Retooling the Labor Force

DRIVING CHANGE

Greening the Automotive Workforce

Ford Conference and Event Center, Dearborn, Michigan

Driving Change—Four Goals

1. Focusing on the new skill and training requirements of the auto workforce, chart the industry transformation
2. Identify the effects of structural transformation on the auto parts supply chain workforce
3. Examine green job opportunities as **alternative career pathways for displaced workers**
4. Identify the **skills gap** for dislocated workers to transition into new occupations

Presentation Outline

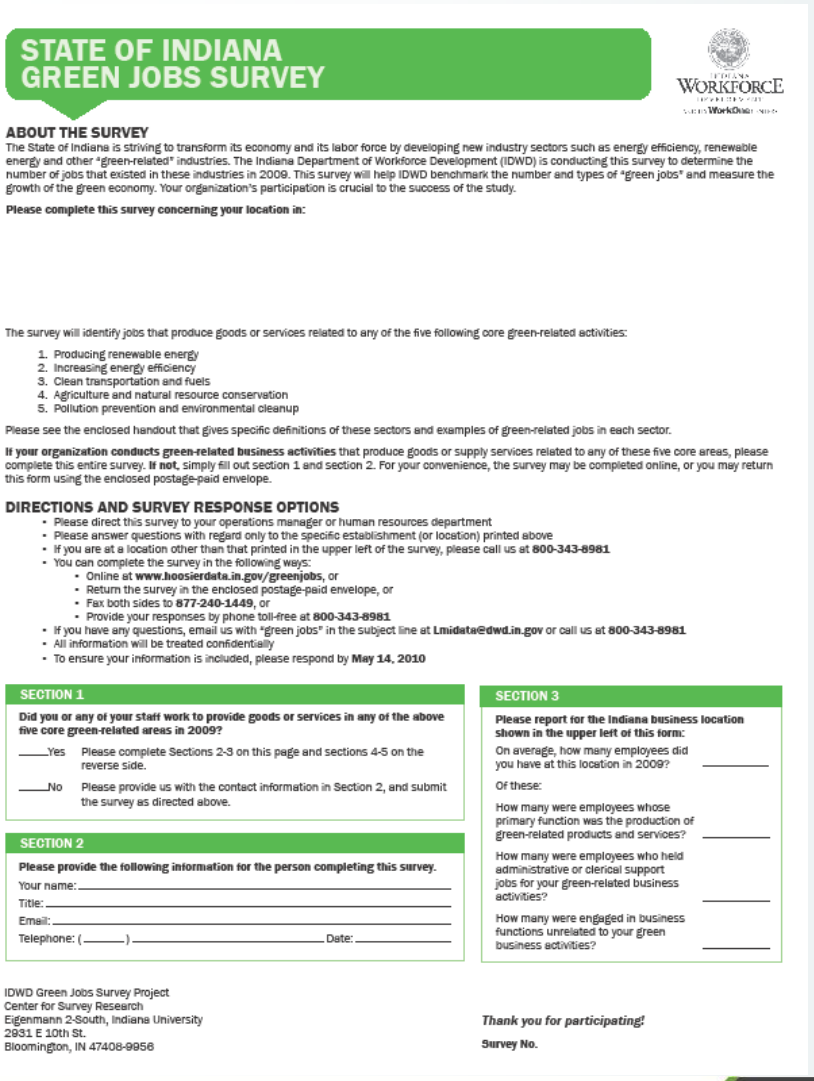
1. Green Jobs Survey
2. Survey Results
3. Are Green Jobs the Future?
4. Pathway Cluster Analysis
5. Skills Gap Analysis
6. Other Alternative Pathway Resources

Survey Method

- Tri-state Roll-up
  - Report green jobs for all 3 states
  - IN & OH survey method matches MI
- Replicate Michigan
  - Green job definitions
  - Survey instrument
  - Sample composition
- For more information on MI methodology see:

  Measurement and Analysis of Employment in the Green Economy: Workforce Information Council—Green Jobs Study Group

Surveys Virtually Identical



STATE OF INDIANA GREEN JOBS SURVEY

ABOUT THE SURVEY

The State of Indiana is striving to transform its economy and its labor force by developing new industry sectors such as energy efficiency, renewable energy and other "green-related" industries. The Indiana Department of Workforce Development (IDWD) is conducting this survey to determine the number of jobs that existed in these industries in 2009. This survey will help IDWD benchmark the number and types of "green jobs" and measure the growth of the green economy. Your organization's participation is crucial to the success of the study.

Please complete this survey concerning your location in:

The survey will identify jobs that produce goods or services related to any of the five following core green-related activities:

1. Producing renewable energy
2. Increasing energy efficiency
3. Clean transportation and fuels
4. Agriculture and natural resource conservation
5. Pollution prevention and environmental cleanup

Please see the enclosed handout that gives specific definitions of these sectors and examples of green-related jobs in each sector.

If your organization conducts green-related business activities that produce goods or supply services related to any of these five core areas, please complete this entire survey. **If not,** simply fill out section 1 and section 2. For your convenience, the survey may be completed online, or you may return this form using the enclosed postage-paid envelope.

DIRECTIONS AND SURVEY RESPONSE OPTIONS

- Please direct this survey to your operations manager or human resources department
- Please answer questions with regard only to the specific establishment (or location) printed above
- If you are at a location other than that printed in the upper left of the survey, please call us at **800-343-8981**
- You can complete the survey in the following ways:
  - Online at **www.hoosierdata.in.gov/greenjobs**, or
  - Return the survey in the enclosed postage-paid envelope, or
  - Fax both sides to **877-240-1449**, or
  - Provide your responses by phone toll-free at **800-343-8981**
- If you have any questions, email us with "green jobs" in the subject line at **Lmidata@dwd.in.gov** or call us at **800-343-8981**
- All information will be treated confidentially
- To ensure your information is included, please respond by **May 14, 2010**

SECTION 1

Did you or any of your staff work to provide goods or services in any of the above five core green-related areas in 2009?

_____Yes Please complete Sections 2-3 on this page and sections 4-5 on the reverse side.

_____No Please provide us with the contact information in Section 2, and submit the survey as directed above.

SECTION 2

Please provide the following information for the person completing this survey.

Your name: _____

Title: _____

Email: _____

Telephone: (_____) _____ Date: _____

SECTION 3

Please report for the Indiana business location shown in the upper left of this form:

On average, how many employees did you have at this location in 2009? _____

Of these:

How many were employees whose primary function was the production of green-related products and services? _____

How many were employees who held administrative or clerical support jobs for your green-related business activities? _____

How many were engaged in business functions unrelated to your green business activities? _____

IDWD Green Jobs Survey Project
Center for Survey Research
Eigenmann 2-South, Indiana University
2931 E 10th St.
Bloomington, IN 47408-9956

Thank you for participating!

Survey No.

STATE OF MICHIGAN GREEN JOBS SURVEY

ABOUT THE SURVEY

The State of Michigan strives to diversify its economy through business development in new sectors such as renewable energy and energy efficiency. This effort includes supporting development of business sectors and jobs in areas such as wind energy, biofuels, solar energy, energy efficiency, and other "green-related" sectors.

The Michigan Department of Energy, Labor & Economic Growth has been directed to conduct this survey to determine the current number of jobs in these sectors, and also among businesses that **supply parts, components, products, or services** to support these sectors. The survey will identify jobs that produce goods or services related to any of the following five core green-related activities:

1. Producing renewable energy
2. Increasing energy efficiency
3. Clean transportation and fuels
4. Agriculture and natural resource conservation
5. Pollution prevention and environmental cleanup

Please see the enclosed handout that gives specific definitions of these sectors and examples of the green-related jobs they supply.

If your firm conducts "green-related" business activities **that produce goods or supply services** related to any of these five core areas, please complete the information below and continue to page two. If not, please fill out Section 1 and Section 2 below and return using the postage-paid envelope.

DIRECTIONS AND SURVEY RESPONSE OPTIONS

- Please direct this survey to your operations manager or human resources department.
- Include information about the Michigan business location listed in the lower left-hand corner of this form.
- All information will be treated confidentially.
- Return the survey in the enclosed postage-paid envelope, or
  - Fax both sides to (800) 794-6424, or
  - Contact us toll free at (888) 587-3282 to report by telephone or receive answers to your questions.
  - Questions can also be emailed to us at greenjobssurvey@michigan.gov
- To ensure inclusion of your information, please respond to this survey by February 27, 2009.

