An Index to Measure Sustainable Competitiveness

Sustainable Competitiveness means that a region is successful in its ability to retain human resources that are used to sustain economic prosperity balanced with improving social equity while preserving environmental quality. Further, sustainable competitiveness provides the focus necessary to maintain and or improve its competitive edge over time. Thus, a region's sustainable competitiveness requires the integration and balance of economy, environment and equity.

Everyone seems aware of globalization, but few realize that regions alone have the necessary scale and diversity to compete in the global marketplace. Also, our region must recognize that we compete with the world, whether we do it well or not, thus the ability to remain competitive with other regions is critical to the long run well being of San Diego.

Winners in this new competitive environment will be the regions that that can continually innovate. To innovate successfully, a region needs skilled individuals and if San Diego is to maintain its skilled work force and attract other skilled individuals, the region's leaders must learn to work together to build affordable housing, relieve traffic congestion, preserve open space and promote economic development. If government is going to be effective in this new age, we are going to have to start thinking regionally and benchmarking our performance in three broad areas that together determine whether a region's competitiveness is sustainable:

- **Economy** - standard of living, innovation, educational attainment, private investment as a share of regional product and government capital facilities investment on infrastructure necessary for economic development.
- **Environment** - air and water quality, and governmental capital investments on infrastructure that impact environmental quality.
- **Equity** - the distribution of income, housing affordability, basic education, transportation, and governmental capital facilities investments on public transportation.

To help San Diegans understand their region's competitive position, SANDAG's Competitiveness Index Advisory Committee has created the ***Sustainable Competitiveness Index***. The purpose of this unique index is to quantify the elements of sustainable competitiveness and benchmark one region against another. The components of the index are both forward looking and balanced.

Many indicators are available for the index; however, the indicators listed in Figure 6 are selected because they provide the key information for each of the three elements. Adding more indicators would dilute the results of the index without adding additional value.

The indicators provide snapshots of essential items today [air quality, real per capita income, housing opportunity] as well as a "forward looking" perspective [patents, Venture Capital, Initial Public Offerings, Capital Facilities Investments by government]. The "forward looking" indicators will have their biggest impact in the future. For example, governmental capital outlays on air transport will impact the ability of the region to move people and material in and out of San Diego for decades to come. Thus, the Index incorporates dynamic aspects into its formulation as 61% of the indicators [11 of the 18] have a future impact. If the Index did not have forward looking indicators, it would provide a static evaluation which omits the ability of systems to change.

One fundamental role of this index is to develop a consensus on the essential elements of a sustainable and competitive region. A second role of the index is to help us move beyond the misconception that there is an internal conflict between our economic, our environmental and our social equity goals. And a third role is to act as a spark, igniting the political will and momentum necessary to move forward with initiatives to improve the region. An important task is to work to translate this emerging consensus into action.

This unique index can help policy makers by pinpointing areas of relative weakness and areas of relative strength. The index can assist local government officials with limited financial resources to make policy decisions that are focused on correcting deficiencies to help San Diego be competitive.

Indexing Concept

The Sustainable Competitiveness Index allows us to benchmark ourselves against other similar regions as well as the nation. The Index has three original essential *elements* – one for the economy, one for the environment and one for equity. Each element is composed of three or more *components*. The components may be a single *indicator* – such as real per capita income. Or the component may be two or more indicators – such as capital facilities investment which is composed of capital outlays per capita for sewerage, capital outlays per capita for solid waste management and capital outlays per capita for water utilities. Figure 6 details these three of the Index's elements.

Figure 6
Elements, Components and Indicators for the Sustainable Competitiveness Index

Economic Element	Environment Element	Equity Element
1. Standard of Living	**1. Air Quality**	**1. Income Distribution**
• Real Per Capita Income	• Number of days not meeting EPA standards	• Ratio of average to median household income
2. Business Investment	**2. Water Quality**	**2. Housing Affordability**
• Venture Capital Share of GMP • IPO funds as a share of GMP	• US EPA Index of Watershed Indicators	• Housing Opportunity Index
3. Capital Facilities Investment	**3. Capital Facilities Investment**	**3. Capital Facilities Investment**
• Capital Outlays on Air Transport • Capital Outlays on Sea & Inland Ports • Capital Outlays on Highways	• Capital Outlays on Sewerage • Capital Outlays on Solid Waste • Capital Outlays on Water Utilities	• Capital Outlays on Mass Transit
4. Innovation		**4. Transportation**
• Patents per million population		• Average Commute Time
5. Education		**5. Education**
• Level of Educational Attainment for those 25 years of age and older		• Percent of preschoolers in early childhood education programs

The method of compiling the index is based on the rank ordering of data. For example, real per capita income for the 21 regions and the US are rank ordered from the highest income to the lowest income. The region with the highest per capita income is ranked 1st [best] and the region with the lowest income is ranked 22nd [worst]. This ranking is done for each component of an element. Since scores are based on rank, where lower numerical rank numbers indicate better performance, the lowest overall score is best. In the economic element, the best possible score would be a 5 [a rank of one in each of five components]. This process is duplicated for each element.

It is possible a region could perform quite well in two elements but poorly in the third element. This "unbalanced" performance is considered a threat to a region's sustainable position and to specifically address this issue, we add a Balance Element.

To compute the Balance Element, the formula for statistical variance is used and applied to each region's Economic, Environmental and Equity scores[5].

While it is hypothesized that an unbalance position is unsustainable, no research has been undertaken to substantiate this claim. Thus, one area that should be analyzed is the correlation between balance and sustainable competitiveness.

To compute a region's Sustainable Index score, the rank order for each of the four elements [Economy, Environment, Equity, and Balance] is added. All of the region's summed index scores are then rank ordered from the lowest total [best] to the highest total [worst] to obtain the overall leader for the Sustainable Competitiveness Index. All of these data are found in Appendix A.

The Economic Element

Indicators selected for this element represent the current standard of living and the ability of a region to sustain economic development. The Economic Element has five components with each component weighed equally. The five components are the following:

1. *Standard of living* as measured by real per capita income in constant 2000 dollars
2. *Business Investment* as measured by two indicators:
   - Venture Capital funding as a share of Gross Metropolitan Product
   - Initial Public Offerings funds raised as a share of Gross Metropolitan Product
3. *Capital Facilities Investment* as measured by three indicators:
   - Capital Outlays on air transport facilities in constant 2000 dollars per capita
   - Capital Outlays on sea and inland port facilities in constant 2000 dollars per capita
   - Capital Outlays on highways in constant 2000 dollars per capita
4. *Innovation* as measured by the number of patents per million population
5. *Education* as measured by the level of attainment of the population aged 25 or older

The **2000 Economic Element** uses Standard of Living data from the year 2000, Business Investment data from the year 2000, Capital Facilities Investment data from four periods – 1982, 1987, 1992 and 1997[6], Innovation data from 1999, and Educational Attainment data from 2000.

