The Economic Impact of the FedEx Ground Facility - Detroit EB-5 Project

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Table of Contents

Section 1: Introduction 1
1.1 Purpose of the Study 1
1.2 Study Highlights 1

Section 2. Methods of Analysis 4
2.1 Input-Output Modeling 4

Section 3. Description of the Regional Center and EB-5 Project 6
3.1 The American VIP Regional Center 6
3.2 The FedEx Ground Facility - Detroit EB-5 Project 7
3.2.1 Overview of the EB-5 Project 7
3.2.2 Use of Funds 8

Section 4. Economic Impact Analysis 10
4.1 Model Assumptions and Inputs 10
4.1.1 Geographic Scope 10
4.1.2 Impact Study Inputs 13
4.2 Overview of Project Impacts 14
4.2.1 Job Creation and Other Economic Impacts 14
4.2.2 Direct and Indirect Jobs 16
4.3 Estimate of Jobs Attributable to the Regional Center 18
4.3.1 Jobs Arising from Construction Activities 18
4.3.2 Summary of the Jobs Attributable to the Regional Center 19

Section 5. Conclusion 21

Appendix 1. Regulatory Output NAICS Activity Impacts 22

Appendix 2. About Economic & Policy Resources, Inc. 25

Appendix 3. Limitations and Contingent Conditions 26

Appendix 4. The REDYN Model 27

List of Tables and Figures

Table 1: Summary of Model Specifications and Jobs Attributable to the Regional Center 3
Table 2: Use of Funds Detail.....9
Table 3: Impact Study Inputs 13
Table 4: Summary of the Total Project Impacts 15
Table 5: Direct and Indirect Jobs.....17
Table 6: Model Simulation Direct and Indirect Job Calculations 18
Table 7: Summary of Model Specifications and Jobs Attributable to the Regional Center 20

Figure 1: American VIP Regional Center Original and Amended Geographies 7

Section 1: Introduction

1.1 Purpose of the Study

This study is intended to assist the United States Citizenship and Immigration Services ("USCIS") in their evaluation of the proposed FedEx Ground Facility - Detroit EB-5 Project (the "Project") in conjunction with a regional center amendment request by the American VIP Regional Center under the Immigrant Investor Program ("EB-5 Program"). The project is an actual project and the applicant is not at this point requesting a pre-approval.[1] In compliance with guidance issued by the USCIS, this study sets forth the likely new economic impacts, including job creation, associated with the Project, which is located in Oak Park, Michigan, which lies within Oakland County. Changes in the number of jobs, output, labor income, and household earnings that the Project is expected to generate are identified for the following regions: 1) within the amended geographic scope of the American VIP Regional Center (the "Regional Center"); 2) the remainder of the United States outside the geography of the Regional Center; and 3) the United States as a whole.[2] This study therefore demonstrates how the Project will promote economic growth within the geographic scope of the Regional Center through job creation and increased capital investment consistent with *8 C.F.R. §204.6*, assuming the USCIS approves the Project and regional center amendment as proposed.[3]

1.2 Study Highlights

- Input-output modeling for the FedEx Ground Facility - Detroit EB-5 Project was performed utilizing the REDYN model. Please refer to *Section 2.1 Input-Output Modeling* for further discussion on input-output methodologies for modeling the economic impacts of a project.
- The Project is an actual EB-5 project sponsored by the American VIP Regional Center, which seeks an amendment to extend its geographic boundaries in order to accommodate its evolving business strategies, including sponsorship of the Project. Please refer to *Section 3.1 The American VIP Regional Center* for more detail on the Regional Center, including a map of its geographic scope.
- The Project, which is located in Detroit, Michigan, consists of the construction of a 303,485-square-foot ground facility, including office, warehouse, and other space, that will be leased to Federal Express Ground Package System, Inc. The project site is located at 15000 Eight Mile Road in Oak Park, Michigan, a suburb of Detroit. Please refer to *Section 3.2 The FedEx Ground Facility - Detroit EB-5 Project* for additional information pertaining to the Project.
- Three geographic regions were defined in the model simulations for the Project. These three regions allow for the reporting of new economic impacts within the amended geographic boundaries of the American VIP Regional Center, in the remainder of the United States outside the Regional Center, and, consequently, for the United States as a whole. Please refer to *Section 4.1.1 Geographic Scope* for more detail on how the geographic regions that were defined in the modeling were determined.

[1] However, this is a real project and it is expected that this impact study will eventually be filed along with I-526 investor petitions at some point in the future.

[2] As stated in *8 C.F.R. §204.6(e)*, a regional center is an "*economic unit, public or private, which is involved with the promotion of economic growth…*" Such an entity must further conform to the rule laid out in *8 C.F.R. §204.6(m)(3)(i)*, which requires that a regional center focus on promoting growth within a geographical region of the United States. Accordingly, when referring to the economic entity, Energize-ECI EB-5 Visa Regional Center, LLC (dba American VIP), this report uses the term "Regional Center" and when referring to the geographic focus area of that entity uses terms such as "geographic scope," "geographic boundaries," and "geography."

[3] This economic impact study, taken together with the FedEx Ground Facility - Detroit EB-5 Project Business Plan, presents the specific details of how the Project will result in new economic growth within the geographic scope of the Regional Center, the remainder of the United States outside the geographic scope of the Regional Center, and correspondingly, the United States as a whole.

- Model simulation inputs were derived from information provided by the project developers, checked for internal consistency, and adjusted to exclude those expenditures that are not appropriate for inclusion in the modeling, such as land acquisition, contingencies, certain fees, insurance expenditures, and financing and interest costs, as well as other items that were expected to have relatively minor economic impacts. Please refer to *Section 4.1.2 Impact Study Inputs* for more detail on the inputs to the model simulations.
- Please refer to *Section 4.2 Overview of Project Impacts* for detail on the total economic impacts of the Project, including detail on the number of direct and indirect jobs.[4]
- Based on the EB-5 Program rules and regulations, the impact analysis estimates that 614 new jobs be attributed to the Regional Center under the EB-5 Program. These jobs are a subset of the total job creation that is estimated to result from the construction activities associated with the Project. The estimate of jobs attributable to the Regional Center is summarized in *Table 1 Summary of Model Specifications and Jobs Attributable to the Regional Center* on the next page.
    - The subset of jobs being estimated as new jobs attributable to the Regional Center was determined from the total expected job creation based upon the following EB-5 Program rules and regulations:
        - The EB-5 Program requires that direct jobs persist for at least two years.[5]
        - The EB-5 Program allows indirect jobs created outside the geographic scope of the Regional Center to be attributed to the Regional Center.[6]
        - The EB-5 Program requires that the estimated jobs occur within a reasonable time, which is generally considered to be within two years and six months of the adjudication of the immigrant investors' Form I-526 petitions.[7]
    - The estimated jobs arising from construction activities include only indirect jobs.[8]
        - The estimated indirect jobs include those that are created both inside and outside the geographic scope of the Regional Center (i.e., throughout the entire United States).
    - All estimated jobs arising from construction activities are expected to be created within two years and six months of the adjudication of immigrant investors' Form I-526 petitions.
    - Please refer to *Section 4.3 Estimate of Jobs Attributable to the Regional Center* for further discussion on how the EB-5 Program requirements were applied to the job creation expected to result from the construction activities of the EB-5 Project and the estimate of jobs attributable to the Regional Center.

[4] Direct jobs are defined herein as those that are created as a direct result of the incremental change in final demand for a given project (e.g., the developer hires a construction management firm). Indirect jobs are created as materials and other inputs to production are supplied to the project (e.g., the supplier of steel to the construction firm hires additional staff). It should be noted that induced jobs, which are a subset of indirect jobs, are created when the new workers occupying the direct and indirect jobs spend their new income resulting from the project at other businesses (e.g., the workers patronize restaurants and retail stores).

[5] May 30, 2013 EB-5 Adjudications Policy Memorandum, page 17.

[6] Ibid., page 18.

[7] Ibid., pages 19 and 22.

[8] Please refer to *Section 4.2.2 Direct and Indirect Jobs* for information pertaining to the method in which the REDYN model calculates direct and indirect jobs.

Table 1: Summary of Model Specifications and Jobs Attributable to the Regional Center

Project Component	NAICS Activity Code	Model Inputs ($ Millions)	Total United States Job Creation	Job Creation Attributable to the Regional Center
CONSTRUCTION				
Commercial building construction	NAICS 2362	Year 1: $8.78 Year 2: $0.09	Year 1: 277 Year 2: 2	***223*** *Indirect Jobs Only Year 1, Total U.S.*
Electrical contractors	NAICS 2382	Year 1: $2.73 Year 2: $0.00	Year 1: 84 Year 2: 0	***67*** *Indirect Jobs Only Year 1, Total U.S.*
Plumbing & HVAC contractors	NAICS 2382	Year 1: $3.29 Year 2: $0.00	Year 1: 102 Year 2: 0	***82*** *Indirect Jobs Only Year 1, Total U.S.*
Site preparation contractors	NAICS 2389	Year 1: $9.46 Year 2: $0.00	Year 1: 298 Year 2: 0	***240*** *Indirect Jobs Only Year 1, Total U.S.*
Architecture & engineering services	NAICS 5413	Year 1: $0.08 Year 2: $0.00	Year 1: 1 Year 2: 0	***1*** *Indirect Job Only Year 1, Total U.S.*
Environmental consulting services	NAICS 5416	Year 1: $0.13 Year 2: $0.00	Year 1: 2 Year 2: 0	***1*** *Indirect Job Only Year 1, Total U.S.*
Total Job Creation Attributable to the Regional Center (Construction Only):				**614**
Prepared by: Economic & Policy Resources, Inc.				