Section 1

Do you or any of your staff work to provide goods or services in any of the above five core green-related areas?

____ Yes Please complete Sections 2-3 on this page and Sections 4-5 on the reverse side.

____ No Please provide us with contact information below in Section 2, and mail survey in postage paid envelope, or fax survey back to (800) 794-6424.

Section 2

CONTACT PERSON

Name: _____

Title: _____

Telephone: ( ) _____

Date: _____

Contact Name
Trade Name, Unit Description
Address
Address 2
City, State, Zip

Survey ID #:

Section 3

PLEASE REPORT FOR THE MICHIGAN BUSINESS LOCATION SHOWN IN THE LOWER LEFT-HAND CORNER OF THIS FORM

How many employees do you currently have at this location in Michigan? ____

How many of these are employees whose primary function is the production of "green-related" products and services? ____

How many of these are employees who hold support jobs for your "green-related" business activities? ____

How many of these are employees engaged in business functions *unrelated* to your "green" business activities? ____

THANK YOU FOR PARTICIPATING!

Michigan Department of Energy, Labor & Economic Growth

Bureau of Labor Market Information & Strategic Initiatives
3032 West Grand Boulevard, Suite 9-100
Detroit, MI 48202

DELEG is an equal opportunity employer/program.
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Survey Results

- **Indiana 46,879** direct green jobs
  - 1.7% of the state's total employment in the second quarter of 2010
- **Michigan 96,767** direct green jobs
  - 3.1% percent of the state's private sector employment in the first quarter of 2009
- Indiana: 17,400 jobs support green business
- Michigan: 12,300 jobs support green economy
- Ohio: conducting the survey even now

Survey Results: the numbers

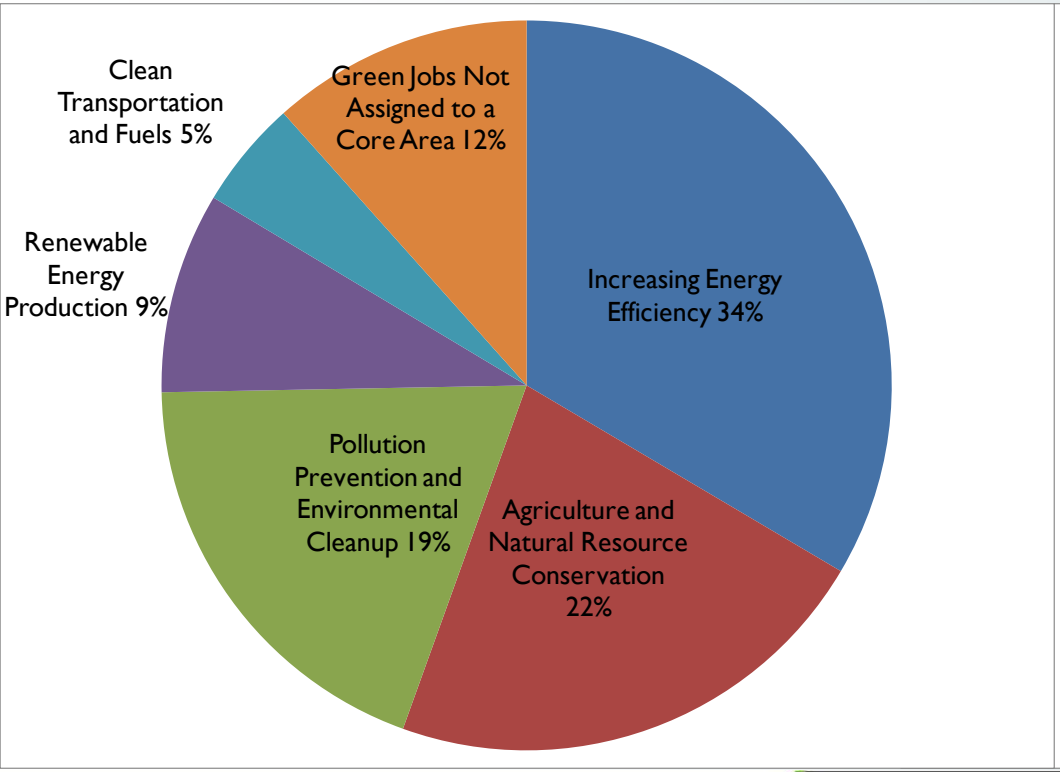
Green jobs categorized into 5 core green areas

Core Area	Indiana	Michigan
Total Direct Green Jobs	**46,879**	**96,767**
Increasing Energy Efficiency	33.5%	23.0%
Agriculture and Natural Resource Conservation	22.0%	12.4%
Pollution Prevention and Environmental Cleanup	19.2%	12.8%
Renewable Energy Production	8.9%	9.1%
Clean Transportation and Fuels	4.8%	40.6%
Green Jobs Not Assigned to a Core Area	11.6%	2.1%

