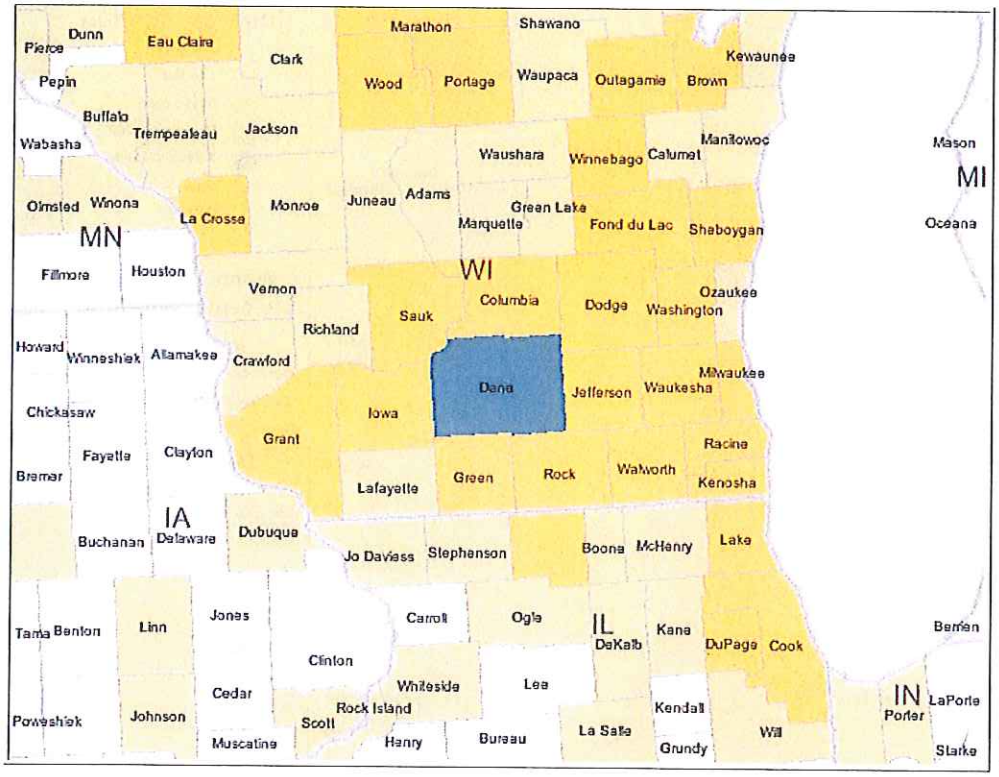

County migration
2000-05

- 1 to 500
- 501 to 5000
- Selected county
- State
- County

Zoom to a state

Your next click on a county will:

- ◉ Show where county residents moved from
- ○ Show where county residents moved to
- ○ Zoom In
- ○ Zoom Out
- ○ Recenter
- Start over

Selected county: Dane, Wisconsin

Migration	In	Out	Net
Total people migrating	**99,154**	**91,183**	**7,971**
Median household income	$19,782	$24,449	($4,668)
Within US	**94,995**	**89,749**	**5,246**
Median household income	$20,782	$24,644	($3,662)
Foreign	**4,159**	**1,434**	**2,725**
Median household income	$3,558	$14,502	($10,944)

Not migrating: 358,716
Median household income: $40,166

Source: Charlotte Observer analysis of IRS data

NOTES
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Feedback

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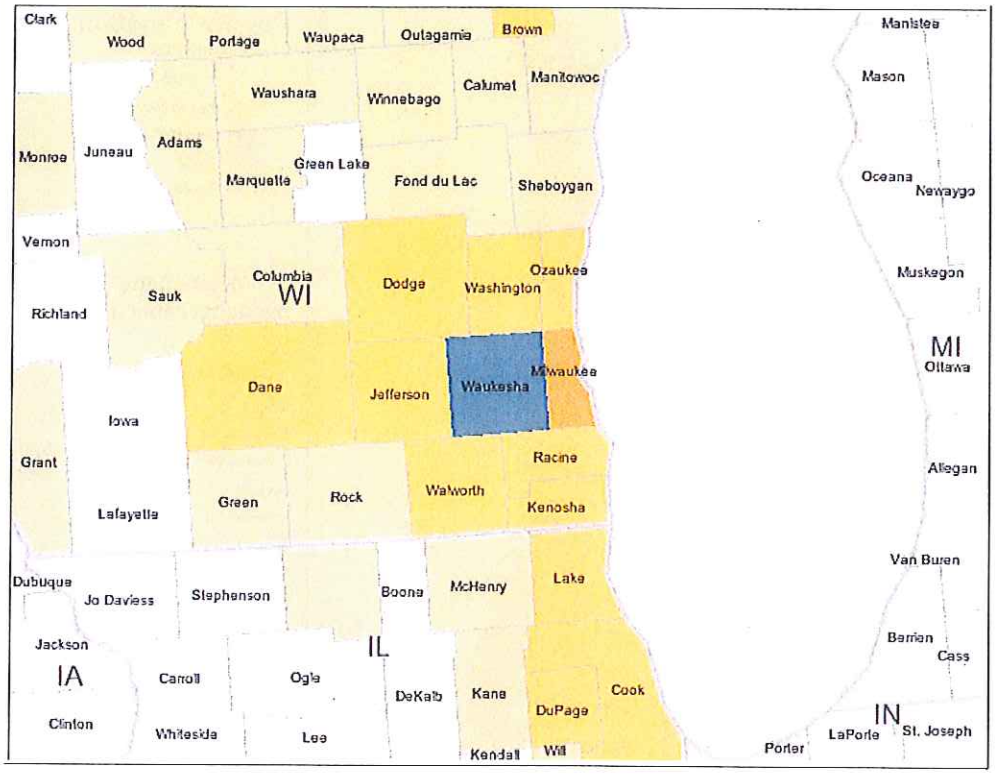
Where Dane residents came from *

Counties	People
Cook, IL	4,371
Milwaukee, WI	4,231
Columbia, WI	3,918
Rock, WI	3,907
Jefferson, WI	2,895
Waukesha, WI	2,571
Sauk, WI	2,395
Green, WI	1,792
Iowa, WI	1,709
Hennepin, MN	1,393
Brown, WI	1,374
Dodge, WI	1,311
Grant, WI	1,274
La Crosse, WI	1,155
Winnebago, WI	1,123
Marathon, WI	1,039
Outagamie, WI	980
Walworth, WI	946
Eau Claire, WI	873
Portage, WI	866
DuPage, IL	857
Racine, WI	804
Winnebago, IL	785
Fond du Lac, WI	739
Maricopa, AZ	736
Lake, IL	689
Sheboygan, WI	677
Wood, WI	676
Los Angeles, CA	640
Washington, WI	571
Ramsey, MN	564
Kenosha, WI	561
San Diego, CA	515
Lafayette, WI	499
King, WA	489
Ozaukee, WI	485
Manitowoc, WI	454
Richland, WI	414
Middlesex, MA	410
Dakota, MN	374
Juneau, WI	356
Alameda, CA	345
Adams, WI	339
Kane, IL	334
St. Louis, MO	311
McHenry, IL	310
Monroe, WI	301
Santa Clara, CA	299
Calumet, WI	294
Oneida, WI	291
Johnson, IA	288



County migration
2000-05

- 1 to 500
- 501 to 5000
- More than 5,000
- Selected county
- State
- County

Where Waukesha residents came from

Counties	*People*
Milwaukee, WI	44,675
Washington, WI	4,308
Racine, WI	2,676
Jefferson, WI	2,651
Walworth, WI	2,005
Dane, WI	1,971
Cook, IL	1,478
Ozaukee, WI	1,380
Dodge, WI	1,215
DuPage, IL	740
Maricopa, AZ	633
Kenosha, WI	609
Brown, WI	596
Lake, IL	594
Hennepin, MN	551
Rock, WI	424
Outagamie, WI	417
Winnebago, WI	392
Sheboygan, WI	387
Fond du Lac, WI	375
Marathon, WI	287
San Diego, CA	283
Los Angeles, CA	261
McHenry, IL	261
La Crosse, WI	254
Kane, IL	237
Will, IL	237
St. Louis, MO	221
Dakota, MN	220
Portage, WI	217
Winnebago, IL	214
Oakland, MI	198
Eau Claire, WI	194
Orange, CA	186
Harris, TX	185
Johnson, KS	177
Franklin, OH	171
Polk, IA	167
Manitowoc, WI	167
Clark, NV	165
Oneida, WI	155
Ramsey, MN	152
Wood, WI	151
Broward, FL	138
Columbia, WI	137
Pinellas, FL	134
Pima, AZ	133
Sauk, WI	132
Tarrant, TX	127
Fairfax, VA	127
El Paso, CO	127
Wayne, MI	127

Zoom to a state

Your next click on a county will:

- (•) Show where county residents moved from
- ( ) Show where county residents moved to
- ( ) Zoom In
- ( ) Zoom Out
- ( ) Recenter

Start over

Selected county: **Waukesha, Wisconsin**

Migration	In	Out	Net
Total people migrating	**94,284**	**87,201**	**7,083**
Median household income	$33,631	$29,979	$3,652
Within US	**93,577**	**86,480**	**7,097**
Median household income	$33,822	$30,059	$3,763
Foreign	**707**	**721**	**-14**
Median household income	$14,338	$17,311	($2,973)

Not migrating: 330,787
Median household income: $48,917

Source: Charlotte Observer analysis of IRS data

NOTES
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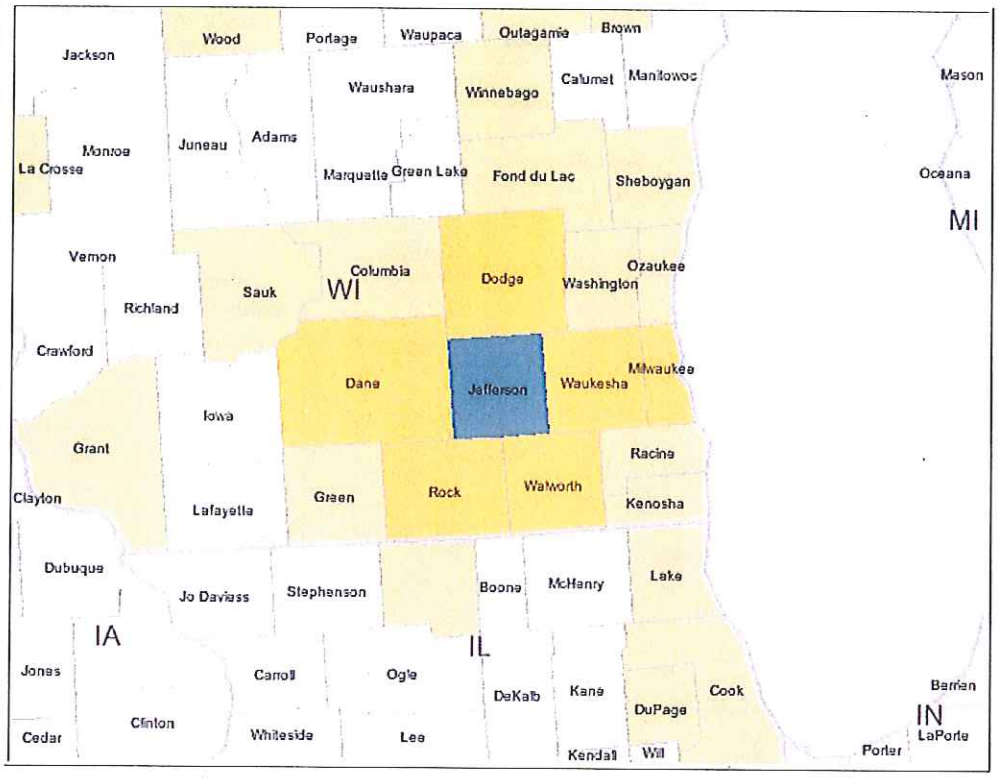

County migration
2000-05

- 1 to 500
- 501 to 5000
- Selected county
- State
- County

Where Jefferson residents came from

Counties	People
Waukesha, WI	4,469
Dodge, WI	3,496
Dane, WI	2,938
Milwaukee, WI	1,871
Walworth, WI	1,075
Rock, WI	964
Washington, WI	263
Racine, WI	259
Columbia, WI	241
Cook, IL	193
Sauk, WI	94
Marathon, WI	94
Winnebago, WI	89
Kenosha, WI	74
Grant, WI	71
Winnebago, IL	66
Lake, IL	55
Brown, WI	54
DuPage, IL	47
Ozaukee, WI	41
Maricopa, AZ	40
La Crosse, WI	38
Fond du Lac, WI	34
Sheboygan, WI	30
Green, WI	28
San Diego, CA	23
Outagamie, WI	21
Eau Claire, WI	18
Wood, WI	16

Zoom to a state

Your next click on a county will:

- (•) Show where county residents moved from
- ( ) Show where county residents moved to
- ( ) Zoom In
- ( ) Zoom Out
- ( ) Recenter

Start over

Selected county: **Jefferson, Wisconsin**

Migration	In	Out	Net
Total people migrating	**22,150**	**20,762**	**1,388**
Median household income	$26,826	$24,000	$2,826
Within US	**22,113**	**20,677**	**1,436**
Median household income	$26,851	$24,042	$2,809
Foreign	**37**	**85**	**-48**
Median household income	$16,041	$15,332	$708

Not migrating: 62,909
Median household income: $35,898

Source: Charlotte Observer analysis of IRS data

NOTES
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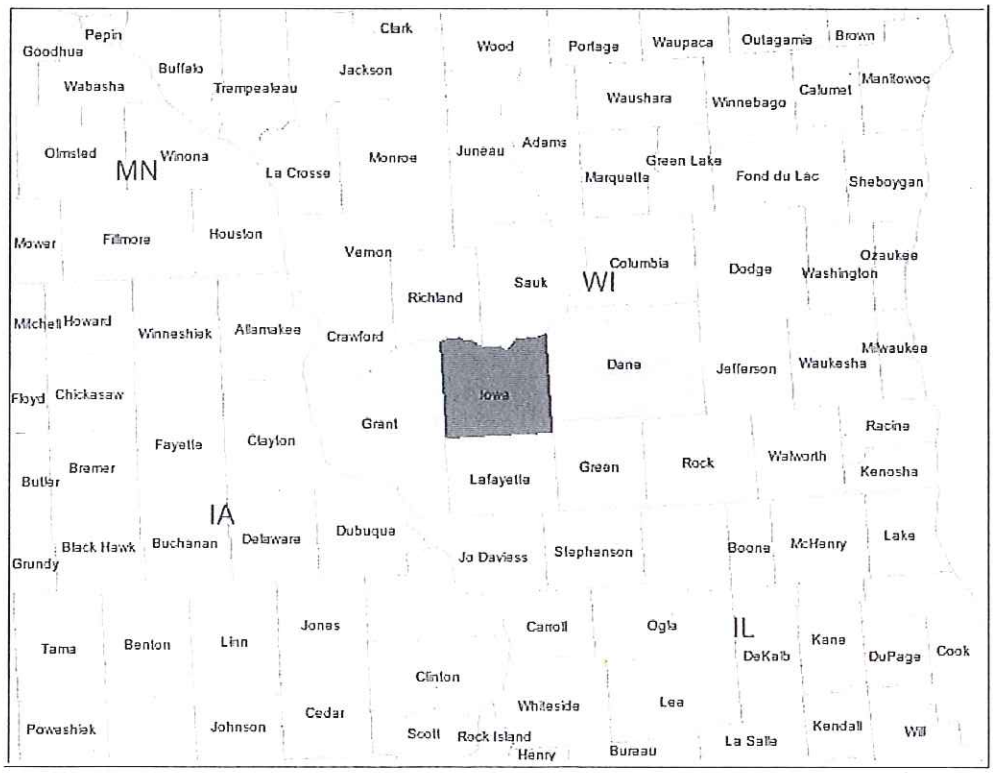

County migration
2000-05

1 to 500
501 to 5000
Selected county
State
County

Where Iowa residents came from

Counties	*People*
Dane, WI	2,072
Grant, WI	833
Sauk, WI	301
Richland, WI	299
Lafayette, WI	271
Green, WI	117
Rock, WI	69
Cook, IL	24
Milwaukee, WI	20

Zoom to a state

Your next click on a county will:

- ◉ Show where county residents moved from
- ○ Show where county residents moved to
- ○ Zoom In
- ○ Zoom Out
- ○ Recenter

Start over

Selected county: **Iowa, Wisconsin**

Migration	In	Out	Net
Total people migrating	**5,766**	**5,449**	**317**
Median household income	$25,496	$22,691	$2,805
Within US	**5,766**	**5,449**	**317**
Median household income	$25,496	$22,691	$2,805
Foreign	**0**	**0**	**-**
Median household income	$0	$0	-

Not migrating: 19,377
Median household income: $34,027

Source: Charlotte Observer analysis of IRS data

NOTES
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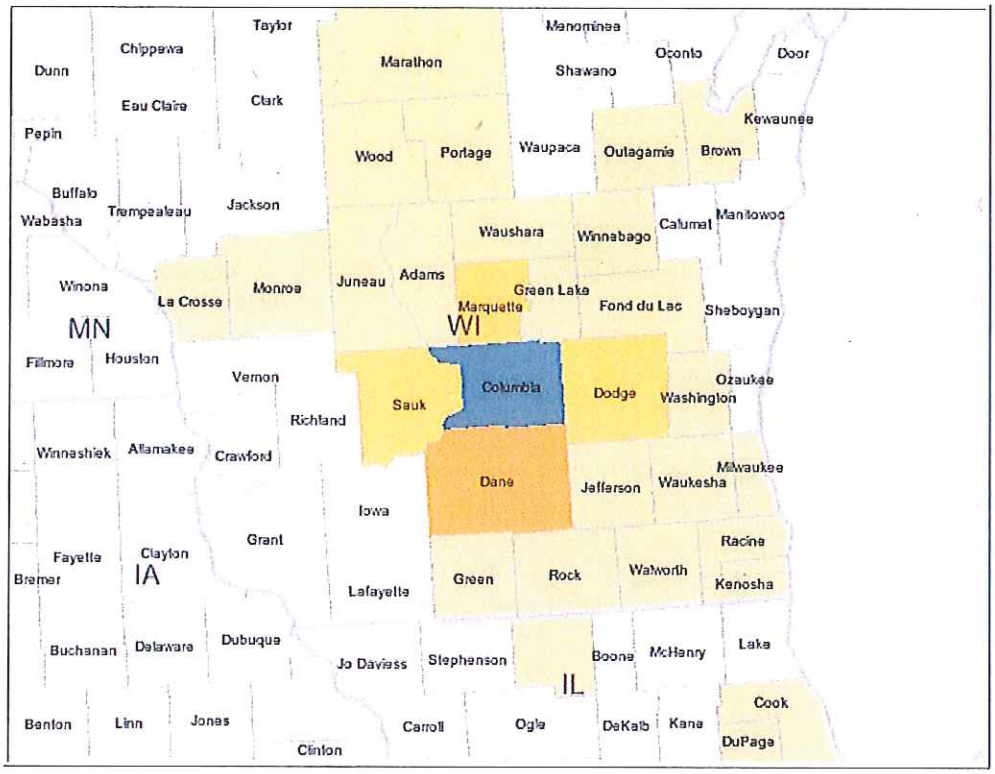