Section 2. Methods of Analysis

2.1 Input-Output Modeling

In contrast to proving the direct job count of an EB-5 project through the provision of payroll records to the USCIS, regional centers can provide evidence based on "reasonable methodologies" to demonstrate that they satisfy the job creation requirements of the EB-5 Program.[9] Regional centers have some latitude under the "reasonable methodologies" requirement. The most common of the reasonable methodologies is to provide economic impact estimates developed through the use of input-output ("I-O") tools or models.

Even though the approaches used in various I-O tools and models differ in complexity and structure, the general approach to the estimating process is essentially the same for all of those tools and models that have been previously recognized as reasonable by the USCIS. All of the I-O tools and models use calculated coefficients based on detailed federal data, including data from the United States Bureau of Economic Analysis ("BEA"), the United States Bureau of Labor Statistics ("BLS"), and the United States Census Bureau. Compilation of these data series, which are updated each year to varying degrees, involves assembling and updating data regarding how much input is used for producing a given amount of output.

Dynamic I-O models, such as Regional Dynamics ("REDYN") and Regional Economic Models, Inc. ("REMI"), simulate the economic relationships between sectors of an economy on several geographic levels through time. Linkages exist between sectors and regions because their economies use outputs from other sectors and regions. I-O models are founded on these linkages and allow analysts to see how changes in final demand in individual or multiple sectors in a regional economy ripple throughout the system and geography simultaneously. For example, effects of a new investment are felt in linked sectors and regions as increased employment, output, labor income, and household earnings. IMPLAN Group, LLC, the owner of the Impact Analysis for Planning ("IMPLAN") tool, describes I-O analysis in another way as "*…a means of examining relationships within an economy, both between businesses and between businesses and final customers. It captures all monetary market transactions for consumption in a given time period. The result mathematical formulae allow examination of the effects of a change in one or several economic activities on an entire economy.*"[10]

In that way, the I-O process depicts the so called "ripple effect" of the impacts caused by an economic change in a region. In the long run, a project is shown to materially alter the regional and national economies through a significant amount of new investment and related business development activities. Therefore, it is expected that the regional economy of the area included in the geographic scope of the American VIP Regional Center, the economy of the remainder of the United States outside the geographic scope of the Regional Center, and, consequently, the economy of the United States as a whole will all have a correspondingly higher level of investment, employment, output, labor income, and household earnings than would otherwise be the case in the absence of the FedEx Ground Facility – Detroit EB-5 Project.

[9] On page 18, the May 30, 2013 EB-5 Adjudications Policy Memorandum issued by the USCIS states that *"for a new commercial enterprise that is located within a regional center, the EB-5 Program provides that the full-time positions can be created either directly or indirectly by the new commercial enterprise. 8 C.F.R. §204.6(j)(4)(iii). Investors investing in a regional center are subject to all the same program requirements except that they may rely on indirect job creation as demonstrated through reasonable methodologies. 8 C.F.R. §204.6(m)(1), (7)."*

[10] IMPLAN Professional: Version 2.0: Social Accounting & Impact Analysis Software, MIG, Inc., page 95.

This economic impact study utilized REDYN for the purpose of determining the likely new economic impacts associated with the Project. REDYN has been used to assess the new economic impacts associated with economic development projects, new businesses, certain types of public policy changes, the effectiveness of government and private sector programs, and utility power projects in various states throughout the country in a variety of analytical settings. Economic & Policy Resources, Inc. ("EPR") has used REDYN in more than 175 studies overall, including more than 150 economic impact studies submitted for consideration under the EB-5 Program. REDYN has been previously used in numerous adjudications that have been approved by the USCIS under the EB-5 Program.

Section 3. Description of the Regional Center and EB-5 Project

3.1 The American VIP Regional Center

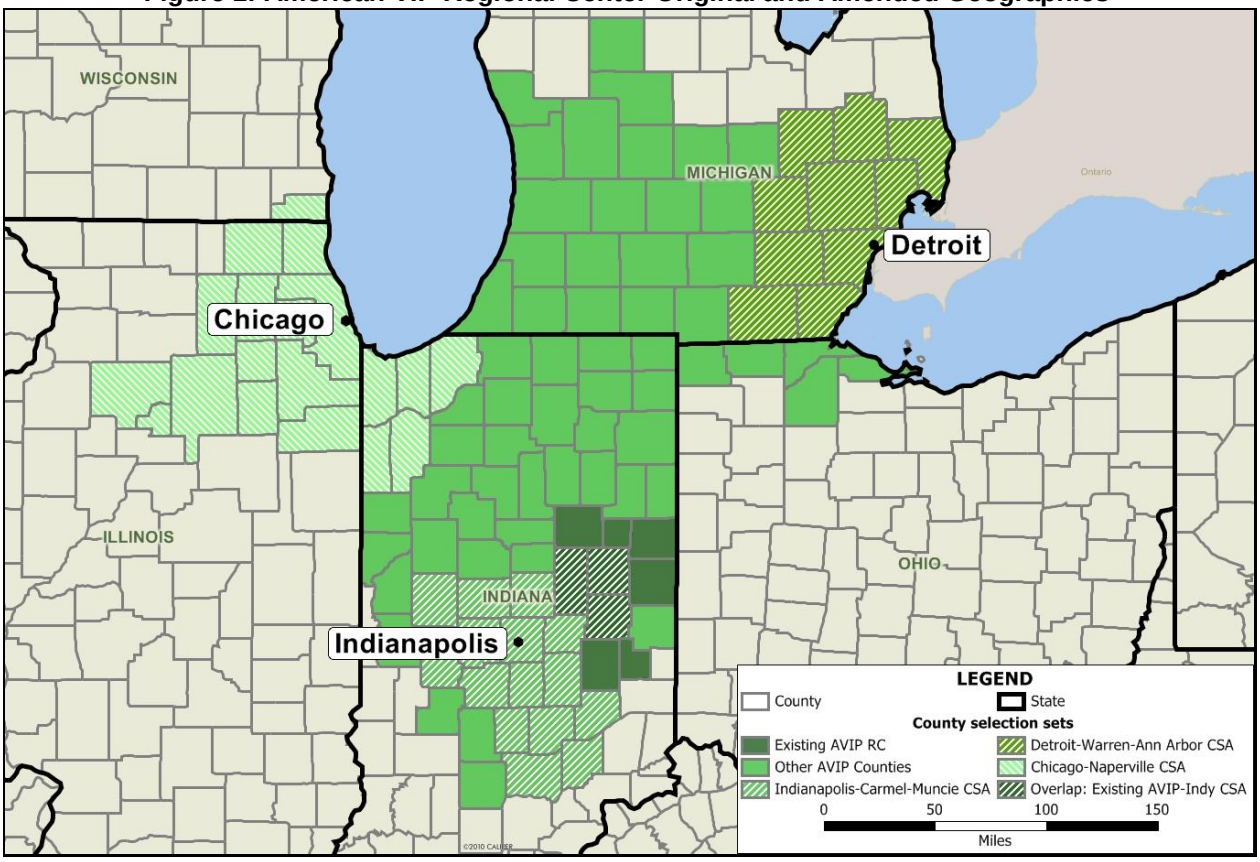
The American VIP Regional Center (RCW 1114750218) is a USCIS-designated regional center, which has been operating as an official regional center since its initial approval on August 30, 2011. The counties that comprise the geographic scope encompassing its development activities include 9 counties in east-central Indiana: Blackford, Delaware, Fayette, Grant, Henry, Jay, Madison, Randolph, and Rush. As a result of evolving business strategies, particularly the plan to sponsor the actual FedEx Ground Facility – Detroit EB-5 Project, as well as projects like that of the hypothetical FedEx Ground Facility – Chicago EB-5 Project and the hypothetical FedEx Ground Facility – Indianapolis EB-5 Project, the American VIP Regional Center is seeking approval from the USCIS to expand its geographic scope to include the metropolitan areas of Chicago, Detroit, and Indianapolis, as well as the interstitial counties connecting these three large metropolitan regions. The regional center amendment report, A Proposal to Amend the American VIP Regional Center, is included in the EB-5 filing and discusses the proposed amended geography for the regional center. Please refer to *Figure 1 Original + Amended Regional Center Geography* for a map of the proposed, amended regional center geography.

The regional center is currently approved for capital investment opportunities in the following North American Industry Classification System ("NAICS") categories:

- Construction (NAICS 23) sector;
- Animal Production and Aquaculture: Finfish Farming and Fish Hatcheries (NAICS 112511) industry;
- Computer and Electronic Product Manufacturing: Computer Storage Device Manufacturing (NAICS 334112) industry;
- Software Publishers (NAICS 511210) industry;
- Truck Transportation (NAICS 484) subsector; and
- Other Chemical Product and Preparation Manufacturing: Custom Compounding of Purchased Resins (NAICS 325991) industry.

The regional center seeks to expand its current list of approved NAICS sectors to include the Professional, Scientific, and Technical Services (NAICS 541) subsector. The regional center requests that the Professional, Scientific, and Technical Services (NAICS 541) subsector be approved so that it might sponsor EB-5 investment projects of this type throughout its potentially amended geographic region.

Figure 1: American VIP Regional Center Original and Amended Geographies



3.2 The FedEx Ground Facility - Detroit EB-5 Project

3.2.1 Overview of the EB-5 Project

The FedEx Ground Facility – Detroit EB-5 Project is located at 15000 Eight Mile Road in Oak Park, Michigan, a northern suburb of Detroit. The project site is an approximately 54.14 acre parcel of land, upon which will be constructed a package terminal/distribution facility that will be leased by Federal Express Ground Package System, Inc. Please refer to the lease document in *Appendix II Lease Agreement* of the FedEx Ground Facility – Detroit EB-5 Project Business Plan. The facility will be approximately 303,485 square feet of space, including: 13,784 square feet of office space; 288,413 square feet of warehouse space; and 1,288 square feet of miscellaneous space including toilet room and computer room. The property will also include a 3,070 square foot gateway building and a 5,180 square foot vehicle maintenance building.