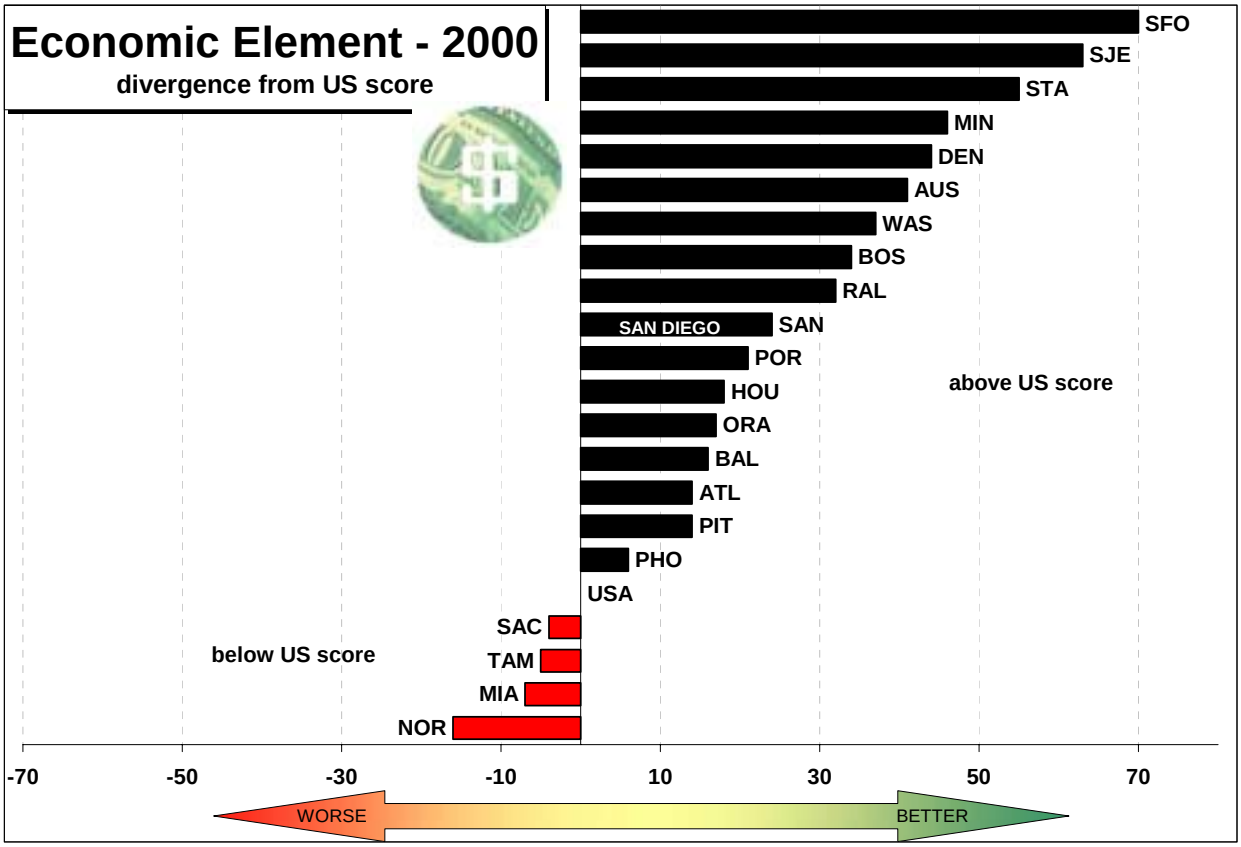
The Economic Element accounts for 25% of the Sustainable Competitiveness Index.

[5] The variance is a statistical term and represents the degree of spread of a data set.

[6] These data are from the Bureau of the Census and are collected in five-year intervals. The four years for which we have data are 1982, 1987, 1992 and 1997. Since these expenditures tend to be "lumpy" in nature, we add the capital outlays in constant 2000 dollars together from the various categories and divide by 15 to obtain a 15-year average. The 15-year average is then divided by a region's 2000 population to obtain Capital Outlays per capita in constant 2000 dollars. See the Appendix for details.

Ranked 1st is San Francisco while San Jose is ranked 2nd and Seattle-Tacoma is ranked 3rd. San Diego is ranked 10th while Norfolk-Va. Beach is ranked last [see figure 7]. The graph presents the data in terms that are above or below the U.S. score to get a sense of how each region performs relative to the nation. Only Sacramento, Tampa, Miami and Norfolk fall below the US average for the Economic Element.

Figure 7



To help understand the rankings, a Figure 8 is presented on the following page that presents the components of the Economic Element for each region's individual scores. The optimal score a region can obtain for the Economic Element is 5, and San Francisco's score is 11 while San Jose's score is 18. San Diego's score is 57 [ranked 10th] while Norfolk's score is 97 [ranked last]. The US score is 81.

San Francisco and San Jose dominate the Economic Element. Between them, they hold 7 of the top ten positions – ranked 1 & 2 in Standard of Living, 1 & 2 in Business Investment and 1 & 2 in Educational Attainment. San Jose also holds the #1 ranking in Innovation.

San Francisco's rank as #1 in the Economic Element is extremely strong, as it is ranked 1st in two components – the Standard of Living and Educational Attainment. In addition, San Francisco is ranked 2nd in Business Investment, 3rd in innovation and 4th in Capital Facilities Investment.

For San Francisco, its #1 rank in Standard of Living comes about because its real per capita income in 2000 is $52,348, which makes it about 77% higher than the US average of $29,501. San Diego is ranked 10th for this component with per capita income equal to $31,357. Ranked last for this component is Norfolk with $26,089.

Figure 8
Economic Element Summary

					Capital		Educational
	2000 Economic		Standard	Business	Facilities		Level of
	Element		of Living	Investment	Investment	Innovation	Attainment
Metropolitan Regions	Score	Rank	Rank	Rank	Rank	Rank	Rank
San Francisco, CA (SFO)	11	1	1	2	4	3	1
San Jose, CA (SJE)	18	2	2	1	12	1	2
Seattle-Tacoma, WA (STA)	26	3	3	7	2	11	3
Minneapolis-St.Paul, MN (MIN)	35	4	7	16	1	5	6
Denver-Boulder, CO (DEN)	37	5	6	4	13	9	5
Austin-San Marcos, TX (AUS)	40	6	13	3	15	2	7
Washington, DC (WAS)	44	7	4	10	6	16	8
Boston, MA-NH NECMA (BOS)	47	8	5	5	22	6	9
Raleigh-Durham, NC (RAL)	49	9	12	9	20	4	4
San Diego, CA (SAN)	**57**	**10**	**16**	**6**	**14**	**7**	**14**
Portland-Salem, OR-WA (POR)	60	11	15	13	11	10	11
Houston, TX (HOU)	63	12	9	18	5	11	20
Orange, CA (ORA)	64	13	8	14	19	8	15
Baltimore, MD (BAL)	65	14	14	11	3	18	19
Atlanta, GA (ATL)	67	15	11	8	18	17	13
Pittsburgh, PA (PIT)	67	15	9	19	8	14	17
Phoenix-Mesa, AZ (PHO)	75	17	20	17	9	13	16
United States (USA)	***81***	***18***	***19***	***12***	***17***	***15***	***18***
Sacramento, CA (SAC)	85	19	17	21	16	19	12
Tampa-St. Pete., FL (TAM)	86	20	18	20	7	20	21
Miami-Ft Lauderdale, FL (MIA)	88	21	21	14	10	21	22
Norfolk-Va Beach VA (NOR)	97	22	22	22	21	22	10

San Francisco's #1 rank in Educational Attainment follows from having about 17% of its adults holding graduate or professional degrees compared to about 9% for the US average, and about 28% of its population holding a bachelor's degree, compared to about 16% for the US[7]. For San Diego [ranked 14th], about 11% of its adults have graduate or professional degrees while about 19% hold bachelors degree. For Miami [ranked last] about 9% of its adults have hold graduate or professional degrees and about 16% of its adults hold bachelors degrees.