County migration
2000-05

- 1 to 500
- 501 to 5000
- More than 5,000
- Selected county
- State
- County

Where Columbia residents came from

Counties	*People*
Dane, WI	6,226
Sauk, WI	1,380
Dodge, WI	984
Marquette, WI	784
Adams, WI	494
Jefferson, WI	303
Milwaukee, WI	239
Juneau, WI	231
Cook, IL	210
Green Lake, WI	191
Rock, WI	186
Waukesha, WI	171
Fond du Lac, WI	119
Winnebago, WI	105
Portage, WI	65
Marathon, WI	63
Wood, WI	51
Washington, WI	40
Walworth, WI	32
Maricopa, AZ	31
Winnebago, IL	31
Monroe, WI	26
Outagamie, WI	26
Kenosha, WI	21
DuPage, IL	20
Green, WI	20
Waushara, WI	18
Racine, WI	17
La Crosse, WI	15
Brown, WI	15

Zoom to a state

Your next click on a county will:

- (•) Show where county residents moved from
- ( ) Show where county residents moved to
- ( ) Zoom In
- ( ) Zoom Out
- ( ) Recenter

Start over

Selected county: **Columbia, Wisconsin**

Migration	In	Out	Net
Total people migrating	**16,246**	**14,357**	**1,889**
Median household income	$26,580	$22,752	$3,828
Within US	**16,147**	**14,326**	**1,821**
Median household income	$26,750	$22,812	$3,938
Foreign	**99**	**31**	**68**
Median household income	$9,580	$9,823	($244)

Not migrating: 46,475
Median household income: $36,564

Source: Charlotte Observer analysis of IRS data

NOTES
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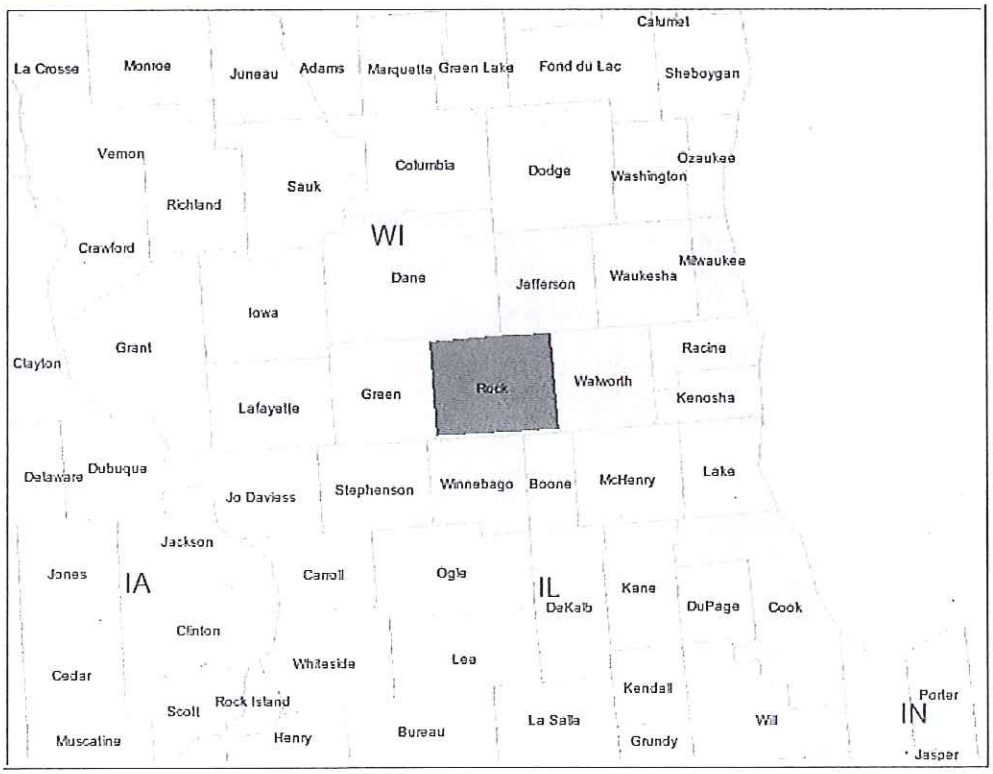

County migration
2000-05

- 1 to 500
- 501 to 5000
- Selected county
- State
- County

Zoom to a state

Your next click on a county will:

- ◉ Show where county residents moved from
- ○ Show where county residents moved to
- ○ Zoom In
- ○ Zoom Out
- ○ Recenter
- Start over

Selected county: Rock, Wisconsin

Migration	In	Out	Net
Total people migrating	**26,736**	**26,403**	**333**
Median household income	$23,363	$22,194	$1,169
Within US	**26,470**	**26,222**	**248**
Median household income	$23,715	$22,316	$1,399
Foreign	**266**	**181**	**85**
Median household income	$2,988	$12,594	($9,606)

Not migrating: 126,961
Median household income: $34,229

Source: Charlotte Observer analysis of IRS data

NOTES
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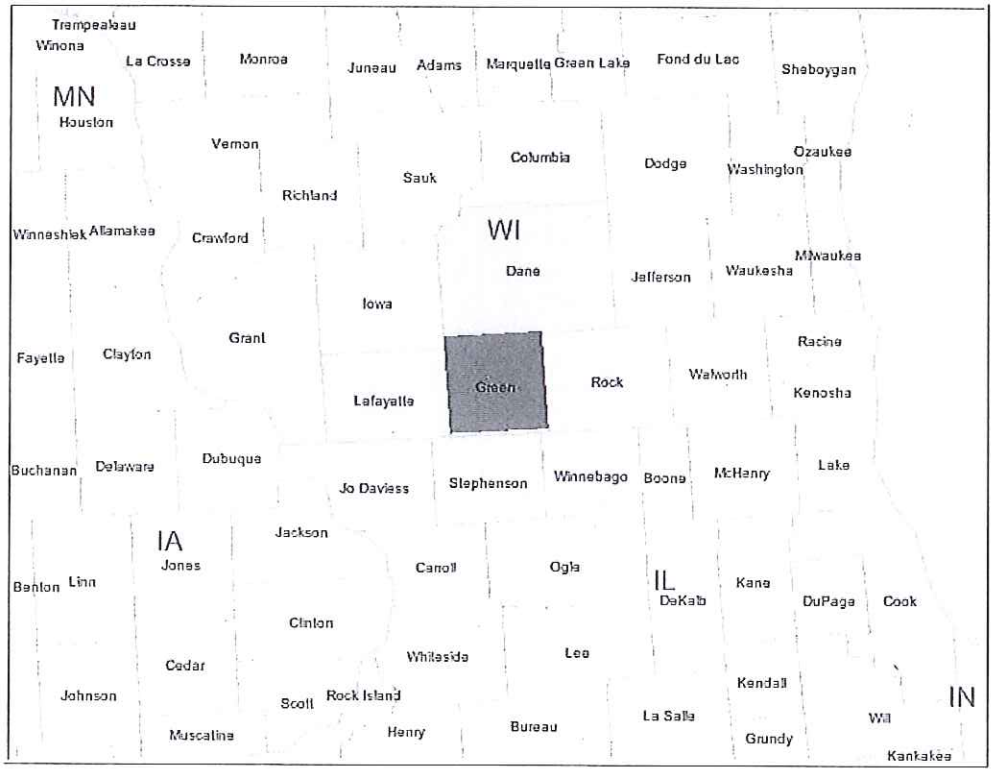
Where Rock residents came from

Counties	*People*
Dane, WI	4,845
Winnebago, IL	2,876
Walworth, WI	2,060
Jefferson, WI	1,215
Green, WI	1,132
Cook, IL	1,069
Milwaukee, WI	655
Racine, WI	299
Waukesha, WI	247
Boone, IL	235
Kenosha, WI	213
McHenry, IL	211
DuPage, IL	210
Columbia, WI	175
Sauk, WI	167
Kane, IL	147
Grant, WI	143
Maricopa, AZ	137
Los Angeles, CA	131
Lake, IL	130
Dodge, WI	127
Stephenson, IL	125
Brown, WI	117
Winnebago, WI	102
Fond du Lac, WI	101
Marathon, WI	92
Juneau, WI	84
Washington, WI	80
Hennepin, MN	76
Outagamie, WI	75
Portage, WI	71
Adams, WI	69
Clark, NV	67
La Crosse, WI	64
Wood, WI	62
Monroe, WI	58
San Diego, CA	52
Eau Claire, WI	49
Ogle, IL	37
Lafayette, WI	35
Iowa, WI	23
Barron, WI	20
Harris, TX	20
Lee, FL	15



County migration
2000-05

1 to 500
501 to 5000
Selected county
State
County

Where Green residents came from

Counties	*People*
Dane, WI	2,802
Rock, WI	1,105
Lafayette, WI	589
Stephenson, IL	382
Winnebago, IL	125
Cook, IL	97
Iowa, WI	91
Grant, WI	64
Columbia, WI	43
Jo Daviess, IL	29
Milwaukee, WI	27

Zoom to a state

Your next click on a county will:

- ⊙ Show where county residents moved from
- ○ Show where county residents moved to
- ○ Zoom In
- ○ Zoom Out
- ○ Recenter

Start over

Selected county: **Green, Wisconsin**

Migration	In	Out	Net
Total people migrating	**8,039**	**7,252**	**787**
Median household income	$26,420	$21,267	$5,153
Within US	**8,039**	**7,252**	**787**
Median household income	$26,420	$21,267	$5,153
Foreign	**0**	**0**	-
Median household income	$0	$0	-

Not migrating: **29,450**
Median household income: $33,987

Source: Charlotte Observer analysis of IRS data

NOTES
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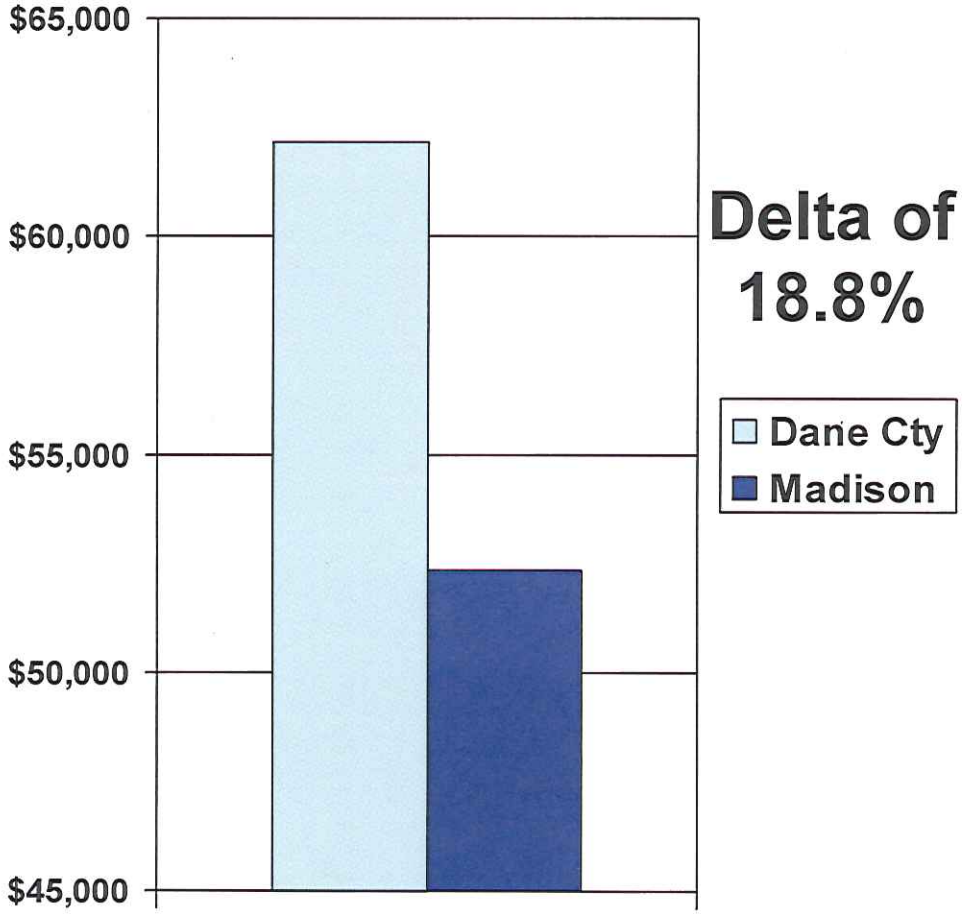
Median 2008 Household Income



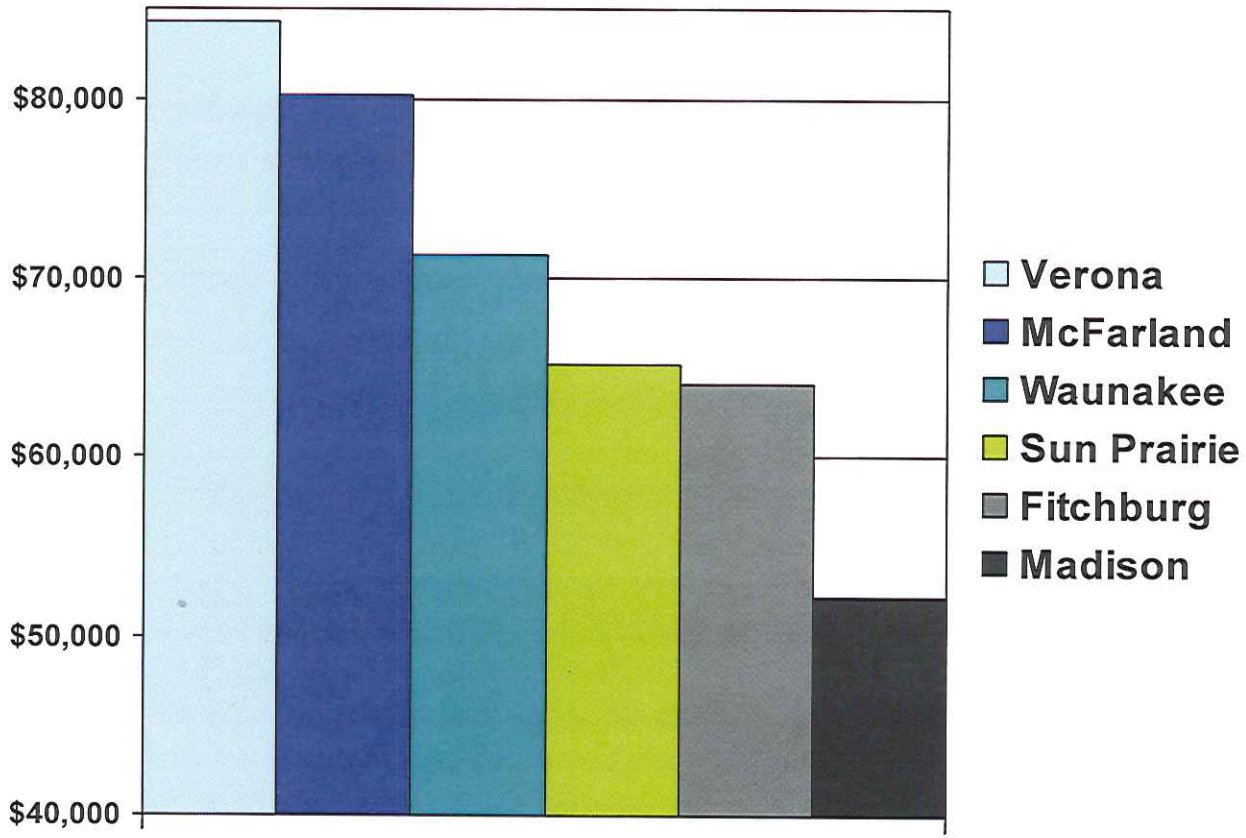
- **Madison is lagging rest of county.**
- **Wealth is moving to the suburbs.**
  - Added discretionary income
- **Commercial development is following**
  - Retail/service/office/ industrial/hospitality

Madison
ECONOMIC DEVELOPMENT

Source: U.S. Census Bureau, American Community Survey

Larger Disparity with Immediate Suburbs

2008 Median Household Income

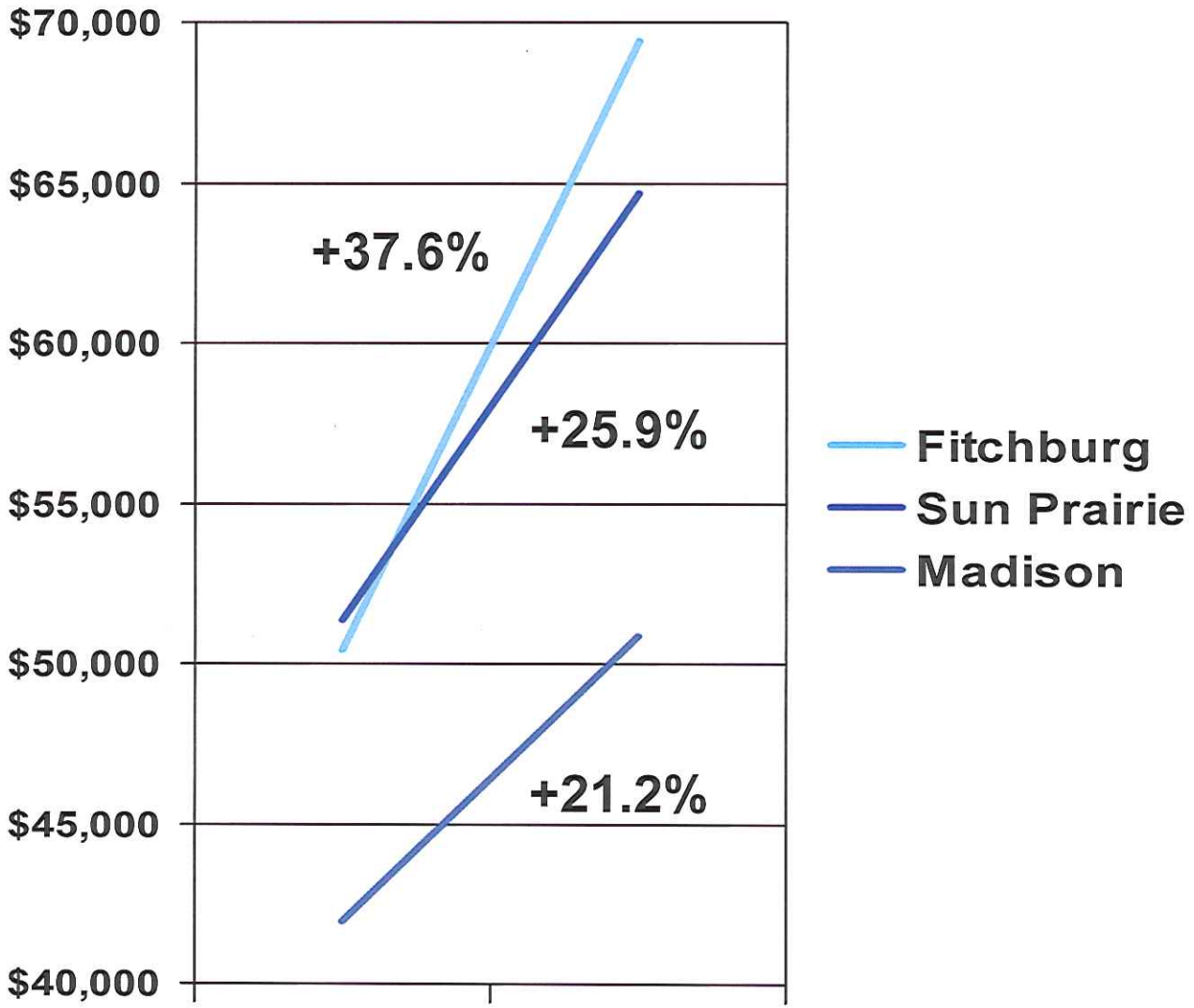


Source: U.S. Census Bureau, American Community Survey

Madison
ECONOMIC DEVELOPMENT

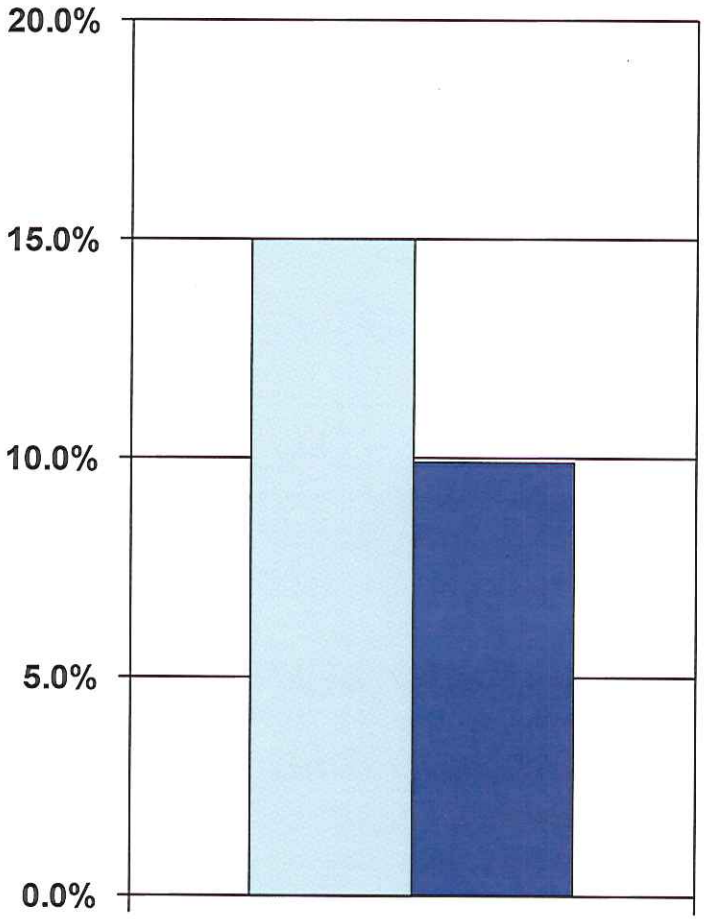
Madison Growth vs. Immediate Suburbs

2000 - 2008 Median Household Income



Madison
ECONOMIC DEVELOPMENT

Job Growth Rate 2000-2008



50% Greater

- Statistics are for <u>location</u> of the job vs. individual holding the job.
- As household and discretionary income moves, jobs follow.

