Buffalo Niagara ::

# Where Industry Creates Energy

**Green Study Overview**

## *Buffalo Niagara Enterprise*

## *Economic Development Tools for a New Economy*

January 12, 2010

*Keith W. Rabin - President; KWR International, Inc.*

nationalgrid

KWR INTERNATIONAL

# *Why "Green" Industry?*

*US Conference of Mayors estimated in 2006, green jobs in the Buffalo-Niagara region could rise from roughly 2,000 jobs to almost 16,000 jobs.*

- Test preliminary BNE research
- Analyze existing supply chain
- Facilitate site selection in WNY

# *Project Overview*

- RFP released – August, 2008
- Consultant selection – October, 2008
- Study kick off – November, 2008
- Study completed – Summer, 2009

Project Funding: National Grid

Special Thanks: The Center for Industrial Excellence; City of Buffalo; Empire State Development; UB Dept. of Engineering & Applied Sciences; UB Law School; Buffalo Niagara Medical Campus; City of Niagara Falls; RiverWright LLC; Globe Metallurgical; The Knoer Group; Moog Inc.; Linde, Inc.; Praxair, Inc., NYSERDA, California Public Utilities Commission; Japan External Trade Organization (JETRO); Aladdin Capital, Green Chip Stocks, Discovery Investing and the entire project team who spent many late nights researching and tirelessly dedicating themselves to this initiative.

# *Industry Sectors*

## Renewable Energies

- Wind
- Solar
- Hydrokinetic
- Geothermal
- Biomass
- Nuclear

## Energy Efficiency

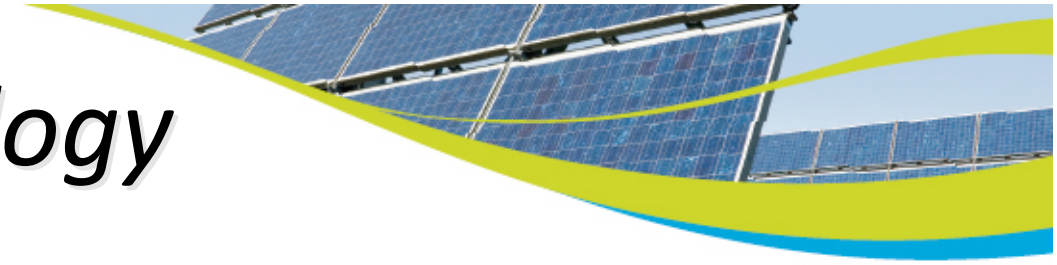
- Energy transmission & storage
- Green buildings
- Transportation
- Waste remediation/recycling

# *Buffalo Niagara Economy*

**Autumn 2007 City Journal Magazine**

**Can Buffalo Ever Come Back? By *Edward L. Glaeser, Harvard Univ.***

*Probably not—and government should stop bribing people to stay there. At the onset of the Great Depression, Buffalo had 573,000 inhabitants, making it the 13th-largest city in America. In the 75 years that followed, this once-mighty metropolis lost 55 percent of its population, a decline most dramatic in its blighted inner city but also apparent in its broader metropolitan area, one of the 20 most quickly deteriorating such regions in the nation. Twenty-seven percent of Buffalo's residents are poor, more than twice the national average. The median family income is just $33,000, less than 60 percent of the nationwide figure of $55,000. Buffalo's collapse—and that of other troubled upstate New York cities like Syracuse and Rochester—seems to cry out for a policy response.*



# *Study Methodology*

- Industry sector analysis
- Regional strengths
  - Intra-Buffalo Niagara industry analysis
  - Intra-sectoral comparison
- Sector supply chain analysis
- Regional weaknesses
- Buffalo Niagara opportunities
- Threats to Buffalo Niagara's green future
- Regional green industry sector comparative analysis
- Interviews
- Conclusions & recommendations

# *Sector Review*

Completed for each sector:

- Type of direct jobs created & support functions required
- Major companies (Globally)
- NAICS codes for supply chain

**Jobs created in the solar energy sector include:**

Solar Power Electrical Engineers, Electricians, Industrial Machinery Mechanics, Welders, Metal Fabricators, Electrical Equipment Assemblers, Equipment Operators, Installation Helpers, Laborers, Construction Managers, Silicon Feedstock Processing.

**Support functions:** R&D, Design, Financial, Legal, Administrative, System Resellers, Distributors and Installers, Accountants, Engineers, Computer Analysts, Clerks, Factory Workers, Truck Drivers and Mechanics.

**Major companies in the sector:**

Solar Cells: Sharp—Japan: Q-Cells—Germany; Suntech—China; Motech—Taiwan; Kyocera—Japan; SunPower—Philippines; First Solar—U.S.; Gintech—Taiwan; E-Ton—Taiwan; Deutsche Cell/Shell—Germany; JA Solar—China; and Sanyo—Japan.

**Major North American Industry Classification System (NAICS) solar industry codes**

| | |
|---|---|
| 221119 | Other Electric Power Generation |
| 221122 | Electric Power Distribution |
| 237130 | Power/Comm. Line/Related Structures Const |
| 238220 | Plumbing, Heating, & A/C Contractors |
| 325211 | Encapsulant |
| 326113 | Rear Layer |
| 326299 | Fuel cells, solid-state |
| 327211 | Top Surface |
| 331316 | Aluminum Extruded Product Mfg |
| 331421 | Copper Rolling, Drawing & Extruding |
| 332311 | Prefabricated Metal Building/Component Mfg |
| 332312 | Fabricated Structural Metal Manufacturing |
| 332322 | Sheet Metal Work Manufacturing |
| 332410 | Power Boiler/Heat Exchanger Mfg |
| 332999 | All Other Misc. Fab Metal Product Mfg |
| 333412 | Industrial/Commercial fans/blowers |
| 333414 | Heating Equip (except Warm Air Furnace) Mfg |
| 333415 | HVAC & Comm./Indust. Refrig. Equip Mfg |
| 333613 | Power Transmission Equip |
| 333911 | Pump/Pumping Equip Mfg |
| 333912 | Air/Gas Compressor Mfg |
| 334112 | Computer Storage Device Mfg |
| 334413 | Solar Cells |
| 334418 | Printed Circuits & Electronics Assemblies |
| 334513 | Instruments for Measure, Display & Control |
| 334515 | Meter |
| 334519 | Other Measuring/Controlling Device Mfg |
| 335311 | Power, Distribution & Specialty Transformer Mfg |
| 335312 | Motor & Generator |
| 335313 | Circuit Breakers & Fusers |
| 335314 | Relay & Industrial Control |
| 335911 | Storage Batteries |
| 335931 | Electrical Connections |
| 335999 | Charge Controller |
| 423720 | Plumbing/Heating Equip Merchandise / Wholesalers |
| 541310 | Architectural services |
| 541330 | Engineering Design Services |
| 541690 | Energy Consulting Services |
| 541710 | R&D in Physical, Engineering & Life Sciences |

# *Quantitative Results*

**To determine Buffalo-Niagara's capacity and how much of an impact green economy sectors are already having on the region a quantitative review was undertaken within the limitations of the commonly-utilized NAICS code model**

| Total Buffalo Niagara Revenue/Firms with NAICS Codes Demonstrating Statistical Error | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | Solar | Wind | Hydro | Geo | Bio | Nuclear | ETS | Bldg | Waste | Trans |
| Firms (total) | 72,377 | 2,351 | 1,611 | 1,643 | 1,739 | 2,874 | 1,629 | 1,536 | 5,920 | 1,722 | 1,411 |
| Total Rev. (mil) | $35,151 | $19,121 | $20,440 | $25,547 | $25,732 | $26,748 | $23,265 | $16,359 | $20,094 | $17,087 | $21,296 |
| % BN Firms | 100.0 | 3.30 | 2.23 | 2.27 | 2.40 | 3.97 | 2.25 | 2.12 | 8.18 | 2.38 | 1.95 |
| % BN Rev | 100.0 | 54.40 | 58.15 | 72.68 | 73.20 | 76.09 | 66.19 | 46.54 | 57.16 | 48.61 | 60.58 |

# *Quantitative Results*

**Does Buffalo-Niagara perform as forecasted with the green industry sectors? What are the top number of supply chain firms by count and revenue?**

| SOLAR | Al | Ca | Ch | Er | Ge | Ni | Or | Wy | Total |
|---|---|---|---|---|---|---|---|---|---|
| All Sector BN Revenue (Millions $) | $628 | $1,502 | $2,349 | $24,689 | $1,049 | $3,660 | $578 | $696 | $35,151 |
| % Total Revenues | 1.8% | 4.3% | 6.7% | 70.2% | 3.0% | 10.4% | 1.6% | 2.0% | 100.0% |
| Solar BN Rev Frcst Based on All | $341 | $817 | $1,278 | $13,430 | $571 | $1,991 | $314 | $379 | $19,121 |
| Actual Revenues Based on Model | $21 | $660 | $289 | $17,213 | $87 | $809 | $31 | $12 | $19,121 |
| Actual Revenues/Forecast Revenues | 6.1% | 80.8% | 22.6% | 128.2% | 15.3% | 40.6% | 9.9% | 3.0% | 100.0% |
| | | | | | | | | | |
| All Sector BN Firms (Total) | 1,923 | 3,909 | 7,549 | 43,232 | 2,986 | 9,144 | 1,673 | 1,961 | 72,377 |
| % Total Firms | 2.7% | 5.4% | 10.4% | 59.7% | 4.1% | 12.6% | 2.3% | 2.7% | 100.0% |
| Solar BN Firm Frcst Based on All | 64 | 129 | 249 | 1,428 | 99 | 302 | 55 | 65 | 2,391 |
| Actual Firms Based on Model | 53 | 112 | 205 | 1,535 | 97 | 293 | 52 | 44 | 2,391 |
| Actual Firms / Forecast Firms | 83.4% | 86.7% | 82.2% | 107.5% | 98.3% | 97.0% | 94.1% | 67.9% | 100.0% |