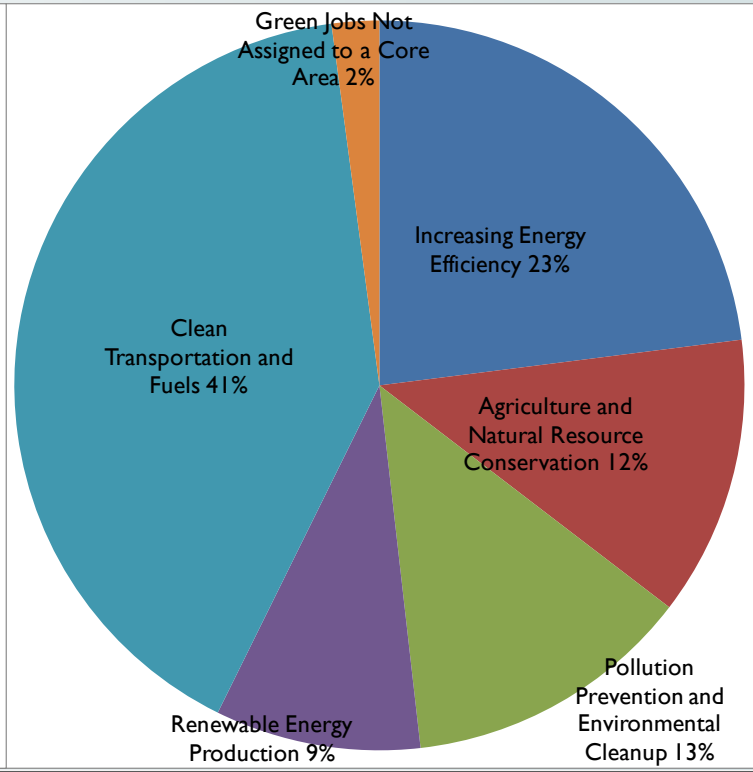
Survey Results: the numbers

Green jobs categorized into 5 core green areas

Indiana



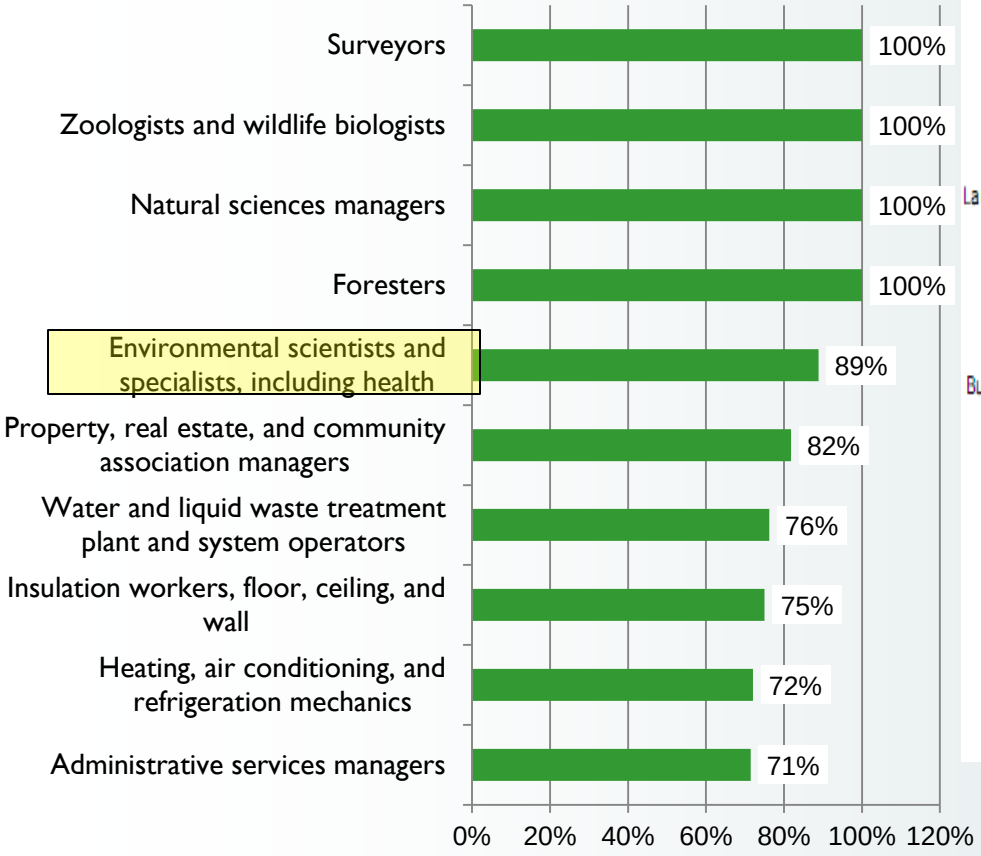
Michigan



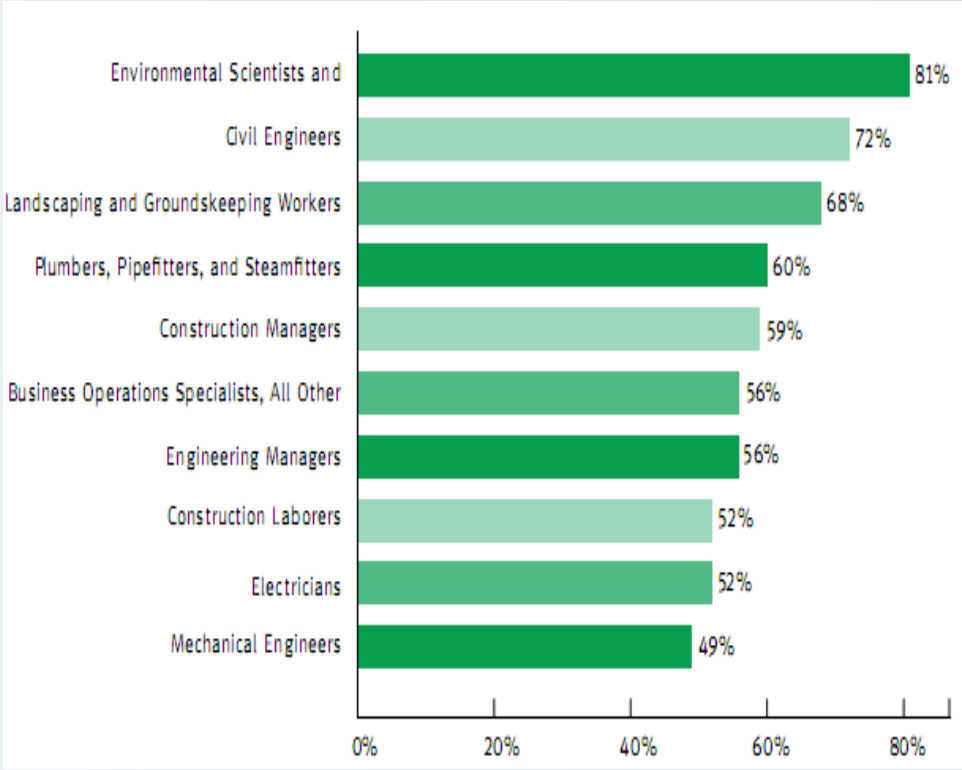
Other Survey Findings

Occupations That Require Unique Skills for Green Projects

Indiana



Michigan



Other Survey Findings

- Training needs for green-related workforce
- Question sheds some light on the future green-related training capacity requirements
- Either:
  - **Formal** training provided by community colleges or other training providers
  - **Informal** training of staff on-the-job
- Michigan: 32% future employee training needs will be formal
- Indiana: 21% may be formal

Assessing the Results

- Green jobs in the two states concentrated in TEM and construction—the industries particularly hard hit by the Great Recession
  - Industry data show higher rates of job loss
- Differences in green job concentration reflect the different occupational mix in MI and IN
  - Michigan TEM heavy in engineering, design and testing **plus** headquarters
    - In Michigan, the auto sector is considered green, largely due to the resources devoted to designing and producing more fuel efficient vehicles
  - Indiana TEM more concentrated in parts production
    - Are the ball bearings going into an SUV or a Volt?

Green Jobs Survey Implications

- Employers indicated that most green-related training is done on-the-job
- Squares with consortium partner research that production and trade jobs require little special green-related training
- Engineering and high-skilled jobs require specialized and advanced education and skills
- STEM disciplines
- "Green Jobs" are not a pathway out of poverty

From Primary to Secondary Data Sources

- Survey gave a snapshot of green jobs today
- Based on federal and state data sources, what does the future of green jobs look like?
- Is the green economy big enough to absorb the displaced workers?

- Data Sources

O*NET
Occupational Employment Survey
BLS occupation projections
Help Wanted On Line (HWOL)

Current Demand for Green & Growing

- HWOL 4th quarter 2010 postings

  Organized based on O*NET categories…

  - Green new and emerging
  - Green enhanced skills
  - Green increased demand

Current Demand

- Strength of current demand for occupations based on…
  - Number of HWOL postings
  - HWOL posting to employment for that occupation
  - No consideration given for true opening versus firms developing a resume pool
- Results presented by auto and non-auto sector occupations

Demand for Green and Growing

Tri-State Top Five Green Enhanced Skills Automotive Occupations by Job Postings and Expected Job Change to 2018

Rank	Description	HWOL Green Postings[1]	10-Year Expected Growth[2]	Postings-to-Employment Ratio[3]	Mean Wage[4]
1	Mechanical Engineers	6,626	6.0%	1 : 7	$78,759
2	Maintenance and Repair Workers, General	5,004	10.9%	1 : 25	$36,712
3	Electrical Engineers	2,901	1.7%	1 : 4	$76,464
4	Machinists	2,307	-4.6%	1 : 28	$38,823
5	Electronics Engineers, Except Computer	1,444	0.3%	1 : 6	$81,587

[1] Source: HWOL, Quarter 4, 2010; Green enhanced skills auto occupation total, N=20,553.
[2] Source: BLS; Projections from 2008 to 2018 are for the parent, six-digit SOC. HWOL and O*NET now report occupations at the eight-digit SOC level. As a result, those occupations listed in this table are at the more detailed, eight-digit SOC while the projection figures are for the parent six-digit SOC. Hence the projection is for a group of similar occupations and not the specific occupation listed in the table.
[3] Source: IBRC using HWOL and BLS/OES data
[4] Source: 2009 data from BLS. Mean wage calculated for tri-state using a weighted average

Demand for Green and Growing

Tri-State Top 15 Green and Growing Non-Automotive Occupation Postings and Expected Job Change to 2018

Rank	Description	HWOL Green Postings[1]	10-Year Expected Growth[2]	Industry Group[3]	Postings-to-Employment Ratio[4]	Mean Wage[5]
1	Truck Drivers, Heavy and Tractor-Trailer	16,343	13.0%	Env Serv	1 : 10	$39,190
2	Customer Service Representatives	13,767	17.7%	Env Serv	1 : 13	$32,898
3	Marketing Managers	5,919	12.5%	Env Serv	1 : 2	$106,051
4	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	5,194	9.7%	Env Serv	1 : 8	$80,298
5	General and Operations Managers	4,038	-0.1%	Env Serv., Energy	1 : 22	$108,057
6	Laborers and Freight, Stock, and Material Movers, Hand	3,131	-0.8%	Env Serv	1 : 75	$25,930

Pathway Cluster Analysis

- Driving Change "Pathways" are **transitions** from one occupation to another
- The focus is on **displaced workers** finding new jobs
- Occupations most similar to current or former job
- TORQ is such a tool but only uses KSAs
- Use all the data and categories in O*NET
- Include worker traits

Pathway Cluster Analysis

- **Pathway Cluster Operating Principle**
  - Workers will seek, and be most productive in, occupations that are most similar to their current or former jobs
- Pathway Clusters constructed based on occupational and ***worker*** similarities
- Provides a user a set of several possible target occupations