Madison
ECONOMIC DEVELOPMENT

The Next Youth-Magnet Cities

If you were a recent college graduate in a recovering economy launching a career, looking for a mate or both, where would you choose to live?

Predicting cities that will emerge as post-recession meccas for the young is easy to argue about, but impossible to forecast empirically. Whether you prefer hip, casual Austin, Texas, over the cosmopolitan allure of New York City is partly a matter of personal taste. Still, we asked six experts which 10 cities will emerge as the hottest, hippest destinations for highly mobile, educated workers in their 20s when the U.S. economy gets moving again. Our panelists—demographers, economists, geographers and authors on urban issues—picked their cities based on the criteria they deem most important, from economic diversity to lifestyle.

Big cities dominate our panelists' forecasts. Where trendy smaller cities might have captivated youth in the past, today's recession-scarred young people are more pragmatic, placing "greater emphasis on where high-quality, high-paying jobs are created," says Ross DeVol, director of regional economics for the nonprofit Milken Institute. Northeastern and West Coast cities are ascendant, eclipsing former Sunbelt favorites such as Atlanta.

By Sue Shellenbarger

Other cities once lauded as youth magnets fell off the radar. Naples, Fla., cited in an influential 2003 U.S. Census Bureau report on migration among young adults, was bypassed by panelists, a victim of the sagging Florida economy. The housing collapse sank another past favorite, former real-estate boom town Las Vegas. And Charlotte, N.C., a banking center, lost some of its luster to the financial crisis.

Quirky urban cultures haven't entirely lost their allure. Our panelists' No. 4 pick is a city with double-digit unemployment—Portland, Ore., a haven for artists, musicians and outdoor enthusiasts. The city has shown "staying power" among youth, says Rachel Franklin, a geographer at the University of Maryland and author of the Census Bureau report.

Where young adults settle is no small thing. People 18 to 29 are the most mobile age group, and their past migration patterns have defined the future of regions. Youth-magnet cities gain a cultural allure and a labor-market edge.

The young are likely to be more restless than usual when the recovery comes. The recession has brought migration to a grinding halt: Fewer people moved across state lines last year than at any time since 1950, when the population was smaller by half, says William Frey, a senior fellow at the Brookings Institution, a nonprofit Washington research organization.

Here's a look at our survey's top five cities:

First Place (Tie): Washington, D.C.

The 2008 election touched off a youthful pilgrimage to the capital that most panelists say won't end soon. In the eyes of some young peo-

Please turn to the next page

Washington, D.C.

"Right now Washington is a magnet. It has become the new New York."

Unemployment: 10.3%
Cost of Living Index: 140 (U.S. Average = 100)
Education Levels*: 61.3%
Median Household Income: $57,936

Seattle

"A high-tech and lifestyle mecca."

Unemployment: 7.7%
Cost of Living Index: 122
Education Levels*: 64.2%
Median Household Income: $61,786

New York

"The city's mythic status as a place to test one's mettle against the best and the brightest" remains intact.

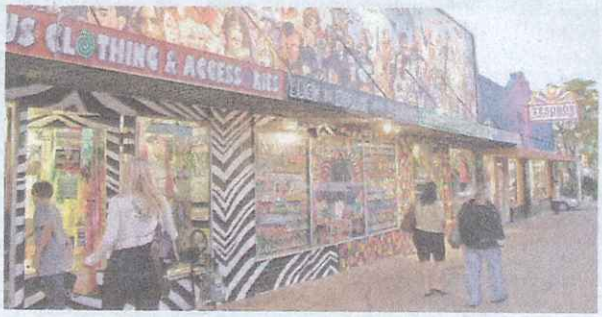
Unemployment: 10.3%
Cost of Living Index: Manhattan = 218, Brooklyn = 176, Queens = 158**
Education Levels*: 43.0%
Median Household Income: $51,116

Portland, Ore.

A symbol of "West Coast hipness," Portland has continued to draw migrants through the recession.

Unemployment: 11.4%
Cost of Living Index: 120
Education Levels*: 47.3%
Median Household Income: $50,979

Associated Press (Washington, Portland, Seattle); Alamy (New York, Austin)

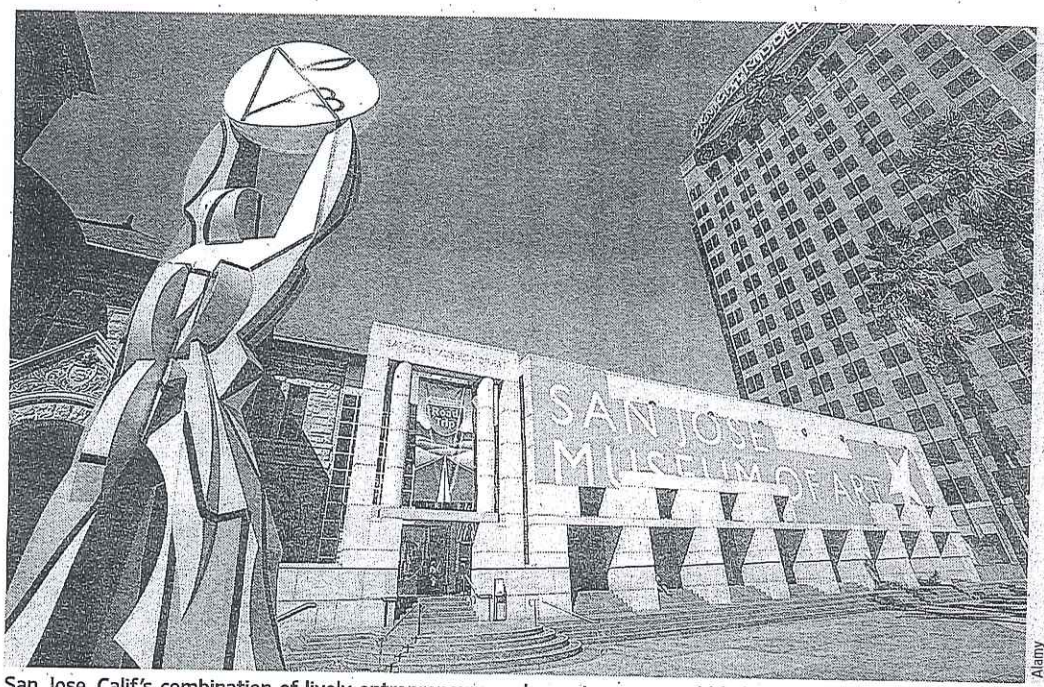


Austin, Texas

"A model for a thriving 21st-century knowledge-based community."

Unemployment: 6.6%
Cost of Living Index: 97
Education Levels*: 41.8%
Median Household Income: $51,372

*Education levels: 25- to 34-year-olds with bachelor's degree or higher. **Data for other boroughs not available.
Sources: Census Bureau, Bureau of Labor Statistics, Council for Community and Economic Research



Alamy

San Jose, Calif.'s combination of lively entrepreneurs and smart money could help it to continue to draw the best and brightest.

The Next Hot Youth-Magnet Cities

11 Post-Recession Boomtowns

Where the young and ambitious are likely to flock.

1. Washington, D.C.
1. (tie) Seattle
3. New York City
4. Portland, Ore.
5. Austin, Texas
6. San Jose, Calif.
7. Denver
8. Raleigh-Durham, N.C.
9. Dallas
10. Chicago
10. (tie) Boston

See more details on the winning cities at **WSJ.com/Real Estate.**

Continued from the prior page

ple, "Barack Obama is America's coolest boss," says Richard Florida, author of "Who's Your City?" and a professor of business and creativity at the University of Toronto's Rotman School of Management.

Government hiring is projected to grow fast, and jobs in lobbying, aerospace, defense contracting and professional services are also a draw. Mr. DeVol calls Washington the national leader in high-tech services, surpassing Silicon Valley. Washington's 4,000-plus nonprofits hold appeal for service-minded youth. And amid rising regulation of financial markets, says Barbara Lang, president of the DC Chamber of Commerce, "much of Wall Street is now moving to K Street."

David Gibson Jr., 25 years old, passed up finance jobs in Charlotte, New York and Atlanta to settle in Washington as a financial analyst for the Federal Reserve. Mr. Gibson, who has an M.B.A., figures the capital, with its many universities, can accommodate him for the long haul, enabling him to pursue a Ph.D. if he chooses. He loves the city's museums and live jazz and R&B venues, he says, and its power-center status is helping him "expand my network world-wide."

That combination of factors, says David Plane, a professor of geography and regional development at the University of Arizona, signals "sustained dynamism" for Washington.

The downside: Not all see the current federal hiring binge continuing. "Right now Washington is a magnet. It has become the new New York," says Steven Cochrane, managing director of Moody's Economy.com. But the ballooning federal deficit suggests that "by next year, the government is going to be looking seriously at making cuts."

First Place (Tie): Seattle

Former Ohio residents Lane Kuhlman, 26, and her husband, Matt Mansbach, 32, mulled several cities, including New York and Chicago, as potential destinations last summer, after Ms. Kuhlman received her master's degree specializing in interactive media.

In their eyes, none could match Seattle's combination of a diverse high-tech sector, cultural life, access to rugged natural terrain and a strong university presence. Ms. Kuhlman has since taken a post as a new-product researcher for Microsoft, and Mr. Mansbach is weighing attending one of the city's grad schools in his field, computer animation. Meanwhile, Ms. Kuhlman says, "we're only 15 minutes from a beautiful waterfall, and there are amazing places to hike."

Anchor to a region of innovative companies, Seattle is "a high-tech and lifestyle mecca," Dr. Florida says. Mr. DeVol says the city's high-tech sector, with 226,300 workers, is just slightly smaller than Silicon Valley's. Joblessness, at 7.7%, remains relatively low. City officials see rapid growth in biotech; Seattle also has tens of thousands of jobs in music and interactive media. And it enjoys a reputation as home to a lot of brainy people.

The downside: It rains half the time.

Third Place: New York

Reeling from the financial crisis, the nation's largest city may seem an unlikely pick. But one reason New York's unemployment rate is stuck at a daunting 10.3% is that hopeful job seekers continue to move there, city officials say. Clearly, "the city's mythic status as a place to test one's mettle against the best and the brightest" remains intact, Dr. Florida says.

New York hasn't lost as many financial-services jobs as predicted, says Deputy Mayor Robert Lieber; so far, fewer than half of the 293,000 job losses that were projected by the city from 2009 through mid-2010 have materialized. Residential growth in boroughs outside Manhattan, such as Brooklyn, is making the city marginally more affordable, and some panelists see housing prices falling more.

At Vermont's Middlebury College, New York surpasses nearby Boston as the destination of choice for the class of 2010, says Jaye Roseborough, career-services director. Allison Bailey, a 2009 grad, loves the city's "European lifestyle," she says. After studying in France, "I wanted to be in a 'walking city' like Paris." Working lots of overtime as a litigation assistant for a law firm, she can manage the $1,450 monthly rent for her Manhattan studio, she says. And she is happy to leave behind the long car commutes of her native Houston.

The downside: The city is still unaffordable for many, and the less-pricey suburbs can impose enervating commutes.

Fourth Place: Portland, Ore.

Los Angeles native Ryan O'Leary, 23, didn't expect when he graduated from college with a journalism degree last year to be working construction at this point, he says. But he decided about a month ago to give top priority to moving to the place he most wanted to live, and Portland was it—despite its daunting 11.2% unemployment rate.

Mr. O'Leary, who found an apartment downtown, calls his move "the best decision I've made in a long time." He loves the city's nightlife and neighborhoods, and the city's streetcars—one of which stops by his building—are a refreshing change from Los Angeles's car culture. He continues to job-hunt in his field, public relations, on his days off.

A symbol of "West Coast hipness," Ms. Franklin says, Portland has continued to draw migrants through the recession. An urban-growth boundary fosters a strong downtown culture while containing suburban sprawl, easing travel to nearby mountains and forests. Portland has expanded mass transit and boasts sizeable electronics and activewear companies, several wind- and solar-energy firms, and many green-building projects.

Its quirky culture appeals to musicians and artists: The city has more than its share of oddball events, including an adult soap-box derby and an urban Iditarod (wherein costumed revelers pull shopping carts). "Keep Portland Weird" is a popular bumper sticker. Although Austin claimed that motto first, "we live it pretty well here," says a city staffer.

The downside: While regional officials have laid plans to add 10,000 jobs in the next five years, Portland has done better at promoting its quality of life than fostering job growth. "As nice as it may be to live in Portland," says Economy.com's Dr. Cochrane, "you can only sleep on someone's couch for so long. At some point you have to get a job."

Fifth Place: Austin, Texas

After a year spent traveling and working overseas in 2007, New Jersey resident Olga Garcia, 26, and her boyfriend, Kevin Kurkjian, 27, debated places to settle. Then Kevin announced, "Olga, I've got it figured out: We're going to Austin." She agreed. Both had heard from friends that Austin offered housing and career opportunities and a welcoming, youthful culture. "I had never heard anything bad about Austin," says Ms. Garcia, a marketing consultant.

A state capital and the site of a big University of Texas campus, Austin has become a gathering place for tech- and arts-conscious young adults. Its SXSW media and arts conference, and its Austin City Limits music festival, draw hundreds of thousands of visitors each year. Both unemployment and the cost of living are relatively low. And with significant high-tech, videogame and renewable-energy sectors, Mr. DeVol calls Austin "a model for a thriving 21st-century knowledge-based community."

The downside: Some panelists have doubts about how strongly Austin will rebound after the recession.

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Cooley

The 'Real' Jobless Rate: 17.5% Of Workers Are Unemployed

Posted By: Jeff Cox | CNBC.com
CNBC.com
| 19 Nov 2009 | 04:55 PM ET

As experts debate the potential speed of the US recovery, one figure looms large but is often overlooked: nearly 1 in 5 Americans is either out of work or under-employed.

According to the government's broadest measure of unemployment, some 17.5 percent are either without a job entirely or underemployed. The so-called U-6 number is at the highest rate since becoming an official labor statistic in 1994.

The number dwarfs the statistic most people pay attention to—the U-3 rate—which most recently showed unemployment at 10.2 percent for October, the highest it has been since June 1983.

The difference is that what is traditionally referred to as the "unemployment rate" only measures those out of work who are still looking for jobs. Discouraged workers who have quit trying to find a job, as well as those working part-time but looking for full-time work or who are otherwise underemployed, count in the U-6 rate.

With such a large portion of Americans experiencing employment struggles, economists worry that an extended period of slow or flat growth lies ahead.

"To me there's no easy solution here," says Michael Pento, chief economist at Delta Global Advisors. "Unless you create another bubble in which the economy can create jobs, then you're not going to have growth. That's the sad truth."

Pento warns that forecasts of a double-dip ("W") or a straight up ("V") recovery both could be too optimistic given the jobs situation.

Instead, he believes the economy could flatline (or "L") for an extended period as small businesses struggle to grow and consequently rehire the workers that have been furloughed as the U-3 unemployment rate has doubled since March 2008.

As that trend has happened, the U-6 rate has expanded at an even more dramatic pace. Economists cite several reasons for the phenomenon.

For one, more workers are becoming discouraged as real estate—the focal point for the expansion in the earlier part of the decade—has collapsed and taken millions of directly related and ancillary jobs with it.

Many workers believe those jobs aren't coming back, and have thus quit looking and added themselves to the broader unemployment count.

"In the earlier part of this decade, 40 percent of all new jobs created were in real estate. Attorneys, mortgage brokers, agents, construction—they were all circled around housing," Pento says. "We've had a jobless recovery in the last two recessions. This is going to be the third jobless recovery in a row."

Another factor that may be leading people onto the rolls of those no longer looking for jobs is the government's accommodative extensions of jobless benefits.

"Workers are unemployed for a much longer span than we've seen historically," says David Resler, chief economist at Nomura Securities International in New York. "Part of that may be affected by the longer availability of benefits. It reduces the incentives for an urgent job search."

The U-6 rate debuted in January of 1994 at 11.8 percent, while the U-3 was at 6.6 percent. The measure hit a low of 6.9 percent in April 2000 while U-3 sat at 3.8 percent.

While the current methodology only dates back 15 years, a former U-6 gauge was in existence previously and peaked at 14.3 percent in 1982. Economists predict the current measure would fall just below that number using the same methodology.

"We're in the process of discovering how severe this recession and the long-run impact on certain industries will be and what that will do to overall employment," Resler says. The U-6 rate "portends a very slow, sluggish recovery."

If that holds and the US economy stays weak, that presents challenges for investors.

"People focus too much on that 10 percent number and not on the larger number," says Kevin Mahn, chief investment officer at Hennion & Walsh in Parsippany, N.J. "There's a humongous inventory of people out there looking for work and have been looking for work for a long time. Where are those jobs going to come from?"