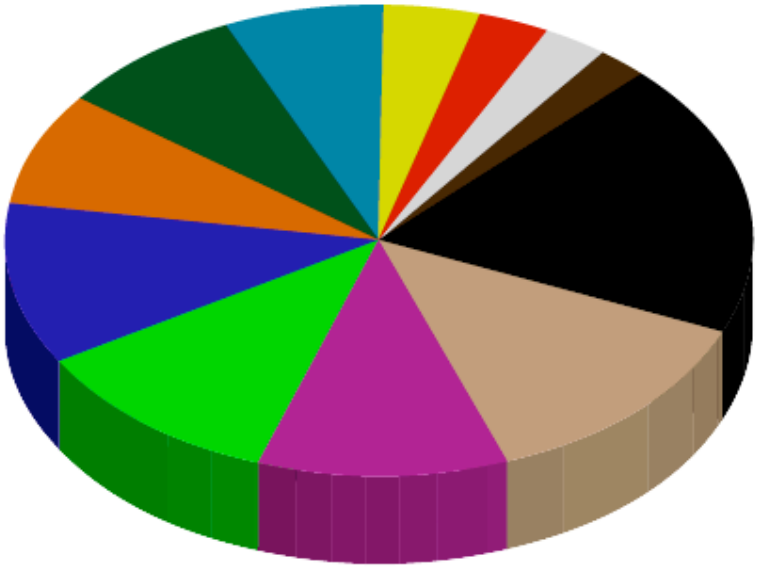
| SOLAR - Major NAICS Codes - Revenues | | Major Segments - Revenue | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NAICS | Solar Industry Segment Name | Al | Ca | Ch | Er | Ge | Ni | Or | Wy | Total | % Total |
| 221122 | Electric Power Distribution | $0 | $0 | $17 | $2,448 | $0 | $0 | $0 | $0 | $2,464 | 12.9% |
| 334513 | Instr/Related Prod Mfg for Meas., Disply & Contl | 0 | 0 | 13 | 2,122 | 0 | 0 | 2 | 0 | 2,137 | 11.2% |
| 333911 | Pump/Pumping Equip. Mfg | 0 | 0 | 0 | 1,934 | 6 | 138 | 0 | 0 | 2,079 | 10.9% |
| 334519 | Other Measuring/Controlling Device Mfg | 0 | 3 | 0 | 2,038 | 0 | 12 | 0 | 0 | 2,054 | 10.7% |
| 332322 | Sheet Metal Work Manufacturing | 2 | 8 | 39 | 1,464 | 1 | 16 | 3 | 1 | 1,532 | 8.0% |
| 332312 | Fabricated Structural Metal Manufacturing | 0 | 1 | 31 | 1,438 | 1 | 33 | 0 | 1 | 1,505 | 7.9% |
| 332999 | All Other Misc. Fab. Metal Product Mfg | 3 | 2 | 0 | 1,403 | 18 | 1 | 0 | 0 | 1,426 | 7.5% |
| 238220 | Plumbing, Heating & AC Contractors | 2 | 16 | 36 | 684 | 19 | 38 | 5 | 5 | 805 | 4.2% |
| 423720 | Plumbing/Heating Equip. Merch./Wholesalers | 3 | 1 | 21 | 455 | 11 | 91 | 0 | 1 | 582 | 3.0% |
| 541690 | Energy Consulting Services | 2 | 2 | 6 | 254 | 2 | 228 | 1 | 1 | 496 | 2.6% |
| 335312 | Motor and Generator | 0 | 300 | 0 | 146 | 0 | 0 | 0 | 0 | 447 | 2.3% |
| | Total Other | 9 | 328 | 126 | 2,828 | 30 | 252 | 19 | 3 | 3,595 | 18.8% |
| **Total Revenues Solar ($ Millions)** | | **$21** | **$660** | **$289** | **$17,213** | **$87** | **$809** | **$31** | **$12** | **$19,121** | |
| **Total Solar Revenues % to Total** | | **0.1%** | **3.5%** | **1.5%** | **90.0%** | **0.5%** | **4.2%** | **0.2%** | **0.1%** | **100.0%** | |

| SOLAR - Major NAICS Codes - Firms | | Major Segments - Number of Firms | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NAICS | Solar Industry Segment Name | Al | Ca | Ch | Er | Ge | Ni | Or | Wy | Total | % Total |
| 238220 | Plumbing, Heating & AC Contractors | 21 | 50 | 90 | 521 | 50 | 114 | 27 | 19 | 892 | 37.3% |
| 541330 | Engineering Design Services | 6 | 16 | 15 | 230 | 8 | 46 | 5 | 6 | 332 | 13.9% |
| 541690 | Energy Consulting Services | 9 | 9 | 15 | 174 | 4 | 31 | 5 | 4 | 251 | 10.5% |
| 541310 | Architectural services | 2 | 0 | 11 | 115 | 1 | 10 | 1 | 3 | 143 | 6.0% |
| 334519 | Other Measuring/Controlling Device Mfg | 2 | 4 | 12 | 67 | 9 | 12 | 2 | 2 | 110 | 4.6% |
| 541712 | R&D in Physical, Engineering, and Life Sciences | 3 | 1 | 2 | 62 | 1 | 6 | 1 | 0 | 76 | 3.2% |
| 332312 | Fabricated Structural Metal Manufacturing | 1 | 2 | 10 | 57 | 3 | 0 | 0 | 1 | 74 | 3.1% |
| 332322 | Sheet Metal Work Manufacturing | 1 | 2 | 10 | 32 | 3 | 8 | 2 | 1 | 59 | 2.5% |
| 221119 | Other Electric Power Generation | 2 | 6 | 11 | 15 | 3 | 11 | 1 | 1 | 50 | 2.1% |
| | Total Other | 6 | 22 | 29 | 262 | 15 | 55 | 8 | 7 | 404 | 16.9% |
| **Total Firms Solar** | | **53** | **112** | **205** | **1,535** | **97** | **293** | **52** | **44** | **2,391** | |
| **Total Firms % to Total** | | **2.2%** | **4.7%** | **8.6%** | **64.2%** | **4.1%** | **12.3%** | **2.2%** | **1.8%** | **100.0%** | |

# Sector Review

## Solar NAICS Industries Distribution in BN Region

(Revenue per NAICS code)

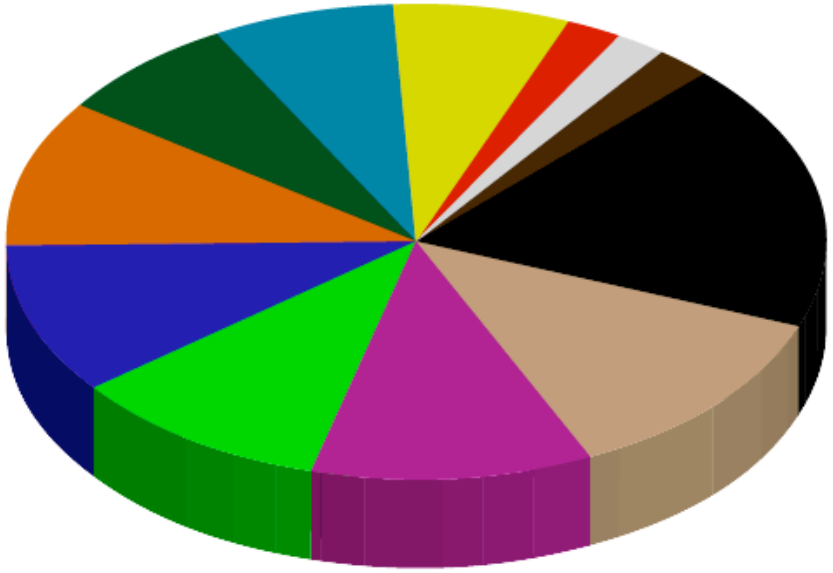


| | | | | | |
|---|---|---|---|---|---|
| 19% | Total other | 11% | Other measuring/ controlling device mfg | 4% | Plumbing, heating & AC contractors |
| 13% | Electric power distribution | 8% | Sheet metal work mfg | 3% | Plumbing/heating equip merch/wholesalers |
| 11% | Instr/related prod mfg for measuring, display & control | 8% | Fabricated structural metal mfg | 3% | Energy consulting services |
| 11% | Pump/pump priming equipment mfg | 7% | All other misc fab. metal product mfg | 2% | Motor and generator |

# Sector Review

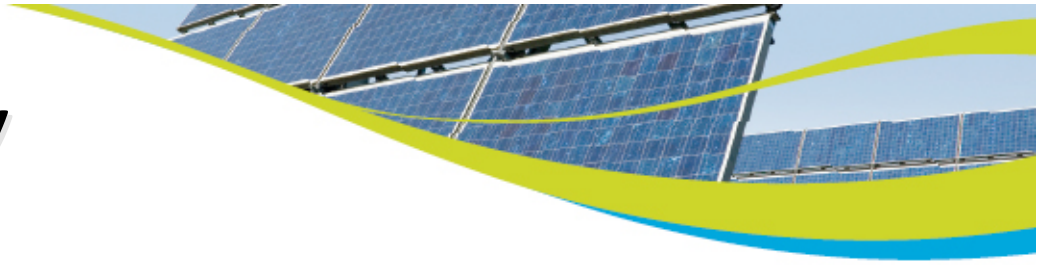
## Wind NAICS Industries in Buffalo-Niagara Region

**(Revenue per NAICS code)**

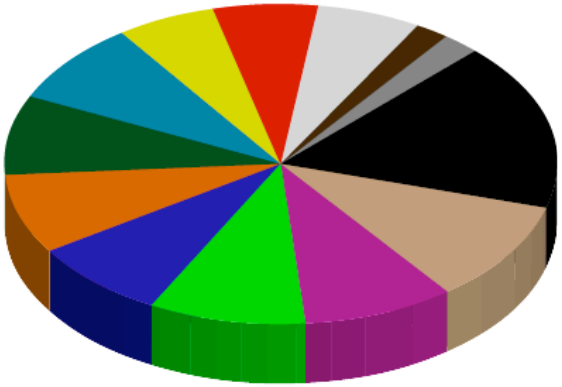


| | | | | | |
|---|---|---|---|---|---|
| 18% | Total other | 10% | Industrial Valve Mfg | 7% | All Other Misc Fab Metal Product Mfg |
| 12% | Electric power distribution | 10% | Other Measuring/ Controlling Device Mfg | 2% | Energy Consulting Service |
| 11% | Fluid Power Cylinder/ Actuator Mfg | 7% | Sheet Metal Work Mfg | 2% | Motor & Generator |
| 10% | Instr/Related Prod Mfg for Measure, Display & Control | 7% | Fabricated Structural Metal | 2% | All Other Plastics Product Mfg |

# Sector Review

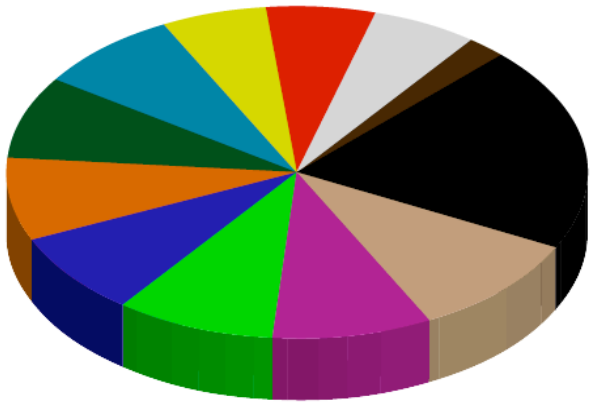


## Hydropower NAICS Industries in Buffalo-Niagara Region
**(Revenue per NAICS code)**



- 17% Total Other
- 10% Electric Power Distribution
- 9% Hydroelectric Power Generation
- 9% Fluid Power Cylinder/ Actuator Mfg
- 8% Instr/Related Prod Mfg for Measure, Display & Control
- 8% Industrial Valve
- 8% Pump/Pumping Equip Mfg
- 8% Other Measuring/ Controlling Device Mfg
- 6% Sheet Metal Work Mfg
- 6% Fabricated Structural Metal Mfg
- 6% All Other Misc Fab Metal Product Mfg
- 2% Ovrhd Traveling Crane, Hoist & Monorail Sys Mfg
- 2% Plumbing/Heating Equip Merch/Wholesalers