The facility will be operated by the tenant, FedEx Ground, who will install a conveyer system to conduct their operations. The tenant operations will be as follows:

- Semitrailers will deliver packages to the dockside of the building during early-morning hours. Package handlers will unload the trailers and load the packages onto a conveyer system in single file formation, and route them to delivery vans. These vans will be parked and loaded inside of the facility. These vans will then depart once loaded. There is no static storage or warehousing of packages.

- During the late afternoon/early evening, the delivery vans will return and second-shift package handlers will remove packages from the vans and load them onto the conveyers. The packages will then be loaded onto semitrailers at the dockside of the building.
- During the day, the facility will be empty except for some office personnel and maintenance workers.
- All the individuals employed at the facility (package handlers, office personnel, and maintenance/janitorial workers) will be employed by the tenant, FedEx Ground.

3.2.2 Use of Funds

The total budget for the construction of the Project is $45.50 million. As shown in *Table 2 Use of Funds Detail* below, the construction expenditures are divided into the following major categories: land; soft costs; and hard costs. Within these categories are detailed line items, each of which is labeled with the code of the NAICS category into which it was classified for the economic modeling; line items that were not included in the economic modeling are indicated as not modeled ("N/M").[11,12]

[11] The FedEx Ground Facility - Detroit EB-5 Project Business Plan presents expenditures on a project year basis. In this case, Year 1 corresponds to the 12-month period beginning March 2015 and ending in February 2016, and Year 2 extends from March 2016 through February 2017.

[12] This table was adapted from *Appendix I Construction Budget* of the FedEx Ground Facility - Detroit EB-5 Project Business Plan.

Table 2: Use of Funds Detail

Project Uses of Funds	NAICS	Total
Land		**$8,468,558**
Construction		**$28,286,513**
Commercial building construction	23622	$8,870,084
Electrical contractors	23821	$2,729,700
Plumbing & HVAC contractors	23822	$3,288,142
Site preparation contractors	23891	$9,183,976
Bonds/insurance	N/M	$248,124
Fees, allowances, permits	N/M	$684,839
Inspections	N/M	$260,000
Contractor fees	N/M	$496,648
Construction contingencies	N/M	$2,525,000
Soft costs		**$8,081,181**
Architect & engineering services	5413	$75,000
Environmental assessment	54162	$130,000
Title and survey	N/M	$100,000
Appraisal fees	N/M	$6,000
Cost certification/audit	N/M	$5,000
Leasing fees	N/M	$894,473
Due diligence reimbursement	N/M	$434,618
Legal fees	N/M	$50,000
Closing costs	N/M	$2,525
Soft costs contingencies	N/M	$383,565
Developer fee	N/M	$6,000,000
Financing costs		**$663,748**
Development loan interest	N/M	$418,098
Taxes during construction	N/M	$127,028
Loan origination fee	N/M	$118,622
Total Uses of Funds		***$45,500,000***

Prepared by: Economic & Policy Resources, Inc.

Section 4. Economic Impact Analysis

4.1 Model Assumptions and Inputs

4.1.1 Geographic Scope

The use of REDYN provides the analyst with flexibility in examining the impacts of a project by geographic region. REDYN allows the analyst to examine impacts down to the county level, for states as a whole, for custom regions, and for the United States economy overall. Therefore, the first step for the analyst is to determine the regions of importance for conducting the economic impact study based upon the particulars of the project being assessed. There are several key considerations for the analyst to take into account when determining the geographic regions for study, which are as follows: 1) the county in which the project is located; 2) the geographic regions of importance for reporting results relative to the purpose of the study (e.g., regions that are of importance to an economic development program, such as the EB-5 Program); 3) the region where a significant number of the workers occupying the direct jobs created as a result of the project are expected to live; and 4) the nature of the supply chain supporting project activities.

The first key consideration for the analyst when specifying the regions of importance for the study is the county in which the project is located. I-O models determine impacts based on linkages between sectors and regions. Counties are the smallest geographic unit for which these data are available in most of the I-O tools and models in common usage. Therefore, the most appropriate geographic unit for determining impacts of a particular project is often the county in which the project is located. The FedEx Ground Facility - Detroit EB-5 Project is located in Oakland County, Michigan. Therefore, Oakland County, Michigan has been included as one of the regions specified in the modeling.

The second key consideration for the analyst when specifying regions in the model is the purpose of the study. In the case of this economic impact study, the purpose is to assess the economic impacts of a project for consideration under the EB-5 Program. As such, regions of importance in the EB-5 Program should be included as regions specified in the model for the reporting of economic impacts. On page 13 of the May 30, 2013 EB-5 Adjudications Policy Memorandum, the USCIS identifies the regions of importance to the EB-5 Program by stating that a regional center must provide "*…a detailed prediction regarding the manner in which the regional center will have a positive impact on the regional or national economy.*"[13] Therefore, the two regions of importance for the reporting of economic impacts under the EB-5 Program are the geographic scope of the Regional Center and the United States as a whole.

The importance of the United States as a region for specification in the modeling is further demonstrated by the following quote from page 15 of the May 30, 2013 EB-5 Adjudications Policy Memorandum:

> "*In developing the EB-5 Program, Congress intended to promote the immigration of people who invest capital into our nation's economy and help create jobs for U.S. workers. Therefore, the creation of jobs for U.S. workers is a critical element of the EB-5 Program.*"[14]

Based on these two quotes from the May 30, 2013 EB-5 Adjudications Policy Memorandum issued by the USCIS, it is important that the analyst specify the regions in the model such that economic impacts can be reported for the geographic scope of the regional center and the United States as a whole.

[13] Op. cit., page 13.
[14] Op. cit., page 15.

The third key consideration for the analyst when specifying model regions is considering where a significant number of the workers occupying the direct jobs created as a result of the project are expected to live. By definition, all direct jobs are assumed to occur within the region in which a project is located. However, since the region in which the economic activity was modeled will not typically include the locations where all of the workers occupying those jobs live (i.e., not all workers occupying the direct jobs will necessarily live in the county where the project is located), it is important that the analyst also specify a region in the model that corresponds to the larger functional economy of which the project location is a part. According to the classic text, An Introduction to Regional Economics, a functional region encompasses interdependent relationships in the trade of goods, services, people, and money.[15] The IMPLAN Group publication Principles of Impact Analysis and IMPLAN Applications similarly defines a functional region as follows:

> "*A functional economy encompasses appropriate local inputs, including the primary suppliers and the location where employees are working, living, and spending their income.*"[16]

As discussed in *Section 3.1 The American VIP Regional Center*, the amended geographic scope of the regional center (if approved) stretches across Indiana and into the Indianapolis and Chicago CSAs. Because CSAs are defined based on the commuter-shed network of their central cities, the labor pool of the Project, located in Detroit, should be captured within the geographic boundaries of the regional center. As discussed above, the regional center geography should be specified in the model since the purpose of the study is to assess the economic impacts of the Project within the context of the EB-5 Program. Therefore, by specifying the regional center geography in the modeling, the analyst is also able to capture the region where a significant number of the workers occupying the direct jobs created as a result of the project are expected to live.

The third key consideration when specifying regions in the model is the nature of the supply chain supporting project activities. Given the nature of their respective economic linkages, certain activities tend to have more geographically extensive or narrow economic impacts as they draw inputs to production from other industries. Some examples of activities that tend to have broad geographic disbursement of impacts are those in the Construction (NAICS 23) sector and the Manufacturing (NAICS 31-33) sector. Industries in these sectors are typically referred to as goods-producing industries. Examples of activities that tend to have more localized economic impacts are those in the Retail Trade (NAICS 44-45) sector and the Accommodation and Food Services (NAICS 72) sector. Industries in these sectors are typically referred to as service-providing industries.[17]

Certain goods-producing industries tend to have broader impacts in terms of geographic disbursement, because they require a supply of material inputs to production in order to be carried out. For example, major materials involved in building construction included masonry and concrete, metal and steel, and wood products and lumber. Furthermore, certain geographic areas tend to specialize in the production of the materials used as inputs to production, such as Pittsburgh, Pennsylvania with steel or Eugene, Oregon with lumber and other wood products. Therefore, projects needing these inputs throughout the country will source the materials from these regions despite the geographic location of the project. This

[15] An Introduction to Regional Economics, Edgar M. Hoover and Frank Giarratani, Third Edition. Chapter 9. Accessible online from the Regional Research Institute at West Virginia University (http://www.rri.wvu.edu/WebBook/Giarratani/main.htm).
[16] Principles of Impact Analysis and IMPLAN Applications, Frances Day, page 25.
[17] The examples of sectors within the goods-producing and service-providing classifications were taken from the list of those classified as belonging to those groups provided by BLS on their website (http://www.bls.gov/iag/tgs/iag_index_naics.htm).

specialization in the production of materials suggests that economic linkages will extend job creation to other regions of the United States.[18]

Another reason why goods-producing industries tend to have more geographically extensive economic impacts is that they and their geographically extensive, goods-producing suppliers tend to have higher average wages than many of the service-providing industries. For example, in the United States in 2013 the weighted average wages in goods-producing industries was $58,364, compared to only $47,845 for the service-providing industries. A similar divergence was seen in the state of Michigan with weighted average wages of $60,451 and $43,041 for goods-producing and service-providing industries, respectively. Similarly, in the state of Illinois goods-producing and service-producing industries had weighted average wages of $62,532 and $50,703, respectively.[19] Likewise, in the state of Indiana 2013 average wages were $55,444 for goods-producing industries and $37,026 for service-providing industries. The higher wages in goods-producing industries typically lead to greater induced impacts. Therefore, the induced impacts from a project in a goods-producing industry with higher average wages in its broad supply chain would be expected to be more geographically extensive than those from a service-providing industry with lower average wages and fewer material inputs to production.[20]

It should be noted that most of the new construction activity associated with the Project included in the modeling occurs within the Construction (NAICS 23) sector.[21] Therefore, as the Construction (NAICS 23) sector falls under the categorization of goods-producing, which in turn means that the EB-5 Project is likely to have geographically extensive economic impacts, it is important that the analyst specify a region in the model that includes the remainder of the United States outside the geographic scope of the regional center.