[7] There is scoring system used to compute the overall level of educational attainment for each region and this is detailed in the appendix. There are five categories – less than high school, high school graduate, associate's degree or some college, bachelors' degree, and graduate or professional degree.

San Jose is ranked 2nd in the Economic Element in large part because of its #1 ranking in Business Investment, #1 ranking in Innovation, its #2 ranking in Standard of Living and #2 ranking in Educational Level of Attainment. For Business Investment, the San Jose region has revenues from Initial Public Offerings and Venture Capital representing about 16% of Gross Metropolitan Product – more than 10 times higher than the US average of 1.6%. San Diego is ranked 6th for this component with Business Investment representing about 3% of GMP. Ranked last is Norfolk with Business Investment represent about 0.01% of its GMP.

For the component of Innovation, San Jose's ratio of patents per million population is about 3,400 – more than 11 times the US average of 308. San Diego is ranked 7th for this component with a ratio of 620 while Norfolk is ranked last with a ratio of 84 patents per million population.

Minneapolis is the only other region to get a #1 ranking for a component of the Economic Element as it is ranked 1st in Capital Facilities investments for air transport, sea and inland ports and highways. On a per capita basis in constant 2000 dollars, Minneapolis spent about $34 – more than 2½ times the US average of about $13. San Diego is ranked 14th for this component with per capita capital outlays of about $15 while Boston is ranked last with per capita capital outlays of about $5.

Norfolk, which is ranked last for the Economic Element is ranked last in three components – the Standard of Living, Business Investment and Innovation and it is ranked 21st in Capital Facilities Investment. Its area of relative strength is Educational Attainment where it is ranked 10th.

San Diego's areas of relative strength are Business Investment where it is ranked 6th and Innovation where it is ranked 7th. San Diego is ranked 14th in Capital Facilities Investment, 14th in Educational Level of Attainment and 16th in Standard of Living.

The Environment Element

Indicators selected for this element represent direct measures of environmental quality or government investments in infrastructure that impact environmental quality. The Environment Element has three components with each component weighed equally. The three components are the following:

1. *Air Quality* as measured by the number of days in a year a region does not meet United States Environmental Protection Agency ambient air quality standards
2. *Water Quality* as measured by the United States Environmental Protection Agency's Watershed Index that evaluates watershed health
3. *Capital Facilities Investment* as measured by three indicators:
    - Capital Outlays on sewerage treatment facilities in constant 2000 dollars per capita
    - Capital Outlays on solid waste management in constant 2000 dollars per capita
    - Capital Outlays on water utilities in constant 2000 dollars per capita

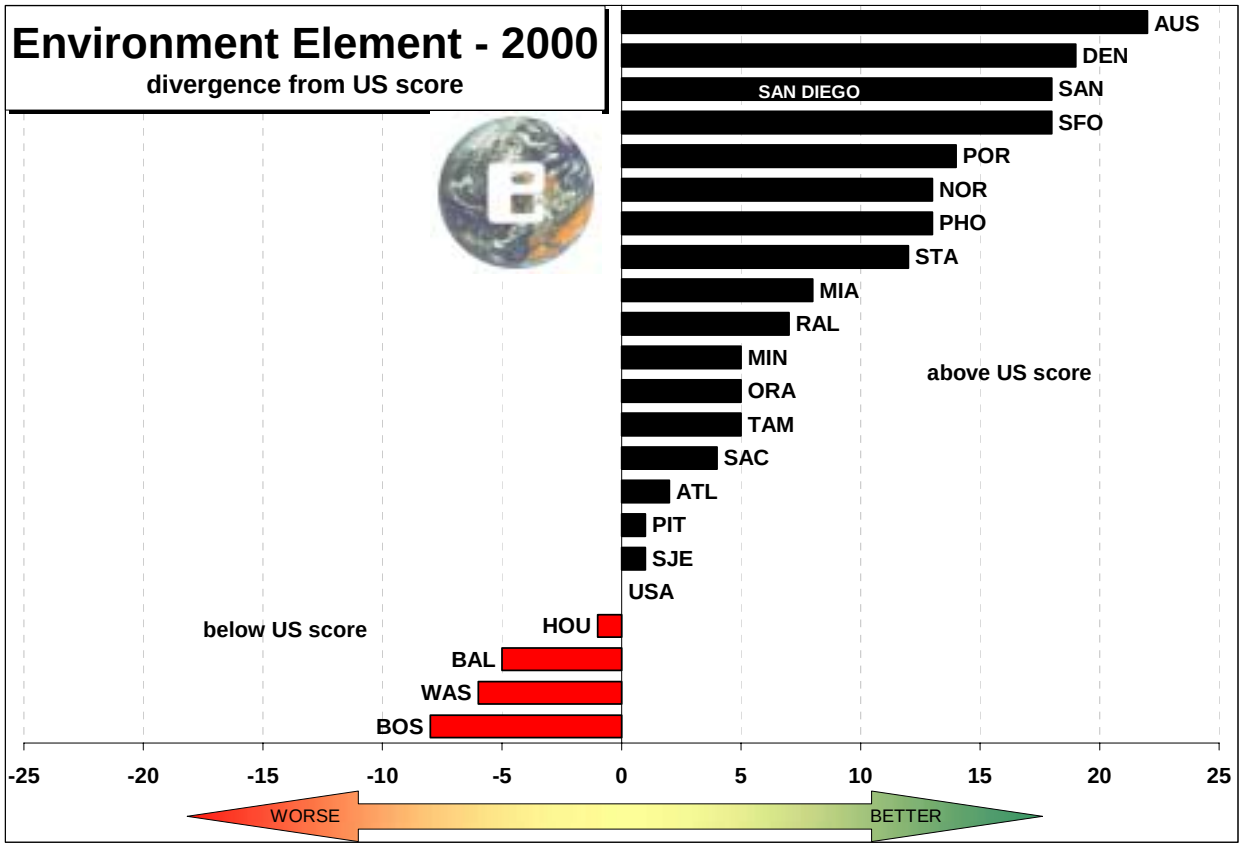
The **2000 Environment Element** uses Air Quality data from 2000, Water Quality data from 1999, and Capital Facilities Investment data from four periods – 1982, 1987, 1992 and 1997[8].

The Environment Element accounts for 25% of the Sustainable Competitiveness Index.