Pathway Cluster Methodology

- Distill over 500 O*NET job or worker characteristics used to define an occupation
- Realign O*NET job characteristics into 3 categories
- Goal: Use the characteristics that provide the most information about a job

- Perform cluster analysis

Pathway Cluster Analysis

O*NET-type Pathway Cluster Categories

- Requirements of the worker
  - Knowledge
  - Cross-Functional Skills
- Traits of the worker
  - Interests
  - Work Values
  - Work Styles
- Occupational Requirements
  - Generalized Work Activities
  - Work Context

Pathway Cluster Results

- Information and Investigation
- Health, Social and Personal Service
- Production, Construction and Engineering
  - Engineering and Applied Technology
  - Construction and Extraction Operation and Repair
  - Design and Production
- Liberal Arts, Education and Human Relations
- Business Sales and Administration
- Transportation and Public Services
- Environmental Sciences and Food Services

Pathway Cluster Results

Cluster Name§	Number of Occupations	Number of Auto*	Number of Green¤
Information and Investigation	62	0	12
Health, Social and Personal Services	90	0	0
Production, Construction and Engineering	217	44	55
Engineering and Applied Technology	*75*	*20*	*26*
Construction and Extraction, Equipment Operation, and Repair	*69*	*2*	*15*
Design and Production	*73*	*20*	*14*
Liberal Arts, Education and Human Relations	86	0	7
Business, Sales and Administration	105	2	15
Transportation and Public Services	97	0	20
Environmental Sciences and Food Service	74	1	15

§ Clusters are ordered based on their relative strength, or how "tight" the clusters are. Information and investigation was the strongest cluster. The environmental sciences and food service cluster, in contrast, had the weakest similarity scores. The number of occupations in a cluster does not speak to the cluster's relative strength or importance.
* Based on the CAR definition of auto-related occupations. It does not include two residual occupation categories "all other" for which there are no job specific data.
¤ Based on the six-digit SOC definitions of the 2009 vintage of O*NET. The 2010 eight-digit O*NET/SOC definitions have considerably more jobs classified as green.
Source: Indiana Department of Workforce Development and the Indiana Business Research Center

Pathway Cluster Results

Knowledge and Skills dominate the **Engineering and Applied Technology** sub-cluster

Category	Variable Type	Detailed Variable
R	Knowledge	Engineering and Technology
R	Knowledge	Mechanical
R	Knowledge	Physics
R	Skills	Monitoring/Design
R	Skills	Systems/Programming

Example Occupations

Electrical Engineers
Electronics Engineers, Except Computer
Mechanical Engineers
Power Distributors and Dispatchers
Elevator Installers and Repairers
Radio Mechanics

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Pathway Cluster Results

Worker traits and work context are important for the **Health, Social and Personal Services** cluster

Category	Variable Type	Detailed Variable
R	Knowledge	Medicine and Dentistry
R	Knowledge	Psychology
R	Knowledge	Therapy and Counseling
T	Interests	Social
T	Work Styles	Social
T	Work Values	Relationships
O	Work Activities	Assisting and Caring for Others
O	Work Contexts	Dealing with Conflict or Aggressive People

Example Occupations

Marriage and Family Therapists
Nursing Instructors and Teachers
Family and General Practitioners
Internists, General
Psychiatrists
Surgeons

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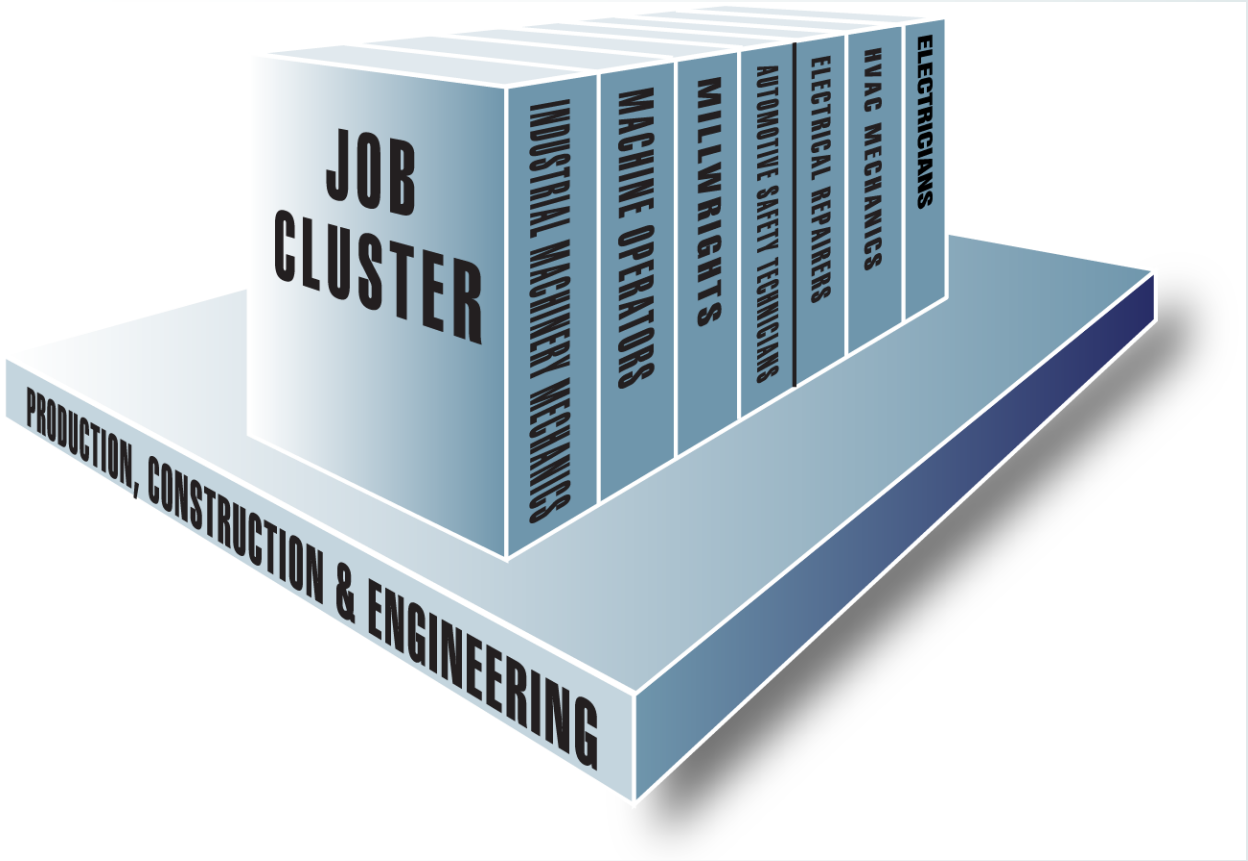
Pathway Clusters