Given the considerations discussed above, the analyst specified a three region model in order to complete this economic impact study for the Project. The three specified regions were as follows: 1) Oakland County, Michigan, 2) the remainder of the geographic scope (original + amended) of the American VIP Regional Center; and 3) the remainder of the United States. Region 1—Oakland County--was specified as it represents the county in which the Project is located. Region 2 was specified in the model in order to be able to examine the impacts of the Project within the geographic scope of the Regional Center, which is a region of importance for examining impacts relative to the EB-5 Program and which encompasses the region in which the workers occupying the direct jobs are expected to live. Region 3 was specified in the model in order to examine the effects of the Project on the total United States economy, given that the construction activities of the Project are in a goods-producing sector and given the focus of the EB-5 Program on the creation of jobs for workers in the United States.

[18]One way to examine specialization is through the use of location quotients. Location quotients represent the ratio of a sector's employment share in a given geography to the same share in another. Examining the location quotient for the Pittsburgh, PA Metropolitan Statistical Area in the Iron and Steel Mills and Ferroalloy Manufacturing (NAICS 3311) industry group for 2013, one finds that the share of employment in that industry group in Pittsburgh was 8.70 times the share of employment in that industry group in the United States. Similarly, the location quotient for the Wood Products Manufacturing (NAICS 321) subsector in the Eugene, Oregon Metropolitan Statistical Area reveals that the share of employment in that subsector in 2013 for Eugene was 9.34 times for that for the nation as a whole. These location quotients indicate that regions do specialize in the production of materials used in goods-producing sectors, as discussed above. Therefore, it stands to reason that other regions would import goods from these specialized areas. [Note: The location quotient data was obtained from the BLS website.]

[19] The wage data was obtained from the Quarterly Census of Employment and Wages data published by BLS.

[20] Additionally, there will be indirect effects associated with the new spending.

[21] Of the $24.35 million in new construction activity associated with the EB-5 Project included in the modeling, $24.35 million occurs within the Construction (NAICS 23) sector and only $0.21 million (i.e., $20,000) occurs outside of this sector.

The sum of the impacts in Oakland County (Region 1) and the remainder of the geographic scope of the American VIP Regional Center (Region 2) represent the new economic impacts within the geographic scope of the American VIP Regional Center. The impacts within the geographic boundaries of the regional center plus the impacts in the remainder of the United States (Region 3) sum to the total expected economic impacts for the United States as a whole. This model structure, when employed with the assumptions listed below and using the specific data inputs specified in *Table 3 Inputs* in *Section 4.1.2 Model Inputs* would enable an analyst to replicate the I-O model simulations employed in this study.

4.1.2 Impact Study Inputs

The relevant information and data used to develop the I-O model inputs for this study of the FedEx Ground Facility - Detroit EB-5 Project included the amount and timing of the construction expenditures for the Project on an annual timeline. The data from the project developers are laid out in a comprehensive and detailed business plan that will be filed along with the other materials in the regional center amendment request materials. Using these project parameters, the analyst quantified the new business activity of the Project in each year and assigned it to the proper NAICS activity category, as shown in *Table 3 Inputs* below.

Table 3: Impact Study Inputs

		Year 1	Year 2
		Construction	
Construction Expenditures ($ Millions)	**NAICS**		
Commercial building construction	2362	$8.78	$0.09
Electrical contractors	23821	$2.73	$0.00
Plumbing & HVAC contractors	23822	$3.29	$0.00
Site preparation contractors	23891	$9.46	$0.00
Architect & engineering services	5413	$0.08	$0.00
Environmental consulting services	5416	$0.13	$0.00

Note: All dollar values are presented in millions of nominal dollars.

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Beyond the discussion above, key I-O modeling details and assumptions for the Project are described below:

- In accordance with *Section 3. EB-5 Project Details* of the FedEx Ground Facility - Detroit EB-5 Project Business Plan, modeling was carried out on a project year basis. In this case, Year 1 corresponds to May 2015 through April 2016 and Year 2 corresponds to May 2016 through April 2017. The entire construction timeline is approximately 13 months—from May 2015 to May 2016.
- The detailed use of funds information contained in *Appendix I Construction Budget* of the FedEx Ground Facility - Detroit EB-5 Project Business Plan is the source of the model inputs associated with the construction activities for the Project. The table in the business plan appendix was adapted herein as *Table 1 Use of Funds* in *Section 3.2.2 Use of Funds*.
- Construction expenditures total $45.50 million for the Project. Out of the total construction expenditures, only $24.55 million was included in the modeling. These included expenditures were categorized for use in the model as follows:
    - Building shell, categorized as commercial building construction (NAICS 2362) totaled $8.87 million in expenditures; with $8.78 million in Year 1 and $0.09 million in Year 2.

  - Electrical, categorized as electrical contractors (NAICS 2382) totaled $2.73 million in expenditures; all during Year 1
  - Plumbing and heating, ventilation, and air conditioning, categorized as plumbing and HVAC contractors (NAICS 2382), totaled $3.29 million in expenditures, all during Year 1.
  - Sitework, categorized as site preparation contractors (NAICS 2389), totaled $9.46 million in expenditures, all during Year 1.
  - Architectural and engineering services (NAICS 5413) totaled $0.08 million in expenditures, all during Year 1.
  - Environmental assessment, categorized as environmental consulting services (NAICS 5416), totaled $0.13 million in expenditures, all during Year 1.
- All project expenditures not detailed in the list above and *Table 3* were excluded from the modeling because they are not appropriate for inclusion or they are too small to significantly impact the analysis. The expenditures excluded from the modeling over the two-year period total $20.95 million.
  - Expenditures not appropriate for inclusion in the model are land acquisition costs, contingencies and other non-specific line items, certain fees, insurance expenditures, and financing and interest costs.

4.2 Overview of Project Impacts

4.2.1 Job Creation and Other Economic Impacts

REDYN is capable of estimating all measurable linkages associated with the incremental economic activity in the NAICS activities modeled to describe the FedEx Ground Facility - Detroit EB-5 Project.[22] This incremental activity will create and sustain employment. The Project is expected to add new jobs within the geographic scope of the American VIP Regional Center due to the expanded business activity related to the EB-5 Project, an increase which has a ripple effect throughout the economy of the United States. As shown in *Table 4 Summary of the Total EB-5 Project Impacts*, this study finds that, as a result of this new business activity and the subsequent ripple effects stemming from it, the Project will have significant economic impacts on the economies of the regional center, the remainder of the United States outside the regional center, and, consequently, the United States as a whole.[23]

[22] With regard to I-O tools and models, such as the REDYN model, the May 30, 2013 EB-5 Adjudications Policy Memorandum issued by the USCIS states on page 17 that "*due to the nature of accepted job creation modeling practices, which do not distinguish whether jobs are full- or part-time, USCIS relies upon the reasonable economic models to determine that it is more likely than not that the indirect jobs are created and will not request additional evidence to validate the job creation estimates in the economic models to prove by a greater level of certainty that the indirect jobs created, or to be created, are full-time or permanent.*"

[23] All values are reported in constant 2015 dollars.

Table 4: Summary of the Total Project Impacts

	Year 1	Year 2
	Construction	
Regional Center Economy		
Total Jobs	431	1
Output ($ Millions)	$71.11	$0.26
Labor Income ($ Millions)	$35.47	$0.13
Household Earnings ($ Millions)	$31.17	$0.11
Outside the Regional Center Economy		
Total Jobs	335	1
Output ($ Millions)	$63.42	$0.17
Labor Income ($ Millions)	$21.37	$0.05
Household Earnings ($ Millions)	$19.34	$0.05
Total United States Economy		
Total Jobs	766	2
Output ($ Millions)	$134.54	$0.43
Labor Income ($ Millions)	$56.84	$0.18
Household Earnings ($ Millions)	$50.52	$0.16

Note: All dollar values are presented in millions of 2015 dollars.

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This economic impact study finds that the Project, through successful construction, will result in new and significant economic impacts for the economy within the geographic scope of the regional center. The Project is expected to result in economic impacts within the economy of the regional center as follows:

- The new jobs in each year are estimated to be as follows:
  - Year 1: 431 new jobs.
  - Year 2: 1 new job.
- A 2-year cumulative increase of $71.37 million in output.
- A 2-year cumulative increase of $35.60 million in labor income.
- A 2-year cumulative increase of $31.29 million in household earnings.

This economic impact study finds that the Project, through successful construction, is expected to generate new and significant economic impacts for the United States economy outside the geographic scope of the regional center. The Project is likely to result in economic impacts in the United States economy outside the geography of the regional center as follows:

- The new jobs in each year are estimated to be as follows:
  - Year 1: 335 new jobs.
  - Year 2: 1 new job.
- A 2-year cumulative increase of $63.59 million in output.
- A 2-year cumulative increase of $21.42 million in labor income.
- A 2-year cumulative increase of $19.39 million in household earnings.