[8] These data are from the Bureau of the Census and are collected in five-year intervals. The four years for which we have data are 1982, 1987, 1992 and 1997. Since these expenditures tend to be "lumpy" in nature, we add the capital outlays in constant 2000 dollars together from the various categories and divide by 15 to obtain a 15-year average. The 15-year average is then divided by a region's 2000 population to obtain Capital Outlays per capita in constant 2000 dollars. See the Appendix for details.

Ranked 1st is Austin with Denver ranked 2nd and San Francisco and San Diego tied for 3rd [see Figure 9]. The graph presents the data in terms that are above or below the US score to get a sense of how each region performs relative to the nation. Only four regions fall below the US average and they are Houston, Baltimore, Washington, DC and Boston – with Boston ranked last.

Figure 9



To help understand the rankings, Figure 10 is presented on the following page that presents the components of the Environment Element for each region's individual scores. The optimal score a region can obtain for the Environment Element is 3 and Austin's score is 17. Denver is ranked 2nd with a score is 20 while San Diego and San Francisco are tied for 3rd with a score of 21. Thus, the top three regions all have very close scores. Boston is ranked last with a score of 47 and the US score is 39.

Austin's rank as #1 in the Environment Element is based on a #2 ranking in water quality, a #3 ranking in capital facilities investment and a #12 ranking in air quality. Austin has no #1 ranking for an individual component in the Environment Element, but high overall performance places it at the top of the list.

For the Air Quality component, there are five regions tied for the #1 ranking and they are Miami, Minneapolis, Portland, San Francisco and San Jose. All of these regions met the United States Environmental Protection Agency's air quality standards every day of 2000. San Diego is ranked 18th for this component as it did not meet the Environmental Protection Agency standards on 14 days. Houston is ranked last and did not meet the air quality standards on 42 days. The US score represents the average for the 21 metropolitan regions in this study as the US Environmental Protection Agency does not estimate a national average.

For the Water Quality component, Denver is ranked 1st with a score of 1.0 on the Index of Watershed Indicators [IWI]. This Watershed Index is compiled by the US Environmental Protection Agency and ranges from 1 [good watershed quality] to 6 [poor watershed quality][9]. Five regions are tied for 2nd and are Austin, Phoenix, Raleigh, San Diego and San Francisco. Two regions are tied for last and they are Boston and Minneapolis. The US is ranked 10th and its score of 3.3 is based on the average water quality for more than 2,000 watersheds in the United States[10].

Figure 10
Environment Element Summary

					Capital
	2000 Environment		Air	Water	Facilities
	Element		Quality	Quality	Investment
Metropolitan Regions	Score	Rank	Rank	Rank	Rank
Austin-San Marcos, TX (AUS)	17	1	12	2	3
Denver-Boulder, CO (DEN)	20	2	8	1	11
San Diego, CA (SAN)	**21**	**3**	**18**	**2**	**1**
San Francisco, CA (SFO)	21	3	1	2	18
Portland-Salem, OR-WA (POR)	25	5	1	11	13
Norfolk-Va Beach VA (NOR)	26	6	11	11	4
Phoenix-Mesa, AZ (PHO)	26	6	16	2	8
Seattle-Tacoma, WA (STA)	27	8	6	16	5
Miami-Ft Lauderdale, FL (MIA)	31	9	1	11	19
Raleigh-Durham, NC (RAL)	32	10	14	2	16
Minneapolis-St.Paul, MN (MIN)	34	11	1	21	12
Orange, CA (ORA)	34	11	9	16	9
Tampa-St. Pete., FL (TAM)	34	11	12	16	6
Sacramento, CA (SAC)	35	14	21	7	7
Atlanta, GA (ATL)	37	15	20	7	10
Pittsburgh, PA (PIT)	38	16	9	7	22
San Jose, CA (SJE)	38	16	1	16	21
United States (USA)	***39***	***18***	***14***	***10***	***15***
Houston, TX (HOU)	40	19	22	16	2
Baltimore, MD (BAL)	44	20	19	11	14
Washington, DC (WAS)	45	21	17	11	17
Boston, MA-NH NECMA (BOS)	47	22	6	21	20

[9] The Index of Watershed Indicators is a compilation of information on the "health" of aquatic resources in the United States. It combines a variety of indicators that point to whether rivers, lakes, streams, wetlands and coastal areas are "well" or "ailing" and whether activities on the surrounding lands that affect the waters are placing them at risk. Examples of indicators include the occurrence of contaminants in surface or groundwater and the percent of rivers and lakes supporting drinking water use. The IWI is composed of three components and each watershed is ranked on a scale of 1 to 6 where 1 is best and 6 is worst.
[10] See the Water Quality portion of Monitoring Our Progress for greater detail on the indicator.

San Diego is ranked 1st in Capital Facilities Investment in Sewerage, Solid Waste Management and Water Utilities. The governmental capital outlay data are on a per capita basis in constant 2000 dollars. San Diego governments had capital outlays that averaged about $37 per capita – more than twice the US average of about $17 per capita. Ranked 22nd is Pittsburgh with per capital capital outlays of about $13.

Boston, which is ranked last in the Environment Element, is ranked 21st in Water Quality and 20th in Capital Facilities Investment. Boston's area of relative strength is Air Quality where it is ranked 6th.

San Diego is tied for 3rd in the Environment Element based on its strong areas of Capital Facilities Investment [where it is ranked 1st] and Water quality [where it is ranked 2nd]. San Diego's area of relative weakness is Air Quality where it is ranked 18th.

The Equity Element

Equity is concerned with distribution and opportunity throughout the population. To evaluate distribution and opportunity we select indicators that measure distribution directly or indirectly, and we examine capital expenditures that impact all citizens' lives. The Equity Element has five components with each component weighed equally. The five components are the following:

1. *Income Distribution* as measured by the ratio of average household income to median household income
2. *Housing affordability* as measured by the Housing Opportunity Index which relates the median sales prices of homes to median incomes
3. *Transportation* as measured by average commute time
4. Capital Facilities Investments measured by:
   - Capital Outlays on mass transit in constant 2000 Dollars per capita
5. *Education* as measured by the percent of preschoolers in early childhood education programs.