## Geothermal NAICS Industries in Buffalo-Niagara Region
**(Revenue per NAICS code)**

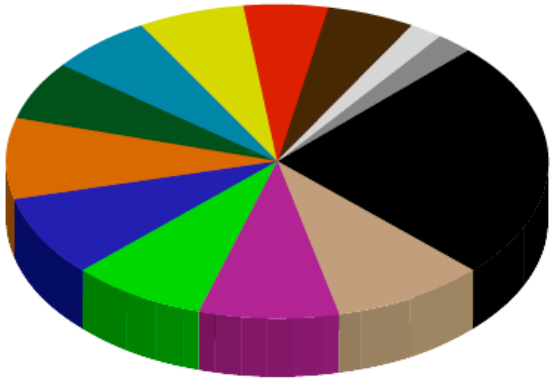


- 20% Total Other
- 10% Electric Power Distribution
- 9% Hydroelectric Power Generation
- 9% Fluid Power Cylinder/ Actuator Mfg
- 8% Instr/Related Prod Mfg for Meas., Disply & Contl
- 8% Industrial Valve Mfg
- 8% Pump/Pump Priming Equipment Mfg
- 8% Other Measuring/ Controlling Device Mfg
- 6% Sheet Metal Work Mfg
- 6% Fabricated structural metal mfg
- 6% All Other Misc. Fab. Metal Product Mfg
- 2% Ovrhd Trvlg Crane, Hoist, & Monorail Sys Mfg

# Sector Review

## Biomass NAICS Industries in Buffalo-Niagara Region

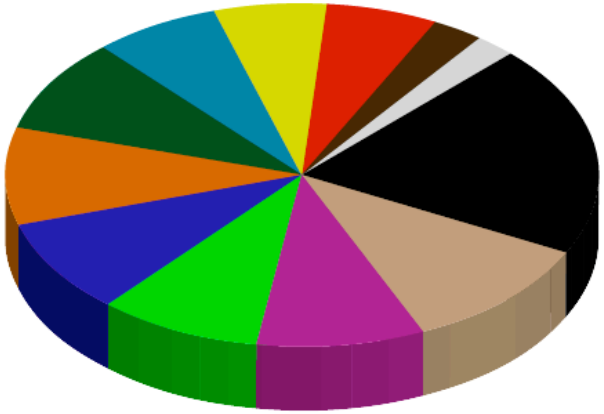
**(Revenue per NAICS code)**



| | | | | | |
|---|---|---|---|---|---|
| 24% | Total Other | 8% | Instr/Related Prod Mfg for Measure, Display & Control | 6% | Sheet metal work mfg |
| 9% | Electric Power Distribution | 8% | Pump/Pump Priming Equipment Mfg | 5% | Fabricated structural metal mfg |
| 8% | Fluid Power Cylinder/ Actuator Mfg | 6% | Other Measuring/ Controlling device mfg | 5% | All other misc. fab. metal product mfg |
| 8% | Industrial Valve Mfg | 6% | All other motor vehicle parts mfg | 2% | Ovrhd Trvlg Crane, Hoist, & Monorail Sys Mfg |
| | | | | 2% | Plumbing/Heating Equip Merch/Wholesalers |

## Nuclear NAICS Industries in Buffalo-Niagara Region

**(Revenue per NAICS code)**

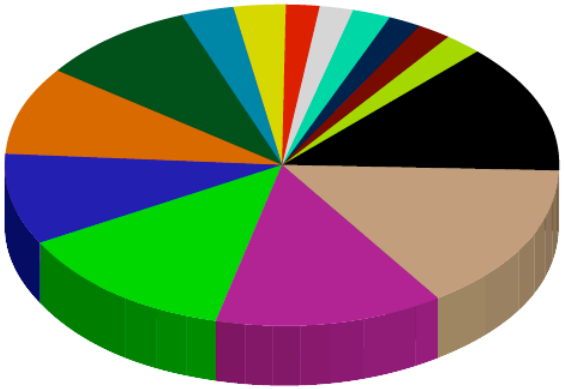


| | | | | | |
|---|---|---|---|---|---|
| 20% | Total other | 9% | Instr/Related Prod Mfg for Measure, Display & Control | 6% | Fabricated Structural Metal Mfg |
| 11% | Electric power distribution | 9% | Pump/Pumping Equip. Mfg | 6% | All Other Misc. Fab. Metal Product Mfg |
| 9% | Fluid Power Cylinder/ Actuator Mfg | 9% | Other Measuring/ Controlling Device Mfg | 3% | Overhead Trvlg Crane, Hoist, & Monorail Sys Mfg |
| 9% | Industrial Valve Mfg | 7% | Sheet Metal Work Mfg | 2% | Energy consulting services |

# Sector Review

## ETS NAICS Industries in Buffalo-Niagara Region

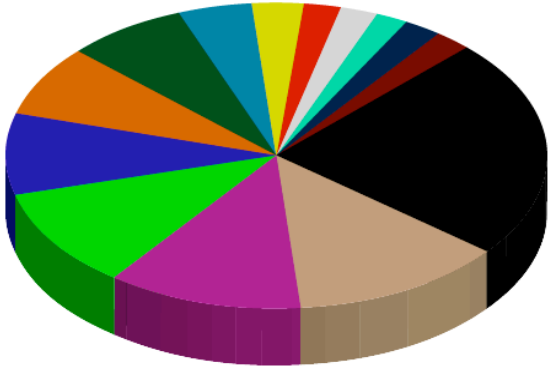
**(Revenue per NAICS code)**



| | | | | | |
|---|---|---|---|---|---|
| 13% | Total other | 9% | Fabricated Structural Metal Mfg | 2% | Power, Distr, & Specialty Transformer Mfg |
| 15% | Electric power distribution | 9% | All Other Misc Fab Metal Product Mfg | 2% | Engeneering Design Services |
| 13% | Instr/Related Prod Mfg for Measure, Display & Control | 3% | Energy Consulting Services | 2% | Air/Gas Compressor Mfg |
| 13% | Other Measuring/ Controlling Device Mfg | 3% | Motor & Generator | 2% | Charge Controller |
| 9% | Sheet Metal Work Mfg | 2% | All Other Plastics Product Mfg | 2% | Printed Circuits & Electronics Assemblies |

## Green Building Industries in Buffalo-Niagara Region

**(Revenue per NAICS code)**

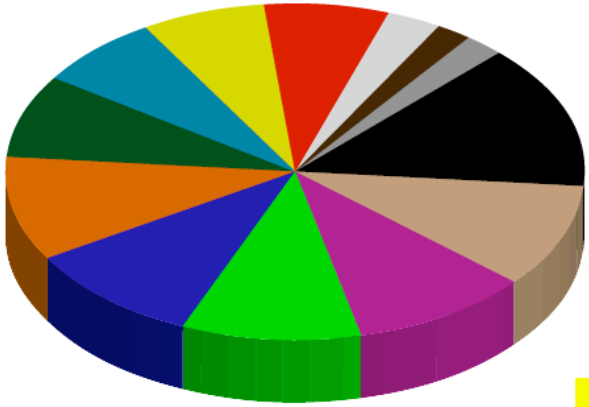


| | | | | | |
|---|---|---|---|---|---|
| 22% | Total other | 7% | Fabricated Structural Metal Mfg | 2% | Energy Consulting Services |
| 12% | Electric power distribution | 7% | All Other Misc Fab Metal Product Mfg | 2% | New Single-family Housing Const |
| 11% | Instr/Related Prod Mfg for Measure, Display & Control | 4% | Comm/Institutional Building Const | 2% | Motor & Generator |
| 10% | Other Measuring/ Controlling Device Mfg | 4% | Plumbing/Heating & AC Contractors | 2% | Utilities Mgt Consulting Services |
| 8% | Sheet Metal Work Mfg | 3% | Plumbing/Heating & Equip Merch Wholesalers | 2% | All Other Plastics Product Mfg |

# Sector Review

## Transportation NAICS Industries in Buffalo-Niagara Region

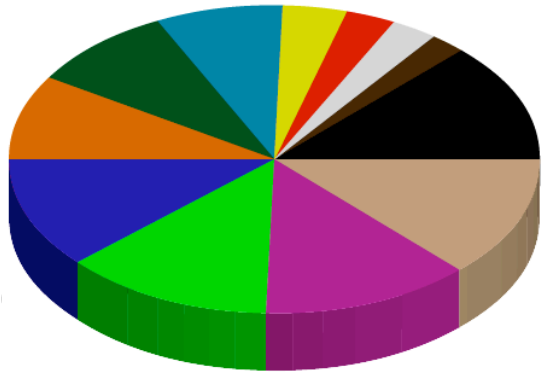
**(Revenue per NAICS code)**



- 14% Total other
- 10% Fluid Power Cylinder/ Actuator Mfg
- 10% Instr/Related Prod Mfg for Measure, Display & Control
- 10% Industrial Valve Mfg
- 10% Pump/Pumping Equip Mfg
- 10% Other Measuring/ Controlling Device Mfg
- 8% All Other Motor Vehicle Parts Mfg
- 7% Sheet Metal Work Mfg
- 7% Fabricated Structural Metal Mfg
- 7% All Other Misc Fab Metal Product Mfg
- 3% Ovrgd Trvlg Crane, Hoist, & Monorail Sys Mfg
- 2% Energy Consulting Services
- 2% Motor & Generator

## Solid Waste NAICS Industries in Buffalo-Niagara Region

**(Revenue per NAICS code)**



- 13% Total Other
- 13% Fluid Power Cylinder/ Actuator Mfg
- 13% Industrial Valve Mfg
- 13% Instr/Related Prod Mfg for Measure, Display & Control
- 12% Other Measuring/ Controlling Device Mfg
- 9% Sheet Metal Work Mfg
- 9% Fabricated Structural Metal Mfg
- 8% All Other Misc. Fab. Metal Product Mfg
- 4% Ovrhd Trvlg Crane, Hoist, & Monorail Sys Mfg
- 3% Energy Consulting Services
- 3% Motor & Generator Mfg
- 2% Engineering Services