This economic impact study finds that the Project, through successful construction, will generate new and significant economic impacts for the United States economy as a whole. The Project is expected to result in economic impacts in the United States economy as a whole as follows:

- The new jobs in each year are estimated to be as follows:
  - Year 1: 766 new jobs.
  - Year 2: 2 new jobs.
- A 2-year cumulative increase of $134.96 million in output.
- A 2-year cumulative increase of $57.02 million in labor income.
- A 2-year cumulative increase of $50.68 million in household earnings.

4.2.2 Direct and Indirect Jobs

Table 5 Direct and Indirect Jobs below presents the United States job creation associated with the Project separated into those jobs that are direct and those that are indirect.[24] By definition, all direct jobs are assumed to occur within Oakland County, Michigan, which is the region in which the project activity is located. The number of direct and indirect jobs created as a result of the Project was determined using the REDYN model. Red highlighted numbers in the table means those indirect jobs were used in the EB-5 program job estimate attributable to the regional center as laid out in *Table 7* (below).

[24] Direct jobs are defined herein as those that are created as a direct result of the incremental change in final demand for a given project (e.g., the developer hires a construction management firm). Indirect jobs are created as materials and other inputs to production are supplied to the project (e.g., the supplier of steel to the construction firm hires additional staff). It should be noted that induced jobs, which are a subset of indirect jobs, are created when the new workers occupying the direct and indirect jobs spend their new income resulting from the project at other businesses (e.g., the workers patronize restaurants and retail stores).

Table 5: Direct and Indirect Jobs

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	Year 1	Year 2
	Construction	
Commercial building construction (NAICS 23622)		
Direct Jobs	54	1
Indirect Jobs	223	1
Total Jobs	277	2
Electrical contractors (NAICS 23821)		
Direct Jobs	17	0
Indirect Jobs	67	0
Total Jobs	84	0
Plumbing & HVAC contractors (NAICS 23822)		
Direct Jobs	20	0
Indirect Jobs	82	0
Total Jobs	102	0
Site preparation contractors (NAICS 23891)		
Direct Jobs	58	0
Indirect Jobs	240	0
Total Jobs	298	0
Architecture & Engineering (NAICS 5413)		
Direct Jobs	0	0
Indirect Jobs	1	0
Total Jobs	1	0
Environmental consulting (NAICS 5416)		
Direct Jobs	1	0
Indirect Jobs	1	0
Total Jobs	2	0

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Table 6 Model Simulation Direct and Indirect Jobs Calculations below has been included to demonstrate how the REDYN model determines which jobs are direct and which are indirect. *Table 6* shows the REDYN calculations for the model simulation of the commercial building construction expenditures for the Project in Year 1. The REDYN model calculates direct jobs based on a productivity concept (i.e., based on the average output per employee). As such, the REDYN model divides the change in final demand in the specific NAICS activity (Item D) by the average output per employee (Item C) for that NAICS activity in the region in which the inputs were modeled in order to determine the number of new direct jobs that will be created (Item E). The number of indirect jobs (Item G) is calculated by subtracting the number of direct jobs (Item E) from the total number of new jobs (Item F). This same method was used for each NAICS activity included in the impact study modeling.

Table 6: Model Simulation Direct and Indirect Job Calculations

COMMERCIAL BUILDING CONSTRUCTION (NAICS 2362)--Year 1					
NAICS 2362 Baseline Output (Millions):	$1,010	[A]	Input Expenditures (Millions):	$8.78	[D]
NAICS 2362 Baseline Employment:	6,182	÷ [B]	NAICS 2362 Baseline Output (Millions)/Employee:	$0.16	÷ [C]
NAICS 2362 Baseline Output (Millions)/Employee:	$0.16	= [C]	NAICS 2362 Direct Jobs	54	= [E]
			NAICS 2362 Total United States Jobs:	277	[F]
			NAICS 2362 Direct Jobs:	54	- [E]
			NAICS 2362 Indirect Jobs:	223	= [G]

Notes:
1. All output and expenditure figures are in millions of 2015 dollars ($2015).
2. The REDYN model baseline output and employment figures are those for the specific NAICS activity listed as calculated by the REDYN model for Oakland County, Michigan.
3. Baseline output and employment represents the current level of economic activity within the commercial & institutional building construction industry (NAICS 23622).
4. Based on the definition of direct job creation, all direct jobs are assumed to occur within the region in which the economic activity was modeled. The economic activity for the FedEx Ground Service - Detroit EB-5 Project was modeled in Oakland County, Michigan, where the EB-5 project is located. Therefore, the input-output model assumes that all direct jobs occur within Oakland County, Michigan.
5. Output per employee is a productivity concept. It measures the average output per employee in the specific NAICS activity being analyzed.

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4.3 Estimate of Jobs Attributable to the Regional Center

4.3.1 Jobs Arising from Construction Activities

A subset of the total jobs estimated to be created by the construction activities of the FedEx Ground Facility - Detroit EB-5 Project have been included in the estimate of jobs attributable to the American VIP Regional Center. These jobs include the indirect jobs created in the United States in Year 1. The rationale behind attributing the estimated jobs to the amended American VIP Regional Center is based on the following: 1) the EB-5 Program requirement that direct jobs must last for at least two years; 2) the admissibility of an estimate to attribute jobs, including jobs both inside and outside the geographic scope of the regional center, to the regional center; and 3) the EB-5 Program requirement that jobs be created within a reasonable time.

First, EPR would like to address the EB-5 Program requirement that direct jobs must last for at least two years. The following quote from the May 30, 2013 EB-5 Adjudications Policy Memorandum issued by the USCIS provides guidance:

> "*Direct jobs that are intermittent, temporary, seasonal, or transient in nature do not qualify as full-time jobs for EB-5 purposes. Consistent with prior USCIS interpretation, however, jobs that are expected to last for at least two years generally are not intermittent, temporary, seasonal, or transient in nature.*"[25]

In the case of the Project, construction activity lasts for less than two years. Therefore, only indirect jobs for each NAICS activity associated with construction are included in the estimate of new jobs attributable to the regional center. The project construction timeline includes 12 months of construction in project Year 1 and 1 month of construction in project Year 2. Based on this information, project Year 1 was chosen as the most appropriate year in which to count the indirect jobs as it represents the most intensive year of construction.[26]

Next, EPR would like to address the admissibility of the estimate of jobs attributable to the regional center include jobs both inside and outside the geographic scope of the regional center. The following

[25] Op. cit., page 17.

[26] With regard to indirect jobs, the May 30, 2013 EB-5 Adjudications Policy Memorandum states on page 17 as follows: "*Due to the nature of accepted job creation modeling practices, which do not distinguish whether jobs are full- or part-time, USCIS relies upon the reasonable economic models to determine that it is more likely than not that the indirect jobs are created and will not request additional evidence to validate the job creation estimates in the economic models to prove by a greater level of certainty that the indirect jobs created, or to be created, are full-time or permanent.*"

quote from the May 30, 2013 EB-5 Adjudications Policy Memorandum issued by the USCIS provides guidance:

> "*Indirect jobs can qualify and be counted as jobs attributable to a regional center, based on reasonable economic methodologies, even if they are located outside of the geographical boundaries of a regional center.*"[27]

As previously mentioned in *Section 4.1.1 Geographic Scope*, based on the definition of direct jobs and the fact that the regional center encompasses a significant portion of the locations where the workers occupying the new jobs created as a result of the Project are expected to live, all direct jobs are assumed to be located within the geographic scope of the regional center. As such, all of the jobs outside the geographic boundaries of the regional center are indirect jobs and have been shown to be admissible under the EB-5 Program. Furthermore, it is to be expected that a project component comprised primarily of goods-producing activities, such as those categorized as construction, would create jobs for workers throughout the economy of the United States.

Finally, EPR would like to address the EB-5 Program requirement that jobs attributable to a regional center occur within a reasonable time. The May 30, 2013 EB-5 Adjudications Policy Memorandum issued by the USCIS states as follows:

> "*For purposes of the Form I-526 adjudication and the job creation requirements, the two-year period described in 8 C.F.R. §204.6(j)(4)(i)(B) is deemed to commence six months after the adjudication of the Form I-526. The business plan filed with the Form I-526 should reasonably demonstrate that the requisite number of jobs will be created by the end of this two-year period.*"[28]

The jobs estimated to be attributed to the regional center are estimated to arise in Year 1. Therefore, Year 1 needs to fall within two years and six months of the adjudication of immigrant investor Form I-526 petitions. *Figure 3 Immigrant Investor and Project Development Timelines* in *Section 5.4 EB-5 Timelines* of the FedEx Ground Facility - Detroit EB-5 Project Business Plan shows how the immigrant investor and project development timelines associated with the EB-5 Project align. As shown in *Figure 3*, the job-generating construction activities occurring in Year 1 will occur within two years and six months of the expected adjudication of immigrant investor Form I-526 petitions. Consequently, the estimate for jobs attributable to the Regional Center under the EB-5 Program satisfies the requirement that the jobs occur within a reasonable time.

4.3.2 Summary of the Jobs Attributable to the Regional Center

For each NAICS activity included in the modeling, *Table 7 Summary of Model Specifications and Jobs Attributable to the Regional Center* below summarizes the following: 1) the model input specifications by year; 2) the total number of jobs created in the United States by year; and 3) the jobs that are estimated to be attributed to the American VIP Regional Center under the EB-5 Program. See *Table 5* (above) for the detail between direct and indirect jobs and the indirect job count source for *Table 7* (below).

[27] Op. cit., page 18.
[28] Op. cit., page 19.