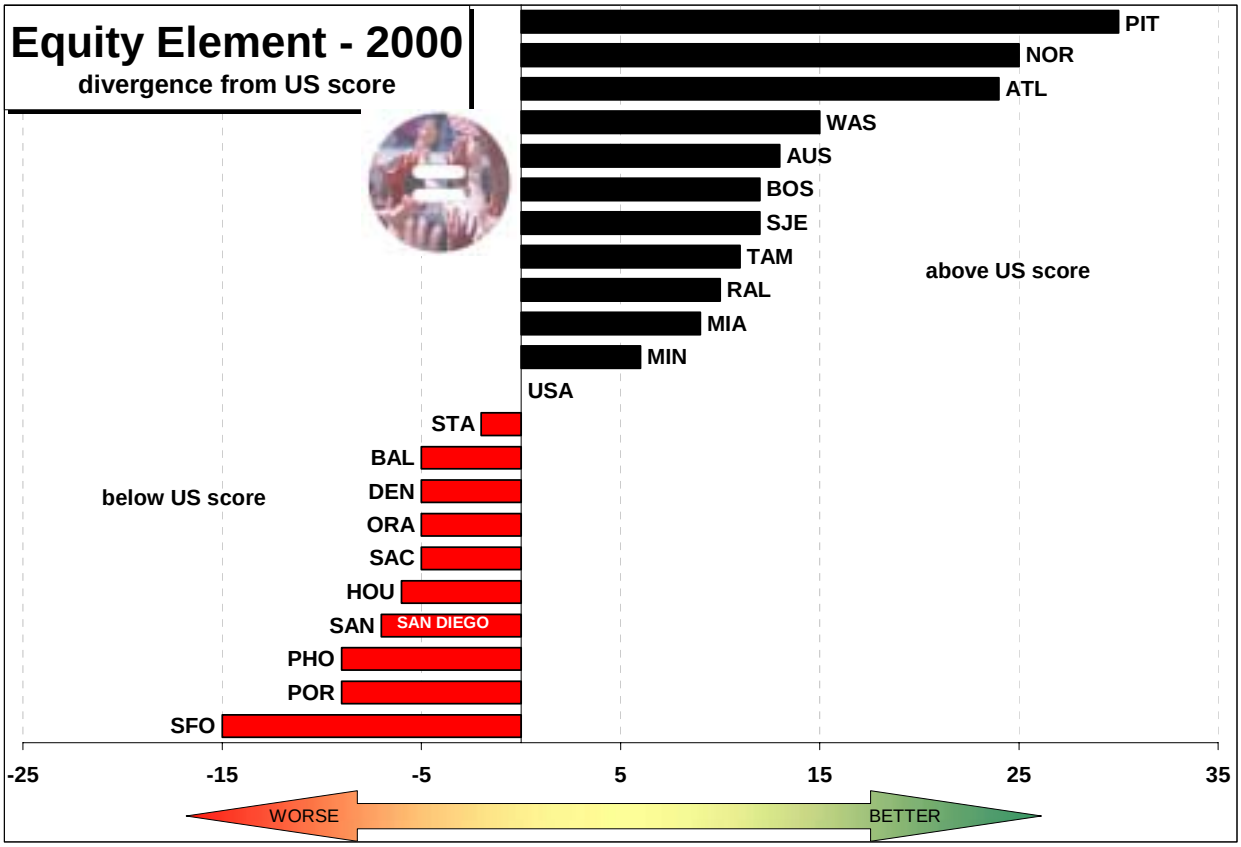
The **2000 Equity Element** uses Income Distribution data from 1999, Housing Affordability data from 2000, Average Commute data from 1999, Capital Facilities Investment data from four periods – 1982, 1987, 1992 and 1997[11], and education data from 2000.

The Equity Element accounts for 25% of the Sustainable Competitiveness Index.

[11] These data are from the Bureau of the Census and are collected in five-year intervals. The four years for which we have data are 1982, 1987, 1992 and 1997. Since these expenditures tend to be "lumpy" in nature, we add the capital outlays in constant 2000 dollars together from the various categories and divide by 15 to obtain a 15-year average. The 15-year average is then divided by a region's 2000 population to obtain Capital Outlays per capita in constant 2000 dollars. See the Appendix for details.

Ranked 1st is Pittsburgh with Norfolk ranked 2nd and Atlanta ranked 3rd [see Figure 11]. The graph presents the data in terms that are above or below the US data to get a sense of how each region performs relative to the nation. Ten regions fall below the US average and they are Seattle, Baltimore, Denver, Orange, Sacramento, Houston, San Diego, Phoenix, Portland and San Francisco – with San Francisco ranked last.

Figure 11



To help understand the rankings, Figure 12 is presented on the following page that presents the components of the Equity Element for each region's individual scores. The optimal score a region can obtain for the Equity Element is 5 and Pittsburgh's score is 32. Norfolk is ranked 2nd with a score of 37 while Atlanta is ranked 3rd with a score of 38. Thus, the top three regions all have very close scores. San Francisco is ranked last with a score of 77, the US score is 62 and San Diego's score is 69.

There are no regions that dominate the Equity Element the way San Francisco and San Jose dominate the Economic Element. Not only are the Equity Element scores much higher than the optimal [5], a comparison with the Economic Element [which also has five components] demonstrates how different the scores are. For the Economic Element, the #1 ranked region has a score of 11 with the 2nd ranked region having a score of 18. For the Equity Element, the #1 ranked region has a score of 32 while the #2 ranked region has a score of 37. There are two regions in the Equity Element that have two #1 component rankings, and both of these regions have at least one other component in which they are ranked 21st or 22nd.

Pittsburgh's rank as #1 in the Equity Element is based on a #5 ranking in average commute, a #5 ranking in capital facilities investment, a #7 ranking in income distribution, a #7 ranking in the percent of preschoolers in early educational programs, and a #8 ranking in affordable housing.

Pittsburgh has no #1 ranking for a component in the Equity Element. By contrast, Norfolk is ranked 1st in two components – Income Distribution and Average Commute time and Washington DC is ranked 1st in two components – Capital Facilities Investment and Education.

For the Income Distribution component, Norfolk is ranked 1st and has a ratio of average household income to median household income of 1.236[12]. This ratio is selected as it is one measure of determining the manner in which income is distributed among the population. If the households at the upper end of the distribution have disproportionately more income than households at the lower end, the values at the top will outweigh those at the bottom, and the mean will be larger than the median. Thus, ratios closer to 1.0 imply more equal distribution. For contrast, the US ratio is 1.381 which is about 12% more unequally distributed than found in Pittsburgh. Washington DC is ranked last for this component with a ratio of 1.584 while San Diego is ranked 15th with a ratio of 1.395.

Figure 12
Equity Element Summary

						Capital	Education
	2000 Equity		Income	Housing	Average	Facilites	% Preschool
	Element		Distribution	Affordability	Commute	Investment	in Ed Prog
Metropolitan Regions	Score	Rank	Rank	Rank	Rank	Rank	Rank
Pittsburgh, PA (PIT)	32	1	7	8	5	5	7
Norfolk-Va Beach VA (NOR)	37	2	1	6	1	21	8
Atlanta, GA (ATL)	38	3	5	4	22	3	4
Washington, DC (WAS)	47	4	22	2	21	1	1
Austin-San Marcos, TX (AUS)	49	5	4	13	10	12	10
Boston, MA-NH NECMA (BOS)	50	6	12	16	18	2	2
San Jose, CA (SJE)	50	6	6	21	3	4	16
Tampa-St. Pete., FL (TAM)	51	8	18	3	6	18	6
Raleigh-Durham, NC (RAL)	52	9	3	11	2	19	17
Miami-Ft Lauderdale, FL (MIA)	53	10	19	10	7	14	3
Minneapolis-St.Paul, MN (MIN)	56	11	17	1	17	16	5
United States (USA)	***62***	***12***	***13***	***12***	***13***	***10***	***14***
Seattle-Tacoma, WA (STA)	64	13	16	17	11	7	13
Baltimore, MD (BAL)	67	14	8	5	20	22	12
Denver-Boulder, CO (DEN)	67	14	10	14	19	15	9
Orange, CA (ORA)	67	14	9	18	9	13	18
Sacramento, CA (SAC)	67	14	2	15	8	20	22
Houston, TX (HOU)	68	18	20	9	16	8	15
San Diego, CA (SAN)	**69**	**19**	**15**	**20**	**4**	**11**	**19**
Phoenix-Mesa, AZ (PHO)	71	20	11	7	15	17	21
Portland-Salem, OR-WA (POR)	71	20	14	19	12	6	20
San Francisco, CA (SFO)	77	22	21	22	14	9	11

[12] Both of these statistics measure central tendency. If the average and median values are the same, the ratio equals 1.0 and there is a "normal distribution" of incomes The higher the ratio above 1.0, the more unequal the distribution.