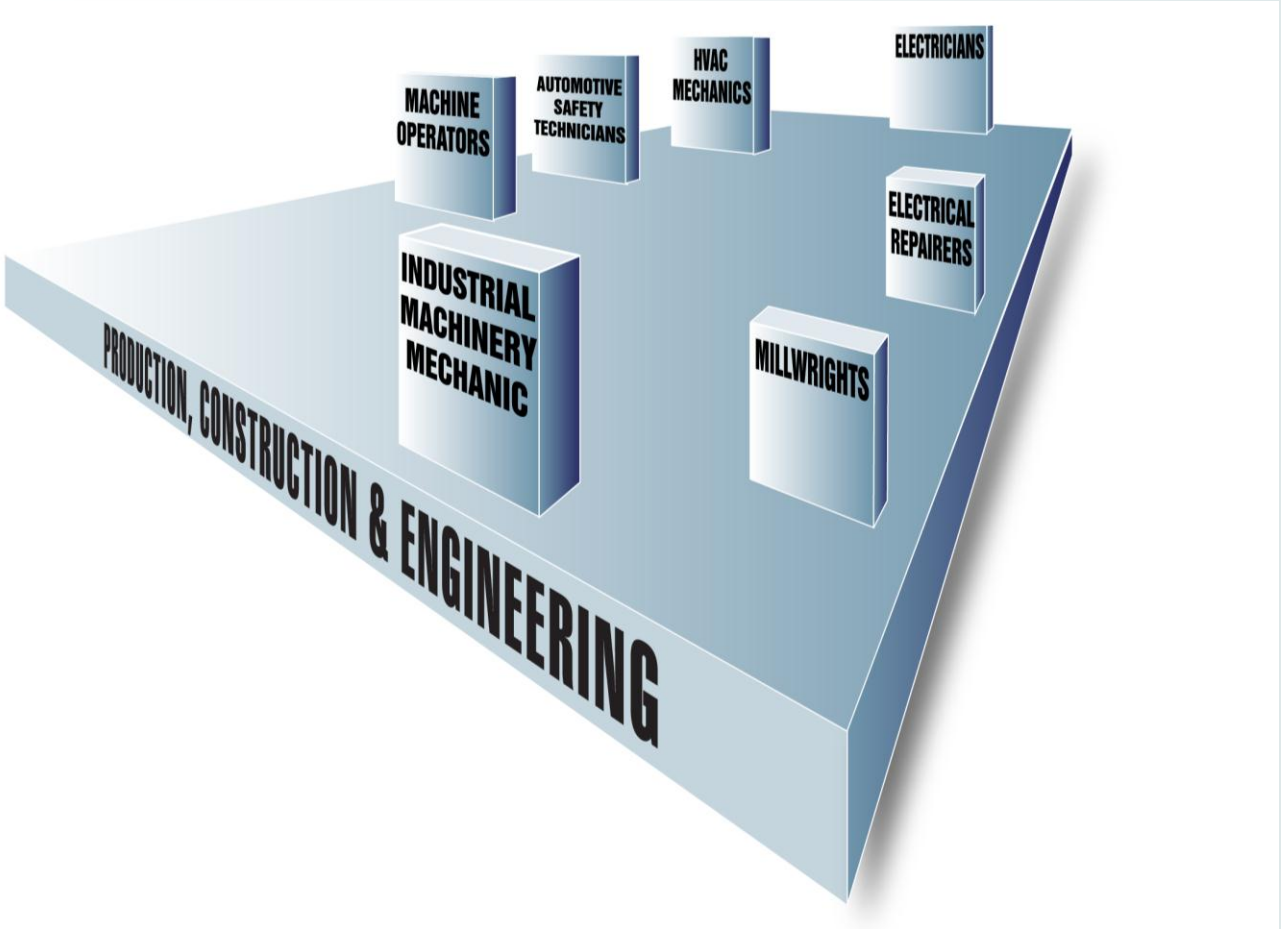
Goal: Identify occupations that are relatively similar to the original occupation of the displaced worker



Next Step:
Measure the Skills Gap between occupations

Skills Gap Analysis

Measure the ease of transition between occupations



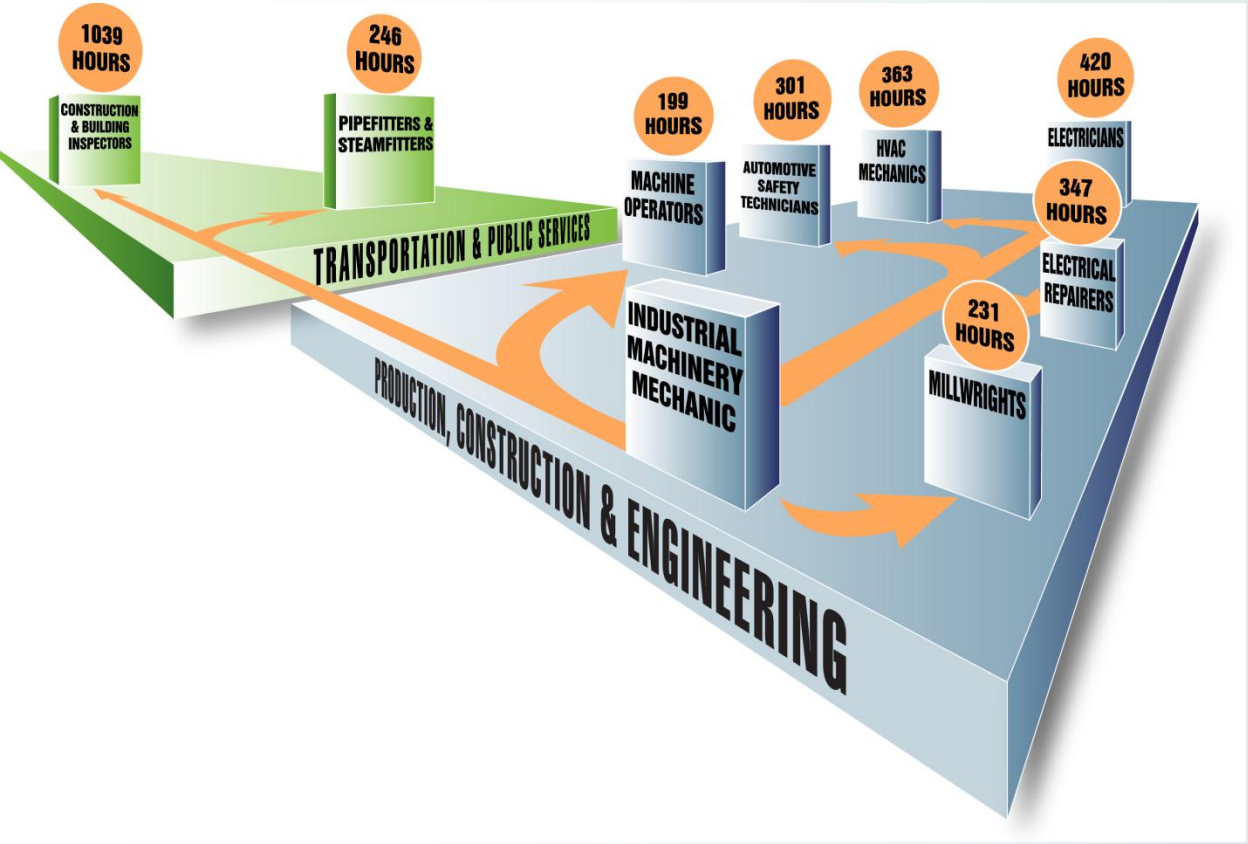
Selected occupations in the same cluster as **Industrial Machinery Mechanics**

Skills Gap Analysis

- **Skills Gap is really a human capital gap**
- Goal: boil down the complex components of skills, knowledge and experience that an occupation needs into one dimension
- The time-to-transition measure—trip time—is a simple measure to inform a decision about which alternative pathway to follow
- Used the O*NET job zone framework as the foundation for calculating trip time

Skills Gap Results

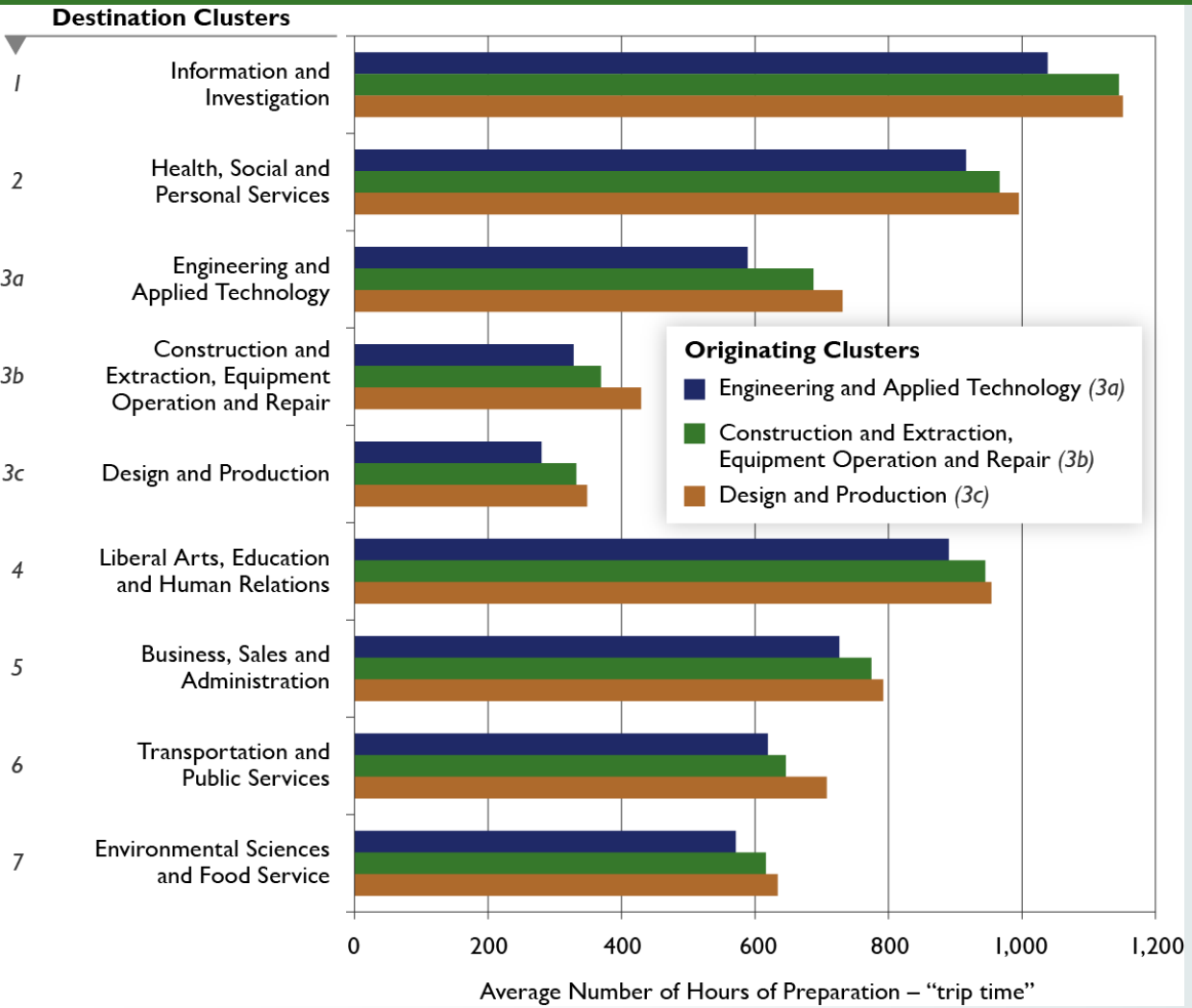
Trip time is a relative measure for the ease of transition