# Sector Review

**COMPONENT INDUSTRIES IN RENEWABLE ENERGY BY NAICS CODE**

| NIACS | Description | Biomass | Hydro | Storage | Geo | Green Building | Grid | Nuclear | Solar | Transp | Waste | Wind |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 111110 | Soybean Farming | ● | | | | | | | | | | |
| 111120 | Oilseed (except Soybean) Farming | ● | | | | | | | | | | |
| 111150 | Corn Farming | ● | | | | | | | | | | |
| 111199 | All Other Grain Farming | ● | | | | | | | | | | |
| 111998 | All Other Misc. Crop Farming | ● | | | | | | | | | | |
| 113210 | Nurseries/Gathering Forest Prod. | ● | | | | | | | | | | |
| 115114 | Postharvest Crop Activities (ex. Cotton Ginning) | ● | | | | | | | | | | |
| 115115 | Farm Labor Contractors | ● | | | | | | | | | | |
| 115310 | Support Activities for Forestry | ● | | | | | | | | | | |
| 211111 | Hydroelectric Power Generation | | ● | | ● | | | | | | | |
| 221113 | Nuclear Electric Power Generation | | | | | | | ● | | | | |
| 221119 | Other Electric Power Generation | | ● | ● | ● | | ● | | ● | | | ● |
| 221122 | Electric Power Distribution | ● | ● | ● | ● | ● | ● | ● | ● | | | ● |
| 221330 | Steam & Air-Conditioning Supply | | | | ● | | | | | | | |
| 236115 | New Single F. Housing Const/ | | | | | ● | | | | | | |
| 236116 | New Multifamily Housing Const. | | | | | ● | | | | | | |
| 236117 | New Housing - (spec) builders | | | | | ● | | | | | | |
| 236118 | Residential Remodelers | | | | | ● | | | | | | |
| 236210 | Industrial Building Construction | ● | | | | ● | | | | | ● | |
| 236220 | Comm./Instit. Bldg Construction | | | | | ● | | | | | | |
| 237130 | Power/Comm. Line/Reated. Structures Const. | ● | ● | ● | ● | ● | ● | ● | ● | | | ● |
| 238220 | Plumbing, Heating, and Air-Conditioning Contractors | | | | | ● | | | ● | | | |
| 321113 | Sawmills | ● | | | | | | | | | | |
| 321999 | All Other Miscellaneous Wood Product Mfg | ● | | | | ● | | | | | | |
| 322110 | Pulp Mills | ● | | | | | | | | | | |
| 322121 | Paper (except Newsprint) Mills | ● | | | | | | | | | | |
| 322299 | Cardboard, All Other Converted Paper Product Mfg | ● | | ● | | | | | | | | |
| 324110 | Petroleum Refineries | ● | | | | | | | | | | |
| 324199 | All Other Petrol/Coal Prod. Mfg | ● | | | | | | | | | | |
| 325188 | All Other Basic Inorganic Chemical Mfg. | | | | | | | ● | | | | |
| 325193 | Ethyl Alcohol Mfg | ● | | | | | | | | | | |
| 325199 | All Other Basic Organic Chemical Mfg | ● | | | | | | | | | | |
| 325211 | Encapsulant | ● | | | | | | | ● | | | |
| 326113 | Rear Layer | | | | | | | | ● | | | |

**COMPONENT INDUSTRIES IN RENEWABLE ENERGY BY NAICS CODE**

| NIACS | Description | Biomass | Hydro | Storage | Geo | Green Building | Grid | Nuclear | Solar | Transp | Waste | Wind |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 326199 | All Other Plastics Product Mfg | | | ● | | ● | | | | | | ● |
| 326299 | Fuel cells, solid-state | | | ● | | | | | ● | ● | | ● |
| 327211 | Top Surface | | | | | ● | | | ● | | | |
| 327993 | Mineral Wool Mfg | ● | | | | ● | | | | ● | | |
| 331210 | Iron/Steel Pipe/Tube Mfg from Purchased Steel | ● | ● | | ● | ● | | ● | | ● | | |
| 331316 | Aluminum Extruded Product Mfg | | | ● | | | | | ● | | | ● |
| 331421 | Copper Rolling, Drawing, and Extruding | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| 331511 | Iron Foundries | | ● | | ● | | | ● | | ● | | ● |
| 332111 | Iron and Steel Mills | | ● | ● | ● | ● | ● | ● | | ● | | ● |
| 332112 | Nonferrous Forging | | | ● | | | ● | | | | | |
| 332996 | Fabricated Pipe and Pipe Fitting Mfg | | ● | | ● | | | ● | | ● | | |
| 332311 | Prefabricated Metal Building/ Component Mfg | | | | | ● | | ● | ● | | | |
| 332312 | Fabricated Structural Metal Mfg | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| 332313 | Plate Work Mfg | | | | | | | | | | | ● |
| 332322 | Sheet Metal Work Mfg | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| 332410 | Power Boiler/Heat Exchanger Mfg | ● | | | ● | | | ● | ● | ● | | |
| 332420 | Metal Tank (Heavy Gauge) Mfg | ● | | | ● | | | ● | | ● | ● | |
| 332911 | Industrial Valve Mfg | ● | ● | | ● | | ● | ● | | ● | ● | ● |
| 332999 | All Other Misc. Fab. Metal Product Mfg | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| 333120 | Construction Machinery Mfg | ● | | | | ● | | ● | | | ● | |
| 333132 | Oil/Gas Field Machinery and Equipment Mfg | | | | ● | | | | | | | |
| 333210 | Sawmill and Woodworking Machinery Mfg | ● | | | | | | | | | | |
| 333291 | Paper Industry Machinery Mfg | ● | | | | | | | | | | |
| 333298 | All Other Industrial Machinery Mfg | ● | | | | | | ● | | | ● | |
| 333411 | Air Purification Equipment Mfg | ● | | | | ● | | | | ● | ● | |
| 333412 | Industrial/Commercial fans/blowers | ● | | | ● | ● | | | ● | ● | | ● |
| 333414 | Heating Equip.(ex. Warm Air Furnace) Mfg | ● | | | | | | | ● | ● | | |
| 333415 | Air-Con/Warm Air Heating Equip. & Comm./Indust. Refrig. Equip. Mfg | ● | ● | | ● | ● | ● | | ● | ● | | |
| 333611 | Turbines, Turb. Generators, & Turb. Gen. Sets | ● | ● | ● | ● | | | | | | | ● |
| 333612 | Speed Changer, Industrial | ● | ● | ● | ● | | | | | | | ● |
| 333613 | Power Transmission Equip | ● | ● | ● | ● | | ● | ● | ● | ● | | ● |
| 333911 | Pump/Pumping Equip. Mfg | ● | ● | | ● | | | ● | ● | ● | | |
| 333912 | Air/Gas Compressor Mfg | ● | | ● | ● | | | | ● | ● | | ● |
| 333922 | Conveyor/Conveying Equipment Mfg | ● | | | | | | | | ● | ● | |

# Sector Review

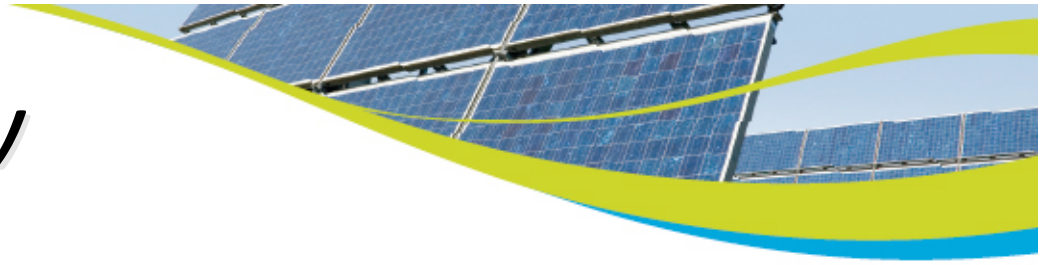
## COMPONENT INDUSTRIES IN RENEWABLE ENERGY BY NAICS CODE

| NIACS | Description | Biomass | Hydro | Storage | Geo | Green Building | Grid | Nuclear | Solar | Transp | Waste | Wind |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 333923 | Overhead Traveling Crane, Hoist, Monorail Mfg | ● | ● | | ● | | | ● | | ● | ● | |
| 333995 | Fluid Power Cylinder/Actuator Mfg | ● | ● | | ● | | | ● | | ● | ● | ● |
| 333997 | Scale/Balance (ex Laboratory) Mfg | ● | | | | | | | | | | |
| 333999 | All Other Misc. Gen. Purpose Mach. Mfg | ● | | | | | | | | | | |
| 334112 | Computer Storage Device Mfg | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| 334413 | Solar Cells | | | | | | | | ● | | | |
| 334418 | Printed circuit electronic assemblies | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| 334512 | Automatic Environmental Control Mfg for Residential, Commercial, and Appliance Use | | | | | ● | ● | | | | | |
| 334513 | Instruments/Products Mfg for Meas., Display Control | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| 334515 | Meter (Instrument Mfg for Measuring and Testing Electricity and Electrical Signals) | ● | ● | ● | ● | ● | ● | ● | ● | | | ● |
| 334519 | Other Measuring/Controlling Device Mfg | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| 335110 | Electric Lamp Bulb/Parts | | | | | ● | | | | | | |
| 335121 | Resid. Electric Light Fixtures | | | | | ● | | | | | | |
| 335122 | Commercial, Industrial, Instit. Lighting Fixtures | | | | | ● | | | | | | |
| 335129 | Other Lighting Equipment (floodlights, street lights) | | | | | ● | | | | | | |
| 335221 | Household Cooking Appliance | | | | | ● | | | | | | |
| 335228 | Other Major Household Appliances | | | | | ● | | | | | | |
| 335311 | Power, Distribution & Specialty Transformer Mfg | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● |
| 335312 | Motor and Generator | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| 335313 | Switchgear/SwitchboardApparatus Mfg | ● | ● | ● | ● | ● | ● | ● | ● | ● | | ● |
| 335314 | Relay and Industrial Control | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| 335911 | Storage Battery | | | ● | | ● | ● | | | ● | | ● |
| 335912 | Primary Battery Mnf | | | ● | | ● | | | | ● | | |
| 335931 | Electrical Connections | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| 335999 | Charge Controller | | ● | ● | ● | ● | | ● | ● | ● | | ● |
| 336111 | Automobile Mfg | | | | | | | | | ● | | |
| 336112 | Light Truck and Utility Vehicle Mfg | | | | | | | | | ● | | |
| 336399 | All Other Motor Vehicle Parts Mfg | ● | | | | | | | | ● | | |
| 336510 | Railroad Rolling Stock Mfg | ● | | | | | | | | ● | | |
| 423720 | Plumbing/Heating Equip. Merch./ Wholesalers | ● | ● | | | ● | | | ● | | | |
| 423930 | Recyclable Material Wholesalers | ● | | | | | | | | | ● | |
| 532412 | Construction, Mining, and Forestry Machinery and Equipment Rental and Leasing | ● | | | ● | ● | | | | | | |
| 541310 | Architectural services | ● | ● | ● | ● | ● | ● | ● | ● | | ● | ● |

## COMPONENT INDUSTRIES IN RENEWABLE ENERGY BY NAICS CODE

| NIACS | Description | Biomass | Hydro | Storage | Geo | Green Building | Grid | Nuclear | Solar | Transp | Waste | Wind |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 541330 | Engineering Design Services | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| 541350 | Building Inspection Services | | | | | ● | | | | | | |
| 541380 | Testing Laboratories | ● | ● | | ● | ● | ● | ● | | | ● | |
| 541420 | Indust. Design Svcs (Energy Effic.) | | | | | ● | | | | | | |
| 541618 | Utilities Mgt Consulting Svcs | | | | | ● | ● | | | | | |
| 541620 | Envir. Consulting Svcs | ● | ● | ● | ● | ● | ● | ● | | | ● | ● |
| 541690 | Energy Consulting Services | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| 541710 | R&D in Physical, Engineering, and Life Sciences | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| 562111 | Solid Waste Collection | ● | | | | ● | | | | | ● | |
| 562112 | Hazardous Waste Collection | | | | | | | ● | | | ● | |
| 562119 | Other Waste Collection | | | | | ● | | | | | ● | |
| 562211 | Hazardous Waste Treatment/ Disposal | | | | | | | ● | | | ● | |
| 562212 | Solid Waste Landfill | ● | | | | ● | | | | | ● | |
| 562213 | Solid Waste Combustors and Incinerators | ● | | | | ● | | | | | | |
| 562219 | Other Nonhazardous Waste Treatment/Disposal | ● | | | | ● | | | | | ● | |
| 562910 | Remediation Services | ● | | | | ● | | ● | | | ● | |
| 562920 | Materials Recovery Facil. | ● | | | | ● | | | | | ● | |
| 562991 | Septic Tank & Related Svcs | | | | | ● | | | | | ● | |
| 562998 | All Other Misc Waste Mgt Svcs | | | | | ● | | | | | ● | |