High unemployment and the resulting pressure on consumers is driving many investors to look for opportunities overseas and in other assets.

Walsh says that trend is going to continue, with clients going to foreign markets, real estate investment trusts, certain bonds—anywhere that can offer profits above the slow-growth mire of US-based investments.

"If full employment is 4 percent, people are wondering how we're going to get from 10 (percent) to 4. Well, try getting from 17 to 4. We may not get back to full employment for a decade," Mahn says. "As an investor, that causes me to look for different places now. Maybe you can't just put money in US large caps and ride out this recovery."

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Kauffman Foundation Analysis Emphasizes Importance of Young Businesses to Job Creation in the U.S.

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U.S. Census data showing new and young firms as the primary source of new jobs come at a critical time for policymakers

(KANSAS CITY, Mo.) Nov. 5, 2009 – The Ewing Marion Kauffman Foundation today released a study showing that newly created and young companies are the primary drivers of job creation in the United States. Though perhaps showing some improvement, the Bureau of Labor Statistics update on U.S. employment due out Nov. 6 will likely still show a dismal picture for American workers. Kauffman's analysis of U.S. Census Bureau data showing that companies less than five years old created nearly two-thirds of net new jobs in 2007 could not be timelier.

"Job creation is the number one issue facing families and policymakers during this economic recession, and this study shows that *new* businesses and entrepreneurs are the key factor in adding new jobs," said Carl Schramm, president and CEO of the Kauffman Foundation. "If the U.S. economy is going to have a sustained recovery, it will be up to entrepreneurs to lead the way."

The distinction of firm age, not necessarily size, as the driver of job creation has many implications, particularly for policymakers who are focusing on small business as the answer to a dire employment situation. This report shows that most net job creation is generated by firms that are one to five years old. These firms create more net new jobs than their older counterparts, as well as a higher average number of jobs per firm. In some cases, these young firms grow into large companies employing thousands of people. Importantly, these companies could still fail at some point or be acquired by older and larger companies; or they could stop growing and remain the same size indefinitely. Some of these firms, meanwhile, continue to generate positive rates of net job creation at older ages.

"During our study of Census data, we continually find that new and young firms drive economic growth and job creation," said Dane Stangler, senior analyst at the Kauffman Foundation and one of the study's authors. "Within this group of companies, moreover, there is a substantial set of rapidly growing businesses that account for a disproportionate share of net job creation."

Net job growth is marked by churn, the process by which jobs are created and destroyed by shifts in the economy. Each year new companies emerge to create lots of jobs and are succeeded in subsequent years by a new pool of firms. The net effect of this is to consistently add two million new jobs to the economy each year.

"This study sends an important message to policymakers that young firms need extra support in the early years of formation so they can grow into viable job creators," said Robert Litan, vice president of Research and Policy at the Kauffman Foundation and one of the study's authors. "Sometimes a single barrier, such as limited access to credit for business growth, can mean the difference between survival and failure. We must create an environment that aids firm formation and growth if we are going to turn employment around."

Kauffman-funded researchers have highlighted the importance of firm age in previous unpublished papers. But this report, which can be downloaded at right, draws on a new set of data, a Special Tabulation conducted by the Census Bureau at the request of the Kauffman Foundation, calculated from the 2009 Business Dynamics Statistics (BDS). The BDS includes measures of business startups, establishment openings and closings, and establishment expansions and contractions in both the number of establishments and the number of jobs. The BDS data provide these new statistics on an annual basis, with classifications for the total U.S. private sector by broad industrial sector, firm size, firm age and state. Further information about the BDS can be found at http://www.ces.census.gov/index.php/bds/bds_home.

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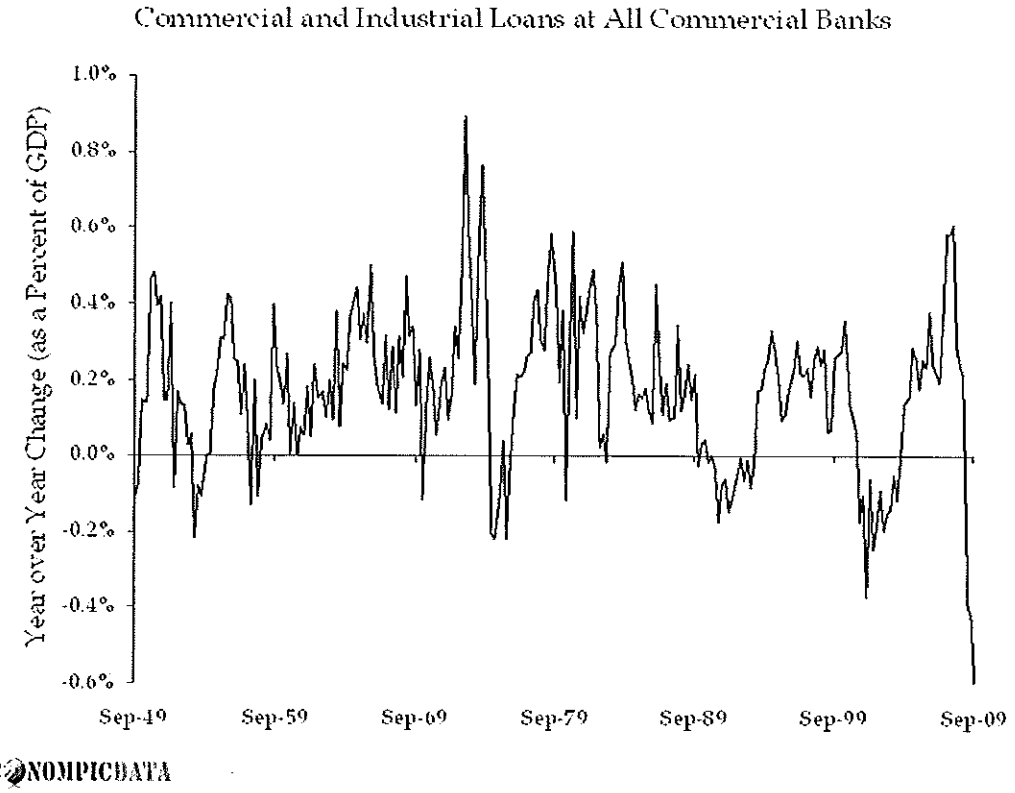
November 10, 2009

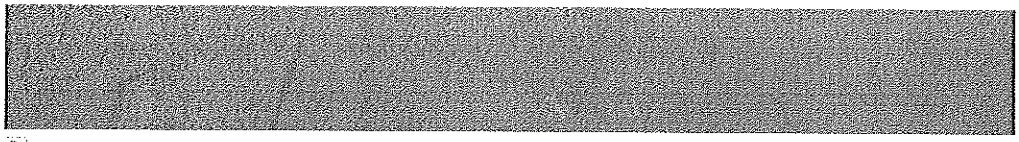
Kauffman Insight

Capital is the oxygen of startups, but in the current climate, new firms face asphyxiation.



(click to view larger image)

Business loans have plummeted during this recession. Worse, the most recent trend--beginning in late 2008 through today--is sharply downward. The administration's move to expand some SBA loan programs, raise the caps on others, and offer more aid to community banks is thus welcome news for America's young firms, which do the lion's share of the job creation and hiring in our economy. These are steps in the right direction, but we need policies that have a long-term affect that will sustain a robust entrepreneurial environment--like a fundamental revision of fixed bank capital standards, which do not vary with economic cycles; and more flexible standards that allow prudent lending in bad times, when many firms need it the most to survive or meet demand when it begins to grow.



THE WALL STREET JOURNAL.
WSJ.com

OCTOBER 20, 2009

Employers Hold Off on Hiring

By TIMOTHY AEPPEL and CONOR DOUGHERTY

Companies across the economy are holding off on hiring even as the profit outlook improves, amid economic uncertainty and their own success at raising productivity in rough waters.

Hiring always lags behind in economic recoveries, but the outlook this time is worse, many economists say. Most forecasters now expect a prolonged period of high unemployment, even though the government is expected to report next week that the economy grew in the third quarter, after four quarters of contraction. That is sure to frustrate the jobless and could be a problem for the Obama administration.

There are several major factors behind the trend, which is coming on top of sharper-than-expected job cuts in the recession. Many businesses have nagging doubts about the durability of the upturn, attributing much of the recent growth in orders to a move by their customers to rebuild inventories and to government stimulus spending, rather than underlying strength in their markets.

Businesses also face uncertainty about the potential costs of regulatory moves -- such as an expansion of health care and climate legislation -- that could drive up costs. And many employers have learned how to produce more with a smaller number of people than they previously thought possible.

That is what happened at D'Addario & Co. in Farmingdale, N.Y., one of the world's leading producers of guitar strings. Business began reviving in August, roughly when economists believe the recession ended. Chief Executive James D'Addario credits an influx of orders from retailers and China's guitar factories. But he sees much of this growth as a reaction to the slump earlier this year, when his customers were frantically slashing inventories to conserve cash. "Now, the pipeline's empty," he said.

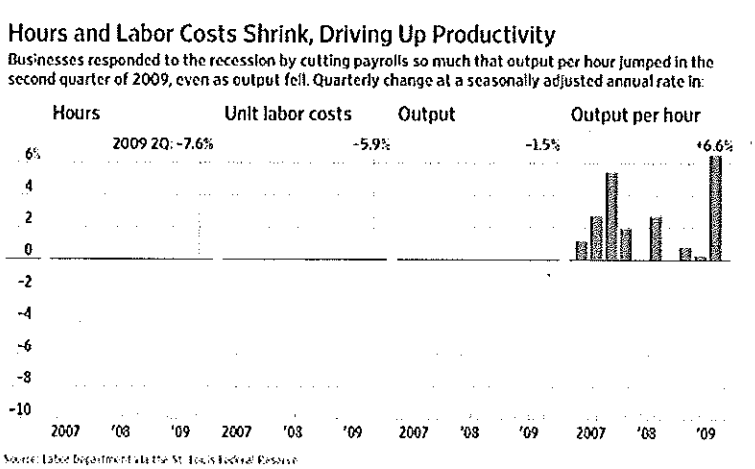
Still, Mr. D'Addario sees no reason to start hiring. He shed 150 workers and cut hours during the darkest days of the slump, bringing the head count down to 950. A host of efficiency moves -- such as teaching many workers to inspect their own work, which let D'Addario go from 17 inspectors to 10 -- has saved so much labor that there's no need to hire now. "I estimate we can produce 15% to 20% more with the same number of people," he said.

The same story is being repeated across the economy -- in factories, hotels and banks. The average workweek is now down to 33 hours, the lowest since records started in the 1960s. Productivity, or output per hour of work, grew at a 6.6% annual rate in the second quarter, as employers shed workers faster than they cut output. It was the largest increase in any quarter since 2003. Productivity grew at a 2.5% pace from 2000 through 2008.

"Businesses have been so aggressive in cutting labor input that productivity rose noticeably in the first half of the year," Federal Reserve staff economists told officials at their September meeting, according to minutes released last week.

Some employers have started calling back workers, and some are expanding. Steel mills and auto factories have reopened. Cree Inc., a Durham, N.C., maker of lighting fixtures, earlier this month said it would add 275 jobs as part of an expansion.

But most employers haven't resumed hiring. The U.S. has shed 7.2 million jobs since the recession began in December 2007, the deepest contraction since the Great Depression. Even if the job market started spitting out jobs as fast as it did during the 1990s boom, adding 2.15 million private-sector jobs a year, the U.S. wouldn't get back to a 5% unemployment rate until late 2017.



"Given the uncertain outlook in the economy and credit conditions, firms are reluctant to hire," says economist Mark Gertler of New York University. "This is a very tough labor market. It looks like it's going to be a slow process."

At the Sheraton Maui Resort & Spa in Hawaii, general manager Chip Bahouth said the recession prompted his hotel to look hard at ways to save money.

Service businesses pose distinct challenges. Unlike factories -- which can automate -- a service business is defined by people vacuuming rugs and scrubbing toilets.

Even so, Mr. Bahouth found ways to nip and tuck. The coffee cart in the hotel lobby used to open at 6 a.m., but sold only about 10 cups in the first hour. So the hotel started opening it at 7, reducing one work hour each day for the cart operator. Similarly, the hotel used to have two full-time carpet cleaners who ran lumbering machines that deep-cleaned about 10 rooms each a day. By staging big drums of cleaning solution in closets on each floor, workers no longer have to make trips to a basement stockroom to refill their machines, and each can now clean up to 15 rooms a day.

Productivity growth is ultimately good for companies, workers and the economy. More productive companies have greater profits, which allow them to pay higher wages. That also allows the economy to grow faster without generating inflation. But in the short run, stretching existing workers means hiring fewer new ones.

Another reason not to hire new workers: Many companies already have excess labor on hand. After reducing hours and cutting overtime during the recession, they can easily increase production by simply adding hours for existing workers.

There's also the fear factor. As companies cut back, remaining workers often picked up the slack. At 352 Media Group, a Web design firm in Newberry, Fla., head count has been reduced to about 40 from 50 a year ago. But Peter VanRysdam, a company principal, said he notices a lot more cars in the parking lot when he gets in each morning.

In a two-week pay period in January, before the layoffs, Mr. VanRysdam said, the company had 1,065 billable hours across 33 Web developers. In the most recent pay period, the company had 1,329 hours from only 26 people.

"After the cuts were made, the people that are still here...are motivated that much more," he said. "They know they can't just put their résumé out there, because this is happening across the industry."

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YAHOO! NEWS

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AP Associated Press

Higher jobless rates could be new normal

By TOM RAUM, Associated Press Writer
Mon Oct 19, 2:29 pm ET

WASHINGTON – Even with an economic revival, many U.S. jobs lost during the recession may be gone forever and a weak employment market could linger for years.

That could add up to a "new normal" of higher joblessness and lower standards of living for many Americans, some economists are suggesting.

The words "it's different this time" are always suspect. But economists and policy makers say the job-creating dynamics of previous recoveries can't be counted on now.

Here's why:

• The auto and construction industries helped lead the nation out of past recessions. But the carnage among Detroit's automakers and the surplus of new and foreclosed homes and empty commercial properties make it unlikely these two industries will be engines of growth anytime soon.

• The job market is caught in a vicious circle: Without more jobs, U.S. consumers will have a hard time increasing their spending; but without that spending, businesses might see little reason to start hiring.

• Many small and midsize businesses are still struggling to obtain bank loans, impeding their expansion plans and constraining overall economic growth.

• Higher-income households are spending less because of big losses on their homes, retirement plans and other investments. Lower-income households are cutting back because they can't borrow like they once did.

That the recovery in jobs will be long and drawn out is something on which economists and policy makers can basically agree, even as their proposals for remedies vary widely.

Retrenching businesses will be slow in hiring back or replacing workers they laid off. Many of the 7.2 million jobs the economy has shed since the recession began in December 2007 may never come back.

"This Great Recession is an inflection point for the economy in many respects. I think the unemployment rate will be permanently higher, or at least higher for the foreseeable future," said Mark Zandi, chief economist and co-founder of Moody's Economy.com.

"The collective psyche has changed as a result of what we've been through. And we're going to be different as a result," said Zandi, who formerly advised Sen. John McCain, R-Ariz., and now is consulted by Democrats in the administration and in Congress,

Even before the recession, many jobs had vanished or been shipped overseas amid a general decline of U.S. manufacturing. The severest downturn since the Great Depression has accelerated the process.

Many economists believe the recession reversed course in the recently ended third quarter and they predict modest growth in the nation's gross domestic product over the next few years. Yet the unemployment rate is currently at a 26-year high of 9.8 percent — and likely to top 10 percent soon and stay there a while.

"Many factors are pushing against a quick recovery," said Heidi Shierholz, an economist at the labor-oriented Economic Policy Institute. "Things will come back. But it's going to take a long time. I think we will likely see elevated unemployment at least until 2014."

At best, many economists see an economic recovery without a return to moderate unemployment. At worst, they suggest the fragile recovery could lose steam and drag the economy back under for a double-dip recession.

"We will need to grind out this recovery step by step," President Barack Obama said earlier this month.

Obama and congressional Democrats are having a hard time agreeing on how to keep the recovery going and help millions of unemployed workers — short of another round of stimulus spending amid rising voter alarm over soaring federal deficits.

So far, they've been unable to win even a simple three-month extension of unemployment insurance for people in states with jobless rates above 8.5 percent.

The extension easily passed the House earlier this month but is bogged down in the Senate over disputes over which states would get the funds. Hundreds of thousands of people have already lost their benefits or are about to lose them.

The White House credits the president's $787 billion stimulus plan passed in February for keeping job losses from becoming even worse. Since Obama took office in January, the economy has lost 3.4 million jobs.

Republicans argue that the stimulus program has not worked as a job producer and is a waste of tax money. And last week, the U.S. Chamber of Commerce launched a multimillion advertising campaign to celebrate small business entrepreneurs — and to argue that further government intervention will not spur permanent job growth.

Chamber leaders called for creation of more than 20 million new private-sector jobs over the next decade, saying it's needed to replace jobs lost in the recession and to keep pace with population growth.

"The government can support a few jobs in the short-run" while free enterprise is the only system that can create 20 million of them, said Thomas Donohue, the chamber president.

To many economists, such a goal seems unreachable given today's altered economic landscape.

"It's a new normal that U.S. growth is going to be anemic on average for years. Right now, the prospect is bleak for anything other than a particularly high unemployment rate and a weak jobs-creating machine," said Allen Sinai, president of Decision Economics Inc. He says he doubts that unemployment will dip below 7 percent anytime soon.

Many economists consider a jobless rate of 4 to 5 percent as reflecting a "full employment" economy, one in which nearly everyone who wants a job has one. After the 2001 recession the rate climbed to 5.8 percent in 2002 and peaked at 6.3 percent in 2003 before easing back to 4.6 percent for 2006 and 2007.

Will unemployment ever get back to such levels?

"I wouldn't say never. But I do think it's going to be a long time," said Bruce Bartlett, a former Treasury Department economist and the author of the book "The New American Economy: The Failure of Reaganomics and a New Way Forward."

"The linkage between growth in the economy and growth in jobs is not what it was. I don't know if it's permanently broken or temporarily broken. But clearly we are not seeing the sort of increase in employment that one would normally expect," said Bartlett.

CLEAN TECH JOB TRENDS 2009

BY RON PERNICK
AND CLINT WILDER
WITH DEXTER GAUNTLETT
TREVOR WINNIE

OCTOBER 2009

CLEAN EDGE
THE CLEAN-TECH MARKET AUTHORITY

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CLEAN TECH JOB TRENDS 2009

For nearly a decade, Clean Edge has issued its annual *Clean Energy Trends* report series in which we present the latest clean-energy trends; report on the current and projected size of the global market for solar, wind and biofuels; and provide insights and intelligence on the broader clean-energy market. This year, we are launching a new report series, focusing on employment in the clean-tech industry, in which we hope to do for clean-tech jobs what we did for clean energy in our earlier reports.

Admittedly, we aren't alone in being interested in the topic of clean-tech jobs.

U.S. President Obama and Chinese President Hu Jintao have both made clean-tech development and deployment a cornerstone of their leadership, targeting the creation of millions of new clean-tech jobs in the process. Brazil, the European Union, India, Japan, and other nations are also aggressively pursuing clean-tech job creation – investing dollars and human capital and implementing supportive policies. And the clean-technology sector is now one of the largest recipients of venture capital (VC) dollars – alongside biotech, software, and medical devices – with clean energy alone raking in $3.35 billion in the U.S. in 2008, according to New Energy Finance. Globally, VC and private equity totaled $13.5 billion in clean-energy investments last year.