The trip time is the skills gap measured in hours of preparation

On average, the trip time within a cluster is less than across clusters

Skills Gap Results



Example of average trip times from the Production super-cluster to other destination clusters

Skills Gap Results

Sample Career Transitions from **Automotive** Occupations to **Green and Growing** Occupations

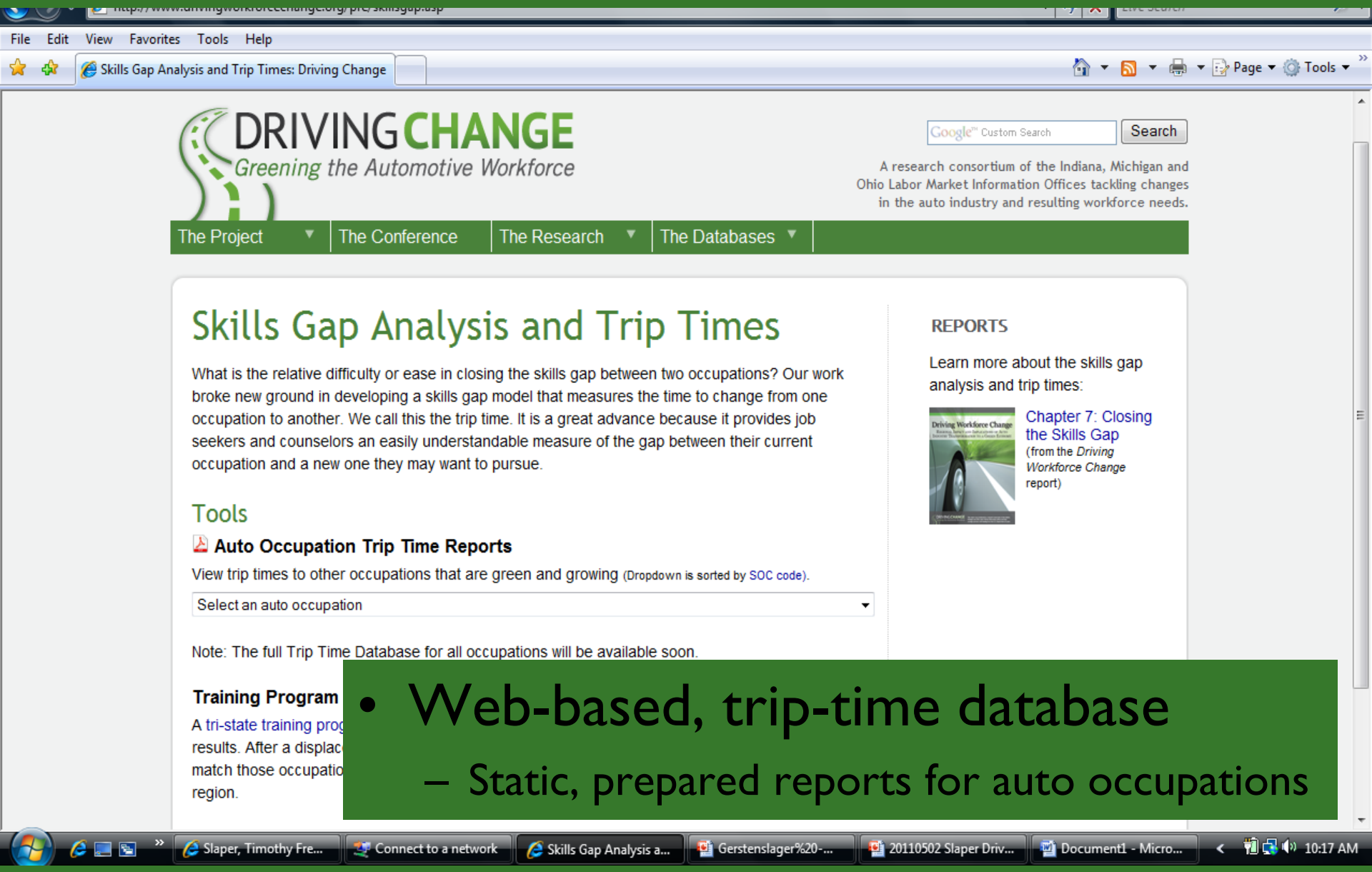
Auto Sector Occupation		Destination Occupation		
Occupation	**Pathway Cluster**	**Occupation**	**Pathway Cluster**	**Trip Time (Hours)**
Team Assemblers	3c	Hazardous Materials Removal Workers	3b	300
		Insulation Workers, Floor, Ceiling, and Wall	7	250
Helpers--Production Workers	3a	Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators, and Tenders	3b	372
		Truck Drivers, Heavy and Tractor-Trailer	6	370

Skills Gap Results

Sample Career Transitions from **Automotive** Occupations to **Non-Green** and Growing Occupations