Table 7: Summary of Model Specifications and Jobs Attributable to the Regional Center

Project Component	NAICS Activity Code	Model Inputs ($ Millions)	Total United States Job Creation	Job Creation Attributable to the Regional Center
CONSTRUCTION				
Commercial building construction	NAICS 2362	Year 1: $8.78 Year 2: $0.09	Year 1: 277 Year 2: 2	***223*** *Indirect Jobs Only Year 1, Total U.S.*
Electrical contractors	NAICS 2382	Year 1: $2.73 Year 2: $0.00	Year 1: 84 Year 2: 0	***67*** *Indirect Jobs Only Year 1, Total U.S.*
Plumbing & HVAC contractors	NAICS 2382	Year 1: $3.29 Year 2: $0.00	Year 1: 102 Year 2: 0	***82*** *Indirect Jobs Only Year 1, Total U.S.*
Site preparation contractors	NAICS 2389	Year 1: $9.46 Year 2: $0.00	Year 1: 298 Year 2: 0	***240*** *Indirect Jobs Only Year 1, Total U.S.*
Architecture & engineering services	NAICS 5413	Year 1: $0.08 Year 2: $0.00	Year 1: 1 Year 2: 0	***1*** *Indirect Job Only Year 1, Total U.S.*
Environmental consulting services	NAICS 5416	Year 1: $0.13 Year 2: $0.00	Year 1: 2 Year 2: 0	***1*** *Indirect Job Only Year 1, Total U.S.*
Total Job Creation Attributable to the Regional Center (Construction Only):				**614**
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As shown, the number of jobs attributable to the regional center totals 614 new jobs. This total consists of the indirect jobs created throughout the United States by the construction activities of the EB-5 Project in Year 1.

Section 5. Conclusion

EPR was commissioned to examine the economic impacts, including job creation, of the FedEx Ground Facility - Detroit EB-5 Project for the purposes of amending the American VIP Regional Center. Based on information and data supplied by the project developers, and additional research conducted as necessary by the analyst, model simulations of the Project were conducted using the REDYN model. The results of those model simulations showed new and significant economic impacts.

Out of the total economic impacts estimated to result from the Project, it is estimated that 633 new jobs be attributed to the American VIP Regional Center. These estimated jobs consist entirely of new indirect jobs created throughout the United States as a result of the construction activities of the Project in Year 1.

The economic impact estimates presented in this study demonstrate specifically how a project consistent with the parameters of the Project will promote economic growth within the economy of the geography of the Regional Center, in the economy of the remainder of the United States outside the geography of the Regional Center, and, consequently, in the economy of the United States as a whole. Therefore, EPR has concluded that approval of the regional center amendment request using the results of this impact study by the USCIS under the EB-5 Program will result in the creation of a significant number of new jobs for workers in the United States.

The May 30, 2013 EB-5 Adjudications Policy Memorandum issued by the USCIS states as follows on page 15:

> *"In developing the EB-5 Program, Congress intended to promote the immigration of people who invest capital into our nation's economy and help create jobs for U.S. workers. Therefore, the creation of jobs for U.S. workers is a critical element of the EB-5 Program."*[29]

As such, the approval of the regional center amendment using this impact study by the USCIS under the EB-5 Program will allow for the subsequent submission of I-526 petitions that will result in the creation of a significant number of new jobs for workers in the United States, consistent with the intent of Congress when creating the EB-5 Program.

[29] Op. cit., page 15.

Appendix 1. Regulatory Output NAICS Activity Impacts

The new economic impact totals described in *Section 4.2.1 Job Creation and Other Economic Impacts* are comprised in part from impacts in regulatory output NAICS activities identified in the EB-5 Program regulations at *8 C.F.R. §204.6(m)(3)(iv)*.[30] The regulatory output NAICS activities are as follows: 1) the Utilities (NAICS 221) subsector; 2) the Construction (NAICS 23) sector; 3) the Professional, Scientific and Technical [Business] Services (NAICS 541) subsector; and 4) the Maintenance and Repair (NAICS 811) subsector. To be in compliance with guidance documents issued by the USCIS regarding economic and job impact reporting of these regulatory output NAICS activities for EB-5 projects, detailed predictions of impacts associated with the FedEx Ground Facility - Detroit EB-5 Project are reported for the economy within the geography of the American VIP Regional Center, the economy of the remainder of the United States outside the geographic scope of the Regional Center, and the United States economy as a whole.[31]

Within the Regional Center Employment and Output Impacts in the Regulatory Output NAICS Activities

	NAICS Activity	Year 1	Year 2
Employment Impacts	Utilities (NAICS 221)	0	0
	Construction (NAICS 23)	97	1
	Construction of Buildings (NAICS 236)	*55*	*1*
	Heavy and Civil Engineering Construction (NAICS 237)	*0*	*0*
	Specialty Trade Contractors (NAICS 238)	*42*	*0*
	Professional, Scientific, and Technical Services (NAICS 541)	15	0
	Repair and Maintenance (NAICS 811)	2	0
	Subtotal	**114**	**1**
Output Impacts ($2015, Millions)	Utilities (NAICS 221)	$0.57	$0.00
	Construction (NAICS 23)	$22.54	$0.09
	Construction of Buildings (NAICS 236)	*$9.04*	*$0.09*
	Heavy and Civil Engineering Construction (NAICS 237)	*$0.09*	*$0.00*
	Specialty Trade Contractors (NAICS 238)	*$13.41*	*$0.00*
	Professional, Scientific, and Technical Services (NAICS 541)	$3.91	$0.01
	Repair and Maintenance (NAICS 811)	$0.41	$0.00
	Subtotal	**$27.43**	**$0.10**

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The table above describes the employment and output impacts of the Project by regulatory output NAICS activity for the economy within the geography of the regional center. These impacts included increased demand for the regulatory output NAICS activities as follows:

- A 2-year cumulative impact of $0.57 million for the Utilities (NAICS 221) subsector.
- A 2-year cumulative impact of $22.63 million for the Construction (NAICS 23) sector.
- A 2-year cumulative impact of $3.92 million for the Professional, Scientific, and Technical [Business] Services (NAICS 541) subsector.
- A 2-year cumulative impact of $0.41 million for the Repair and Maintenance (NAICS 811) subsector.

These output impacts correspond to job impacts within most of the examined NAICS activities.

[30] The EB-5 Program regulations at 8 C.F.R. §204.6(m)(3)(iv) state that the petitioner shall submit a petition which "*contains a detailed prediction regarding the manner in which the regional center will have a positive impact on the regional or national economy in general as reflected by such factors as increased household earnings,* ***greater demand for business services, utilities, maintenance and repair, and construction both within and without the regional center.***" [Emphasis added].

[31] All values are reported in constant 2015 dollars.

Outside the Regional Center Employment and Output Impacts in the Regulatory Output NAICS Activities

	NAICS Activity Name	Year 1	Year 2
Employment Impacts	Utilities (NAICS 221)	0	0
	Construction (NAICS 23)	7	0
	Construction of Buildings (NAICS 236)	*1*	*0*
	Heavy and Civil Engineering Construction (NAICS 237)	*1*	*0*
	Specialty Trade Contractors (NAICS 238)	*5*	*0*
	Professional, Scientific, and Technical Services (NAICS 541)	14	0
	Repair and Maintenance (NAICS 811)	4	0
	Subtotal	**25**	**0**
Output Impacts ($2015, Millions)	Utilities (NAICS 221)	$0.70	$0.00
	Construction (NAICS 23)	$1.34	$0.00
	Construction of Buildings (NAICS 236)	*$0.32*	*$0.00*
	Heavy and Civil Engineering Construction (NAICS 237)	*$0.19*	*$0.00*
	Specialty Trade Contractors (NAICS 238)	*$0.83*	*$0.00*
	Professional, Scientific, and Technical Services (NAICS 541)	$2.87	$0.01
	Repair and Maintenance (NAICS 811)	$0.58	$0.00
	Subtotal	**$5.49**	**$0.01**

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The Project will also have employment and output impacts in the regulatory output NAICS activities in the economy of the remainder of the United States outside the geography of the regional center. These impacts included increased demand for the regulatory output NAICS activities as follows:

- A 2-year cumulative impact of $0.70 million for the Utilities (NAICS 221) subsector.
- A 2-year cumulative impact of $1.34 million for the Construction (NAICS 23) sector.
- A 2-year cumulative impact of $2.88 million for the Professional, Scientific, and Technical [Business] Services (NAICS 541) subsector.
- A 2-year cumulative impact of $0.58 million for the Repair and Maintenance (NAICS 811) subsector.

These output impacts correspond to job impacts within most of the examined NAICS activities.

Total United States Employment and Output Impacts in the Regulatory Output NAICS Activities

	NAICS Activity Name	Year 1	Year 2
Employment Impacts	Utilities (NAICS 221)	0	0
	Construction (NAICS 23)	104	1
	Construction of Buildings (NAICS 236)	*56*	*1*
	Heavy and Civil Engineering Construction (NAICS 237)	*1*	*0*
	Specialty Trade Contractors (NAICS 238)	*47*	*0*
	Professional, Scientific, and Technical Services (NAICS 541)	29	0
	Repair and Maintenance (NAICS 811)	6	0
	Subtotal	**139**	**1**
Output Impacts ($2015, Millions)	Utilities (NAICS 221)	$1.27	$0.00
	Construction (NAICS 23)	$23.88	$0.09
	Construction of Buildings (NAICS 236)	*$9.36*	*$0.09*
	Heavy and Civil Engineering Construction (NAICS 237)	*$0.28*	*$0.00*
	Specialty Trade Contractors (NAICS 238)	*$14.24*	*$0.00*
	Professional, Scientific, and Technical Services (NAICS 541)	$6.78	$0.02
	Repair and Maintenance (NAICS 811)	$0.99	$0.00
	Subtotal	**$32.92**	**$0.11**

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The table above describes the employment and output impacts by regulatory output NAICS activity for the United States economy as a whole. These impacts include increased demand for the regulatory output NAICS activities as follows:

- A 2-year cumulative impact of $1.27 million for the Utilities (NAICS 221) subsector.
- A 2-year cumulative impact of $23.97 million for the Construction (NAICS 23) sector.
- A 2-year cumulative impact of $6.80 million for the Professional, Scientific, and Technical [Business] Services (NAICS 541) subsector.
- A 2-year cumulative impact of $0.99 million for the Repair and Maintenance (NAICS 811) subsector.