# Sector Review



## LEADING BUFFALO NIAGARA CROSS-SECTOR INDUSTRIES IN RENEWABLE ENERGY

| NAICS | Description | Bio | Hydro | ETS | Geo | Bldg | Grid | Nuke | Solar | Trans | Waste | Wind |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 221122 | Electric Power Distribution | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | ■ |
| 331421 | Copper Rolling, Drawing & Extruding | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 332312 | Fabricated Structural Metal Mfg | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 332322 | Sheet Metal Work Mfg | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 332999 | Other Misc Fab Metal Product Mfg | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 333415 | AC/Warm-Air Heating & Refrig Equip Mfg | ■ | ■ | | ■ | ■ | ■ | | ■ | ■ | | |
| 333613 | Power Trans Equip | ■ | ■ | ■ | ■ | | ■ | ■ | ■ | | | ■ |
| 334112 | Computer Storage Device Mfg | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 334513 | Instr Mfg for Measure, Display Control | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 334515 | Meter | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | ■ |
| 334519 | Other Measuring/Control Device Mfg | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 335311 | Power, Dist & Specialty Transformer Mfg | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | ■ |
| 335312 | Motor and Generator | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 335313 | Switchgear/Switchboard Apparatus Mfg | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | ■ |
| 335314 | Relay & Industrial Control | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | ■ | ■ |
| 335931 | Electrical Connections | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 335999 | Charge Controllers | | ■ | ■ | ■ | ■ | | ■ | ■ | ■ | | ■ |
| 541310 | Architectural Svcs | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | ■ | ■ |
| 541330 | Engineering Design Svcs | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| 541380 | Testing Laboratories | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | ■ | |
| 541620 | Envir. Consulting Svcs | ■ | ■ | ■ | ■ | ■ | ■ | ■ | | | ■ | ■ |
| 541690 | Energy Consulting Svcs | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |

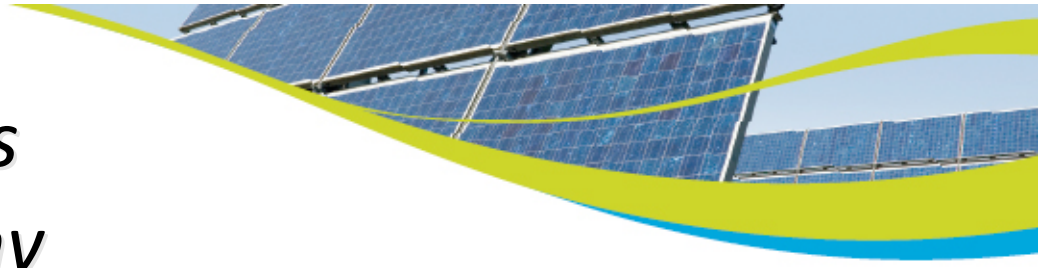
***Note: Colored boxes indicate NAICS codes where Buffalo Niagara possesses strength and that are relevant across different sectors. Blank boxes indicates little or no NAICS activity in targeted sector.***

# *Regional Opportunities for our Green Economy*

- Green community
- Canada
- Wind/solar power systems manufacturing
- Hydropower/hydrokinetic power & manufacturing
- University involvement
- State Incentives

# *Regional Threats to our Green Economy*

- Global economy
- New York State business climate
- Incentive changes in New York State
- Competition from other states & regions



# *Regional Weaknesses for our Green Economy*

- Location
- General economic conditions
- Government initiatives
- Plan implementation
- Local assistance
- Confidence!

# Comparative Analysis

**How does the Buffalo-Niagara region to those areas already successful in green economy sectors?**

### Solar Comparative Analysis—Demographic Information

| COUNTY<br>STATE | MIDDLESEX<br>MASS. | PRINCE GEORGES<br>MD. | OAKLAND<br>MICH. | BN REGION<br>N.Y. |
|---|---|---|---|---|
| Population | 1,465,396 | 801,515 | 1,194,156 | 1,591,708 |
| Population as % of BN | 92% | 50% | 75% | 100% |
| Revenues as % of BN | 659% | 16% | 185% | 100% |
| Firms(Total) | 88,892 | 49,067 | 96,036 | 72,377 |
| # People per Firm | 16.5 | 16.3 | 12.4 | 22.0 |
| # People per Solar Firm | 287 | 466 | 284 | 666 |
| # People employed in Mfg | 95,518 | 13,695 | 134,003 | 120,877 |
| % People employed in Mfg | 6.5% | 1.7% | 11.2% | 7.6% |
| % College degree or above | 43.7% | 23.5% | 36.0% | 19.9% |
| Median House Value | $247,900 | $145,600 | $181,200 | $88,213 |
| Average House Value | $106,981 | $158,368 | $227,110 | $78,094 |

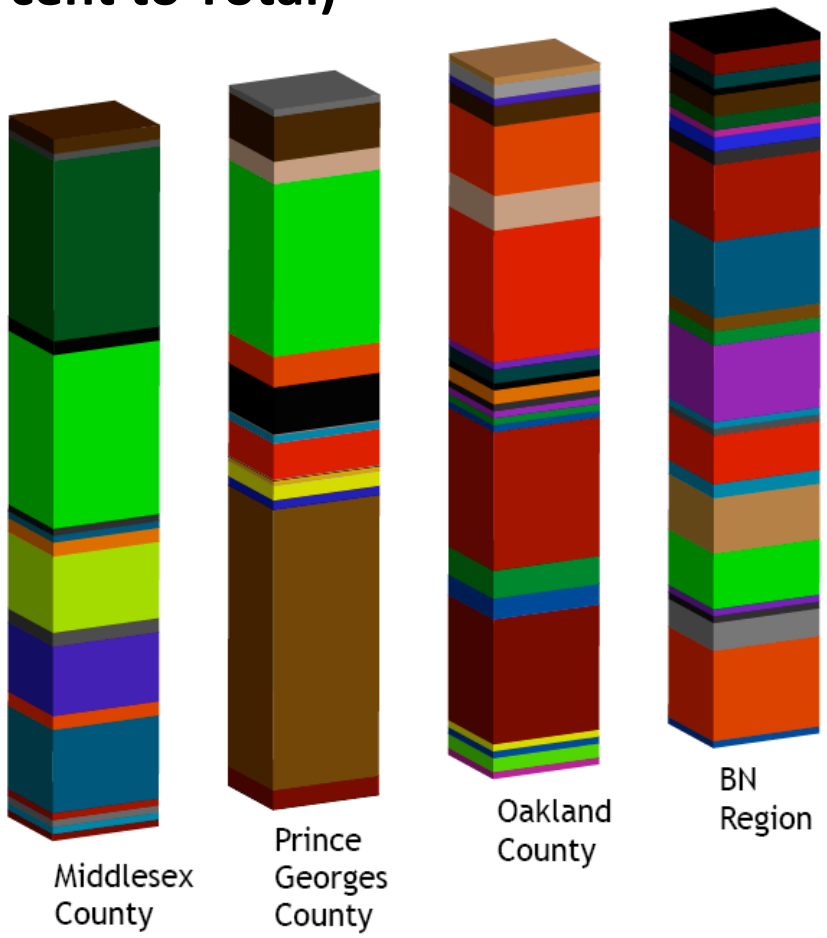
### Solar NAICS Comparative Analysis—Revenues (In Millions $)

| | COUNTY: | Middlesex | | Prince Georges | | Oakland | | BN Region | |
|---|---|---|---|---|---|---|---|---|---|
| NAICS | INDUSTRY SEGMENT | $$ | % | $$ | % | $$ | % | $$ | % |
| 221119 | Other Electric Power Generation | 301 | 0.2 | 3 | 0.1 | 394 | 1.1 | 182 | 1.0 |
| 221122 | Electric Power Distribution | 1,058 | 0.8 | 0 | 0.0 | 15 | 0.0 | 2,464 | 12.9 |
| 237130 | Power/Comm Line/Rel Structures Co | 258 | 0.2 | 85 | 2.7 | 10 | 0.0 | 11 | 0.1 |
| 238220 | Plumbing, Heating, & AC Contractor | 1,016 | 0.8 | 1,270 | 40.4 | 553 | 1.6 | 805 | 4.2 |
| 325211 | Encapsulant | 40 | 0.0 | 5 | 0.1 | 204 | 0.6 | 105 | 0.5 |
| 326113 | Rear Layer | 53 | 0.0 | 0 | 0.0 | 147 | 0.4 | 13 | 0.1 |
| 326299 | Fuel cells, solid-state | 150 | 0.1 | 0 | 0.0 | 502 | 1.4 | 94 | 0.5 |
| 327211 | Top Surface | 7 | 0.0 | 1 | 0.0 | 6,403 | 18.1 | 5 | 0.0 |
| 331316 | Aluminum Extruded Product Mfg | 0 | 0.0 | 0 | 0.0 | 10 | 0.0 | 0 | 0.0 |
| 331421 | Copper Rolling, Drawing, and Extru | 1 | 0.0 | 0 | 0.0 | 6 | 0.0 | 127 | 0.7 |
| 332311 | Prefabricated Metal Building/Comp | 1 | 0.0 | 0 | 0.0 | 1,044 | 2.9 | 28 | 0.1 |
| 332312 | Fabricated Structural Metal Mfg | 108 | 0.1 | 42 | 1.3 | 121 | 0.3 | 1,505 | 7.9 |
| 332322 | Sheet Metal Work Mfg | 785 | 0.6 | 66 | 2.1 | 104 | 0.3 | 1,532 | 8.0 |
| 332410 | Power Boiler/Heat Exchanger Mfg | 4 | 0.0 | 0 | 0.0 | 10 | 0.0 | 312 | 1.6 |
| 332999 | All Other Misc. Fab Metal Product | 673 | 0.5 | 2 | 0.1 | 1,378 | 3.9 | 1,426 | 7.5 |
| 333412 | Industrial/Commercial fans/blowers | 531 | 0.4 | 0 | 0.0 | 67 | 0.2 | 21 | 0.1 |
| 333414 | Heating Equip (ex. Warm Air Furnace | 328 | 0.3 | 19 | 0.6 | 12 | 0.0 | 49 | 0.3 |
| 333415 | AC/Wm Air Htg Eqp & Com/Ind Ref | 30 | 0.0 | 3 | 0.1 | 68 | 0.2 | 109 | 0.6 |
| 333613 | Power Transmission Equip | 16 | 0.0 | 0 | 0.0 | 138 | 0.4 | 225 | 1.2 |
| 333911 | Pump/Pumping Equip Mfg | 9 | 0.0 | 0 | 0.0 | 6,929 | 19.6 | 2,079 | 10.9 |
| 333912 | Air/Gas Compressor Mfg | 35 | 0.0 | 0 | 0.0 | 12 | 0.0 | 333 | 1.7 |
| 334112 | Computer Storage Device Mfg | 15,635 | 12.4 | 0 | 0.0 | 263 | 0.7 | 1 | 0.0 |
| 334413 | Solar Cells | 2,553 | 2.0 | 3 | 0.1 | 372 | 1.1 | 8 | 0.0 |
| 334418 | Printed circuits and electronics | 208 | 0.2 | 0 | 0.0 | 223 | 0.6 | 320 | 1.7 |
| 334513 | Instr/Reld Prod Mfg for Meas, Disp | 12,601 | 10.0 | 165 | 5.2 | 390 | 1.1 | 2,137 | 11.2 |
| 334515 | Meter | 2,883 | 2.3 | 33 | 1.1 | 55 | 0.2 | 54 | 0.3 |
| 334519 | Other Measuring/Controlling Device | 13,331 | 10.6 | 0 | 0.0 | 533 | 1.5 | 2,054 | 10.7 |
| 335311 | Power, Distrib & Specialty Transf | 574 | 0.5 | 0 | 0.0 | 327 | 0.9 | 374 | 2.0 |
| 335312 | Motor and Generator | 156 | 0.1 | 0 | 0.0 | 786 | 2.2 | 447 | 2.3 |
| 335313 | Circuit Breakers & Fuses | 241 | 0.2 | 0 | 0.0 | 154 | 0.4 | 10 | 0.1 |
| 335314 | Relay and Industrial Control | 249 | 0.2 | 0 | 0.0 | 431 | 1.2 | 227 | 1.2 |
| 335911 | Storage Batteries | 10 | 0.0 | 0 | 0.0 | 36 | 0.1 | 1 | 0.0 |
| 335931 | Electrical Connections | 178 | 0.1 | 0 | 0.0 | 172 | 0.5 | 16 | 0.1 |
| 335999 | Charge Controller | 2,810 | 2.2 | 7 | 0.2 | 6,866 | 19.4 | 332 | 1.7 |
| 423720 | Plumbing/Heating Equip Merch | 638 | 0.5 | 215 | 6.8 | 176 | 0.5 | 582 | 3.0 |
| 541310 | Architectural services | 818 | 0.6 | 138 | 4.4 | 1,673 | 4.7 | 232 | 1.2 |
| 541330 | Engineering Design Services | 31,632 | 25.1 | 783 | 24.9 | 3,450 | 9.7 | 355 | 1.9 |
| 541690 | Energy Consulting Services | 2,801 | 2.2 | 101 | 3.2 | 913 | 2.6 | 496 | 2.6 |
| 541712 | R&D | 33,201 | 26.4 | 204 | 6.5 | 466 | 1.3 | 53 | 0.3 |
| | TOTAL REVENUES | $125,920 | 100% | $3,146 | 100% | $35,413 | 100% | $19,121 | 100% |
| | % OF REVENUES: COUNTIES TO BN | 659% | | 16% | | 185% | | | |