The unprecedented level of interest and activity in clean-tech jobs is considerable, but there's a reason for it.

Private investments, while declining in 2009 and certainly under pressure in the current economic climate, are creating jobs among a host of startups such as smart grid networking company Silver Spring Networks in California; high efficiency window and green building materials manufacturer Serious Materials, with plants in California and around the U.S.; and thin-film solar photovoltaic (PV) manufacturer Odersun in Germany. TV stations, newspapers, and magazines across the globe are focused on the emerging phenomenon, with near daily coverage. And dozens of websites and social media outlets are now dedicated to the clean-tech jobs market, including our own jobs board, Clean Edge Jobs.

The unprecedented level of interest and activity in clean-tech jobs is considerable, but there's a reason for it. Many believe we are just at the beginning of the clean-tech jobs creation era, with clean tech offering the greatest opportunity for wealth and job creation (and global economic competitiveness) since the advent of the computer and the Internet.

In a Pew Charitable Trusts report published in June 2009, clean-energy jobs, defined as jobs in renewable energy, energy efficiency, environmentally friendly production, conservation and pollution mitigation, plus related training and support, accounted for half a percent of total employment in the U.S. – 770,000 jobs in 2007. While this number might seem small, it falls into a comparable sphere with such mature U.S. industries as biotech (200,000 jobs), telecommunications (989,000), and traditional energy including utilities, coal mining and oil and gas extraction (1.3 million). The Pew report also found that clean-energy jobs are growing faster than other sectors, increasing by 9.1 percent from 1998 to 2007 compared to 3.7 percent growth for all U.S. jobs over that same time period. According to Clean Edge research, the solar PV industry alone now represents approximately 200,000 direct and indirect jobs globally, while the wind power sector includes more than 400,000 direct and indirect jobs globally.

Defining Clean Tech

But what exactly is a clean-tech job?

We define clean-tech jobs as those that are a direct result of the development, production, and/or deployment of technologies that harness renewable materials and energy sources; reduce the use of natural resources by using them more efficiently and productively; and cut or eliminate pollution and toxic wastes. There's no mistaking the types of jobs we're talking about – they include solar photovoltaic (PV) system installers, wind-turbine technicians, energy-efficiency software developers, green building designers, and clean-energy marketers. While some of these jobs may seem exotic, they are increasingly becoming the norm. The table below shows some of the key sectors in which clean-tech jobs are now emerging.

Top Clean-Tech Job Sectors

Energy	Transportation
Renewable Energy (e.g., Solar, Wind)	Hybrid-Electric Vehicles
Energy Storage	All-Electric Vehicles
Energy Conservation and Efficiency	Electric Rail
Smart Grid Devices and Networks	Hydrogen Fuel Cells for Transport
Electric Transmission and Grid Infrastructure	Advanced Transportation Infrastructure
Biomass and Sustainable Biofuels	Advanced Batteries for Vehicles
Water	**Materials**
Energy-Efficient Desalination	Biommicry
UV Filtration	Bio-Based Materials
Reverse Osmosis Filtration	Reuse and Recycling
Membranes	Green Building Materials
Automated Metering and Controls	Cradle-to-Cradle Systems
Water Recovery and Capture	Green Chemistry

Some of these sectors are rising to the top. According to Clean Edge research, the top five sectors for clean-tech job activity in the U.S., based on a combination of job placements, job postings, and public and private investments, are solar; biofuels and biomaterials; conservation and efficiency; smart grid; and wind power.

Top 5 Sectors for Clean-Tech Job Activity (U.S.)

Rank	Sectors
1	Solar
2	Biofuels & Biomaterials
3	Conservation & Efficiency
4	Smart Grid
5	Wind Power

Source: Clean Edge, Inc., 2009

Show Me the Money: Clean-Tech Job Compensation Survey

But for clean-tech jobs to matter, they need to pay well and provide job security – part of long-term and sustainable clean-tech *careers*. For this report, Clean Edge conducted the first annual survey of clean-tech jobs with PayScale, a leading publisher of global compensation data, to determine the median salary and wage compensation for a range of clean-tech jobs. Our survey shows that clean-tech jobs often compete where it matters most – on pay levels.

Below is a sampling of median annual salary compensation data that we uncovered for select jobs within a number of clean-tech sectors worldwide.

Clean-Tech Compensation Overview

Job Title	Clean-Tech Industry	Median Pay	Typical Job Level	Typical Degree Level
Boiler Operator	Biofuels / Biomaterials	$61,100	Mid-Level	High School/Associate's Degree
Refuse, Garbage, and Recyclable Material Collector	Biofuels / Biomaterials	$38,100	Mid-Level	High School/Associate's Degree
Research Associate, Molecular Biology	Biofuels / Biomaterials	$46,600	Entry-Level	Bachelor's Degree
Geothermal Power Engineer	Geothermal	$71,799	Entry-Level	Engineering Bachelor's Degree
Architect (LEED Certified)	Green Building	$58,700	Mid-Level	Bachelor's Degree
Building Maintenance Engineer	Green Building	$43,300	Mid-Level	High School/Associate's Degree
Energy Field Auditor	Green Building	$48,500	Entry-Level	Bachelor's Degree
HVAC Service Technician	Green Building	$49,500	Mid-Level	High School/Associate's Degree
Instrumentation & Controls Technician	Green Building	$72,900	Mid-Level	High School/Associate's Degree
Insulation Worker	Green Building	$36,100	Mid-Level	High School/Associate's Degree
Project Manager, Construction (LEED Certified)	Green Building	$80,000	Senior-Level	Bachelor's Degree
Manufacturing Engineer	PHEV / EV	$60,300	Entry-Level	Engineering Bachelor's Degree
Mechanical Engineer	PHEV / EV	$63,600	Entry-Level	Engineering Bachelor's Degree
Accountant	Renewable Energy, General	$46,400	Mid-Level	Bachelor's Degree
Business Analyst	Renewable Energy, General	$61,500	Entry-Level	Bachelor's Degree
Financial Analyst	Renewable Energy, General	$60,200	Entry-Level	Bachelor's Degree
Marketing Coordinator	Renewable Energy, General	$39,300	Entry-Level	Bachelor's Degree
Project Developer	Renewable Energy, General	$106,000	Mid-Level	Master's Degree
Embedded Systems Engineer	Smart Grid	$77,100	Mid-Level	Engineering Bachelor's Degree
Hardware Design Engineer	Smart Grid	$87,700	Mid-Level	Engineering Bachelor's Degree

Clean-Tech Compensation Overview

Job Title	Clean-Tech Industry	Median Pay	Typical Job Level	Typical Degree Level
Journeyman Lineman	Smart Grid	$67,900	Mid-Level	High School/Associate's Degree
Network Operations Center Technician	Smart Grid	$46,400	Mid-Level	High School/Associate's Degree
Software Engineer	Smart Grid	$65,500	Entry-Level	Bachelor's Degree
Construction Foreman	Solar PV	$53,500	Senior-Level	High School/Associate's Degree
Electrical Design Engineer	Solar PV	$65,000	Mid-Level	Engineering Bachelor's Degree
Maintenance Technician	Solar PV	$44,100	Mid-Level	High School/Associate's Degree
Research and Development (R&D) Lab Technician	Solar PV	$41,400	Mid-Level	Bachelor's Degree
Solar Energy System Installer	Solar PV	$40,000	Entry-Level	High School/Associate's Degree
Solar Energy Systems Designer	Solar PV	$42,600	Entry-Level	Bachelor's Degree
Solar Fabrication Technician	Solar PV	$43,800	Entry-Level	High School/Associate's Degree
System Integration Engineer	Solar PV	$75,100	Mid-Level	Engineering Bachelor's Degree
Construction Superintendent	Wind Power	$74,000	Senior-Level	Bachelor's Degree
Field Service Engineer	Wind Power	$62,400	Mid-Level	Engineering Bachelor's Degree
Sheet Metal Worker	Wind Power	$50,300	Mid-Level	High School/Associate's Degree
Welder, Cutter, Solderer, or Brazer	Wind Power	$50,300	Mid-Level	High School/Associate's Degree
Wind Turbine Technician	Wind Power	$52,600	Entry-Level	Bachelor's Degree

Source: PayScale and Clean Edge, Inc., 2009

Definitions:

Median Pay: *The median pay is the national median (50th Percentile) annual total cash compensation (TCC). TCC combines base annual salary or hourly wage, bonuses, profit sharing, tips, commissions, overtime pay (when typical for a given job), and other forms of cash earnings, as applicable. It does not include equity (stock) compensation, cash value of retirement benefits, or value of other non-cash benefits (e.g., healthcare). Half the people doing the job earn more than the median, while half earn less.*

Range in pay within a job can be very wide depending upon years of experience, scope of responsibility, number of employees, etc. For example, pay can be higher than the stated median pay if the worker has higher levels of experience and responsibility or they work at a larger company.

Typical Job Level: *There are three categories: 1) Entry-Level Positions where workers typically have less than 5 years of experience, 2) Mid-Level Positions where workers typically have between 5 and 10 years of experience, and 3) Senior-Level Positions where workers typically have more than 10 years of experience. Years of experience refers to the number of years the respondent has spent in the field/career. Therefore the years of experience will incorporate all applicable jobs in the field, not just the current job.*

Typical Degree Level: *This is the degree held by the majority of respondents.*

Where Are the Jobs?

For first-time job seekers, mid-career changers, or anyone else interested in this sector, where are the jobs in clean tech? In our research, we've identified the top 15 metro areas in the U.S. for clean-tech job activity. This list of cities includes well-touted clean-tech centers such as San Francisco and Boston as well as less obvious contenders such as Chicago and Houston. To come up with our list of top U.S. clean-tech job cities, we evaluated a number of datasets, including current and historical job postings, early stage and public market investment activity, clean-tech job presence, and clean-energy patent activity. These metro areas stand at the forefront of clean-tech job activity in the U.S.

Clean-Tech Job Activity – Top 15 U.S. Metro Areas*

Rank	Metro Area
1	San Francisco-Oakland-San Jose, CA
2	Los Angeles-Riverside-Orange County, CA
3	New York-Northern New Jersey-Long Island, NY-NJ-CT-PA
4	Boston-Worcester-Lawrence-Lowell-Brockton, MA-NH
5	Washington-Baltimore, D.C.-MD-VA-WV
6	Denver-Boulder-Greeley, CO
7	Seattle-Tacoma-Bremerton, WA
8	Portland-Salem, OR
9	Chicago-Gary-Kenosha, IL-IN-WI
10	Sacramento-Yolo County, CA
11	San Diego, CA
12	Austin-San Marcos, TX
13	Phoenix, AZ
14	Detroit-Ann Arbor, MI
15	Houston-Galveston-Brazoria, TX

Source: Clean Edge, Inc., 2009

**Job rankings are based on a proprietary weighting of job postings, investment activity, job presence, and patent activity collected from the following datasets:*
- *Job postings including historical data from executive recruiter Hobbs & Towne and from Clean Edge Jobs and other leading job boards*
- *Investment activity provided by New Energy Finance, including early stage investments (number of deals, money invested) and public market investments (number of deals, money invested) by U.S. metro region*
- *State level business & job presence published in a number of research reports including Pew Center's "The Clean Energy Economy" (based on data from the National Establishment Time Series database by Walls & Associates)*
- *Patent activity – Clean Energy Patent Growth Index published by Heslin Rothernberg Farley & Mesiti P.C.*

Although the 15 metro areas listed above are current hotbeds of clean-tech job activity, they are far from the only places to find quality employment in the sector. The clean-tech revolution is a highly dispersed phenomenon – unlike the earlier high-tech revolution with its epicenter of Silicon Valley. No one place or region will control any one clean-tech sector. Clusters of clean-tech activity, supported by local technology development, capital flows, and supportive public policies, are springing up across the U.S. and around the world. The table below highlights this point – showcasing examples of cities around the world (not including any of our top 15 U.S. centers, many of which have extensive activities in the following sectors) that are having a major impact in the world of clean tech.

A Highly Dispersed Revolution: Clean-Tech Activities Emerging in Cities Around the Globe

Sector	Centers of Expertise/Jobs
Solar PV Manufacturing	· Freiberg, Germany · Kansai, Japan · Toledo, OH · Singapore · Wuxi, China
Wind Turbine Manufacturing	· Randers, Denmark · Newton, IA · Daman, India · Tianjin, China
Green Building Design Services	· St. Louis, MO · Stuttgart, Germany · Abu Dhabi, UAE · Trondheim, Norway
Plug-in Hybrid Vehicles and Infrastructure	· Tel Aviv, Israel · Copenhagen, Denmark · London, United Kingdom · Amsterdam, The Netherlands
Smart Grid Networking, Controls, and Devices	· Spokane, WA · Zug, Switzerland · Rome, Italy · Miami, FL

Source: Clean Edge, Inc., 2009

In addition to highlighting key regional centers of clean-tech employment, it's illustrative to look at which companies are doing the hiring. Globally, clean-tech pure plays -- companies dedicated to clean-tech activities such as solar, wind, water filtration, and energy intelligence -- are a leading source of clean-tech jobs. Of the top 10 companies, four are headquartered in the U.S., three are based out of China, and three are European. Below is a list of the top 10 publicly traded clean-tech pure play employers worldwide – along with their most recent employee count.

Top 10 Clean-Tech Employers (Publicly Traded Pure Plays)

Rank	Company	Headquarters	Sector/Activity	Employees
1	Vestas Wind Systems	Randers, Denmark	Wind	21,100
2	LDK Solar	Xinyu, China	Solar	14,100
3	Nalco	Naperville, IL	Water	11,700
4	Suntech Power	Wuxi, China	Solar	9,000
5	Itron	Liberty Lake, WA	Smart Grid	8,700
6	China BAK Battery	Shenzhen, China	Energy Storage	8,200
7	Baldor Electric	Fort Smith, AR	Electric Motors	7,800
8	Gamesa	Vitoria, Spain	Wind	7,200
9	Kingspan Group	Kingscourt, Ireland	Green Building	5,500
10	SunPower	San Jose, CA	Solar	5,400

Source: Clean Edge, Inc., 2009

Based on companies' reported claims and publicly available Q2 2009 financial filings/most recent annual reports

In addition to these pure plays, diversified multinational corporations are also adding to the ranks of emerging clean-tech jobs. Siemens currently has 5,500 employees working for its wind business, BP has more than 2,200 solar employees, and GE Energy, with a diverse portfolio of both conventional and rapidly expanding clean-energy activities, employs 40,000. Other multinationals with significant clean-tech workforces, among a growing list, include Sharp, Toyota, and ABB. And, as we point out later in the report, major entities such as utilities are hiring more clean-tech workers as they transform their businesses.

Manufacturing: A Showcase for Clean-Tech Transition

The move toward a clean-tech economy is also becoming evident in the transition taking place in communities across the U.S. and abroad. Formerly shuttered manufacturing facilities, often in hard-hit industrial areas, are being retrofitted from traditional old-line industry roles into new and emerging clean-tech activities. Clean-tech manufacturers are setting up shop in places where they can hire skilled workers laid off in previous plant shutdowns, with minimal retraining. Not all the indicators are positive. Along with the downturn in the broader economy, many clean-tech deployments have been put on hold or completely scrapped. But many positive developments are moving forward nonetheless.

U.S. MANUFACTURING JOBS IN TRANSITION:

Examples of old-line manufacturing losses replaced by new clean-tech manufacturing gains

Location	Old Manufacturer	Job Loss	New Manufacturer	Job Gain
Newton, Iowa	Maytag (Whirlpool): Home appliances	1,800 people laid off in 2007	TPI Composites: Wind turbine blades	Has hired 325 people since 2008, aiming for 500 total jobs by 2010
West Branch, Iowa	Sauer Danfoss: Hydraulic pumps	130 people laid off in 2003	Acciona: Wind turbines	130 employed at the plant, with plans to expand as demand grows
New Bedford, Massachusetts	Polaroid/Multilayer Coating Technologies (MCT)	In 2006, Polaroid sold its film negative manufacturing facility to MCT, which then closed the plant just one year after the sale, terminating 250 jobs	Konarka: Thin film solar PV	Facility reopened in October 2008, now employs about 20 Konarka workers; the company plans to hire 100 more in the next three years
Vandergrift, Pennsylvania	Kensington Windows: Window manufacturer	150 laid off when plant closed in 2008	Serious Materials: Ultra energy efficient windows	Plant reopened after Serious Materials bought Kensington in January 2009, now employs 40; hopes to employ more than 100
Wixom, Michigan	Ford Motor Company	More than 1,500 jobs lost when plant closed in 2007	The 320-acre facility was recently bought by Xtreme Power (power systems for wind and solar) and Clairvoyant Energy (solar panel manufacturing)	With reopening planned for 2011, the plant is to become a renewable energy business park and could potentially employ thousands

Source: Clean Edge, Inc., 2009

From Crisis to Opportunity

We stand at a unique crossroads. The recent global financial crisis has been disastrous for already struggling old-line industries in the U.S., with the bankruptcy of General Motors heading a long list of business and employment woes. As has been quoted often, "A crisis is a terrible thing to waste." We believe this crisis can accelerate the transition to a clean-energy economy, with the creation of millions of new jobs in a wide range of clean-tech sectors. Those countries that take an active role will move out of the current crisis better positioned to lead in the next industrial revolution: clean technologies.

Indeed, although the numbers are relatively small today, employment in clean tech is moving solidly into the mainstream. From wind-turbine production line workers in central Pennsylvania and ethanol distillers in São Paulo, Brazil, to smart-grid software designers in northern California and PV manufacturers in China's Jiangsu province, clean tech has come a long way from the "alternative energy" pioneers of off-the-grid solar and other first-generation commercial technologies of the 1970s. And the clean-tech field is hot, particularly among younger students and graduates of community colleges, universities, and business schools and those in the high-tech centers of Abu Dhabi, Silicon Valley, Singapore, and Tokyo. At the same time, clean tech has invigorated social justice and labor groups to help extend these new jobs to historically disenfranchised groups. All of today's major global forces – action on carbon emissions reduction, lessening dependence on volatile fossil fuel supplies and prices, the sea change in government leadership on clean energy from Washington, D.C. to Canberra, Australia – point to huge potential growth in clean-tech employment.

Employment in clean tech is moving solidly into the mainstream.

In the following pages we highlight five major trends that we see reshaping the clean-tech jobs landscape. These include how conservation and efficiency are creating tens of thousands of new jobs and leading the clean-tech pack; how utilities facing an aging workforce are turning to a new stable of workers trained in clean tech and the smart grid; and how new educational programs are opening up clean-tech career paths. We then look at a number of emerging public financing models, such as Victory Bonds and the Green Bank, that could help fuel the next wave of innovation and job growth in clean tech.

Finally, at the end of the report, we provide an online resource guide for clean-tech job seekers and employers alike – with references to clean-tech books, reports, web sites, jobs boards, job fairs, networking organizations, educational programs from trade schools to MBAs, and more. We hope that our report will be a useful annual guide to job seekers, employers, and investors as the transition to a clean-tech economy moves forward.