The next component is Housing Affordability as measured by the Housing Opportunity Index, which relates median home prices to median household incomes. Minneapolis is ranked 1st with a score of 78.4 implying 78.4% of the households earning the median income can afford to purchase a home. By comparison, the US score is 62.8. Ranked last is San Francisco with a score of 10.3 while San Diego is ranked 20th with a score of 30.1.

The next component is the Average Commute time and the data used are total commute times – the sum of the morning and afternoon commute. The afternoon commute tends to be about 20% longer than the morning commute. Ranked 1st with the shortest average commute time is Norfolk with about 46 minutes. The average commute time for the US is about 56 minutes or about 23% longer than Norfolk's. Ranked last is Atlanta with an average commute time of over 72 minutes or 57% higher than Norfolk's average commute time. San Diego is ranked 4th with an average commute time of about 49 minutes.

Washington DC is one of three different regions with a #1 component ranking in the Equity Element and it is ranked 1st in Capital Facilities Investment in Mass Transit. The governmental capital outlay data are on a per capita basis in constant 2000 dollars. Washington DC metropolitan area governments have capital outlays that average about $63 per capita – more than six times the US average of about $10 per capita. Ranked 22nd is Baltimore with per capital capital outlays of about $0.01. San Diego is ranked 11th with governmental capital outlays of about $9 per capita.

Washington DC is also ranked 1st in the Education component where we measure the percent of children aged 3-4 enrolled in early childhood educational programs. Longitudinal studies have shown that enrollment in these pre-school programs leads to greater success in life[13]. For this component, Washington DC has about 69% of its 3-4 year old children enrolled in early educational programs. The US average is about 56% [about 20% lower than the Washington DC score]. Ranked last is Sacramento with a 35% enrollment share while San Diego is ranked 19th with 45%.

San Francisco, which is ranked last in the Equity Element, is ranked 22nd in Housing Affordability, 21st in Income Distribution, 14th in Average Commute, and 11th in Education. San Francisco's area of relative strength in the Equity Element is in Capital Facilities Investment where it is ranked 9th.

If San Diego has an "Achilles' heel", it is with regard to equity as it is ranked 19th. San Diego derives its Equity Element ranking based on a 20th place ranking in Housing Affordability, a 19th place ranking in Education, a 15th place ranking in Income Distribution and an 11th place ranking in Capital Facilities Investment. San Diego's area of relative strength in the Equity Element is Average Commute time where it is ranked 4th.

The Balance Element

Since Sustainable Competitiveness is concerned with a balance between the economy, the environment and equity, the variance is estimated and used as the measure of balance[14]. The larger a region's variance, the less balance it has. Therefore, the regions are rank ordered on their variance with the *lowest* variance being ranked highest. Recall, the element scores are the sum of the rank ordering of the element's components. For the Economic Element there are five components, for the Environment Element there are three components and for the Equity Element

[13] Hofferth, S., Shauman, K., Henke, R., and West, J. *Characteristics of Children's Early Care and Education Programs,* U.S. Department of Education, 1998 and West, J., Denton, K., and Germino-Hausken, E. *America's Kindergartners: Findings from the Early Childhood Longitudinal Study, Kindergarten Class of 1998-99, Fall 1998.* U.S. Department of Education, 2000.

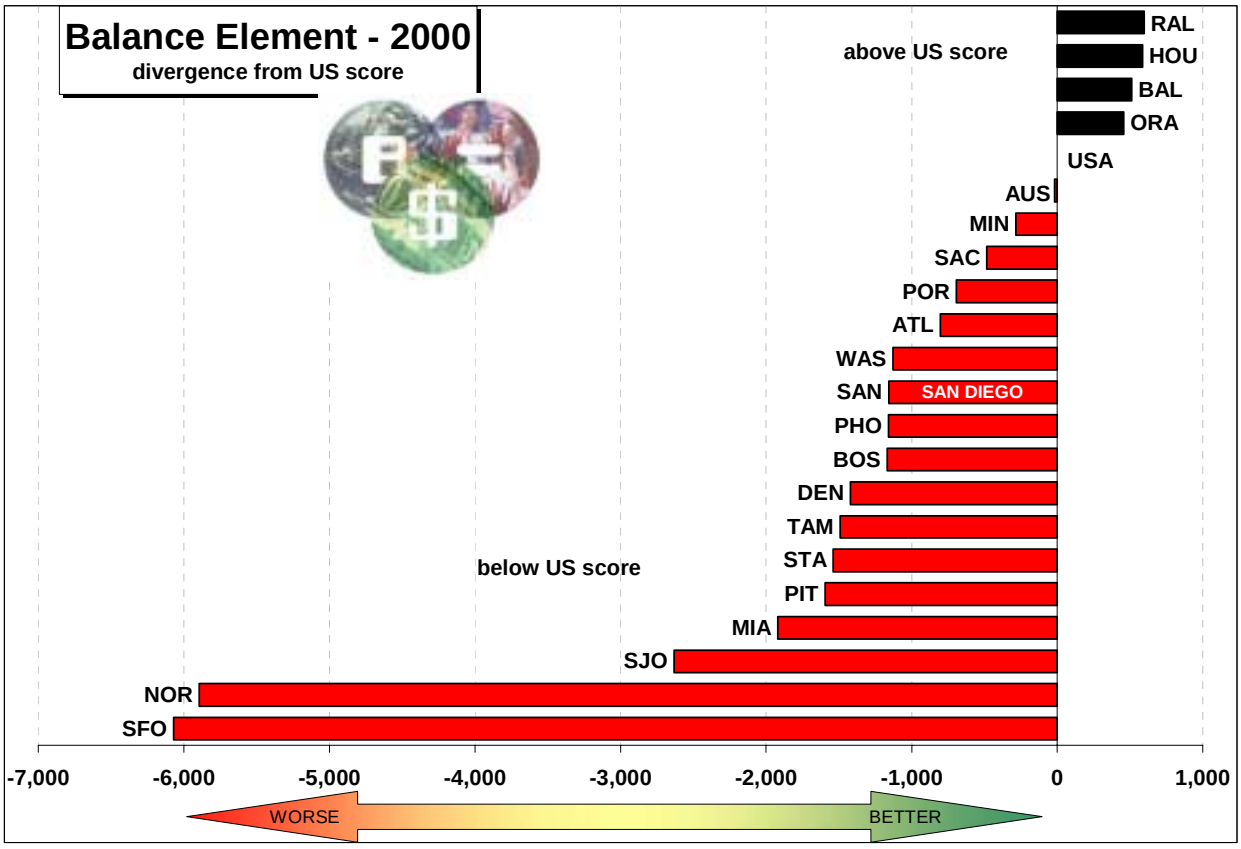
[14] The variance is a statistical term and represents the degree of spread of a data set. It is calculated by subtracting each observation from the mean, squaring the difference, summing all the squared differences, and dividing the sum of the squared differences by the number of observations. The data used to compute the variance are the normalized scores for each element.

