County Economic Development at a Glance: A Single Measure of Opportunity

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Introduction

The U.S. West is rich in renewable resources. Areas with high quality renewable energy resources as well as those targeted for new transmission facilities comprise a variety of economic circumstances. Proposed transmission lines that link remote renewable energy to grid hubs and load centers necessarily traverse a variety of counties along their routes, with longer transmission lines such as the TransWest Express crossing more than a dozen counties on its way from central Wyoming through Colorado and Utah to its destination in Clark County, Nevada.

In a companion paper in this issue, we discuss why the revenue opportunity from future renewable energy development varies within the region. There are two main variables at play: differences in existing condition and differences in revenue collection. Here, we provide a new approach to describing county-level economic condition and discuss its implications for understanding the renewable energy opportunity in the rural West. The goal of this brief is to describe the county-level index and promote its practical application by economic development and policy specialists in the West.

A County-Level Index of Economic Opportunity

In terms of existing conditions and economic opportunity, during the last four decades the fortunes of counties in the West have diverged significantly. Rural and micropolitan areas able to capture the dynamic growth associated with the new "knowledge" economy and amenity-driven migration have led the nation in population and income growth (Rasker et. al. 2009, Moretti 2012). In other counties, rapid growth in oil and gas development has added prosperity where it did not previously exist. Not all rural Western counties, however, have been able to create a diverse, robust, and resilient economy with a healthy tax base. Poverty, low-paying jobs, lack of education, isolation from markets, and difficulties competing in expanding service industries are persistent challenges for some counties (Gude et al. 2012).

The coarse-scale county-level index we present here provides a quick way to categorize county opportunities and challenges according to the dynamics described above. This index is valuable as a basic screen that ranks counties relative to others according to multiple economic variables that consider performance as well as opportunity. It compares to other products like USDA's county typology codes, but has the advantage of not being industry- or sector-specific.[2] The companion article to this one uses this index to demonstrate that many, although not all, rural counties with high levels of renewable energy resources are also counties that have few other economic opportunities (see companion article, Table 2). The index is portable across a variety

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[2] The USDA reports that it will issue a complete update to the county typology codes sometime in 2014. See: http://www.ers.usda.gov/data-products/county-typology-codes.aspx (access 8-9-2014).

of policy analyses that benefit from a simplified, yet informed approach to differentiating western counties.

Methods: County Economic Opportunity Scores

The methods explained below offer a straightforward approach to measuring economic need and development potential. The metrics used for the formula are readily available nationwide for all counties from data published by federal agencies.

Measures of Economic Performance:

A. Median Household Income: The sum of money received by household members 15 years old and over. It includes wage and salary income; self-employment income; interest, dividends, or net rental or royalty income from estates and trusts; Social Security and Railroad Retirement income; Supplemental Security Income, public assistance or welfare payments; and retirement, survivor, or disability pensions.[3]

   The advantage of median household income is that is a comprehensive measure of all the sources of income, measured at the household level. The disadvantage is similar to the use of PCI in instances when household income is made up largely of non-labor sources. For this reason, an additional labor-related measure is needed.

B. Average Earnings Per Job: The total earnings divided by total full-time and part-time employment.[4] The advantage of this measure is that it indicates the relative quality of jobs available in a county. The limitation is that this metric does not measure whether the job is dangerous, high turnover, predictable and stable in the long term.

C. Percentage of Families Above the Poverty Level: The U.S. Bureau of the Census uses a sophisticated technique for measuring poverty for different family configurations. For example, the poverty threshold in 1999 for a family of four with two children less than 18 years was determined to be an annual income of $16,954.[5] A disadvantage of this metric is that it does not account for differences in local cost of living.

Measures of Economic Potential:

D. Percentage of the Population with a Bachelor's Degree or Higher: The percentage of the population 25 years or older who have earned at least a bachelor's degree.

   Education is one of the most important indicators of the potential for economic success, and lack of education is closely linked to poverty. Studies show that areas whose workforce has

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[3] For the full definition of Median Household Income, see the U.S. Bureau of the Census, American Fact Finder Web Site Glossary, online: http://factfinder2.census.gov/help/en/american_factfinder_help.htm (accessed 8-9-2014).

[4] For the full definition of Average Earnings per Job, see the Bureau of Economic Analysis, U.S. Department of Commerce: http://www.bea.gov/regional/definitions/ (last accessed 8-9-2014).