FIVE TRENDS TO WATCH

1. ENERGY EFFICIENCY –THE MOST BANG FOR YOUR BUCK

In an otherwise bleak job market, energy efficiency companies around the world are proudly proclaiming, "Now Hiring!" This trend is catalyzed by stimulus dollars and a growing realization by companies, utilities, and governments that volatile energy costs make energy efficiency a highly competitive option for meeting their new energy needs, and a cost-effective job creator.

The Political Economy Research Institute, in a June 2009 publication, reported that the number of U.S. direct jobs created per million dollar investment in building retrofits and smart grid is far greater than direct jobs created in the coal industry, by a factor of 8:1 and 5:1 respectively. Even compared to wind and solar, at 4.3 and 5.4 direct jobs created per million dollars invested respectively, building retrofits' seven direct jobs per million dollars invested shows how the 'fifth fuel' – as energy efficiency is known – has the potential to pack the most bang for the buck.

The number of U.S. direct jobs created per million dollar investment in building retrofits and smart grid is far greater than direct jobs created in the coal industry.

The Northwest Planning and Conservation Council, for example, has projected that Idaho, Montana, Oregon, and Washington can meet 85 percent of their new electricity needs over the next 20 years solely through conservation, and do so at half the cost of building new power plants. Energy efficiency attracted more than 35 percent of the estimated $470 billion in green stimulus funding worldwide from January to May 2009, according to global financial firm HSBC. The firm defines efficiency as funding for buildings and grid infrastructure.

"Efficiency is the quickest way to meet our energy needs cost-effectively while making the U.S. a world leader in clean-energy technologies across multiple sectors." says Skip Laitner, director of economic and social analysis at the American Council for an Energy Efficient Economy.

In the face of economic turmoil, European efficiency leader Germany has allocated approximately 10% of its total (and more than 60% of climate-related) recovery funds to building retrofits. Since 2006, 6.4 billion euros (U.S. $8.5 billion) have

Profile:

Portland Energy Conservation, Inc. (PECI)

Location

Portland, Oregon

www.peci.org

Founded

1980

Employees

320 expected by the end of 2009

Industry Role

PECI provides energy conservation services for organizations ranging from grocery stores to utilities.

The Buzz

Diane Levin, director of the company's commercial retail program, says that utilities are beginning to shift their thinking toward efficiency measures to help meet increased energy demand. "What's emerging as prevalent thought," she says, "is considering the energy savings from efficiency and conservation as a resource itself – one that's far cheaper with greater potential to fill the demand needs than other alternatives."

Bankrollers

PECI was originally created by the City of Portland as a public agency. As public policy and the energy conservation field evolved, PECI was reorganized as a private, not-for-profit corporation.

Jobs Story

Proving the economics of efficiency work in good times and bad, PECI is an example of a company that has not sought stimulus dollars and is still growing rapidly and creating jobs. The company has added 100 employees since mid-2008, and expects to add another 40 by year's end for a total of nearly 320 employees – a 75% increase in staff during the worst financial crisis in decades.

Our Take

We expect to see exciting growth in the energy efficiency sector as utilities and large companies increasingly realize that it is the most cost-effective source for procuring new electricity. Also keep an eye on utilities on the hunt to acquire leading energy efficiency firms to bring that cost-saving expertise in house.

been invested in the country's CO2 Building Rehabilitation Programme. That's helped renovate 800,000 homes and created approximately 220,000 jobs in medium-sized construction companies, according to the German Ministry of Transport, Building and Urban Affairs.

In the U.S., while stimulus funds have been slow to actually roll out in some cases, workforce development agencies' efforts to administer weatherization training programs are well underway. The Weatherization Training Center at Pennsylvania Technical College in Williamsport will train 2,000 installers, crew chiefs, and energy auditors in the next two to three years, up from less than 400 annually in the past. And with the U.S. Department of Energy targeting one million homes to be weatherized in the next decade, they will likely be busy for years to come.

Meanwhile, venture-backed startups such as Hycrete and Serious Materials are developing new construction materials that require less energy and toxins to produce while delivering superior performance and efficiency. As LEED certification becomes more stringent, and eventually incorporated into building codes, these and other companies will likely need to continue to scale their workforce to meet growing demand.

The real test, however, will be the economy's uptake of these newly trained workers in the years ahead. Critics point out that a big short-term infusion of stimulus dollars in relatively low-paying jobs does not qualify weatherization and lighting upgrades as viable long-term industries. New financing models such as revolving loan funds are being looked at closely by governments across the country as a mechanism that could help to turn these jobs into careers.

Top Headlines

Energy Efficiency Provisions in Waxman-Markey Act Could Create 500,000 Jobs

Texas Energy Efficiency Industry Gets Stimulated

U.K. Government Unveils Plans to Meet 2016 Zero-Carbon Homes Target

Energy Efficiency Effort a Boost to N.C. Jobs

U.S. and China Join Forces on Energy Efficient Buildings

South Korea to Spend $84 Billion on Clean Energy and Energy Efficiency, Add Jobs

Related Job Titles

- Commercial Green Building & Retrofit Architect
- Energy Efficiency Finance Manager
- Energy Field Auditor
- Instrumentation Controls Technician
- Insulation Installer
- Lighting & HVAC Energy Engineer
- Weatherization Operations Manager

Select Organizations to Watch

Hycrete
www.hycrete.com

Orion Energy Systems
www.oriones.com

Portland Energy Conservation, Inc.
www.peci.org

RWE Effizienz GmbH
www.rwe.com/web/cms/de/249838/effizienz

Serious Materials
www.seriousmaterials.com

2. AGING WORKFORCE, NEW CLEAN TECHNOLOGIES TRANSFORM UTILITY INDUSTRY LANDSCAPE

The utility industry is looking for ways to attract a new generation of employees.

For some time, there have been warnings that the global workforce will struggle to replace vast amounts of knowledge and experience once the baby boomer generation reaches the age of retirement. The electric utility industry, with below-average turnover and thousands of career-long employees, is one of the most telling examples of this trend. While utilities frantically prepare for widespread retirements, they also have to acclimate to the growing presence of clean technologies. New business activities – smart grid deployments, large solar thermal power purchase agreements, and utility-owned and operated renewable energy projects – will necessitate vast retraining campaigns and novel hiring strategies. In the face of mass retirement and adoption of clean technologies, the utility industry's workforce is undergoing a significant transformation, one that will present great opportunities for those hoping to work on the front lines of the clean-energy economy.

Although job seekers will focus on the great potential behind this trend, utilities don't have the luxury of optimism and will be forced to intensify hiring and training efforts to make the most of a fleeting worker supply. An industry labor shortage seems counterintuitive given today's steep unemployment rates, yet the challenge is real. Almost half (46%) of the more than 20,000 employees at California's largest utility, Pacific Gas & Electric (PG&E), for example, will reportedly be eligible to retire in the next four years.

To avoid these crippling labor constraints, the utility industry is looking for ways to attract a new generation of employees. One group dedicated to this effort is the Center for Energy Workforce Development (CEWD). Formed in 2006, the nonprofit consortium of utilities and their associations works with contractors, unions, and educators to implement strategies to build a skilled workforce and ease the impact of an industry labor shortage. CEWD's Get Into Energy Career Pathways Model is designed to provide a roadmap for entry into skilled utility technician positions. Individual utilities' efforts, like PG&E's PowerPathway Bridge Programs, are also bolstering the workforce pipeline. In 2008 and 2009 PG&E

Profile:
Pacific Gas & Electric

Location
San Francisco, California
www.pge.com

Founded
1905

Employees
21,000

Industry Role
PG&E serves customers in northern and central California – approximately 5.1 million electric customer accounts and 4.2 million natural gas accounts. Over the next 10 years, the utility plans to meet almost half of new energy demand through energy efficiency.

The Buzz
PG&E, already a leader in wind energy and solar PV, has garnered attention for its efforts to integrate newer clean technologies. The company plans to install 10 million SmartMeter electric and gas meters by the end of 2011, has entered into agreements to buy 1,310 MW of solar thermal power from BrightSource Energy, and has hopes to build a 300 MW compressed air energy storage system to store wind and solar power underground.

Bankrollers
PG&E Corporation is an investor-owned utility, with stocks traded on the New York Stock Exchange (NYSE:PCG). With more than 370 million issued shares, the company has a market cap exceeding $15 billion.

Jobs Story
PG&E has catered a portion of its PowerPathway employee training program to help communities and educational institutions attract and train a clean-energy workforce. This effort will be crucial, considering that PG&E will need a large, specialized workforce to deploy and maintain new clean-technology projects.

Our Take
If PG&E can tap the state's vast education system while also luring environmentally conscious citizens by positioning itself as a facilitator of clean energy, it will be in a good position to reenergize its labor force.

offered courses at local community colleges designed to prepare students to pass the company's pre-employment test for maintenance and construction jobs.

Traditional utility recruiting efforts have satisfied human resource needs in the past, but as the number of clean-energy utility jobs grows, new training sources – like those mentioned in the "Coming to a Campus Near You: Clean-Tech Career Training" trend on page #14 – are beginning to play a bigger role. Clean-tech education programs are great career feeder systems for sector-specific jobs with wind or solar companies, but they are also closely intertwined with the utility industry. At Oklahoma State University's Oklahoma City campus, the wind turbine technology program trains students to work in electric power transmission and distribution. The program began classes in January 2009 and will be a boon for Oklahoma Gas & Electric's (OG&E) growing wind energy capacity, which is slated to swell from 170 megawatts at the end of 2008 to nearly 800 MW by 2012. Graduates of the university's wind program will be equipped to build and maintain OG&E's transmission infrastructure, and veteran OG&E special project engineer Jim Stengle is among the program's instructors.

Utility companies are rapidly adapting to a reality in which clean power sources like wind, solar, and geothermal are not "alternative" energy, but an integral part of the mainstream energy mix. At the same time, utilities are approaching a large wave of employee retirements that will reshape the industry. Given these two factors, we expect the utility industry's clean-tech revolution to unfold from the bottom up – led by the hiring of younger, clean-tech savvy workers, and the promotion of current employees with a knack for new technologies.

Top Headlines

Fresno City College Class Helps Boost PG&E Applicants
Survey: Reliability, Aging Workforce, Infrastructure Tops Electric Utilities' Concerns
For Community Colleges, Wind Technician Training is a Growth Business
Stimulus Funds May Help Alleviate Utility Worker Shortage
Utility Grant Helps Pay for "Green Jobs"
With Training, New Mexico Workers are Making the Shift to Clean-Energy Jobs

Related Job Titles

- Distribution & Transmission Specialist
- Environmental Engineer
- Manager - Solar Interconnection
- Network Systems Administrator
- Renewable Power Program Manager
- Solar Thermal Generation Specialist
- Wind Energy Technician

Select Organizations to Watch

Center for Energy Workforce Development
www.cewd.org

National Commission on Energy Policy
www.bipartisanpolicy.org

NextEra Energy Resources
www.nexteraenergyresources.com

Oklahoma Gas & Electric
www.oge.com

Pacific Gas & Electric
www.pge.com

3. COMING TO A CAMPUS NEAR YOU: CLEAN-TECH CAREER TRAINING

Flush with interest and government funding, new clean-tech educational initiatives are rapidly sprouting up and expanding across the globe, creating opportunities for students and instructors alike. Driving this trend is an unprecedented alignment of leading stakeholders – universities, trade groups, companies, and students. With governments largely footing the bill – to the tune of hundreds of billions in new stimulus-backed programs – investment in clean-tech human capital is now a leading strategy to a sustained global economic recovery in the short term, and a targeted engine of growth through the 21st century.

One group at the forefront is U.S. community colleges, which are initiating new programs in high-demand fields that include energy auditing, home weatherization, solar fabrication, and wind turbine manufacturing and maintenance. The nation's second largest generator of wind power among states, Iowa, is home to six wind turbine manufacturers including Vestas and Clipper Windpower, plus the wind developer Acciona, who compete for graduates of Iowa Lakes Community College's two-year wind energy program in Estherville that has grown from 15 students in 2004 to 102 students this fall. Community colleges provide an excellent on-ramp to clean-tech jobs for those traditionally disenfranchised economically, including minorities, youth, military veterans, and women.

Community colleges provide an excellent on-ramp to clean-tech jobs for those traditionally disenfranchised economically.

Oregon Institute of Technology was the first educational institution in the U.S. to offer a four-year degree in renewable energy engineering at its Klamath Falls and Portland locations. The program has seen meteoric growth from 5 students enrolled in 2005 to 210 students enrolled this fall. Green MBA programs at the University of Michigan, the Presidio School of Management, and many others aspire to turn out the next generation of clean-tech entrepreneurs, corporate managers, and financiers. In the EU, the European Master's in Renewable Energy offered through Oldenburg University (U.K.), University of Zaragoza (Spain), and others provides multi-country post-doc training opportunities in a number of clean-tech sectors to feed the demand for high-level engineers worldwide.

University-industry partnerships are catalyzing innovation and creating regional clean-tech hubs. Ohio's Toledo Univer-

Profile:

National University of Singapore (NUS)

Location

Singapore

www.nus.edu.sg

Founded

1905

Students

30,000

Technology Programs

The flagship clean-energy initiative at the university is the Solar Energy Research Institute of Singapore (SERIS), which plans to produce 50 PhD and 20 Masters students in its first five years. The institute houses state-of-the-art facilities for characterization and calibration of PV materials and devices, solar cell R&D, solar building R&D, and PV module performance analysis. It aims to create a high-level talent pool of solar energy specialists to spur industry development and spinoffs.

The Buzz

The Singapore Economic Development Board expects 7,000 clean-tech jobs to be created across all clean-tech sectors by 2015. The NUS solar and clean water programs are a major opportunity for the small but highly innovative island nation to add clean-tech innovation to its already impressive technology pedigree.

Bankrollers

Between 2008-2013 the Singapore Economic Development Board (EDB) and the National University of Singapore (NUS) will invest $130 million in SERIS.

Jobs Story

SERIS currently employs 40 researchers and professionals from 14 countries and is targeting 100 people by 2010. With professor Joachim Luther, former director of the renowned Fraunhofer Institute in Germany, at the helm, the institute is already building global acclaim.

Our Take

Singapore is already home to facilities of Oerlikon Solar, Vestas, GE, and Renewable Energy Corporation, which is building one of the world's largest solar manufacturing plants at 1.5 GW capacity. With a highly educated labor pool drawing from around the world, the NUS research and training programs will be a key part of attracting additional clean-tech investment dollars to the country.

sity, for example, is expanding its solar engineering department as the city becomes a hub for solar companies, with Xunlight and First Solar manufacturing thin-film photovoltaics on opposite sides of the Maumee River. Similar developments are taking place in Colorado for wind; in Freiberg, Germany for solar PV; and Singapore for solar and clean water technologies.

But no matter how much is invested in educational initiatives and research in the U.S. and Europe, there is no guarantee that the jobs – particularly in manufacturing – will follow, because the growth of clean-tech educational initiatives is a global trend. Market forces will continue to push many clean-tech jobs to the highly educated and increasingly professional, yet significantly lower-cost, global labor pool. According to a 2006 Duke University study, Indian universities and technical schools graduate over 200,000 engineers each year, comparable to the number of engineers educated by U.S. schools. These graduates are now eyeing jobs at Indian clean-tech companies like REVA Motors, Moser Baer, and Suzlon, which alone has grown from 20 to 14,000 employees since 1995. Similarly, many of China's 1,500-plus universities and institutes are rapidly building up their clean-tech related programs, such as the Beijing Solar Energy Research Institute and the Guangzhou Institute of Energy Conversion. With six of the world's top 15 solar manufacturers now located in China, engineering graduates can make around $7,000 per year at these companies – three and half times the national average.

Make no mistake, there is a risk that there will not be enough jobs in some sectors to accommodate the rapid influx of newly minted clean-tech graduates. But as clean-tech activities rise globally, options for finding clean-tech training at a campus nearby will be easier to come by, no matter where you live.

See our resource section at the end of this report for a list of clean-tech educational opportunities.

Top Headlines

Classes Start for First Students at Masdar Institute of Science and Technology

Siemens Opens Wind Training Center in Germany

Ghana to Set Up Solar Testing and Training Centers

Arizona State University Announces New Renewable Energy Technology Program

SolarWorld to Recruit Workers From Portland Community College

National Renewable Energy Laboratory Partners with RES Americas for Balance-Of-Plant Research

Related Job Titles

- Energy Storage Research Sr. Technician
- Lecturer, Renewable Energy Law
- Post-Doctoral Researcher – Solar Photovoltaics
- Professor of Engineering and Renewable Energy
- Weatherization Training Program Manager
- Wind Energy & Turbine Technology Program Coordinator

Select Organizations to Watch

European Master in Renewable Energy
www.master.eurec.be

Guangzhou Institute of Energy Conversion
http://english.giec.cas.cn

Iowa Lakes Community College
www.iowalakes.edu

National University of Singapore
www.nus.edu.sg

Technical University - Bergakademiereiberg Freiberg
http://tu-freiberg.de/index.en.html?int_fav=en

4. CLEAN-TECH MANUFACTURING MOVES NEAR END-USE MARKETS

Throughout the U.S. and the world, many clean-tech companies are increasingly moving manufacturing near the end market for their products. In some cases it's becoming critical – because of financial incentives, carbon constraints, shipping costs, and other factors. As this trend toward localization continues, regional market demand and government support will play strong roles in the creation of clean-tech manufacturing jobs.

The most prominent evidence of localization can be seen in the wind industry, where manufacturers are faced with the logistical challenges of distributing massive products over vast market areas. For utility-scale wind turbines, a single blade typically ranges from 27 to 45 meters in length, according to the American Wind Energy Association. At this scale, the location of manufacturing can be the difference between business success and failure.

At this scale, the location of manufacturing can be the difference between business success and failure.

Denmark-based Vestas Wind Systems, the world's largest wind turbine maker, is placing manufacturing bets on where tomorrow's market demand will be. In April 2009, the firm revealed plans to lay off 1,900 European employees, citing a reduced demand for wind turbines in Northern Europe. But across the Atlantic, the company is eyeing growth. Vestas says it will spend $1 billion in capital investments in the U.S. over the next two years and is hoping to create thousands of new jobs in the process. The manufacturer is also expanding in China, where it is offering a Chinese-made 850 kW turbine designed to withstand the winters of Inner Mongolia.

Localization is also prompting moves within as well as across borders. In August 2009, German wind turbine manufacturer REpower Systems announced plans to move its U.S. headquarters from Oregon to Colorado, closer to the growing wind energy market across the Great Plains of mid-America. As Iowa has surged past California to become the nation's second largest producer of wind energy (behind Texas), turbine and blade manufacturers such as Acciona, Siemens, and TPI Composites have established facilities there.

Other clean-tech sectors are experiencing similar labor local-

Profile:
Vestas Wind Systems

Location

Randers, Denmark

www.vestas.com

Founded

1945

Employees

21,000

Industry Role

What started as a maker of household appliances is now the world's largest manufacturer of wind turbines. In 2008, the company reportedly installed a new turbine every three hours worldwide.

The Buzz

Vestas is chasing market demand with targeted expansion in China and other markets, but the closing of a U.K. blade factory earned the turbine manufacturer its hottest headlines of the year. A sit-in protest at the Isle of Wight plant was ultimately not enough to overcome decreased demand in Northern Europe. The company eventually said in a press release that "it does not make sense, from an environmental and cost perspective, to ship turbines overseas instead of providing them locally."

Bankrollers

In 1998, Vestas went public with an IPO on the Copenhagen Stock Exchange. The company now has a market cap of around $15 billion.