there are five components. Because each element has a different number of components this creates a bias toward the elements with more components. Thus, the element scores are multiplied by a factor to insure each element has the same weight[15]. These adjusted scores are termed "normalized" scores. The best possible normalized score is 45 based on the following computations:

- Economic element - a score of 15 based on five [ranked 1st for five components] multiplied by the equalizing factor which is three [3].
- Environment element – a score of 15 based on three [ranked 1st for three components] multiplied by the equalizing factor which is five [5].
- Equity element - a score of 15 based on five [ranked 1st for five components] multiplied by the equalizing factor which is three [3].

The optimal normalized score is 45 [ranked 1st in all components] while the lowest normalized score is 990 [ranked 22nd for all components]. After the computations we discover that Raleigh is ranked 1st, Houston is ranked 2nd and Baltimore is ranked 3rd [see Figure 13]. The graph presents the data in terms that are above or below the US data to get a sense of how each region performs relative to the nation. Seventeen of the 21 regions fall below the US data with San Francisco ranked last and San Diego ranked 12th.

Figure 13



The Balance Element accounts for 25% of the Sustainable Competitiveness Index.

[15] With five components for the economic and equity elements and three components for the environmental element, the common denominator is 15. To have a balanced composite score where each element has the same weight, the environmental score is multiplied by five [5] and the economic and equity element scores are each multiplied by three [3].

To help understand the rankings, Figure 14 is presented below that presents the components of the Balance Element with each region's variance and rank. Raleigh's score is 29.6 while Houston's score is 40.2. The score for the United States is 626 while that of San Francisco [ranked last] is 6,696. San Diego is ranked 12th with a score of 1,784.

Figure 14
Balance Element Summary

	2000 Balance Element		Economic		Environment		Equity	
Metropolitan Regions	**Variance**	**Rank**	**Score**	**Rank**	**Score**	**Rank**	**Score**	**Rank**
Raleigh-Durham, NC (RAL)	29.6	1	147	9	160	10	156	9
Houston, TX (HOU)	40.2	2	189	12	200	19	204	18
Baltimore, MD (BAL)	113.6	3	195	14	220	20	201	14
Orange, CA (ORA)	169.6	4	192	13	170	11	201	14
United States (USA)	***626.0***	***5***	***243***	***18***	***195***	***18***	***186***	***12***
Austin-San Marcos, TX (AUS)	644.2	6	120	6	85	1	147	5
Minneapolis-St.Paul, MN (MIN)	910.9	7	105	4	170	11	168	11
Sacramento, CA (SAC)	1,110.2	8	255	19	175	14	201	14
Portland-Salem, OR-WA (POR)	1,317.6	9	180	11	125	5	213	20
Atlanta, GA (ATL)	1,429.6	10	201	15	185	15	114	3
Washington, DC (WAS)	1,754.0	11	132	7	225	21	141	4
San Diego, CA (SAN)	**1,784.0**	**12**	**171**	**10**	**105**	**3**	**207**	**19**
Phoenix-Mesa, AZ (PHO)	1,784.2	13	225	17	130	6	213	20
Boston, MA-NH NECMA (BOS)	1,793.6	14	141	8	235	22	150	6
Denver-Boulder, CO (DEN)	2,046.9	15	111	5	100	2	201	14
Tampa-St. Pete., FL (TAM)	2,117.6	16	258	20	170	11	153	8
Seattle-Tacoma, WA (STA)	2,166.0	17	78	3	135	8	192	13
Pittsburgh, PA (PIT)	2,220.2	18	201	15	190	16	96	1
Miami-Ft Lauderdale, FL (MIA)	2,546.9	19	264	21	155	9	159	10
San Jose, CA (SJE)	3,256.9	20	54	2	190	16	150	6
Norfolk-Va Beach VA (NOR)	6,520.2	21	291	22	130	6	111	2
San Francisco, CA (SFO)	6,696.0	22	33	1	105	3	231	22

The reason Raleigh's variance is so low is because of similarity in rankings for the three elements. Raleigh is ranked 9th for the Economic Element, 9th for the Equity Element, and 10th for the Environment Element. For contrast we examine San Francisco which is ranked last for the Balance Element. San Francisco is ranked 1st in the Economic Element, 3rd in the Environment Element and 22nd in the Equity Element. Thus, across these three areas, San Francisco is very un-balanced and this is reflected in its large variance and low ranking.

The United States is fairly balanced with a 12th place ranking for the Equity Element, and two 18th place rankings – one for the Economic Element and one for the Environment Element. Houston is ranked #2 on the Balance Element because of its consistent, though relatively low, rankings – #19 for the Environment, #18 for Equity and #12 for the Economy. Recall, though, that the Balance Element accounts for only 25% of the overall Index. Therefore, the consistently low rankings in the other elements will mostly outweigh the compensatory effects of a high ranking in the Balance Element.