[5] The U.S. Census Bureau follows the Office of Management and Budget's (OMB's) Directive 14, meaning that it uses a set of money income thresholds that vary by family size and composition to determine who is in poverty. If the total income for a family or unrelated individual falls below the relevant poverty threshold, then the family (and every individual in it) or unrelated individual is considered in poverty. See the U.S. Bureau of the Census, American Fact Finder Web Site Glossary, online: http://factfinder2.census.gov/help/en/american_factfinder_help.htm (accessed 8-9-2014).

a higher-than-average education level grow faster, have higher incomes, and suffer less during economic downturns than other regions.[6] Education rates make a difference in earnings and unemployment rates. In 2009, the average weekly earnings for someone with a bachelor's degree was $1,025, compared to $626 per week for someone with a high school diploma. While in 2009 the unemployment rate among college graduates was 5.2 percent, for high school graduates it was 9.7 percent.[7]

E. County Typology—Degree of Isolation from Markets: Counties are classified as belonging to one of five categories: Central Metropolitan Statistical Area, Outlying Metropolitan Statistical Area, Central Micropolitan Statistical Area, and Outlying Micropolitan Statistical Area. A fifth category for all other counties is Rural.[8]

One of the principle determinants of economic success for a county is the ability of its businesses to trade with market centers and of its residents to work in centralized population centers. For example, someone living in a Core Metropolitan Area, or a nearby Outlying Metropolitan Statistical Area, has different employment opportunities from someone who lives in a Rural area. The five categories delineated above serve as a continuum from most densely populated to most sparsely populated. This typology serves as a measure of the degree of connection to markets, including labor markets.[9]

Definitions:
Metropolitan Statistical Areas: counties that have at least one urbanized area of 50,000 or more population, plus adjacent territory that has a high degree of social and economic integration with the core as measured by commuting ties. Counties in Metropolitan Statistical Areas are classified as either central or outlying.

Micropolitan Statistical Areas: counties that have at least one urban cluster of at least 10,000 but less than 50,000 population, plus adjacent territory that has a high degree of social and economic integration with the core as measured by commuting ties.

Micropolitan Statistical Areas are classified as either central or outlying.

Rural: counties that are not designated as either metropolitan or micropolitan.

Central Areas: counties that contain the urban core of metropolitan and micropolitan areas.
Outlying Areas: counties adjacent to metropolitan or micropolitan central counties that have a high degree of social and economic integration with the urban core, as measured by commuting to work.[10]

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[6] For information on the relationship between level of education, earnings, year-round employment, and unemployment rates, see Day and Newburger 2002. For a review of other metrics of economic well-being see Chapple and Lester 2010.
[7] The wage and unemployment effects of education are available from the Bureau of Labor Statistics: http://www.bls.gov/emp/ep_chart_001.htm (last accessed 10/23/10).
[8] For a discussion of the importance of access to markets, see Rasker st al. 2009. Also see Headwaters Economics' "Three Wests" web page, which provides information on three distinct types of counties in the American West as measured by access to markets. www.headwaterseconomics.org/3wests.php. A useful article on metro and non-metro income levels and inequality is McLaughlin 2002.
[9] *Ibid*, Rasker et al., 2009.
[10] Definitions of county typologies can be found at the U.S. Census Bureau web page for Metropolitan and Micropolitan Statistical Areas, http://www.census.gov/population/www/metroareas/metroarea.html (last accessed 8-9-14).

Methods Used to Develop Maps

Figure 1 (next page) maps the index scores of county opportunity in the West by quintiles, ranking economic performance and development potential, from best (black) to worst (lightest gray), based on the following approach.

The five variables listed above are gathered for every county in the West. The variables are first normalized by recalculating each variable to a zero to one index by dividing the individual county values for each variable by the highest value for that variable for the latest year (for example, Index Household Income for Clark County, Idaho = Household Income (Clark County / Highest Household Income (Douglas County, CO).