These output impacts correspond to job impacts within most of the examined NAICS activities.

Appendix 2. About Economic & Policy Resources, Inc.

Economic & Policy Resources, Inc. began providing consulting services to public and private clients in 1983. Our staff is comprised of 10 full-time employees. We deliver economic, financial, planning, and public policy services to support our clients' critical decision-making processes. Our staff of economic, financial, planning, and policy analysts uses state-of-the-art analytical tools and methods to inform and address client issues. EPR has developed and has access to extensive data (including proprietary data) and analytical tools to provide credible, fully considered analyses and results. We have a proven record of accomplishment on a wide-range of studies involving economic, socioeconomic, community and economic development, and public policy topics. Our completed projects list includes over 150 economic impact studies submitted for consideration under the EB-5 Program over the past 10 years.

Appendix 3. Limitations and Contingent Conditions

The results of this economic impact study should be viewed with certain limitations. This analysis is intended to assist the USCIS and interested parties in estimating the economic impact potential associated with the proposed EB-5 Project for the economy within the geographic scope of the Regional Center, the economy for the remainder of the United States outside the geography of the Regional Center, and for the economy of the United States as a whole.

- In undertaking this assignment, we employed accepted practices and assumptions designed to produce conservative estimates for purposes of understanding the potential impacts of the EB-5 Project. Actual results could differ.
- It should also be noted that specific estimates of year-to-year impacts are difficult to make with a high degree of accuracy. The expected impacts of the EB-5 Project in any one year could deviate from those presented in this report due to factors that are beyond the scope of this analysis, such as interest rates and business cycles.
- The authors believe the study is a reasonable and conservative estimate of the likely economic impacts of this development activity under the assumptions employed in this study as of the date of this report.

Data and information utilized in the analysis was obtained from the project developers, various industry sources, (e.g., selected trade associations), and other third party publications (e.g., from authoritative federal government departments and agencies) which are commonly used and relied upon by economic analysts. Information supplied by the project developers has been accepted as correct without further verification, although we conducted routine quality control checks for reasonableness and internal consistency. We express no opinion on the accuracy of the information provided to us by the project developers. The report reflects facts and conditions existing and known as of the date of the report. Subsequent events and additional information may require a review and alteration of the opinions and conclusions presented herein.

Possession of this report, or a copy thereof, does not carry with it the right of publication of all or part of it, nor may it be used for any purpose by anyone but the client without the prior written consent of the client or of EPR and, in any event, not without proper attribution. The opinions expressed herein are valid only for the purposes described herein.

EPR has no present or prospective interest in the entity that is the subject of this report and has no personal interest or bias with respect to the parties involved. EPR is paid an hourly rate for time spent in analyzing and preparing its conclusions and opinions. EPR's fees are not contingent upon the outcome of any event for which this report may be used.

Appendix 4. The REDYN Model

I. Introduction to the REDYN Model

Economic impact modeling to determine the likely economic impacted associated with the EB-5 Project was performed using the REDYN model. The REDYN model has been used to assess the new economic benefits associated with economic development projects, new businesses, certain types of policy changes, and utility power projects in various states throughout the country in a variety of analytical settings. EPR has used the REDYN model in more than 175 studies overall, including more than 150 economic impact studies submitted for consideration under the EB-5 Program.

The REDYN model employed for this economic impact study estimates the impact a specific investment will generate throughout a set of regions, in this case the impact of the EB-5 Project in the economies of the geographic scope of the Regional Center, the remainder of the United States outside the geography of the Regional Center, and the United States as a whole. The I-O model uses a dynamic (or longitudinal) approach that simulates not only the relationships between activities in an economy (e.g., the Construction (NAICS 23) sector is linked to the Architectural, Engineering, and Related Services (NAICS 5413) industry group), but also the interconnectivity of regions (e.g., that goods and services are exchanged between the New York-Jersey City-White Plains, NY-NJ Metropolitan Division and the Newark, NJ-PA Metropolitan Division). The dynamic element of the model has a well-developed impedance database that is able to account for temporal effects due to competitive differences between either geographic regions and/or different economic activities. Over time, these competitive pressures emerge and then tend to bring the regional economy back to equilibrium. The process, in that way, depicts the so called "ripple effect" impact that economic changes have on a region.

The REDYN model has been used previously in adjudications that were approved by the USCIS under the EB-5 Program. The REDYN model is one of four I-O tools and models that have been recognized as accepted methodologies for estimating indirect job creation in the Adjudicator's Field Manual issued by the USCIS, with the others being the RIMS II tool, the IMPLAN tool, and the REMI model. The following sections explain in detail how the REDYN model software works and why it is a valid and preferred approach for determining the economic impacts of EB-5 projects. In addition to this explanation, further detail on the REDYN model can be found in the exhibits appended to the end of this report, which are listed below in the schedule of exhibits.

II. Advantages of the REDYN Model

The internet based REDYN model was principally developed by the late Thomas Tanner, Ph.D., a former model manager at REMI of Amherst, Massachusetts. Dr. Tanner was a former member of the faculty at the University of Georgia, and was most recently employed at the Strom Thurmond Institute of Government and Public Affairs at Clemson University at the time of his death in May of 2009. Dr. Tanner's work experience at REMI gave him the expertise to create an alternative to the REMI model. The result is an integrated I-O model of the counties and cities of the United States which has significant advantages over the existing menu of retail I-O models.

The REDYN model employs a concept known as New Economic Geography, a theory first developed by Nobel Laureate Dr. Paul Krugman while he was at the Massachusetts Institute of Technology (please refer to Exhibit 1). This philosophy employs "fully general equilibrium" models that "derive aggregate behavior from individual maximization." This competitive framework is translated into a model that

makes the assumption that "commodities produced by an industry are truly joint in the production process, as prescribed by a uniform production function for all firms in each industry based on competitive pressures to diffuse advantages quickly across all firms in an industry."

New Economic Geography also focuses on agglomeration economies and the relationships between them in different levels of geographic space.[32] To illustrate this, consider a tight group of commercial establishments configured as a mall, which is an agglomeration of retail establishments. This is the smallest level of an agglomeration economy. It is related to the regional commercial market which is part of the national and world markets. It is the linkages between these levels of economic agglomeration that New Economic Geography seeks to explain and illustrate.

Like all I-O tools and models, the REDYN model calculates the effects of a new final demand stimulus into three general categories. Category 1 includes the direct effects, which measure the change in the NAICS activities where the final demand change was effectuated. Category 2 effects include the indirect effects, which are those changes in inter-sector purchases as they respond to the new final demand change in the directly affected NAICS activities. Category 3 effects include induced effects, which are due to changes in spending from affected workers and their households as labor income either increases or decreases due to the change in final demand. The REDYN I-O model software calculates all three of these effects just like any other I-O tool, but as a dynamic I-O model, like the dynamic REMI model, the REDYN model has the capability through its structure to analyze the impacts over time of the entire EB-5 project and its components as part of a single integrated development scenario.

In its simplest form, the estimation process is comprised of two fundamental steps. These steps are as follows: 1) calculations to determine what are commonly referred to as national coefficients, which are based on production functions;[33] and 2) determinations as to what proportion of those goods and services are purchased within the region. The first calculations estimate how much input is used in any given year to produce a given amount of output in that same year. The second group of calculations referred to above involves calculations of what are referred to as regions purchase coefficients ("RPCs"). These RPCs estimate what proportion of those goods and services are purchased within the region in question.

The REDYN model, like the IMPLAN tool and the REMI model, handles all these calculations within the model software based on the geography and type of stimulus specified by the analyst. The REDYN model is geographically specified so that RPCs are calculated for all involved sectors based on purchases of goods and services from firms within the region. The matrix can be, and usually is, large and complex. RPCs tend to be higher for service-providing sectors and lower for goods-producing sectors. The REDYN model calculates indirect jobs through the I-O simulation process using quantified national relationships from the I-O tables and RPCs as calculated within software algorithms embedded in the REDYN model.

There is a crucial distinction to be made between I-O models, such as the REDYN and REMI models, and tools that use an extracted single number I-O coefficient which measures an impact in a single year, such as the RIMS II tool. The multiplier approach involves simple multiplication where a single number estimate of a change in final demand can be done in a spreadsheet. The REDYN and REMI models do not employ single multiplier calculations, but derive their predictive ability on interconnected matrices of make-and-use tables for specific sectors and specific regions. Therefore, I-O models use a large matrix of

[32] Agglomeration economies refer to circumstances where economic units, although competing, find it mutually advantageous to co-locate or to locate sufficiently close enough to share production resources and/or customers.

[33] This is a process whereby the amount of input (and the corresponding number of jobs and amount of income) required to produce an amount of output of a final product or service is estimated.

multipliers that literally includes hundreds, and sometimes thousands, of multipliers. Impact studies undertaken using the REDYN model can treat a project as a single integrated development scenario and compare the economy under that scenario to a "base case" for the regional economy, with the base case being a scenario in which the project was not undertaken.

