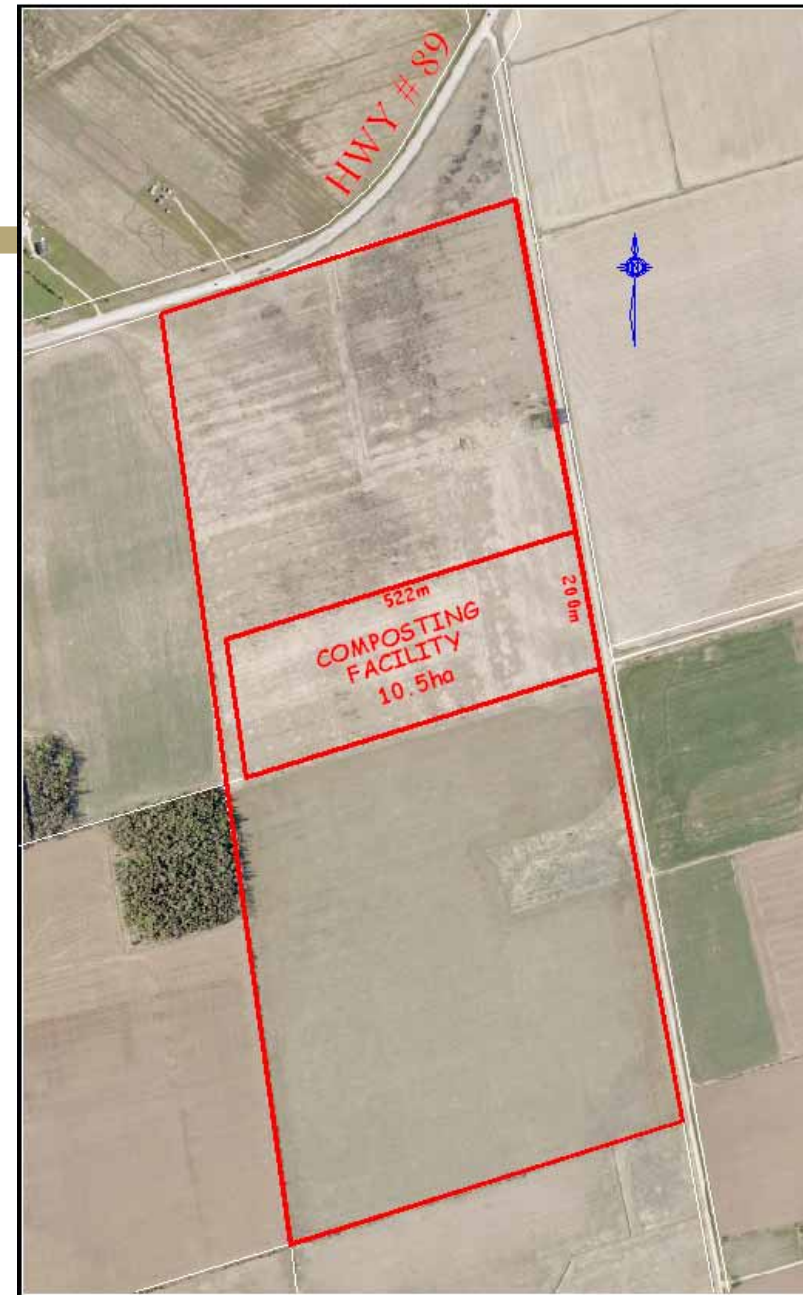
- 200 Acres  $\pm$
- On Hwy #89 west of Shelburne at Townline