A combined economic performance index was calculated for each county as:

$$\text{Combined Index} = \left(\frac{MHI_{i,j}}{MHI_{max,j}} + \frac{EPJ_{i,j}}{EPJ_{max,j}} + \frac{Poverty\%_{i,j}}{Poverty\%_{max,j}} + \frac{Bachelors\%_{i,j}}{Bachelors\%_{max,j}} + Type\ Score\right)$$

Where:

i = Local unit of government
j = Year
MHI = Median Household Income
EPJ = Average Earnings per Job
Poverty% = Percent of families above poverty
Bachelors% = Percent of individuals with bachelor's degree or higher
Type = County typology

To calculate the economic performance score, each unit's combined economic index was assigned a percentile rank relative to all the other unit's combined economic index. The percentile rank for each unit of local government's combined economic performance index is calculated as:

Percentile Rank = (100 * (i - 0.5)) / n

Where:

i = the rank of the unit's combined index score
n equal the total number of governmental units.

The economic performance score is calculated based on the percentile rank as:

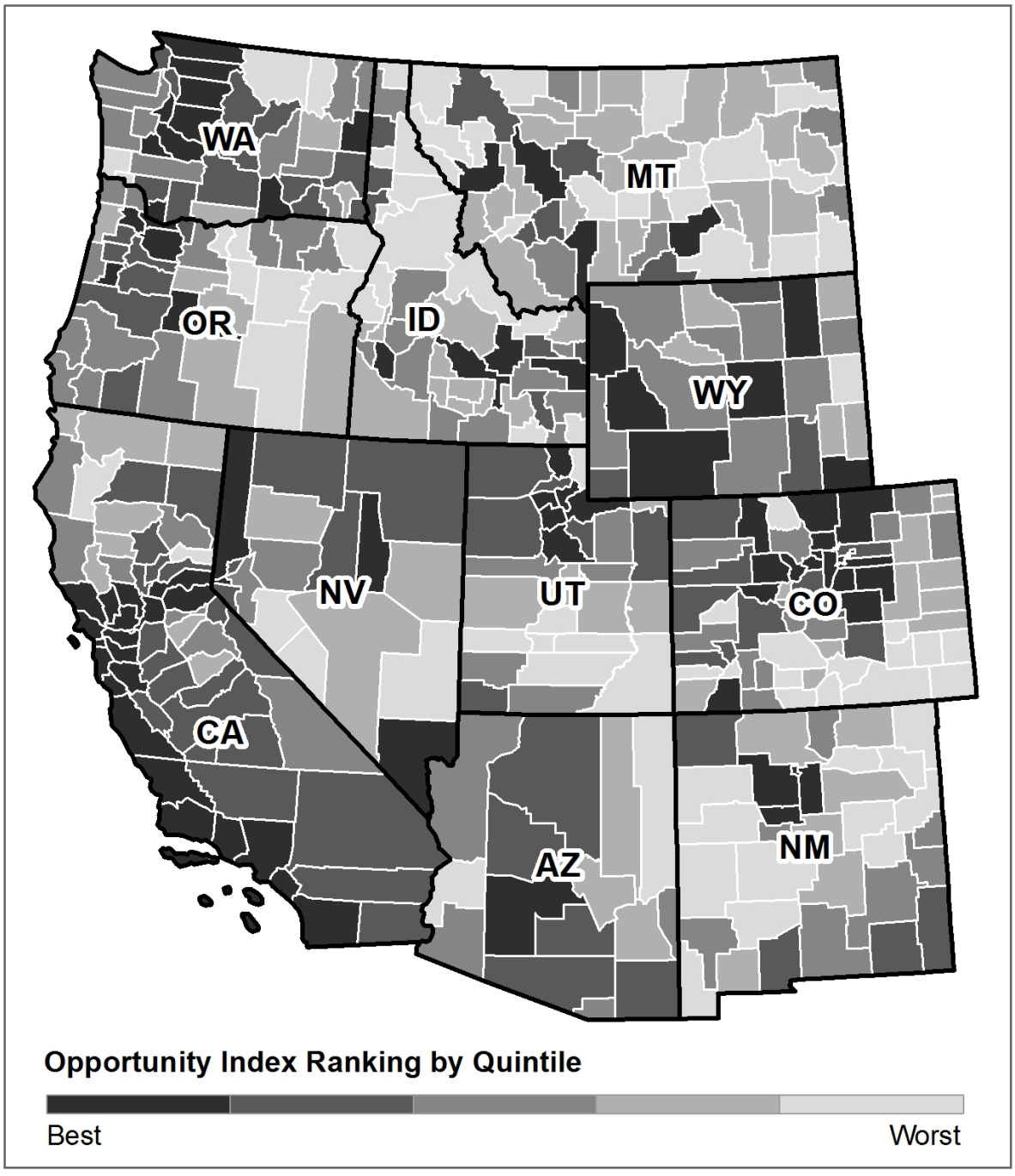
Economic Performance Score = (Percentile Rank – 0.5) * 0.4 + 1