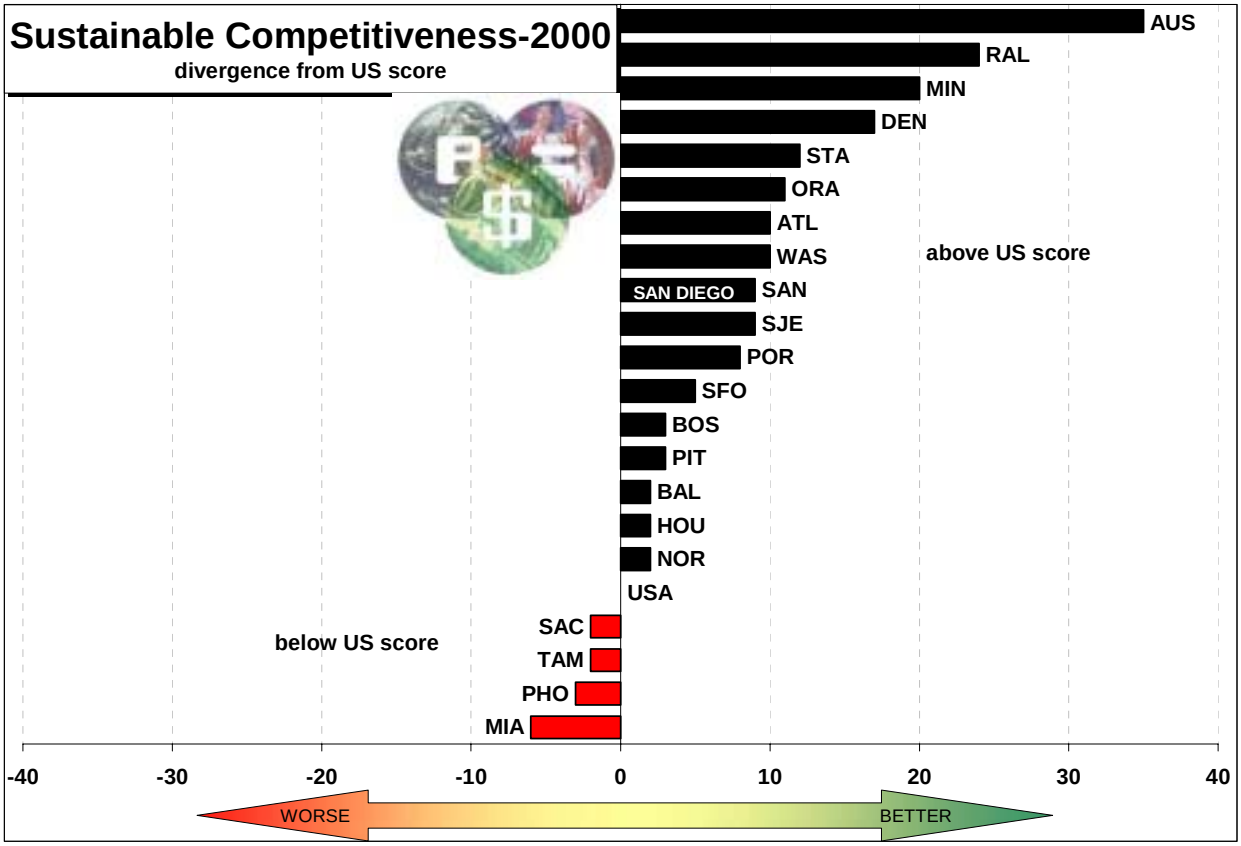
For San Diego, its 12th place ranking for the Balance Element comes about with a 19th place ranking for the Equity Element, a 3rd place ranking for the Environment Element, a 10th place ranking for the Economic Element.

The Competitiveness Index

A region's Sustainable Competitiveness Index score is based on each of the four elements: Economy, Environment, Equity, and Balance. Each region's four element rank order scores are summed and the resulting total is rank ordered from the lowest total [best] to the highest total [worst] to obtain the overall leader for the Sustainable Competitiveness Index.

Ranked 1st in the Sustainable Competitiveness Index is Austin followed by Raleigh and Minneapolis. San Diego is ranked 9th tied with San Jose. Four regions are ranked below the US and they are Sacramento, Tampa, Phoenix and Miami, with Miami ranked last [see Figure 15]. The figure presents the data in terms that are above or below the US data to get a sense of how each region performs relative to the national average.

Figure 15



To help understand the rankings, Figure 16 is presented below that presents the components of the Competitiveness Index with each region's Index score and rank ordering, and the rank ordering for each of the elements [economy, environment, equity and balance]. Each of the elements is weighed equally for the index.

Figure 16
Sustainable Competitiveness Index Summary

`	Rank Order				Sustainable Competitiveness Index	
	Economic	Envt	Equity	Balance		
Metropolitan Regions	Element	Element	Element	Element	Score	Rank
Austin-San Marcos, TX (AUS)	6	1	5	6	18	1
Raleigh-Durham, NC (RAL)	9	10	9	1	29	2
Minneapolis-St.Paul, MN (MIN)	4	11	11	7	33	3
Denver-Boulder, CO (DEN)	5	2	14	15	36	4
Seattle-Tacoma, WA (STA)	3	8	13	17	41	5
Orange, CA (ORA)	13	11	14	4	42	6
Atlanta, GA (ATL)	15	15	3	10	43	7
Washington, DC (WAS)	7	21	4	11	43	7
San Diego, CA (SAN)	**10**	**3**	**19**	**12**	**44**	**9**
San Jose, CA (SJE)	2	16	6	20	44	9
Portland-Salem, OR-WA (POR)	11	5	20	9	45	11
San Francisco, CA (SFO)	1	3	22	22	48	12
Boston, MA-NH NECMA (BOS)	8	22	6	14	50	13
Pittsburgh, PA (PIT)	15	16	1	18	50	13
Baltimore, MD (BAL)	14	20	14	3	51	15
Houston, TX (HOU)	12	19	18	2	51	15
Norfolk-Va Beach VA (NOR)	22	6	2	21	51	15
United States (USA)	***18***	***18***	***12***	***5***	***53***	***18***
Sacramento, CA (SAC)	19	14	14	8	55	19
Tampa-St. Pete., FL (TAM)	20	11	8	16	55	19
Phoenix-Mesa, AZ (PHO)	17	6	20	13	56	21
Miami-Ft Lauderdale, FL (MIA)	21	9	10	19	59	22

The optimal score a region could receive is 4 and Austin's score is 18. Austin's #1 ranking comes about with a #1 ranking in the Environment Element, a 5th place ranking for the Equity Element and two 6th place rankings – one for the Economic Element and one for the Balance Element. The next highest score belongs to Raleigh and is 29 – a good deal behind Austin. Raleigh-Durham obtains its 2nd place Index ranking with a 1st place ranking on the Balance Element, two 9th place rankings – one for the Economic Element and the other for the Equity Element, and a 10th place ranking for the Environment Element.

Miami's 22nd place ranking on the Index is composed of a 21st place ranking for the Economic Element, a 19th place ranking for the Balance Element, a 10th place ranking for the Equity Element, and a 9th place ranking for the Environment Element.

San Diego's 9th place ranking on the Index comes about from a 3rd place ranking for the Environment Element, a 10th place ranking for the Economic Element, a 12th place ranking on the Balance Element, and a 19th place ranking for the Equity Element.

The Next Steps

It appears Austin is doing well – and doing well in all areas as it is ranked 1st in the Environment Element, 5th in the Equity Element and 6th in the Economic Element. By contrast, San Diego is ranked 3rd in the Environment Element, 10th in the Economic Element and 19th in the Equity Element.

Looking beyond just the numbers, San Diego needs to improve ***if it is going to be competitive with a region like Austin***. The element San Diego needs to improve is Equity where San Diego is ranked 20th in Housing Affordability, 19th in Education, 15th in Income Distribution, 11th in Capital Facilities Investments and 4th in the Average Commute time. The two topics that stand out are the 20th place ranking in Housing Affordability and the 19th place ranking in Early Childhood Education.

To improve our ranking for these two indicators requires changes in policies for the relevant indicators. The following questions are designed to focus efforts on changing policies that impact the indicators that are causing San Diego's low ranking in housing affordability and early childhood education:

- What are the issues causing the low ranking for housing and education?
- Are there public policies or investments that could be made to alleviate the problem?
- Which parties are responsible for policies that impact the indicators?
- What is the process by which the relevant polices are changed?
- Is it possible to include some of these topics in SANDAG's Regional Comprehensive Plan?

The greatest asset San Diego has is its human resources. It is the region's people that have the ideas to innovate, build a sound economy and maintain the environment. If housing gets so unaffordable that people decide to leave, it could well hurt San Diego's ability to compete with other regions for human resources.