# Composting Facility

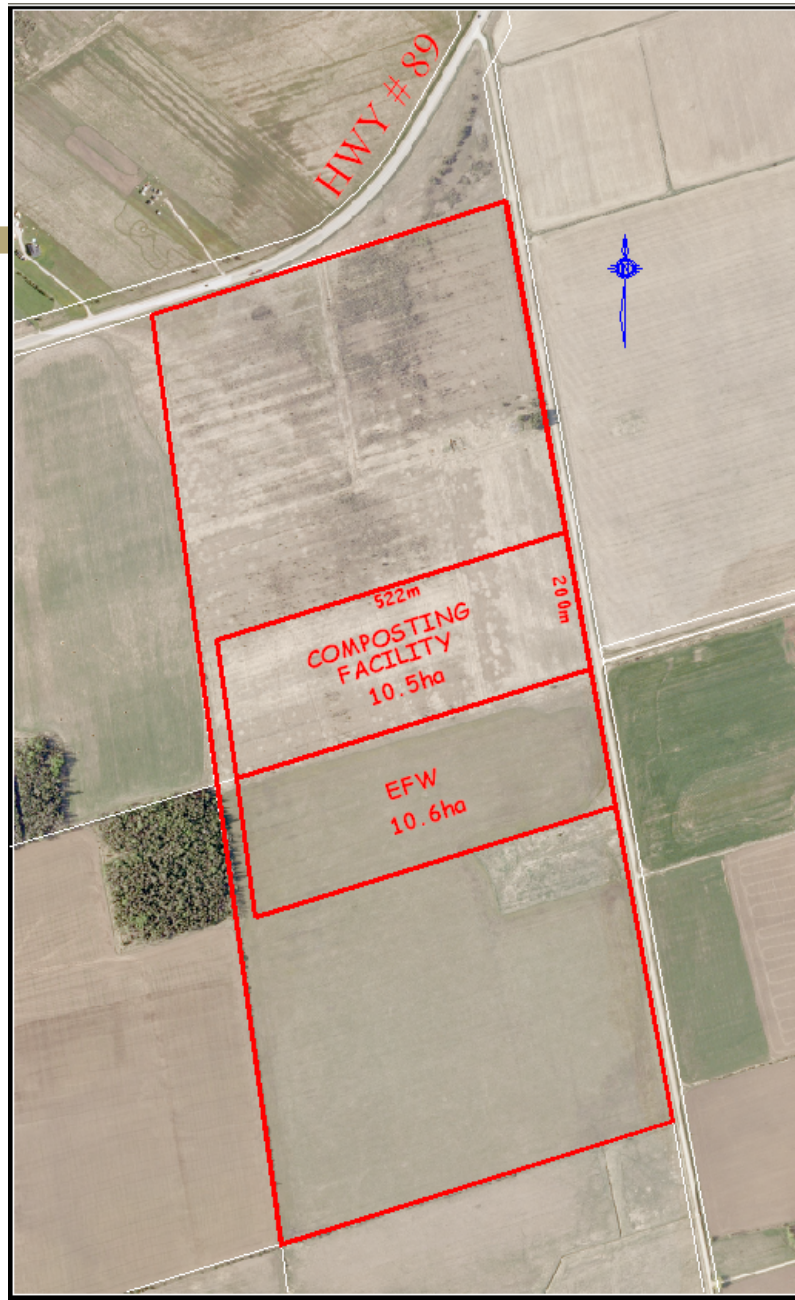
- Joint venture with York Region
- 10.5 Hectares
- RFP Process now closed