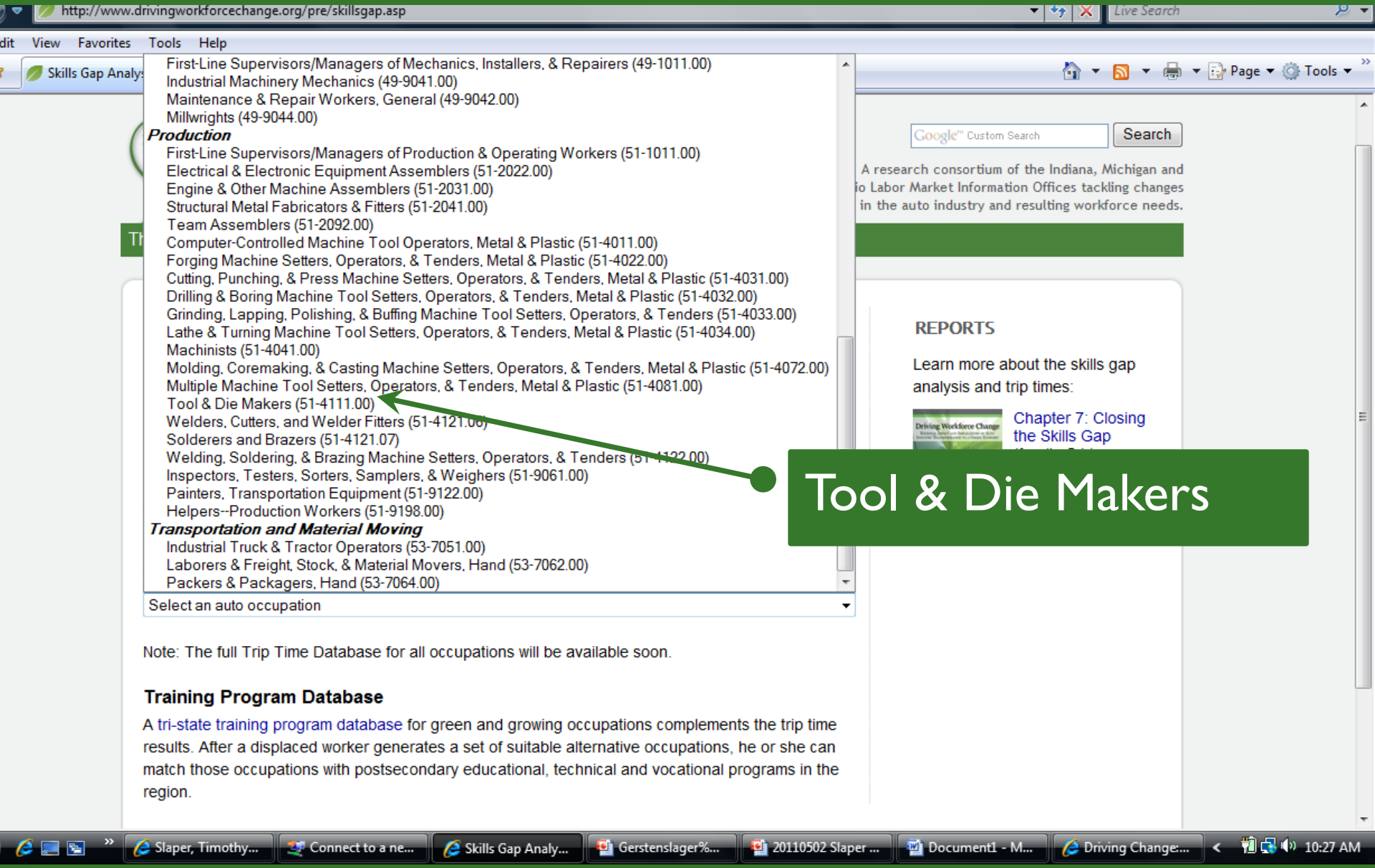
Auto Sector Occupation		Destination Occupation		
Occupation	**Pathway Cluster**	**Occupation**	**Pathway Cluster**	**Trip Time (Hours)**
Team Assemblers	3c	Extruding, Forming, Pressing, and Compacting Machine Setters, Operators, and Tenders	3c	131
		Pipe layers	3b	169
		Coin, Vending, and Amusement Machine Servicers and Repairers	6	306
Helpers--Production Workers	3a	Excavating and Loading Machine and Dragline Operators	3b	198
		Extruding, Forming, Pressing, and Compacting Machine Setters, Operators, and Tenders	3c	203
		Coin, Vending, and Amusement Machine Servicers and Repairers	6	337

Web-based Resources



- Web-based, trip-time database
  - Static, prepared reports for auto occupations

Web-based Resources



Web-based Resources: Trip-time Reports

Skills Gap Transitions to Green and Growing Occupations

Destination Occupations Within Pathway Cluster

Original Occupation:

51-4111.00 Tool & Die Makers

Original Median Wage[3]

$46,300

This occupation is part of the Design and Production pathway cluster (3c)

Destination SOC	Destination Occupation Title	Destin. Cluster	Relative Trip Time	Green[1]	State Growing[2]	Percent of Original Wage[3]
47-5021.00	Earth Drillers, Except Oil & Gas	3b	0	No	IN	80
51-4121.06	Welders, Cutters, and Welder Fitters	3c	0	Yes		70
51-2092.00	Team Assemblers	3c	15	Yes		60
51-4122.00	Welding, Soldering, & Brazing Machine Setters, Operators, & Tenders	3c	15	No	OH	70
53-7051.00	Industrial Truck & Tractor Operators	3b	21	Yes		70
51-7011.00	Cabinetmakers & Bench Carpenters	3c	60	No	MI	60
51-4041.00	Machinists	3c	74	Yes	OH	80
51-9041.00	Extruding, Forming, Pressing, & Compacting Machine Setters, Operators, & Tenders	3c	75	No	IN MI	60
51-4121.07	Solderers and Brazers	3c	99	Yes		70

Trip time is a relative and approximate measure

Web-based Resources: Trip-time Reports

Skills Gap Transitions to Green and Growing Occupations

Destination Occupations Outside Pathway Cluster

Original Occupation:

51-9061.00 Inspectors, Testers, Sorters, Samplers, & Weighers

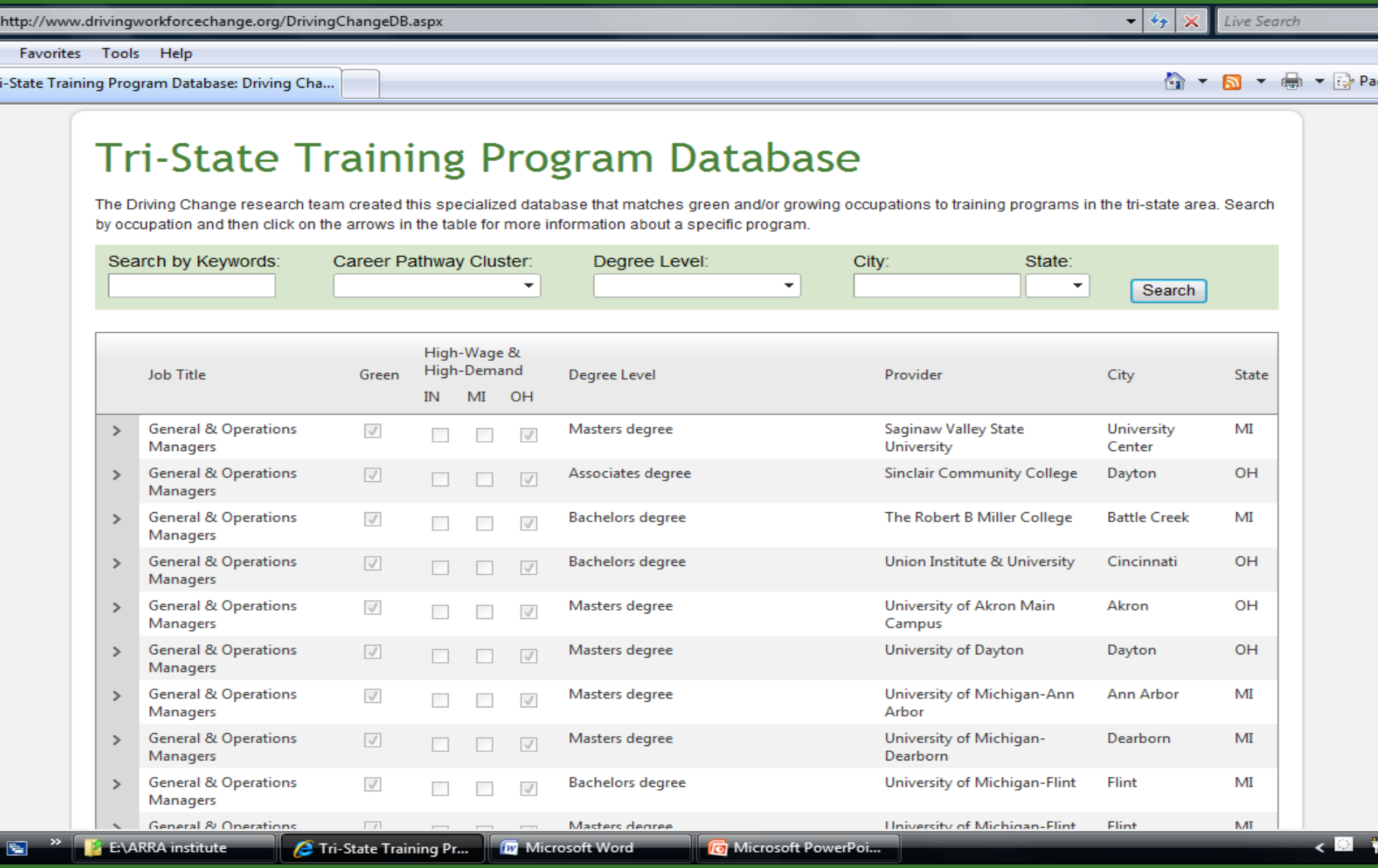
Original Median Wage[3]

$33,200

This occupation is part of the Design and Production pathway cluster (3c)

Destination SOC	Destination Occupation Title	Destin. Cluster	Relative Trip Time	Green[1]	State Growing[2]	Percent of Original Wage[3]
53-7062.00	Laborers & Freight, Stock, & Material Movers, Hand	6	0	Yes		70
43-5052.00	Postal Service Mail Carriers	6	36	No	OH	160
53-7081.00	Refuse & Recyclable Material Collectors	6	45	Yes		100
43-5051.00	Postal Service Clerks	6	91	No	OH	160
43-5071.00	Shipping, Receiving, & Traffic Clerks	6	92	Yes		90
31-9011.00	Massage Therapists	2	164	No	IN MI	90
45-2011.00	Agricultural Inspectors	7	186	Yes	IN	140
53-3022.00	Bus Drivers, School	6	197	No	IN	100
49-9091.00	Coin, Vending, & Amusement Machine Servicers & Repairers	6	199	No	IN	100
25-2011.00	Preschool Teachers, Except Special Education	4	220	No	MI	70
47-2131.00	Insulation Workers, Floor, Ceiling, & Wall	7	268	Yes	IN	100

Web-based Resources: Training Database



Tri-State Training Program Database

The Driving Change research team created this specialized database that matches green and/or growing occupations to training programs in the tri-state area. Search by occupation and then click on the arrows in the table for more information about a specific program.