Jobs Story

More than 400 jobs were deemed "redundant" at the Isle of Wight factory, and more than 1,200 more people are expected to be laid off in the company's Denmark facilities. Meanwhile, Vestas Americas – with headquarters in Portland, Oregon – has several facilities in operation or under construction in Colorado, and plans to establish new R&D sites in Houston and Boston.

Our Take

We expect to see a continued effort from Vestas to establish manufacturing sites near the fastest-growing markets. Localization will be exceptionally important in markets like China, where the government is requiring wind farms to be constructed with a high percentage of domestically produced components.

ization. For the emerging wave and tidal energy sectors, manufacturing resembles the wind industry, with products' massive size and weight confining production – and jobs – to limited coastal areas like Oregon, New Jersey, Portugal, and Scotland. Although the wave and tidal energy industry is in its infancy, it still carries the potential to create a significant number of jobs. An August report by the Forum for Renewable Energy Development in Scotland estimated that scaling up of marine energy could add 12,500 jobs to the Scottish economy by 2020.

Even in the solar PV market, where supply chain activities are often scattered across the globe, there is evidence of efforts to localize final module assembly. Chinese PV module maker Suntech Power, encouraged by U.S. solar market conditions, says it will be opening an American assembly plant in 2010 in either Texas or Arizona that is expected to employ 75 to 150 people. By locating its facilities closer to its customers in the American Sunbelt, the company expects to decrease logistical costs, reduce transport-related carbon emissions, and combat increasingly protectionist policies that put foreign-manufactured products at a disadvantage.

To be sure, much large-scale production, especially of smaller form-factor clean-energy products like PV cells, will continue to migrate to lowest-cost manufacturing regions like China. Clean-tech manufacturing jobs will never be as location-specific as installer and maintenance jobs at the sites of clean-energy installations and energy-efficiency retrofits. But as customers become more concerned with a product's carbon footprint, and a price on carbon boosts shipping costs – a large diesel-powered cargo ship can emit as much CO2 in a year as a medium-sized coal plant – we do expect the localization of clean-tech manufacturing jobs to be a growing trend.

Top Headlines

REpower Announces New Denver Headquarters for U.S. Subsidiary

Vestas Expands Wind Turbine Manufacturing in China and U.S. as British Demand Collapses

Wind Energy Manufacturing Boom Taking Shape in The U.S.

Suntech Power Looks for Factory Space in the U.S.

Arizona-Made Solar Panels Hit Market

U.K. Consumers Continue to Demand Lower Carbon Despite Ongoing Financial Crisis

Related Job Titles

- Biomass Collector, Separator, and Sorter
- Senior Power Systems Engineer
- Solar Fabrication Technician
- Wind Turbine Blade Composite Material Specialist
- Wind Turbine Generator Builder

Select Organizations to Watch

Aquamarine Power
www.aquamarinepower.com

Clipper Windpower
www.clipperwind.com

REpower Systems
http://www.repower.de/index.php?id=347&L=1

Suntech Power
www.suntech-power.com

Vestas Wind Systems
www.vestas.com

5. THE NEXT BIG THING IN IT JOBS: NETWORKING THE GRID

The smart grid has become one of the hottest areas of clean tech. What is it? Well, it's a lot of things, ranging from enhanced grid monitoring and renewable energy integration to smart meter networking and consumer energy management. Deployment of these upgrades to the world's electrical grids will require an enormous amount of manpower – and this means jobs.

There will be plenty of opportunities for traditional grid workers: installing smart meters, building transmission and distribution networks, and integrating new generation capacity. But the heart of the smart grid is in the digital management of data, not unlike the Internet. With even more potential nodes than the Internet, however, the smart grid will be the mother of all networks, placing the work of creating smart grids largely on the shoulders of the IT community.

The smart grid will be the mother of all networks, placing the work of creating smart grids largely on the shoulders of the IT community.

Recognizing the smart grid as an IT-related challenge, some high-level IT executives are leaving traditional industry posts for leadership roles at emerging smart grid startups, a trend that is sure to continue. In mid-2009, Silver Spring Networks, a leading developer of grid networks, lured Judy Lin away from Cisco Systems where she had been senior vice president of the company's Ethernet switching technology group. She now serves as chief product officer for Silver Spring. Not long before Lin's move, John Spirtos left his post as senior vice president of Comverse Technology – a communication and billing software provider – to become head of corporate development and strategy at GridPoint, one of the top grid network platform developers.

In some cases, entrepreneurial spirit has led IT veterans to form their own companies. Consider Greenbox Technology (which was recently acquired by Silver Spring Network), founded by creators of the web multimedia platform Flash. Jon Gay, Peter Santangeli, Robert Tatsumi, and Gary Grossman left the Internet world behind in 2007 to pursue a solution to home energy management. Greenbox's web-based tool got a test run in early 2009 during an Oklahoma Gas & Electric smart grid pilot project. Ecologic Analytics is another example. Ecologic's current vice president and chief operating officer,

Profile:
Cisco Systems

Location

San Jose, California

www.cisco.com

Founded

1984

Employees

66,000 (100+ involved in smart grid)

Industry Role

The Internet technology giant serves many industries with its communication networking equipment and related services.

The Buzz

The company sees vast potential in smart grid technology and has been increasing exposure to the sector with its EnergyWise software, designed to reduce energy consumption for corporate customers, and the Cisco Smart Grid solution, a range of products and services to help utilities and energy companies deploy smart grid technologies.

Bankrollers

With a market cap exceeding $135 billion, Cisco trades on NASDAQ under the ticker CSCO. In June 2009, Cisco replaced General Motors as one of the thirty components in the Dow Jones Industrial Average.

Jobs Story

The company reports that it has more than 100 people working on smart grid-related activities and expects this number to grow as smart grid business escalates. Partnerships with Landis+Gyr and Duke Energy will catalyze smart-grid growth, creating additional opportunities across the industry.

Our Take

Cisco played a major role in the Internet revolution and wants to play a similarly significant role in the smart grid build-out. In May, Cisco said it expects smart grid technology to be a $20 billion a year market over the next five years. If the company hopes to capture a sizeable share of this opportunity, a good number of Cisco smart-grid jobs should be just around the corner.

Kristine Beck, cofounded the meter data management company in 2000 after spending nearly two decades in IT, most recently with the IT department of Minnesota-based utility Xcel Energy.

For non-executive IT professionals, grid-related jobs can be found at smart grid startups. But a growing number of opportunities are also emerging at traditional high-tech companies looking to capitalize on efforts to digitize the grid.

Cisco has emerged as an influential member of the smart grid community and currently offers a bundle of grid products, technologies, and services. The IP networking giant says it already has more than 100 employees dedicated to work on the smart grid and expects this number to grow as business picks up. In August, IBM announced a partnership with energy-data-network-developer Trilliant to improve integration of smart grid software. IBM 's grid ambitions can also be seen in the Mediterranean island nation of Malta, where the company is creating the world's first nationwide smart grid. And Google and Microsoft have taken their fight from search engines to home energy management with the release of competing energy management products, Google's PowerMeter and Microsoft's Hohm.

The growing smart grid market has some serious job creation potential. A January 2009 report by KEMA, Inc., an energy consulting firm, estimated that in the U.S. alone, smart grid development efforts could create up to 280,000 direct jobs between now and 2012. IT veterans and novices, recognizing the smart grid's potential, are shifting attention to this booming industry. The smart grid scale-up demands a workforce that can handle the technical challenges of bringing 21st century networking capabilities to our vast and largely antiquated energy infrastructure. Given these circumstances, it's easy to see that the future of the smart grid belongs to the IT professional.

Top Headlines

Trilliant and IBM Join Forces on Smart Grid Software Solutions

IT Companies Helping Make Smart-Grid Vision a Reality

Cisco Teams with Swiss Company on Smart Grid Projects

Grid Net Funding Round Includes Intel

San Diego Utility's Smart Grid Plans: Cisco, IBM, WiMAX, DOE Funds

Oracle Rumbles into Smart Grid Software Market

Related Job Titles

- Advanced Metering Engineer
- Energy Analytics Manager
- Grid Application Systems Analyst
- Lead Architect – AMI and Smart Grid Technology
- Network Operations Center (NOC) Technician
- Smart-Grid Solution Expert

Select Organizations to Watch

Cisco Systems
www.cisco.com

IBM
www.ibm.com

Silver Spring Networks
www.silverspringnetworks.com

Tendril Networks
www.tendrilinc.com

Trilliant
www.trilliantinc.com

THE ROAD AHEAD: FIVE U.S. MODELS FOR PUBLICLY FINANCING CLEAN-TECH JOB CREATION

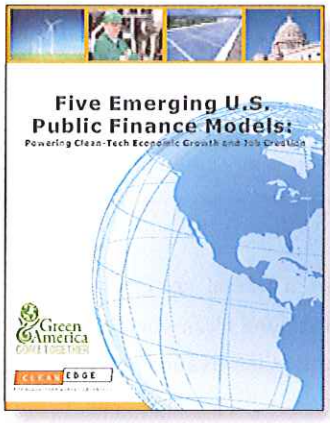
In today's challenging economic climate, government actions to get capital flowing again have taken center stage. The United States' $787 billion stimulus plan, officially the American Recovery and Reinvestment Act (ARRA) of 2009, is one of the most prominent examples, along with stimulus efforts in other countries such as Germany and Japan. And China, by all measures, is vying to be a clean-tech powerhouse by investing heavily in its nation's build out of clean technologies. China is now home to a plethora of solar photovoltaic (PV) manufacturers, burgeoning large-scale wind farms, and the largest concentration of solar hot water heaters in the world. According to numerous reports, the Chinese government could end up spending U.S. $440 billion to $660 billion toward its clean-energy build out over the next ten years.

The clean-energy sector also needs innovative new finance models that leverage public and private capital to fund industry growth.

But government stimulus plans alone cannot guarantee success. The clean-energy sector also needs innovative new finance models that leverage public and private capital to fund industry growth and projects large and small. In order to gain the benefits of the clean-tech revolution – from job creation and energy security to climate solutions and the creation of a 21st century economy – the United States needs new financial instruments that can provide the capital necessary for the rapid expansion of clean-tech industries. Fortunately, a growing number of innovative new ideas for U.S.-based public financing of clean tech provide both promise and hope.

Below is a quick overview of the five of the most promising public financing models:

- Clean Energy Deployment Administration (CEDA) aka The Green Bank
- Clean Energy Victory Bonds
- Tax Credit Bonds
- Federal Loan Guarantees
- Clean Tech City Funds



To learn more about the financing models overviewed on these pages, see our companion report *Five Emerging U.S. Public Finance Models: Powering Clean-Tech Economic Growth and Job Creation.* Published in partnership with Green America, the report can be downloaded at www.cleanedge.com and www.greenamericatoday.org. In the full report, we review each of the financing models in depth, including their history, current state of activity, and potential impact on clean-tech economic growth and job creation – along with visual flow charts and further recommended reading.

MODEL #1: CLEAN ENERGY DEPLOYMENT ADMINISTRATION (THE GREEN BANK)

The Clean Energy Development Administration (CEDA), aka The Green Bank, is a relatively new concept for public clean-energy financing. Plans for CEDA are working their way through the U.S. House and Senate, via provisions in both chambers' versions of pending energy legislation, and the idea has picked up considerable bipartisan support. The bank could fund a range of renewable energy, energy efficiency, and low-carbon solutions. And most important, the bank is projected to leverage public funding by a factor of 10 to 20, so $10 billion invested by the bank could result in $100-$200 billion in total public and private investment by utilizing traditional loans, loan guarantees, and credit enhancement provisions.

While the concept of a green bank is new to energy, it isn't new to the U.S. Similar government investments have supported private enterprise in the past, from the build out of railroads in the 19th century to the development of ARPANET, the precursor to the Internet. And there's a rich history of quasi-governmental organizations that support investments, including the Export-Import Bank of the United States, the Overseas Private Investment Corporation, and the CIA's not-for-profit venture capital arm In-Q-Tel.

MODEL #2: CLEAN ENERGY VICTORY BONDS

The concept of Victory Bonds isn't new. Most notably during World War II, similar bonds were sold in the U.S., Canada, and other nations to support the war effort. Between 1941 and 1946, 85 million Americans, approximately 60 percent of the total U.S. population at the time, invested a cumulative $185 billion in so-called "war bonds" (more than $2 trillion in todays dollars). In Canada, Victory Bonds raised approximately $12.5 billion for that nation's war effort during WWII, with rates ranging between 1.5 and three percent.

A number of initiatives are currently underway worldwide to replicate the war bond concept. The World Bank, along with Scandinavian bank SEB and several other institutions, raised more than $350 million for the first round of "green bonds" in late 2008 with interest rates of around 3 percent. Similarly, in 2007, the European Investment Bank (EIB), a nonprofit long-term lender in the EU, issued more than 1 billion euros worth of its AAA-rated Climate Awareness Bonds.

Clean Energy Victory Bonds could potentially democratize the financing of clean tech. In today's investment environment, a bond that returns between 3 to 5 percent annually, supports clean-energy development and national security, and is backed by the U.S government should prove popular.

MODEL #3: TAX CREDIT BONDS

There are several types of federal bonds that offer bondholders a federal tax credit partially or fully in lieu of interest payments. Three with the best potential to fund clean-energy projects and create jobs include Clean Renewable Energy Bonds; Qualified Energy Conservation Bonds; and Build America Bonds (BABs).

With each model, the Internal Revenue Service essentially authorizes a bonding authority (such as a city, state, or Native American tribal government) to issue federal tax credits as payments to a bond buyer. This gives the bonding authorities additional options for raising the money necessary to fund bonded projects in energy, transportation, construction, and other areas. BABs, in particular, have proven extremely popular, because in place of a tax credit, bond issuers may opt for a BAB-Direct Payment and receive a direct federal subsidy instead. BABs have not yet been used for clean-energy projects, but have plenty of untapped potential to make that happen.

MODEL #4: FEDERAL LOAN GUARANTEES

Government loan guarantees have a long history. Bringing this legacy to clean energy, the U.S. Department of Energy's Loan Guarantee Program, established in the Energy Policy Act of 2005, sounded great in theory and simple in concept. For a range of clean-energy-related projects, the feds would act as a guarantor for banks and other lenders who might balk at a loan because of project uncertainty, default risk, lack of traditional collateral, or other reasons. But an expensive and laborious application process, onerous red tape, lack of DOE emphasis, and the need to hire outside consultants, lobbyists, and legal counsel just to navigate the process kept most prospective recipients away from the program.

Recent deals, however, show a strong ray of hope for what the loan guarantee program can achieve. A recent DOE guarantee of $535 million to solar PV panel maker Solyndra will help fund the first phase of its new PV manufacturing plant in Fremont, California. President Obama and Secretary of Energy Dr. Steven Chu have been much more aggressive in supporting the program, and in July 2009 Chu announced an additional $30 billion in DOE loan guarantees, plus $750 million for electric transmission projects that commence before 2011. Other recent loan guarantee recipients include wind energy developer Nordic Windpower USA, energy storage technology provider Beacon Power, and auto manufacturers Ford, Nissan North America, and Tesla Motors to speed development of electric and fuel-efficient vehicles.

MODEL #5: CITY FUNDS

Among the more innovative clean-energy financing models in the U.S. are city-administered loan funds springing up from coast to coast. Particulars vary considerably from city to city, but in the basic model, homeowners borrow the funds necessary to pay for a solar array or an energy efficiency upgrade – then repay the loan (often at below-market rates) over a long-term period through their property tax or utility bill.

Cities at the forefront of this model include Berkeley, California; Portland, Oregon; Cambridge, Massachusetts; and Boulder, Colorado. Many examples are also emerging at the state level, with Colorado, Connecticut, New Jersey, Oregon, and Pennsylvania among those weighing plans.

To learn more about the financing models overviewed on these pages, see our companion report *Five Emerging U.S. Public Finance Models: Powering Clean-Tech Economic Growth and Job Creation*. Published in partnership with Green America, the report can be downloaded at www.cleanedge.com and www.greenamericatoday.org.

JOB RESOURCE GUIDE

Job Reports

Check out the reports below to learn more about clean-tech job growth potential and associated economic benefits **(titles link to the report PDFs)**.

The Clean Energy Economy

The Pew Charitable Trusts - June 2009
Pew's exploration of America's clean-energy economy includes a look at the growth of clean-energy jobs from 1998 to 2007. States are ranked by job and business presence, investment totals, patent activity, and rate of growth.

Defining, Estimating, and Forecasting the Renewable Energy and Energy Efficiency Industries in the U.S. and in Colorado

ASES and Management Information Services - December 2008
As the title explains, this report by the American Solar Energy Society defines, estimates and forecasts the renewable energy and energy efficiency industries in the U.S. and Colorado under three scenarios.

The Economic Benefits of Investing in Clean Energy

Center for American Progress and PERI - June 2009
This paper looks at how the American stimulus and proposed climate legislation will affect jobs, income, and the clean-energy economy.

How to Revitalize America's Middle Class With the Clean Energy Economy

Blue Green Alliance - June 2009
This policy brief is an update of a 2006 analysis and is designed to highlight the economic benefits that renewable energy development can bring to regions throughout the country.

U.S. Metro Economies: Current and Potential Green Jobs in the U.S. Economy

Global Insight - October 2008
This report examines the economic benefits of the 'Green Economy'. Current green jobs are discussed, along with potential future job growth in areas like renewable power generation, energy efficiency, and renewable transportation fuels.

Wind Energy and Green Jobs

Governors' Wind Energy Coalition - February 2009
GWEC profiles the economic benefits of wind energy and provides policy recommendations which it believes will help states meet the full economic potential from wind energy.

Books

These books are a useful way to navigate the clean-tech industry and find the best strategies to land a job.

Careers in Renewable Energy

Careers in Renewable Energy
With overviews of several renewable energy sectors and information about different career opportunities, this book is a good starting point for anyone looking for a job in the industry.

The Clean Tech Revolution

Ron Pernick and Clint Wilder – Collins Business, 2007 (Paperback 2008)
Provides an excellent overview of the key drivers behind the shift to clean technology and highlights eight emerging clean-tech opportunities. A business-oriented crash course in clean technology.

The Complete Idiot's Guide to Green Careers

Barbara Parks, Jodi Helmer – Alpha, 2009
The popular book series tackles green jobs with this book that explores opportunities in several sectors in the clean-tech industry.

Green Careers: Choosing Work for a Sustainable Future

Jim Cassio – New Society Publisher, 2009
This book provides several sector overviews, information on career opportunities, job search resources, and case studies on environmental jobs.

Green Careers – WetFeet Insiders Guide

Frank Marquardt – WetFeet.com, 2008
Marquardt, who more recently authored The Solar Job Guide e-book, looks at how to land a job in emerging green industries.

The Green Collar Economy

Van Jones – HarperOne, 2008
Written by Green for All founder Van Jones, this book presents a blueprint of how a "green new deal" can simultaneously tackle environmental and socio-economic challenges, creating thousands of jobs in the process.

Green Jobs: A Guide to Eco-Friendly Employment

A. Bronwyn Llewellyn – Adams Media, 2008
A useful text, this book breaks down opportunities in many industries for people interested in environmentally conscious careers.

The Solar Job Guide

Frank Marquardt – 2009
For those specifically interested in the solar field, this e-book gives a detailed look at the industry and provides useful information on how to land a solar job.