# Energy From Waste

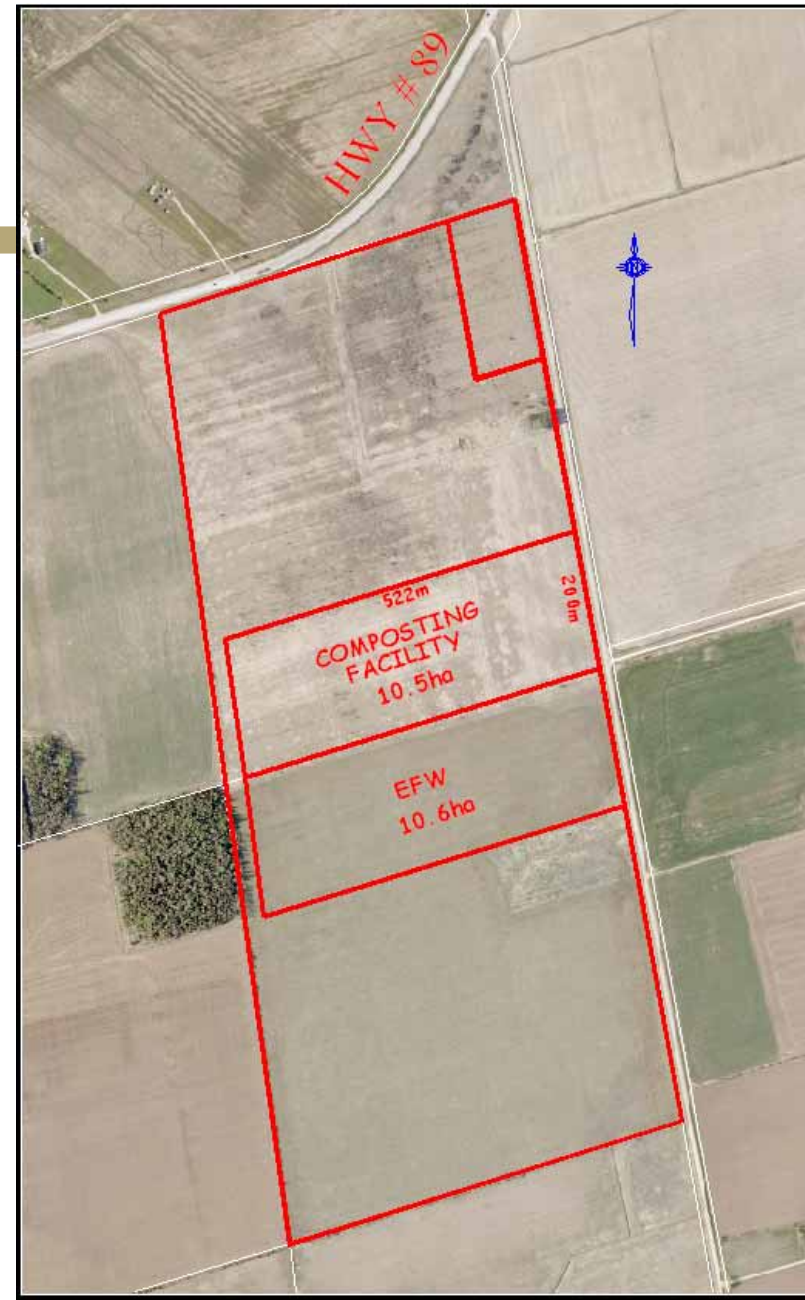
- About to issue RFP
- 25,000t ± facility
- Could take residuals from SSO Treatment facility