Search by Keywords: | Career Pathway Cluster: | Degree Level: | City: | State: | Search

Job Title	Green	High-Wage & High-Demand IN	MI	OH	Degree Level	Provider	City	State
General & Operations Managers	☑	☐	☐	☑	Masters degree	Saginaw Valley State University	University Center	MI
General & Operations Managers	☑	☐	☐	☑	Associates degree	Sinclair Community College	Dayton	OH
General & Operations Managers	☑	☐	☐	☑	Bachelors degree	The Robert B Miller College	Battle Creek	MI
General & Operations Managers	☑	☐	☐	☑	Bachelors degree	Union Institute & University	Cincinnati	OH
General & Operations Managers	☑	☐	☐	☑	Masters degree	University of Akron Main Campus	Akron	OH
General & Operations Managers	☑	☐	☐	☑	Masters degree	University of Dayton	Dayton	OH
General & Operations Managers	☑	☐	☐	☑	Masters degree	University of Michigan-Ann Arbor	Ann Arbor	MI
General & Operations Managers	☑	☐	☐	☑	Masters degree	University of Michigan-Dearborn	Dearborn	MI
General & Operations Managers	☑	☐	☐	☑	Bachelors degree	University of Michigan-Flint	Flint	MI
General & Operations	☑	☐	☐	☑	Masters degree	University of Michigan-Flint	Flint	MI

Resources and Documentation

- Training Program database for Green and Growing Jobs
  - Tri-state post-secondary programs—academic and technical
  - Searchable for any green and growing occupations
- Trip-time and Pathway Clusters Methodology
  - Methodology documentation currently under review
  - Calculations and queries in SQL forthcoming

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www.drivingworkforcechange.org

Questions?

- **Fill out your question card!**

- Some thoughts from industry…
- Gerstenslager Company
  - Steven R. Delmoro, Director
  - Workforce Retraining Project
- Poster child for "high road strategy"
- His thoughts on our research findings…

Gerstenslager Company Comments

Results mirror Gerstenslager's experience

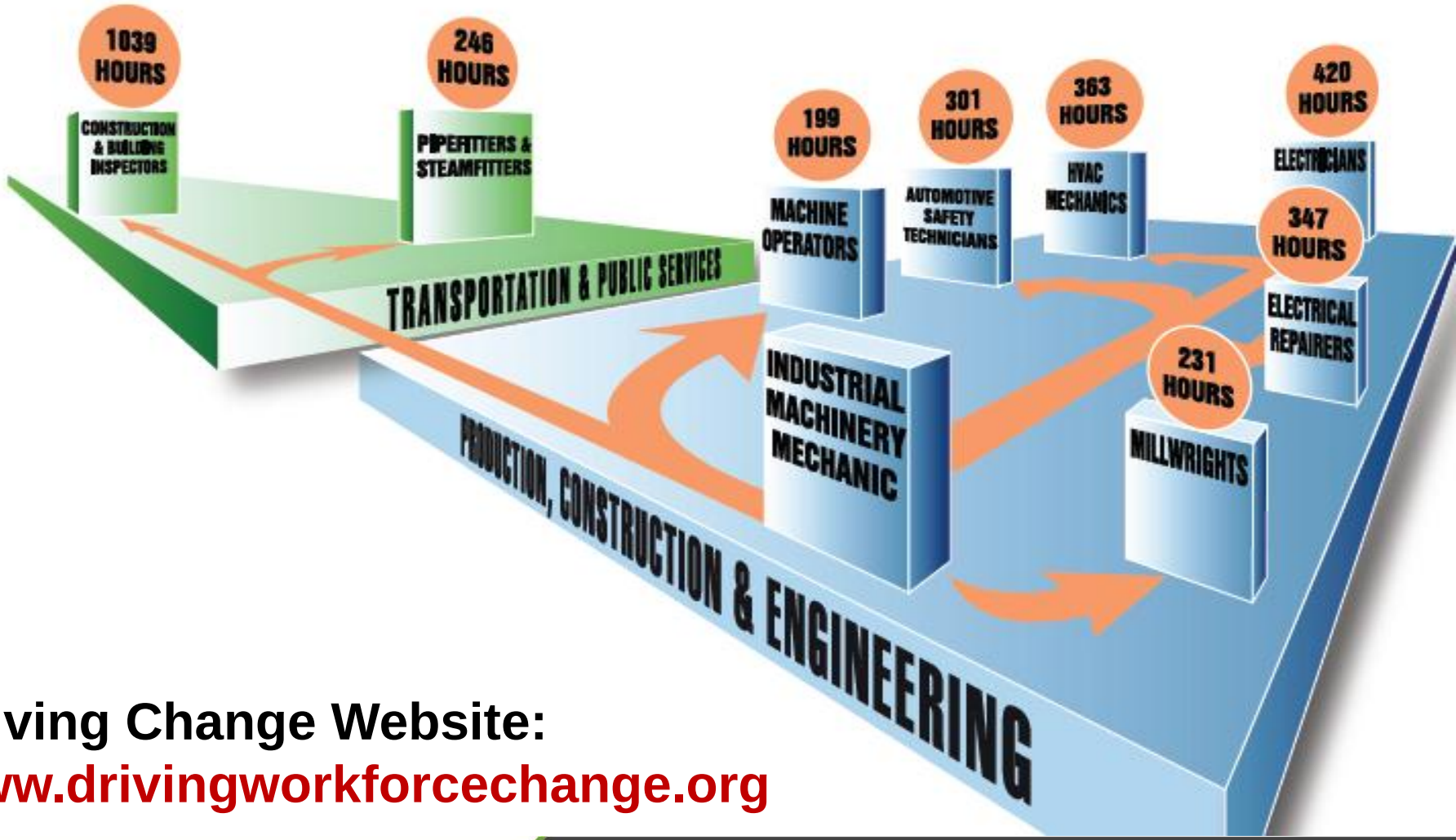
- An agile workforce is required in the future
- Upper management must provide strategic direction for entire enterprise – workforce training must complement product and process improvements
- Invest in training during a downturn to assure retained workforce is better prepared for the rebounding economy
- Position the company as a 'High Road Strategy' – Prepare the company to do what is difficult through training, equipment, facilities investment
- Continuous Improvement Culture necessary for sustained success
- **Formal support of 'Career Pathways' type program by Government, Academic and Private Institutions needed to close skill gaps in displaced workers**

Gerstenslager Company Comments

Challenges to the findings:

- Size of the Green jobs markets seems optimistic. Gerstenslager has actively pursued solar, wind, and vehicle battery programs over the past 3 years with mixed results:
  - Renewable energy projects are slow to materialize and ultimately hinge on governmental grants to be financially justified. Even with all the positive media exposure, few of these projects are delivering on the economic promise.
  - Battery programs do required a skilled labor force to support design and R&D activities. However, the volumes are very small as compared to auto market as a whole. Without substantial improvement in technology, design and performance, these vehicles will be niche offerings for a long time, minimizing the short and mid-term prospects for displaced workers
- Training must be linked to specific entities that require the skills. The cart-before-horse approach to training the masses in hopes of job prospects materializing will not be effective. Private enterprise must support the training because it can benefit directly from it.

Questions?



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