# *Comparative Analysis*

**Solar Industry Segments Revenue**
**(Percent to Total)**

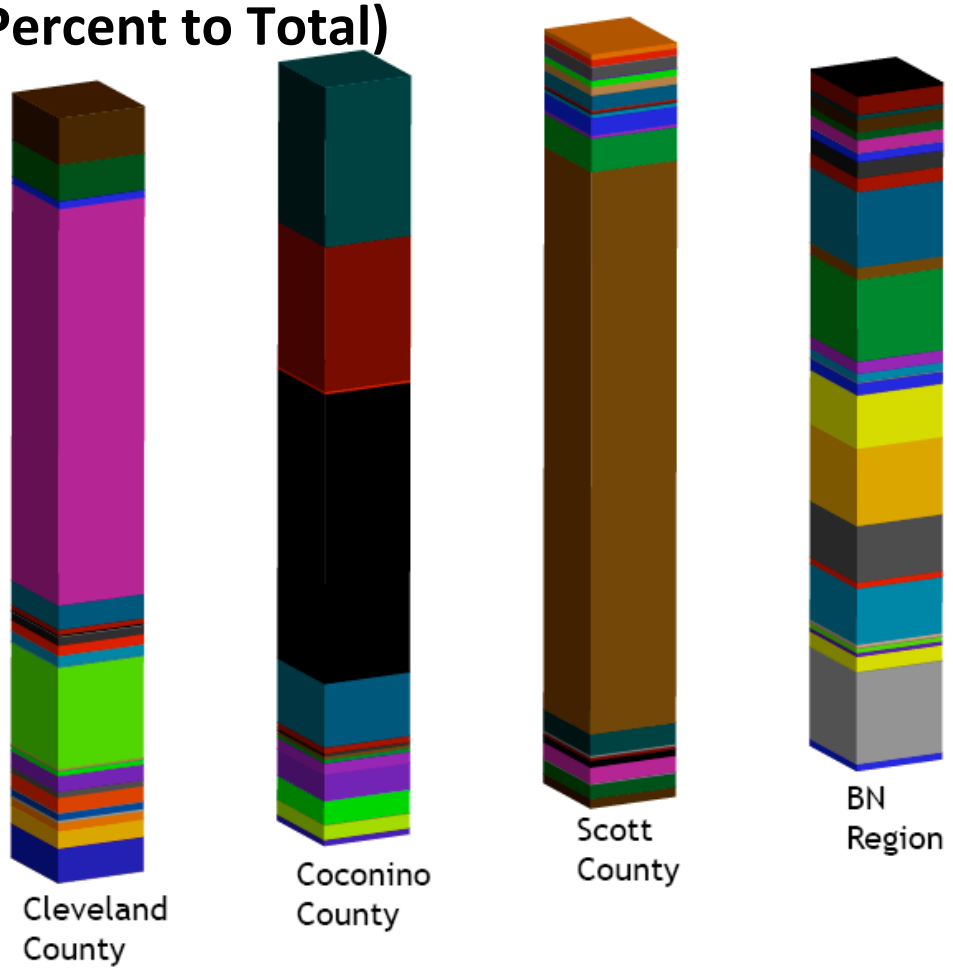
*A greater number of bands amounts to more diversity within the location*



# *Comparative Analysis*

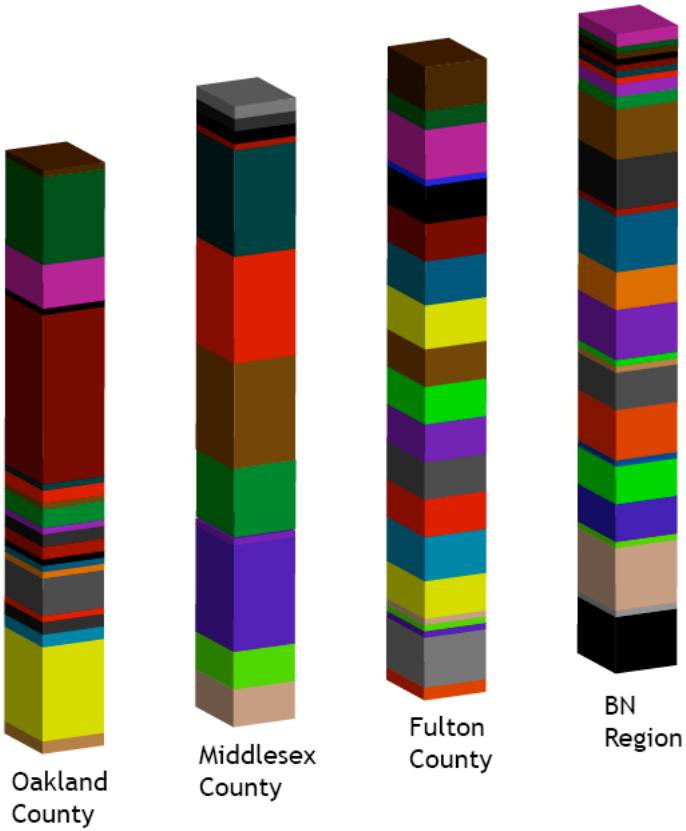
**Wind Industry Segments Revenue (Percent to Total)**