# DEEP H<sub>2</sub>

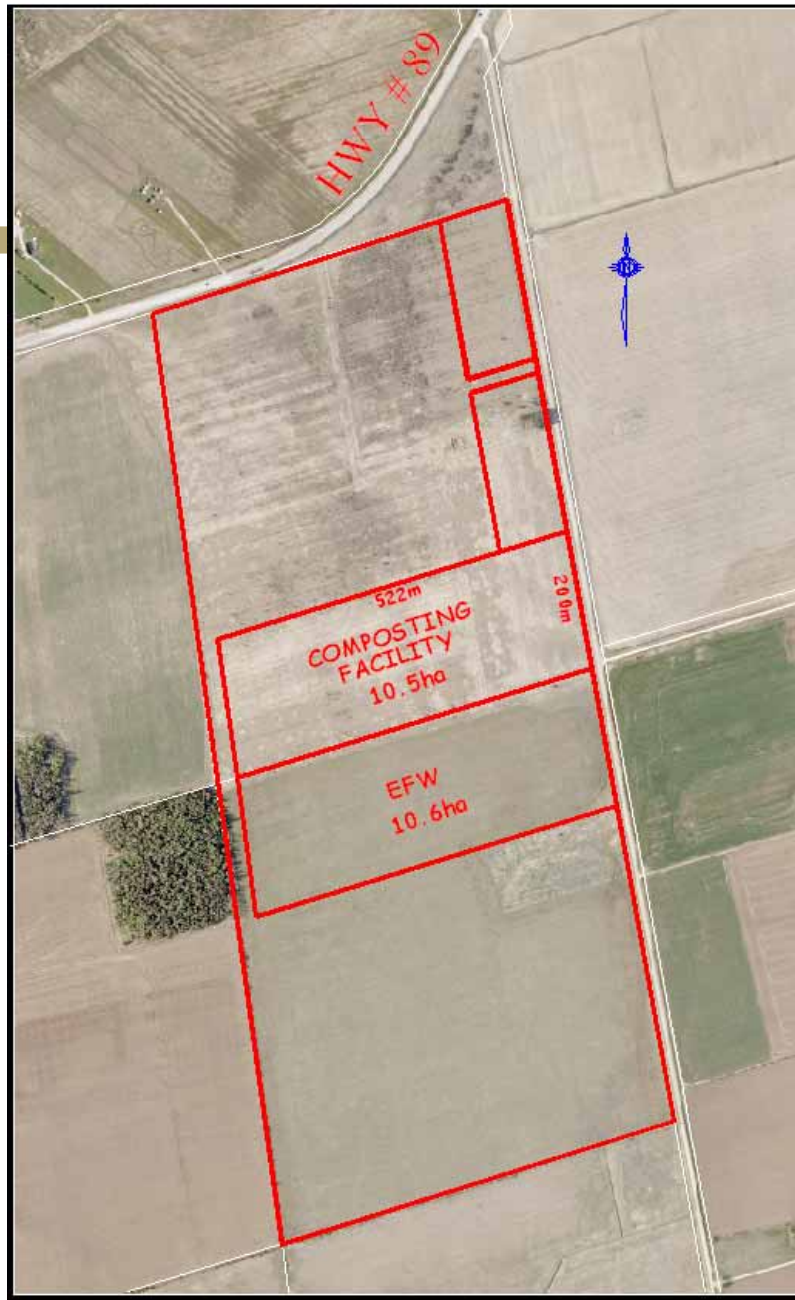
- 2.4 Hectares
- Research Facility





# Bulrush Clean Energy

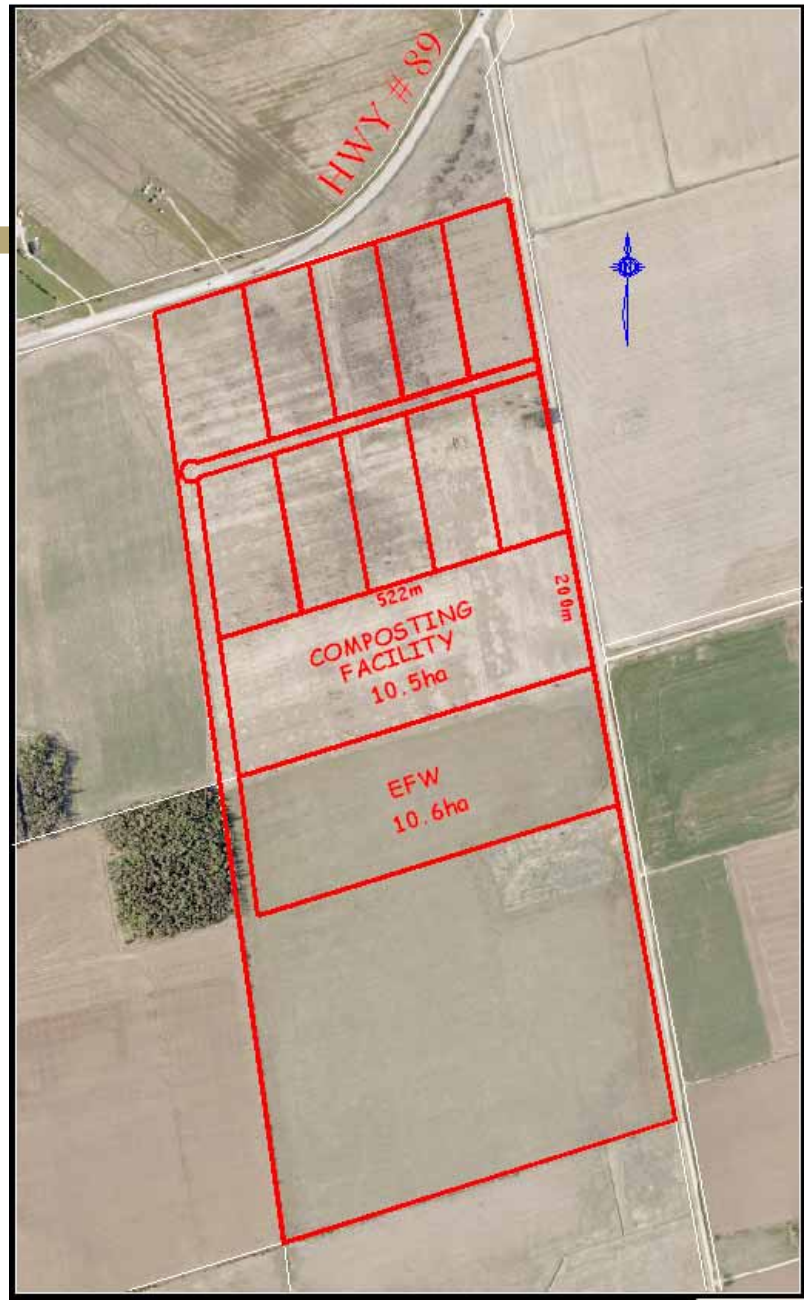
- 2.4 Hectares
- Anaerobic Digestion Facility