JOB RESOURCE GUIDE

Blogs

Blogs are a great way to keep up with the latest news and gather insight from some of the brightest minds following the industry. Below is a sampling of what we feel are some of the best clean-tech blogs. To track these and other industry blogs, visit www.cleanedge.com/blogs.

Apollo Alliance Blog	Green Tech Pastures – ZDNet
earth2tech	R-Squared Energy Blog
Green Collar Blog	Clean Techies
Green Tech – CNET	Environmental Capital - WSJ
Green Light – Greentech Media	Gunther Portfolio
Clean Technica	Green Inc – NYT
EcoGeek.org	Venture Beat – Green Beat
Green for All Blog	

Conferences/Career Fairs

Here are a few of the best events at which to explore clean-tech opportunities and support the clean energy economy.

Good Jobs, Green Jobs	Green Career Conference (SD, SF, LA)	Green Professionals' Conference

Networking Organizations & Nonprofits

Job postings aren't the only way to find jobs. Often times the best career opportunities are found through someone you know. Check out these organizations and events to make sure you're meeting the right people.

Networking	Nonprofits
Eco Tuesday	Apollo Alliance
Green Drinks	Green America
Net Impact	Green For All
Renewable Energy Business Network	Repower America

JOB RESOURCE GUIDE

Education/Training

As the clean-tech industry scales up, the number of job opportunities will grow significantly. Education and training programs will provide the necessary workforce to satisfy this growth. The collection below, while not a comprehensive list, is a sampling of existing clean-tech training and education programs.

Undergraduate Education

Appalachian State University (Boone, NC) – Bachelor of Science Degree in Appropriate Technology
Illinois State University (Normal, IL) – Renewable Energy Degree
Oregon Institute of Technology (Klamath Falls, OR) – Bachelor of Science Degree in Renewable Energy Engineering

Community College/Continuing Education/Training

Amarillo College (Amarillo, TX) – Associate in Applied Science, Renewable Energy
Bronx Community College (Bronx, NY) – Center for Sustainable Energy
California Sustainable Building Training Program (CA)
Coconino Community College (Flagstaff, AZ) - Associate of Applied Science in Alternative Energy Technology
Columbia Gorge Community College (The Dalles, OR) – Associate of Applied Science Degree in Renewable Energy Technology
Indian Hills Community College (Ottumwa, IA) – Associate in Advanced Technologies – Renewable Energy Technology & Smart Grid
Lane Community College (Eugene, OR) – Sustainability Program
Laramie Community College (Cheyenne, WY) – Associate of Applied Science Degree in Wind Energy
Oakland Community College (Bloomfield Hills, MI) – Environmental Systems Technology Program
San Juan College (Farmington, NM) – Associate of Applied Science Degree in Renewable Energy
Solar Living Institute (Hopland, CA)
South Plains College (Levelland, TX) – Renewable Energy – Wind Technology Program
Wayne-Finger Lakes Board of Cooperative Educational Services (NY) – New Vision Renewable Energy Program

Graduate Education

Antioch University (Keene, NH) – MBA in Organizational and Environmental Sustainability
Arizona State University (Tempe, AZ) – School of Sustainability
Bainbridge Graduate Institute (Bainbridge Island, WA) – MBA in Sustainable Business
Denmark Technical University (Copenhagen, Denmark) – MSc in Wind Power
Dominican University of California (San Rafael, CA) – MBA in Sustainable Enterprise
Duquesne University (Pittsburgh, PA) – MBA in Sustainability
Humboldt State University (Arcata, CA) – Bachelor of Science and Masters of Science in Environmental Resources Engineering
Illinois State University (Normal, IL) – Renewable Energy Program
Marylhurst University (Marylhurst, OR) – MBA in Sustainable Business
Oregon State University (Corvallis, OR) – MBA in Sustainable Business Practices
Oregon State University (Corvallis, OR) – Northwest Marine Renewable Energy Center (Master of Ocean Engineering
Portland State Univsersity (Portland, OR) – MBA with Sustainability Concentration
Presidio Graduate School (San Francisco, CA) – MBA in Sustainable Management
Slippery Rock University (Slippery Rock, PA) – M.S. in Sustainable Systems
Texas Tech University (Lubbock, TX) – Ph.d in Wind Science and Engineering
University of Michigan (Ann Arbor, MI) – MBA/MS Program in Global Sustainable Enterprise
University of Nebraska (Lincoln, NE) – Center for Energy Sciences Research
University of Washington (Seattle, WA) – Bioresource-Based Energy for Sustainable Engineering Laboratory
University of Wisconsin (Madison, WI) – Solar Energy Laboratory
Washington State University (Pullman, WA) – Renewable Energy Program

European Master in Renewable Energy (Core curriculum providers):

- Ecole des Mines de Paris, France
- Loughborough University, UK
- University of Zaragoza, Spain
- Oldenburg University, UK

Specializations for European Master in Renewable Energy:

- Energy Conservation in Buildings Specialization - University of Athens, Greece
- Hybrid Systems Specialization – Kassel University, Germany
- Wind Specialization – National Technical University of Athens, Greece
- Photovoltaics Specialization – University of Northumbria, UK
- Bioenergy –Specialization – University of Zaragoza, Spain

JOB RESOURCE GUIDE

Social Media

Social media websites are becoming a popular way for companies to find employees and job seekers to find jobs. LinkedIn, in particular, is a useful tool for anybody searching for the latest available clean-tech employment opportunities.

LinkedIn Groups:		
Clean Edge Jobs	Clean Technology Job Network	CleanTechies Around the World
Cool Climate Jobs	Energy Professionals	Green Jobs & Career Network
Greenfoot Jobs	Green Tech	Power Generation Careers
Renewable Energy Jobs	Renewables Job Market	Utility Jobs

Job Boards

The number of clean-tech specific job websites seems to be increasing exponentially, but there are some clear leaders. Listed below are twenty of the best online job boards where you can find the latest clean-tech job opportunities

ACORE Job Finder	Grist Jobs
Careers in Wind (AWEA)	RenewableEnergyWorld.com
Clean Edge Jobs	SolarJobs.com
CleanLoop	SustainJobs.com
CleanTechies	SustainLane: Green Collar Jobs Board
Cool Climate Jobs	Technical Green
Green Dream Jobs	TreeHugger: Job Board
GreenBiz.com	U.S. Green Building Council
GreenJobs.com	ECO Canada
GreenJobsSearch.org	RenewableEnergyJobs.com

Metropolitan Area Market Analysis (MAMA)

Data as of 2009 Q2

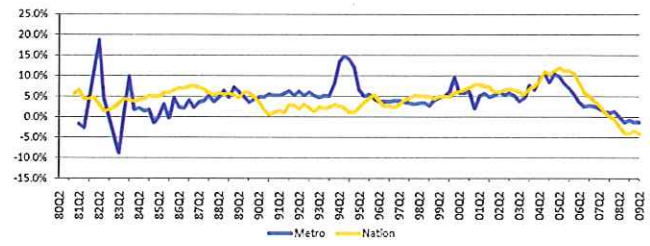
Madison, WI

Metropolitan Statistical Area

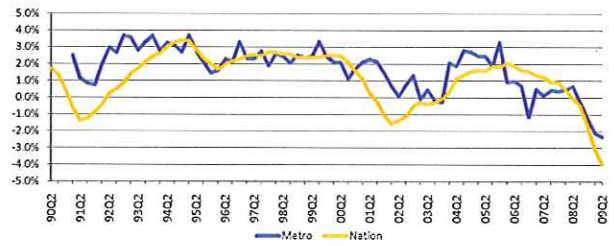
● = High Alert
◑ = Warning
○ = Normal

High Risk Indicators	vs. History	vs. Control	Value Relative to Metro Historical Average	Metro Value Relative to Control
Home Prices:	●	●	1-yr Home Price Appreciation (Very Low), 3-yr Home Price Appreciation (Very Low)	Current 1-yr HPA < 0%
Employment:	●	●	Y/Y Employment Growth (Very Low), % Receiving UI Benefits (Very High), Y/Y Δ % Receiving UI Benefits (Very High)	Y/Y Employment Growth < 0%
Affordability:	○	○	Normal	Home Prices Not Overvalued
Housing Inventory:	◑	○	Total Vacancy Rate (High), Housing Inventory / # Households (Very High)	Total Vacancy Rate < 11%
Credit Conditions:	●	○	60+ Delinquency Rate (Very High), 90+ Delinquency Rate (Very High), Foreclosure Rate (Very High)	60+ Delinquency Rate < 2.5%

1-yr Home Price Appreciation Rate

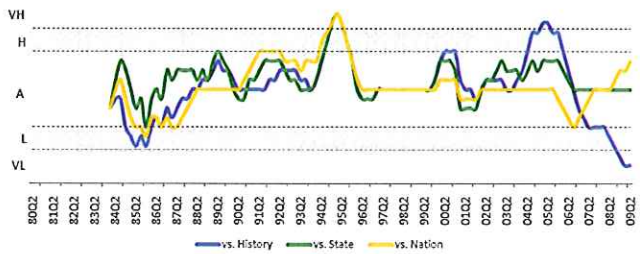


Y/Y Employment Growth



Note: Scale of axes may vary by metro area / state

1-yr Home Price Appreciation, 4Q MA



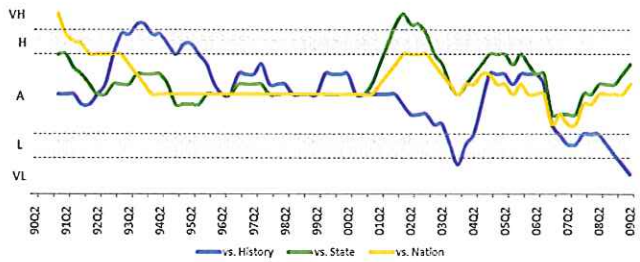
Home Prices

	Metro Comparisons vs. History	vs. State	vs. Nation
1-yr Home Price Appreciation	Very Low	Average	High
3-yr Home Price Appreciation	Very Low	Average	Average
Home Price Acceleration	Average	Average	Average

	Metro	State	Nation
1-yr Home Price Appreciation	-1.2%	-1.6%	-4.0%
3-yr Home Price Appreciation	1.0%	0.9%	-3.4%
Home Price Acceleration	0.0%	-0.5%	-0.6%

* Due to the low concentration of non-distressed purchase transactions in recent months, these FHFA home price growth rates are less informative.

Y/Y Employment Growth, 4Q MA

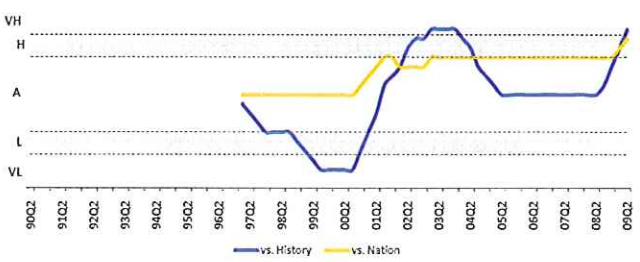


Employment

	Metro Comparisons vs. History	vs. State	vs. Nation
Y/Y Employment Growth	Very Low	Very High	High
% Receiving UI Benefits [1][2]	Very High	N/A	Very High
Y/Y Δ % Receiving UI Benefits [1][2]	Very High	N/A	High
Q/Q Δ % Receiving UI Benefits [1][2]	Very High	N/A	Very High

	Metro	State	Nation
Y/Y Employment Growth	-2.3%	-4.3%	-3.9%
% Receiving UI Benefits [1][2]	6.4%	6.4%	4.8%
Y/Y Δ % Receiving UI Benefits [1][2]	123.3%	123.3%	113.1%
Q/Q Δ % Receiving UI Benefits [1][2]	31.9%	31.9%	23.4%

% Receiving UI Benefits[1][2], 4Q MA



Major Industry Concentrations

Top 3 Concentrations in Metro:	Metro	State	Nation
Government	23.8%	15.5%	16.7%
Wholesale / Retail Trade	14.6%	15.0%	15.5%
Education / Health Services	10.7%	15.0%	14.6%
Total for Top 3	49.1%	45.5%	46.8%

High Concentration Relative to State:	Metro	State	Nation
Government	23.8%	15.5%	16.7%
Finance Activities	7.8%	5.8%	6.1%
Professional / Business Services	10.6%	9.3%	13.2%

High Concentration Relative to Nation:	Metro	State	Nation
Government	23.8%	15.5%	16.7%
Finance Activities	7.8%	5.8%	6.1%
Other Services	5.4%	4.8%	4.1%

[1] State-Level Data; Comparison vs history based on state-level rates
[2] Different than BLS unemployment rate; Continuing unemployment insurance benefits/covered employment
Note: 4Q MA = 4-qtr Moving Average, Δ = Change, UI = Unemployment Insurance

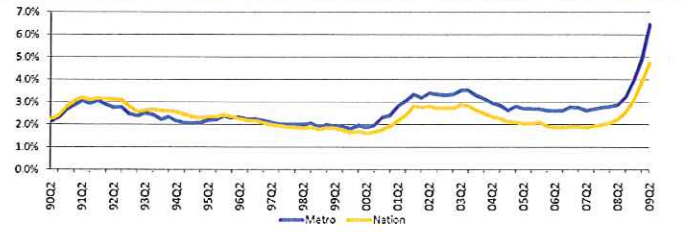
Metropolitan Area Market Analysis (MAMA)

Data as of 2009 Q2

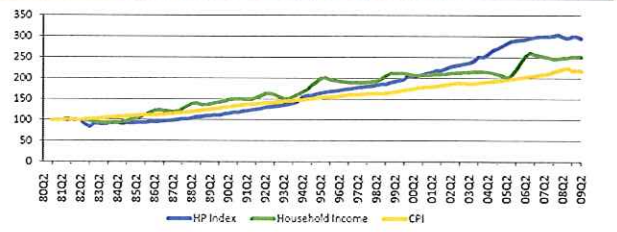
Madison, WI

Metropolitan Statistical Area

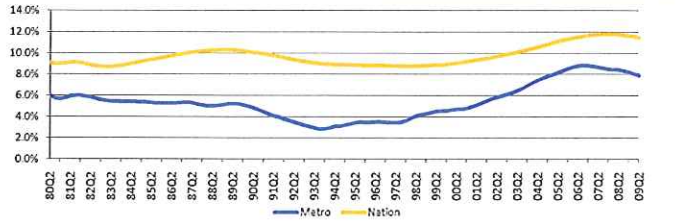
% Receiving UI Benefits[1][2]



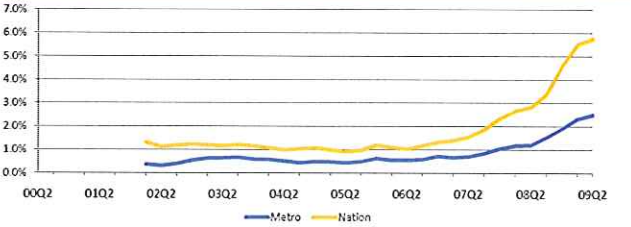
Balance Between Income & Housing Costs in Metro



Total Vacancy Rate

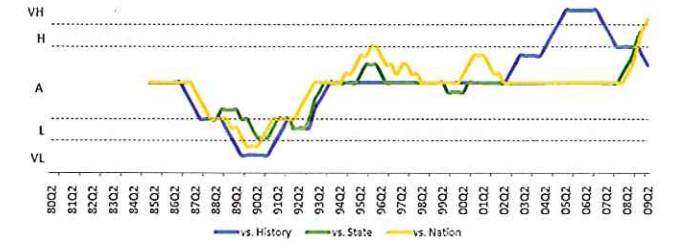


60+ Delinquency Rate (McDash)



Note: Scale of axes may vary by metro area / state

Home Price Valuation (RMIC), 4Q MA

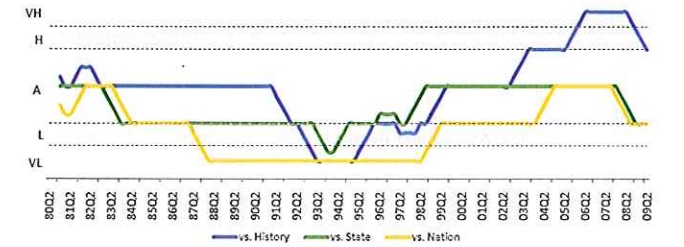


Affordability

	Metro Comparisons		
	vs. History	vs. State	vs. Nation
Home Price Valuation (RMIC)	Average	Very High	Very High
Affordability Index (NAR)	High	Very Low	Low
Median Home Price	High	Very High	Very High
Median Home Price / Household Income	High	Very High	High
(3-yr Home Price Δ) - (3-yr Income Δ)	Average	High	Very High

	Metro	State	Nation
Home Price Valuation (RMIC)		Proprietary	
Affordability Index (NAR)	166.8	206.1	190.2
Median Home Price	$214,932	$146,289	$165,179
Median Home Price / Household Income	3.7	2.9	3.3
(3-yr Home Price Δ) - (3-yr Income Δ)	-2.3%	-6.9%	-30.0%

Total Vacancy Rate, 4Q MA

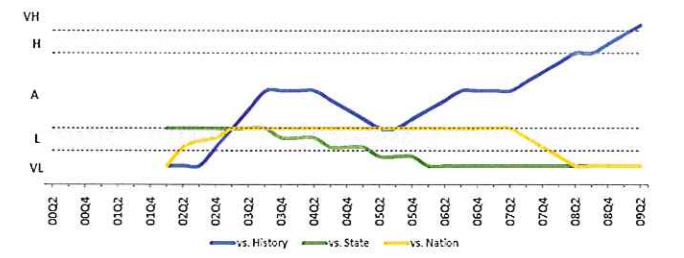


Housing Inventory

	Metro Comparisons		
	vs. History	vs. State	vs. Nation
Total Vacancy Rate	High	Low	Low
1-yr Change Total Vacancy Rate	Low	Low	Low
Housing Inventory / # Households	Very High	Low	Low
% Owner Occupied	Average	Very Low	Low
Permits / 1000 Households	Average	High	Average

	Metro	State	Nation
Total Vacancy Rate	7.9%	14.6%	11.5%
1-yr Change Total Vacancy Rate	-6.4%	-1.7%	-2.5%
Housing Inventory / # Households	1.1	1.2	1.1
% Owner Occupied	56.5%	59.8%	58.9%
Permits / 1000 Households	6.4	5.5	5.6

60+ Delinquency Rate (McDash), 4Q MA



Credit Conditions

	Metro Comparisons		
	vs. History	vs. State	vs. Nation
30+ Delinquency Rate (McDash)	Very High	Very Low	Very Low
60+ Delinquency Rate (McDash)	Very High	Very Low	Very Low
90+ Delinquency Rate (McDash)	Very High	Very Low	Very Low
Foreclosure Rate (McDash)	Very High	Very Low	Very Low
Personal Bankruptcy Rate [1]	Very High	N/A	Average

	Metro	State	Nation
30+ Delinquency Rate (McDash)	4.4%	6.3%	8.8%
60+ Delinquency Rate (McDash)	2.5%	3.6%	5.8%
90+ Delinquency Rate (McDash)	1.7%	2.5%	4.2%
Foreclosure Rate (McDash)	1.9%	4.1%	4.1%
Personal Bankruptcy Rate [1]	1.3%	1.3%	1.3%

[1] State-Level Data; Comparison vs history based on state-level rates

[2] Different than BLS unemployment rate; Continuing unemployment insurance benefits/covered employment

Note: 4Q MA = 4-qtr Moving Average, Δ = Change, UI = Unemployment Insurance