For example, the 75th percentile county receives a score of 1.1, calculated as:

(0.75 - 0.5) *.4 + 1 = 1.1

The result is an economic performance score for each county where the median county receives a score of 1, the highest performing county receives a score of 1.2, and the lowest percentile rank receives a score of 0.8. The map in Figure 1 sorts these scores into five quintiles.

Figure 1. County Opportunity Index



Map by Patricia Gude.

Implications for Economic Opportunities from Renewable Energy Facilities

The economic opportunity index can be a useful tool for policy analysis. By way of example, consider renewable energy development, frequently touted as a potential boon for the rural West (Druckenmiiller 2012). In order to evaluate the representation of underperforming, or economically challenged areas in renewable energy landscapes in the West, we used the economic opportunity index to conduct a simple screening.

We selected 20 counties in the West with the greatest number of acres of high quality solar resources and the 20 with the greatest wind resources, according to the Western Governor's Association's 2009 Western Renewable Energy Zone planning effort.[11] We then sorted these counties into quintiles. According to this very basic exercise, we can quickly confirm that with regard to both wind and solar development, areas with limited economic opportunity are well represented in potential renewable energy development areas. We can also note some important differences between the solar and wind areas. Table 1 provides an overview of this exercise.

Table 1. Economic Opportunity in Top Wind and Solar Counties

WIND COUNTIES				Pondera, MT	
				Platte, WY	Guadalupe, NM
				Sedgwick, CO	Glacier, MT
				Lincoln, NM	Blaine, MT
		Albany, WY		Cheyenne, CO	Prowers, CO
	Laramie, WY	Eddy, NM	Converse, WY	Teton, MT	Las Animas, CO
	Weld, CO	Kern, CA	Logan, CO	Torrance, NM	Baca, CO
	1	2	3	4	5
	<-- BEST ECONOMIC OPPORTUNITY WORST ->				
	1	2	3	4	5
SOLAR COUNTIES	Los Angeles, CA	Imperial, CA	Nye, NV	Luna, NM	Socorro, NM
	Maricopa, AZ	San Bernadino, CA	Iron, UT	Alamosa, CO	Hidalgo, NM
		Riverside, CA	Mohave, AZ		Esmerelda, NV
		Dona Ana, NM			Lincoln, NV
		Pima, AZ			La Paz, AZ
		Kern, CA			Millard, UT
					Beaver, UT

Of the top 20 counties in terms of total acres of high quality (class 4 and class 5) wind, more than half are among the West's most challenged counties in terms of economic opportunity. Among the top 20 counties in terms of acres of high quality (greater than 6.5 Daily Normal Insolation values) solar resources, there is more widespread distribution among opportunity categories, with both the most challenged and the most advantaged represented. Still, nearly

[11] This is not intended to predict the location of future development. The potential for renewable energy resources to support utility-scale projects is related not only to the quality of the resource, but many other factors as transmission access, demand, and so on. Still, this overlay serves as a way to emphasize the overlap between struggling remote rural areas in the West and high quality renewable energy resources. WREZ hub wind and solar data was obtained at the following URL: http://mercator.nrel.gov/wrez (username: wrez password: guest), 11/7/2012.

half of the West's best solar counties in terms of raw acreage are among the region's worst in terms of economic opportunity. Together this information confirms the presence of a possible opportunity in areas that could really use them. The analysis should then prompt policy makers to ask how these challenged areas might best take advantage of renewable energy development—this is the subject of our companion paper.

Summary

Coarse, county-level indices can be useful tools in policy analysis as simple ways to describe and differentiate county economies. The economic performance index described in this paper offers an aggregate, relative county ranking based on an analytically-informed set of variables that relate to performance as well as opportunity. The index complements, rather than replaces existing, more nuanced systems of county typologies though it has the advantage of not being industry- or sector-specific. As in the companion article to this one, the index can be used for policy analysis about county-level impacts of state policies.

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