# Eco-Energy Park

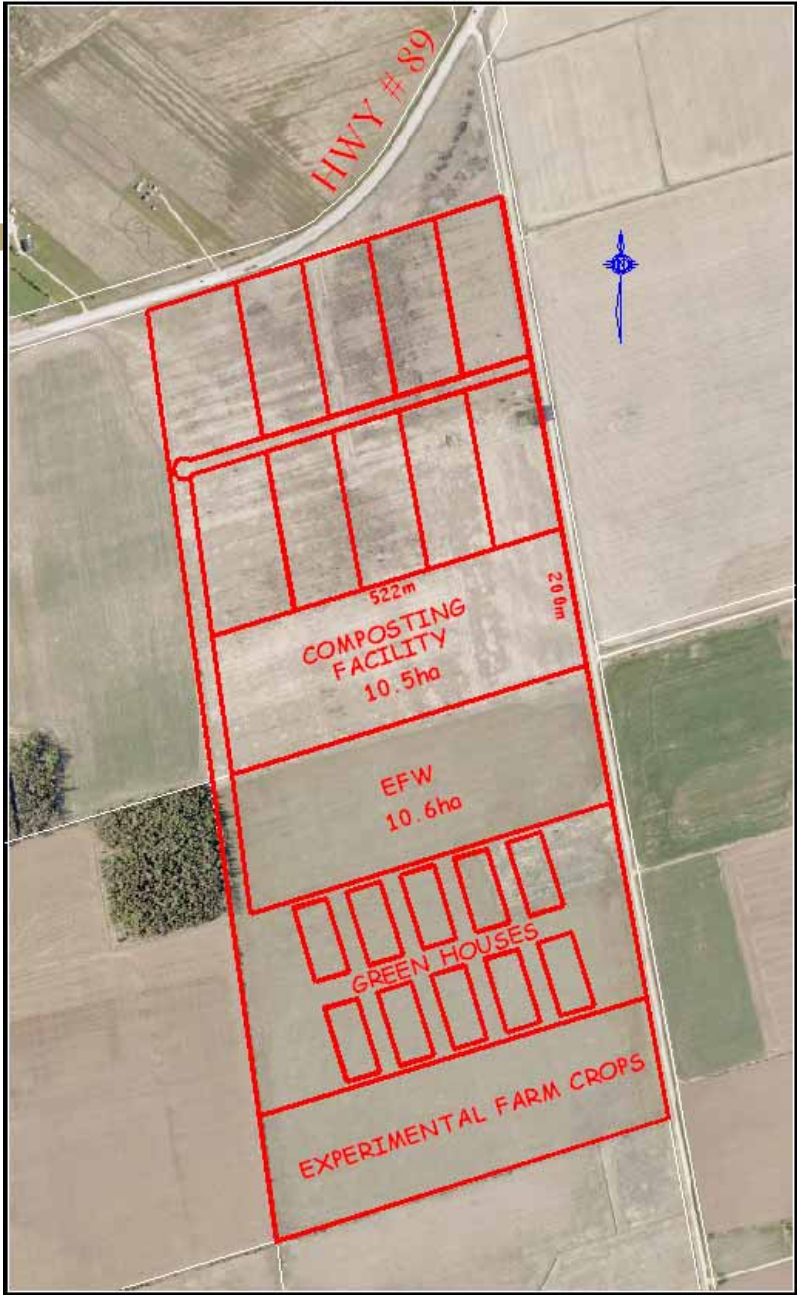
- Locations for other alternative energy creators
- Lots approx. 2.4 Hectares each