*A greater number of bands amounts to more diversity within the location*

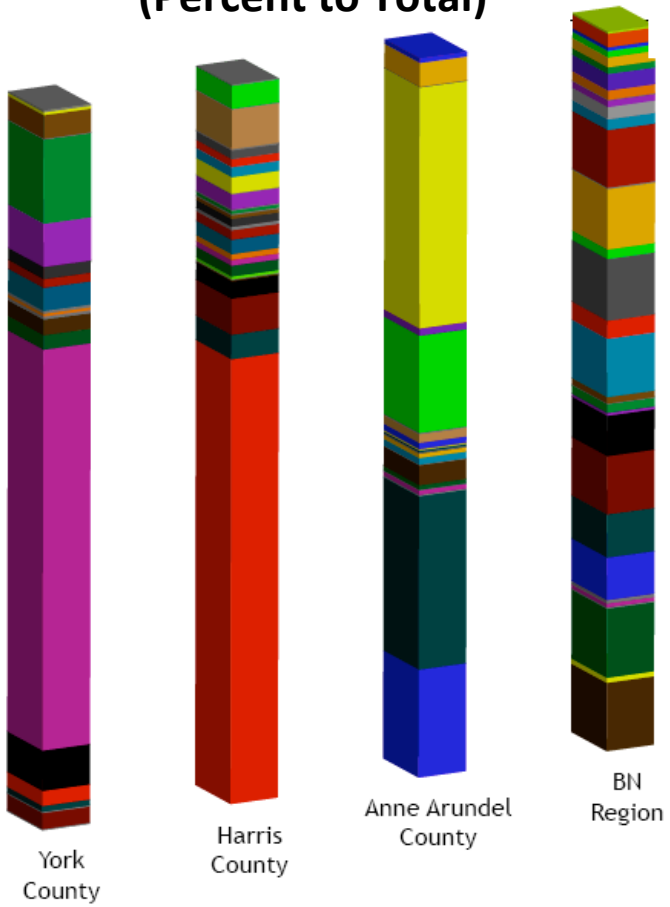


# *Comparative Analysis*

**Geothermal Industry Segments Revenue (Percent to Total)**

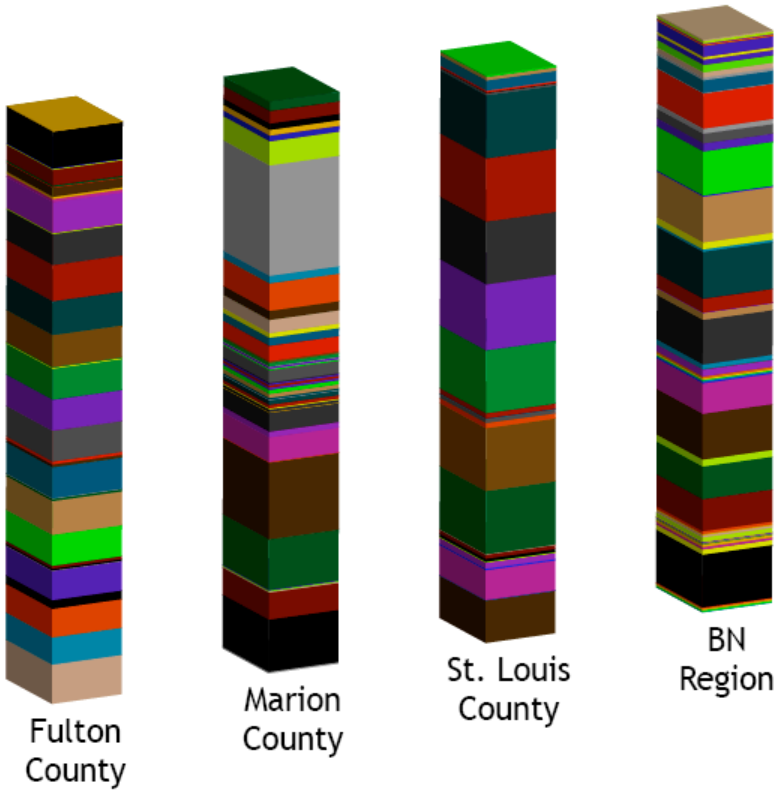



**Hydropower Industry Segments Revenue (Percent to Total)**

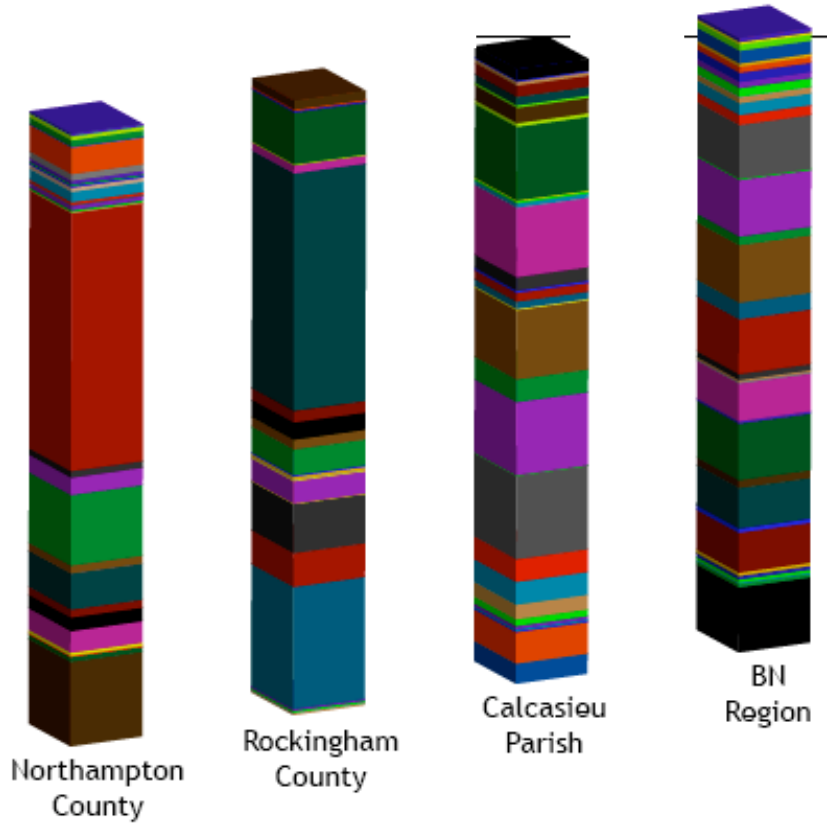


# *Comparative Analysis*

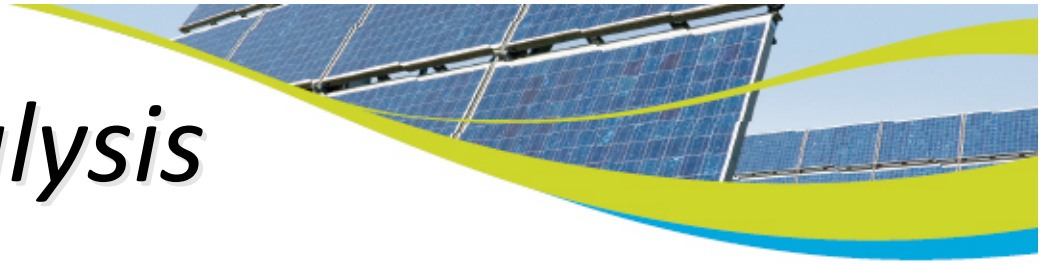
**Biomass Industry Segments Revenue (Percent to Total)**



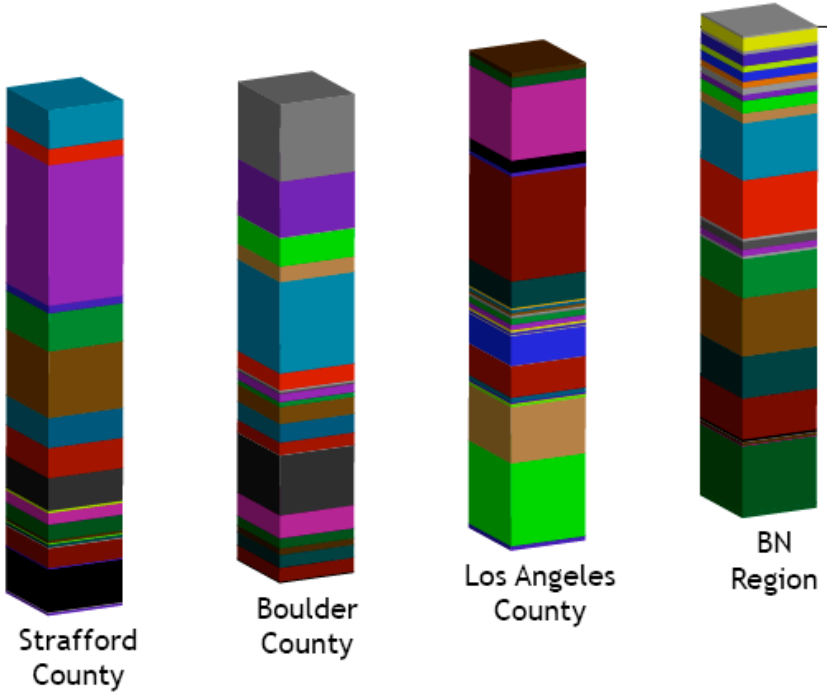

**Nuclear Industry Segments Revenue (Percent to Total)**



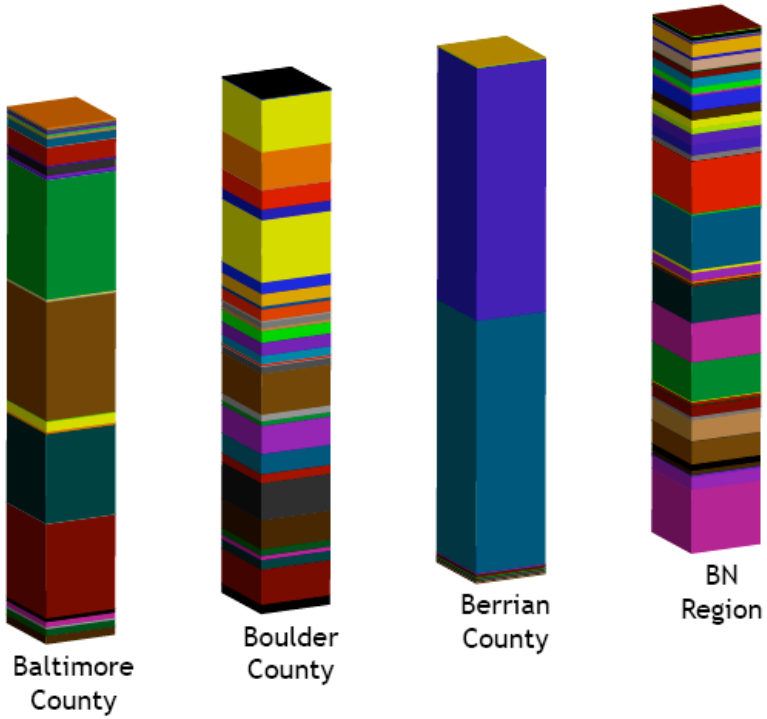
# *Comparative Analysis*



**ETS Industry Segments Revenue (Percent to Total)**

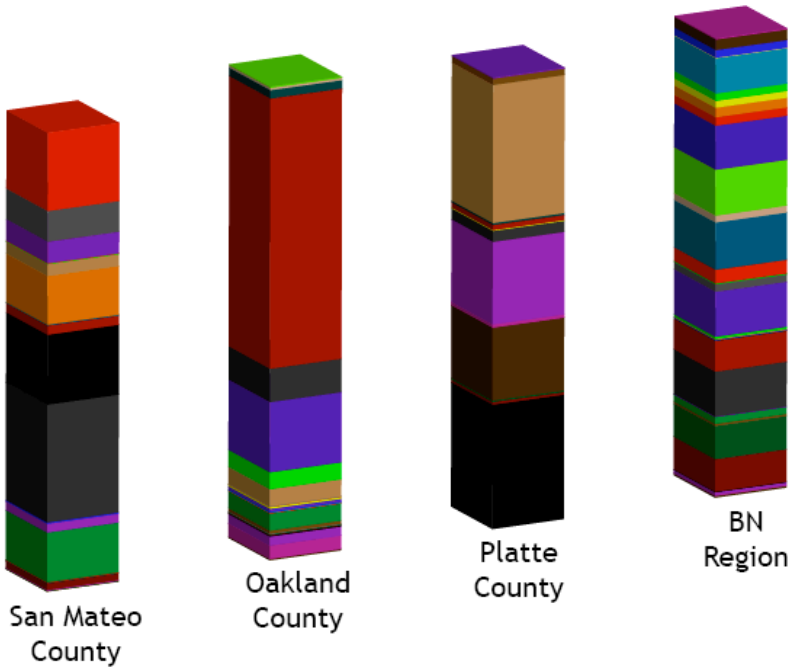



**Green Building Industry Segments Revenue (Percent to Total)**

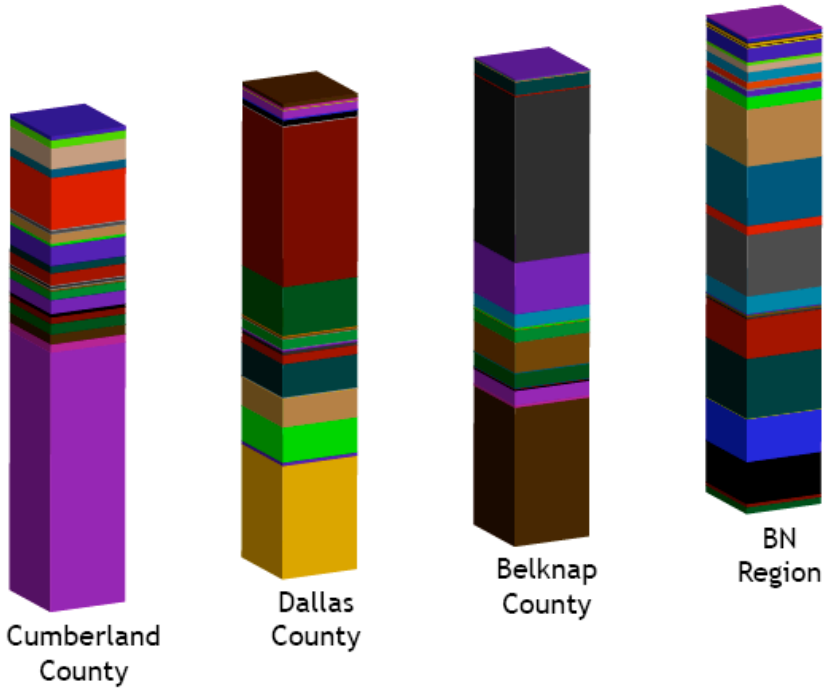


# *Comparative Analysis*

**Transportation Industry Segments Revenue (Percent to Total)**




**Solid Waste Industry Segments Revenue (Percent to Total)**



# *Interviews*

**Are Renewable Energy-Related Products Ready to be Commercialized?**

**Is Excess Capacity Positive or Negative in Terms of Seeking Investment?**

**Can Buffalo Niagara Serve as a Laboratory for a New U.S. Industrial Future?**

**How Essential are Government Stimulus & Incentive Programs?**

New questions and ideas are emerging on the impact of "green" within Buffalo Niagara as well as the U.S. and global economy. These and other issues uncovered in KWR International's research were investigated through additional analysis and discussions with business executives, regulatory officials, academics, trade association managers, attorneys and service professionals, analysts, journalists, and other targeted individuals. They were selected for their ability to provide insight from a local and external perspective. To ensure frank discussion, interview subjects were identified by title and, where relevant, affiliation.