# Green Houses

- Possible location of greenhouses and research farm





# H<sub>2</sub> Energy Pilot Plant

- Component of DEEP to pilot H<sub>2</sub> energy processes
- Objectives of H<sub>2</sub> Energy Pilot Plant
  - Pilot synthetic fuel processes (larger scale)
  - Develop Community scale energy processes
  - Link energy resources to transportation
    - Develop reduced carbon solutions
    - Capture higher value in transportation market
    - Establish regional competency in alternative fuels



# Hydrogen Scenario - Global Drivers

- Can be derived from any energy source
- Motive power from IC Engine or fuel cell
- Develop solutions which can be implemented in similar communities (cookie cutter)
- Use H<sub>2</sub> fuel
- Capture and sequester CO<sub>2</sub> (Greenhouses).





# H-C-O Processes

Electrolysis (water) *makes* Hydrogen

- $\text{H}_2\text{O} + \text{electrical energy} \rightarrow \text{H}_2 + \frac{1}{2}\text{O}_2$



Gasification (carbon) *makes* Syn-Gas

- $2\text{C} + \text{O}_2 \rightarrow \text{CO}$



Anaerobic Digestion (cellulose) *makes* methane

- $\text{C}_6\text{H}_{10}\text{O}_5 \rightarrow \text{CH}_4 + \text{CO}_2$

→ All of these products are gaseous fuels



# But also they can be used to make Hydrogen which can be stored

- Steam reformation *makes* hydrogen from methane



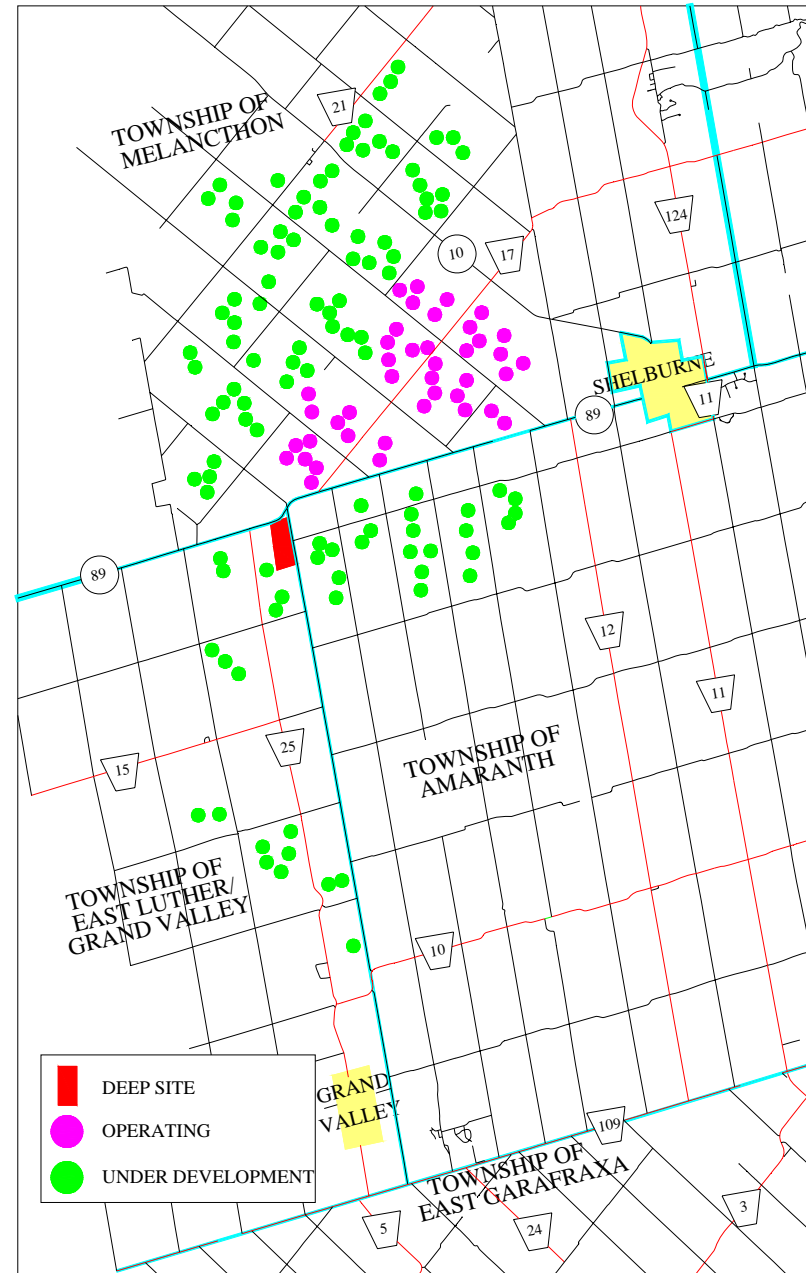
- Water gas shift reactor *makes* hydrogen from Syn-gas





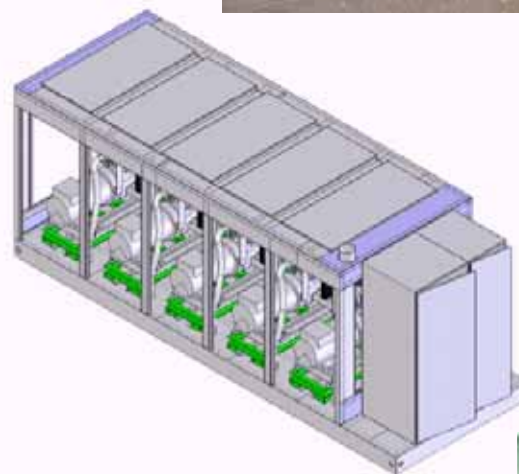
# Wind Turbine Locations

- 153 Wind Turbines within 14 Km of Site
- 41 operating ●
- 112 under development ●





# Convert gaseous fuel to Electricity →



# HEC

Fairfield Group



# But what will we do with the extra hydrogen?

- Shelburne H<sub>2</sub> Transportation Nexus
- H<sub>2</sub> commuter trains
- Competitive with electrified rail on low traffic routes
- Low carbon hydrogen supply using off-peak electricity
- Gaseous H<sub>2</sub> storage





# Bulrush Clean Energy

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- Solution was conceived and designed in 2002
- Proprietary anaerobic digestion technology
- Thunder Bay pilot plant operational since 2003
- Target markets:
  - Municipalities
  - Industrial food processors
  - Agriculture



# Anaerobic Digestion

- Biological process in an oxygen free environment
- Produces a “bio-gas” principally composed of methane and carbon dioxide
- Derived from the decomposition of organic wastes (manure, food processing by-products, green bin waste)
- Can occur naturally or in a controlled vessel called an anaerobic digester (biogas plant)
- Reduces greenhouse gases (Methane is 23 times more harmful than carbon dioxide as a GHG )



# Economic Benefits

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- There are five economic levers to consider:
  - Tipping fees,
  - Long term power contracts (Standard Offer Program)
  - Waste heat contracts (e.g. greenhouses)
  - Fertilizer sales
  - Carbon credits (future)



# Benefits of Working Together

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- Financial
  - Economic
  - Manufacturing jobs
- Environmental
  - Clean air, water, land
  - Reduce / Reuse / Recycle / Recover
- Social
  - Green energy training and employment
  - Progressive process to address green bin and agricultural waste
  - Demonstrate leadership with proven technology



# Buzz Words

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- One Hundred Mile Diet (Localvore) – Site is within 100 miles of the Greater Golden Horseshoe
- Cookie Cutter – Developments from the Eco-Energy Park can be used elsewhere
- Sustainability – Vehicles making deliveries to the site would use the alternate fuel being produced at the site