**How Important is Location & Buffalo Niagara's Proximity to Canada?**

**Is Success Simply a Case of Better Promotion & Outreach?**

**Is the Sum of Renewable Energy Worth More Than Individual Sectors?**

**Do Investors & Site Selectors Help Those Who Help Themselves?**

# *Interviews*

A few key points from interviews:

**'…incentives become key. Germany has become a global leader in solar and they also offer some of the best incentives. Japan has also done well, but purchases declined when subsidies were eliminated in 2005.'**

**'People need to realize all energy is subsidized—that includes oil and gas—so one shouldn't think only alternative energy is subsidized.'**

**'There is a range of skills and that is a real plus here. If you go to Arizona you get lots of lower-skilled labor but you can't get skilled trades people.'**

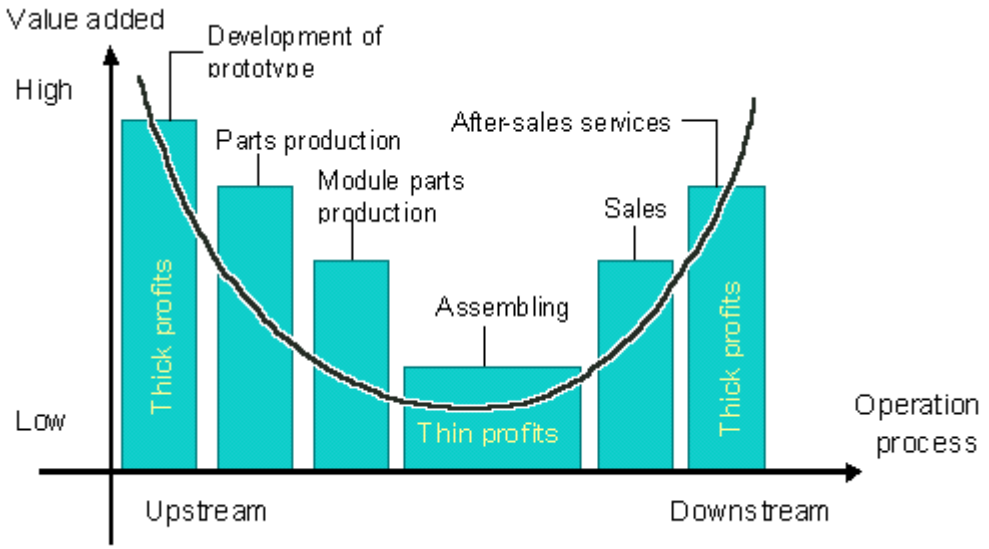
**"What has happened in a lot of cities has been the formation of a 'green team," he added. "Seattle, Milwaukee, Cincinnati, Portland, San Francisco, New York and Toronto have all drawn up green plans, bringing together business, city and community groups to form and implement a sustainability plan. This can include offering subsidies to help businesses that expand in a green way."**

**'One must determine what are the leading thinkers doing and then apply their thoughts into the industrial sector with input and capital from venture capitalists and other investors. One area that gets little attention is energy conservation. With all the snow and older building stock, that could be a natural area for Buffalo.'**

# *Buffalo Niagara Economy*

***Capitalizing on the green economy can help achieve what Glaeser thinks can't be done. A diverse green economy, from R&D, to manufacturing production, to sales, can serve as the foundation for a future economic rebirth.***

Companies focusing on the assembly stage have the thinnest profits and are thus hardest to sustain while operations on the edges possess higher margins. It is this development that the Buffalo-Niagara region should seek to capitalize on and which potentially draws on its strengths. WNY can serve as the stage for research AND implementation of many sectors given it has the ability to support almost the entirety of functions required. This chart also explains why many of the jobs that left the Buffalo region, were outsourced to countries that could operate within the thinnest profit margin areas.

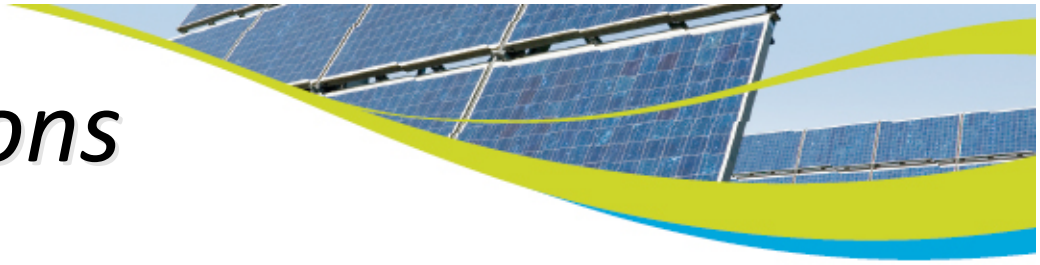



**Visualization of "Smiling Curve" theory developed by Acer Computer founder Stanley Shih – courtesy of RIETI/Japan**

# *Can U.S. Regain its Manufacturing Prowess?*

- Buffalo Niagara represents a great test lab and region can benefit from attention focused on this deficiency.
- Recent report by *American Prospect* titled "Made in the USA: Reviving American Manufacturing (before it's too late) states:
  - *America cannot prosper over the long term with less than 12 percent of its GDP coming from manufacturing. This sector should generate at least 20 percent of our nation's GDP. And when it does, 12 million more workers will be employed directly and up to another 30 million workers indirectly as a result of the very high multiplier effect of new manufacturing jobs.*
- And *New Republic's* Noam Scheiber emphasizes a holistic approach consistent with Smiling Curve and region's potential strengths:
  - *Unfortunately, the evidence suggests it's nearly impossible to thrive at R&D and product-design unless you're also actively involved in the production process, too.*
- E.g., Synergies between industry and Buffalo Niagara Medical Campus.

# *Major Conclusions*



• The new green economy offers Buffalo Niagara unique job-growth opportunities as alternative-energy demand grows. The potential stems from its ability to provide manufacturing capacity in almost all alternative-energy sectors, rather than any one area or sub-sector.

• Buffalo Niagara can be competitive in securing green jobs because it has a more diverse, balanced industrial base than competitors. This provides an opportunity to take a leading role as a component supplier in numerous aspects of renewable-energy use and production.

• Buffalo Niagara can establish itself as America's reindustrialization model in the new green economy and serve as a laboratory for restoring manufacturing jobs.

• Buffalo Niagara has the opportunity to establish itself as a North American center for the commercialization of green and renewable-energy-related products.

• Positioning Buffalo Niagara as a region where "Industry Creates Energy" can allow the region to participate in a revitalized American economy by capitalizing on its historic advantages to reclaim its manufacturing heritage and create new jobs.

# *Additional Conclusions*

•Solar & wind component manufacturing hold the greatest potential for job creation in WNY.

•Wind is likely to offer the greatest opportunity for the region to generate large-scale alternative energy that can be supplied to the grid.

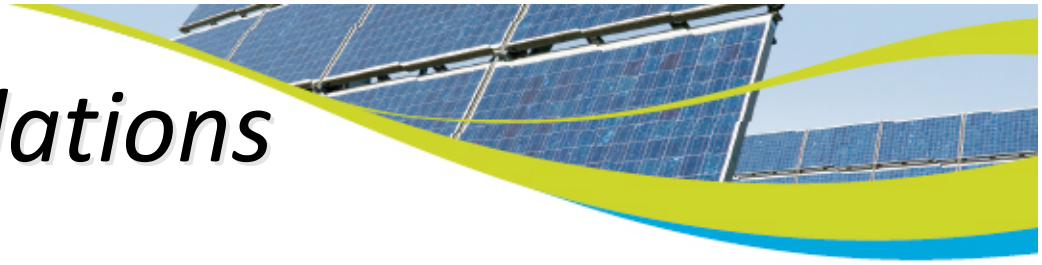
•Hydropower generation can play a significant role in the region's alternative-energy generation if emerging technologies in hydrokinetic turbines prove feasible. The Niagara River, both above and below the Falls, can prove a significant source of low-cost electricity.

•Biomass and biofuels offer potential growth. The region has facilities for large-scale biomass storage (grain elevators) and bulk transport. Massive landfills can be a methane-gas source. Rural areas could be utilized for biomass production when economically and environmentally feasible crops are identified.

•The region does not have a "green image," which is important to green-economy investors and entrepreneurs. Buffalo fails to rank in any national green-communities listing largely because the region's leadership has not embraced an environmental-economy concept.

•At the local level, the region has not formulated special incentives or programs that would foster green jobs that need not be cost-intensive. There has been little follow-up on green-program plans. Building codes in most communities do not address energy-efficiency issues.

# *Major Recommendations*



• Position Buffalo Niagara as a focal point of Alternative Energy activity throughout the value chain where “Industry becomes Energy”.

• Formation of “Green Team” with input from industry, government, investors, academia and local community to create an inviting business and living environment

• Fostering of soft infrastructure that complements industrial capacity.

• Promote global dialogue with US, Canadian, European, Asian and other businesses, governments and entities with an interest in alternative energy sector

• Establish integrated green initiatives for the regional promotion & coordination of planning & policy development.

# *Other Recommendations*

- Assist in retooling of local companies
- Promote sites for development as opportunity to reduce carbon footprint (Hydro-power)
- Encourage institutions to enhance research and programs around green economy directives
- Package regional incentives and business assistance around green economy
- Local governments work towards rebranding as a green community
- Strengthen incentives for energy efficiency and retrofitting
- Develop relationship with southern Ontario, especially for hydro related projects
- Foster business community partnerships with southern Ontario to develop technologies
- Pursue direct foreign investment in Canada, the European Union and Asia
- Form task force to assist auto part manufacturers to anticipate needs of alternative fuel vehicles

Buffalo Niagara ::

Where Industry Creates Energy

# Wrap Up and Questions

Thank You!

nationalgrid

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