III. REDYN Model Data Sources

The REDYN model, like the other recognized I-O tools and models, is based on the concept of a production function, which determines what are called the make-and-use tables. These tables quantify the amount of inputs that are required to produce a unit of output across a number of sectors. The basic data underlying these tables are collected by the United States Department of Commerce, principally through its sub-agency, the BEA. The vast amount of data come from a variety of sources and the data collected are converted into production accounts on a national income basis and I-O accounts basis, called the National Income and Product Accounts ("NIPA"). These accounts are assembled into various tables including transactions tables, which track the economic flows between producers and users of commodities, as well as the commodity taxes, transportation charges, wholesale and retail trade margins between producers and users, and final use tables. These tables are the building blocks for the I-O accounts, from which various multipliers are derived.[34]

Regional I-O models can be constructed using a geographically tailored I-O matrix. Such a matrix takes into account RPCs, which are calculated based on the proportion of goods and services required to produce one unit of output that are produced *within a defined geographical region*. These RPCs for most I-O models are based on subsets of the same national data described above. For the REDYN model, the underlying matrix has all these coefficients embedded in the model, as it is for the REMI model and the IMPLAN tool.

In addition, the REDYN model uses a variety of supplemental data provided by entities of the United States government. The industry structure for the model is the North American Industry Classification System to the five-digit level. This allows the model to provide detail for 713 industries and over 180 commodities for the geographic regions specified in the model (please refer to Exhibit 2). This classification system and level of detail makes the REDYN model's output compatible for comparison to government reported statistics as this is the system used for publishing economic data by the BEA, the BLS, and the Census Bureau.

The REDYN model also employs data from the Census Bureau's County Business Patterns ("CBP"). The Census Bureau's CBP data is the source for wage bill payroll data and employment data used in the REDYN model. The model's developers preferred this approach since it is an annual series that is more complete in its coverage of the workforce than the BLS' Quarterly Census of Employment and Wages ("QCEW") series, as it includes self-employed persons, employees of private households, agricultural production workers, and railroad workers. These workers are not covered by most state unemployment insurance systems and are therefore not reported in the QCEW series.

The CBP data set also is preferred because it provides detail about wages and employment down to the zip code level where concentration of industry is high enough to provide reportable data. The suppression of data due to confidentiality issues is a common problem for all types of wage and

[34] United States Department of Commerce, Bureau of Economic Analysis. Concepts and Methods of the U.S. Input-Output Accounts. September 2006, Updated April 2009.

employment data used in specifying I-O models. The REDYN model has developed a method to fill in the blanks called row-and-column sum ("RAS").

After performing the RAS analytics on the CBP data it is reconciled with Regional Economic Information System ("REIS") data from the BEA to confirm consistency. The REIS data are especially helpful for providing data in the agriculture and governmental sectors. The REIS data are also used to allocate national consumption numbers to the roughly 3,100 counties in the United States that are provided on the aggregate level by the NIPA. The levels of consumption of sectors and households are a key building block in the creation of I-O models (please refer to Exhibit 3).

The I-O tables themselves are created using BEA I-O make-and-use tables (described above). The data in these tables are augmented by the biennial 10-year I-O forecast tables from the BLS. A major difference between the REDYN model and other I-O models is its use of a new distance impedance database supplied by the Oak Ridge National Laboratory (please refer to Exhibit 4). This allows the REDYN model to add elements of trade flow and gravity theory based on distance impedance specific to road, rail, water, air, and proxy transport. The combination of these data sources gives the REDYN model the power to predict the economic impacts of a wide range of economic changes with greater accuracy than ever before.

IV. Schedule of Exhibits

- Exhibit 1: The Business of Regional Dynamics, Inc.: Economic Modeling Redefined.
- Exhibit 2: How the Regional Dynamics Economic Model Works: The REDYN Model in a Nutshell.
- Exhibit 3: REDYN Model Data Sources and Baseline Estimation Process: Where the REDYN Model Gets Data.
- Exhibit 4: The Regional Dynamics Economic Analysis Model: What the REDYN Model Does.

Exhibit 1:
The Business of Regional Dynamics, Inc.:
Economic Modeling Redefined – Source: Regional Dynamics, Inc.

The Business of Regional Dynamics, Inc.

Economic Modeling Redefined

Regional Dynamics is an economic modeling company. We offer the REDYN advanced economic model by web subscription or batch services to consultants, agencies, firms, planners, and analysts (users). REDYN runs on the Internet. Subscriptions include advice to apply and interpret the model. Our model estimates the multi-regional impacts and year-by-year (dynamic) nonlinear effects on industries, consumers, and governments from changes in company sales, jobs, wages, or investments; changes in taxes or personal or government spending; or public policy changes such as energy, environment, school, health, or security measures. The results are called simulation forecasts, or simulations.

Our model is a fundamental re-envisioning of economic theory applied to estimating multi-regional, dynamic effects. It reflects advances in New Economic Geography, especially gravity theory (regional attraction) and trade flow (regional imports/exports), based on a new distance impedance database from Oak Ridge National Laboratories that enables calculating trade flow by commodity by road, rail, water, air, and proxy transport. The breakthrough in design is the commodity production linkage between the trade flow process and an entity-based data structure for the economy. Entities include industries, workers, governments, investors, etc., and commodities are the goods they use and make.

The upshot—users can build and run multiple online custom models on the fly for solid project analysis. These features make REDYN more flexible, complete, and accessible than any other modeling process—in a nutshell: *No sticker shock; better solutions.*

Because our model runs on the Internet for all 3,100+ US counties, it meets the need for multi-regional tools usable by state, regional, Federal, and consulting organizations who share policy or forecasting interests or economic impact interests in the same geographic areas. The model's fresh, efficient design and its Internet accessibility make it ideal for supporting long-term collaborative efforts as well as for doing individual studies.

The model also is ideal for studying effects of sequential regional inputs, or generating a schedule of responses from a large set of alternative inputs, across a very large number of counties. Repetitive changes across many regions may be better handled as an offline batch job following an analytic script rather than as an Internet project. However, the batch approach has an engagement element as follows: After a user calls us, we accept and review the user's study information, set up and run the script, then produce and deliver agreed brief script reports in hard copy or electronic format from the simulation results. Alternatively, users can subscribe online to their simulation results so they can create their own simulation-based script reports at will for open-ended multiple studies.

We offer model subscriptions to consultants, but we're not in the consulting business. We're happy to initiate or partner with consultants if an agency, company, or other group issues a request for proposals (RFP) to do a study involving economic modeling and consulting. However, we'd prefer that the consultants do the modeling and produce the study defined in the RFP, and mention our name and modeling process in the study.

Exhibit 2:
How the Regional Dynamics Economic Model Works:
The REDYN Model in a Nutshell – Source: Regional Dynamics, Inc.

How the Regional Dynamics Economic Model Works

The REDYN Model in a Nutshell

REDYN is a dynamic, nonlinear, endogenous, Input-Output (I-O), computable general equilibrium (CGE) economic and demographic forecasting and analysis engine based on the North American Industrial Classification System (NAICS). REDYN's online model-building edge excels at providing a uniquely complete and consistent Internet tool to configure and access plans, policies, events, and risks fully and very rapidly.

The REDYN model reflects advances in New Economic Geography (NEG) for gravity theory and trade flow to estimate all local and multi-regional trade flow effects by commodity by distance by transport mode by direction in response to any output or demand changes. It does not lock each industry into a straight-line industry transport cost within one implied universal transport distance, mode, and direction between county pairs. In addition, its multi-regional scope always includes the whole regionalized US economy in every forecast and simulation.

REDYN's breakthrough design links three elements into one core activity: its continuous make-and-use commodity transformation production function, its NEG trade flows, and its entity-based data structure for the economy (social accounting matrix). All industries and entities including labor both use and make one or more commodities (goods and services). All commodities use appropriate transport modes, or communications mode if non-material.

The REDYN model moves all commodities including labor both within counties and between all county pairs and the automatic rest-of-US area by five transport modes (road, rail, water, air, and estimated). It uses I-O transport demand and Cobb-Douglas step-wise adjustments (equal proportion changes, i.e., constant elasticity of substitution) to assign commodities to modes, and a detailed Oak Ridge National Laboratory impedance database to account for accessibility (impedance) by mode, distance, and travel direction by commodity (accounting for net elevation difference effects) between all origin-destination pairs.

Users can control access (impedance) either at a mode level, or at a commodity-by-mode level. The Cobb-Douglas shift of commodities toward transport mode(s) with increased accessibility (reduced impedance values) induces changes in delivered prices for all affected commodities including labor. The industries or entities producing or using the affected commodities then adjust their output and thus their need for inputs.

The price-driven output and input adjustment process also applies if a user models a non-transport change or policy, such as an impact, demand, cost, tax, or price scenario. These changes affect local and remote supply and demand for one or more commodities, and thus their delivered prices after they pass through the transportation system. To varying degrees, the process then affects delivered prices, outputs, and inputs for all commodities through the continuous commodity transformation production function applied by every industry and entity wherever located. Expressed over time and distance, this ongoing cycle is the essence of modern CGE-NEG modeling and forecasting defined by REDYN.

Operationally, REDYN's multi-processor Internet server carries active regions for over 3,100 counties, 700 industries, 820 occupations, hundreds of commodities, and a 50-year forecast in a 2-terabyte database. It offers much more power, flexibility, and multi-user access, including consultant and institutional collaboration, than desktop systems offer.

The REDYN model framework takes the traditional economic concept of the circular flow diagram absolutely seriously, and discards the artificial primacy given to the idea of factor inputs to production. The framework views the economy as a comprehensive, continuous process in which industries and entities convert input commodities into output commodities. For example, producers or industries clearly do this, as is seen in the classic I-O table structure based on real-world business behavior.

Labor too can be viewed as an "industry" or entity. It converts consumer goods and services into a wage bill, which is a market commodity behaviorally identical to any other. Similarly, remittance cohorts, defined as the unemployed as well as all individuals such as retired persons and others who receive government payments through transfers, can be seen as entities that convert consumer goods and services into transfer payments.

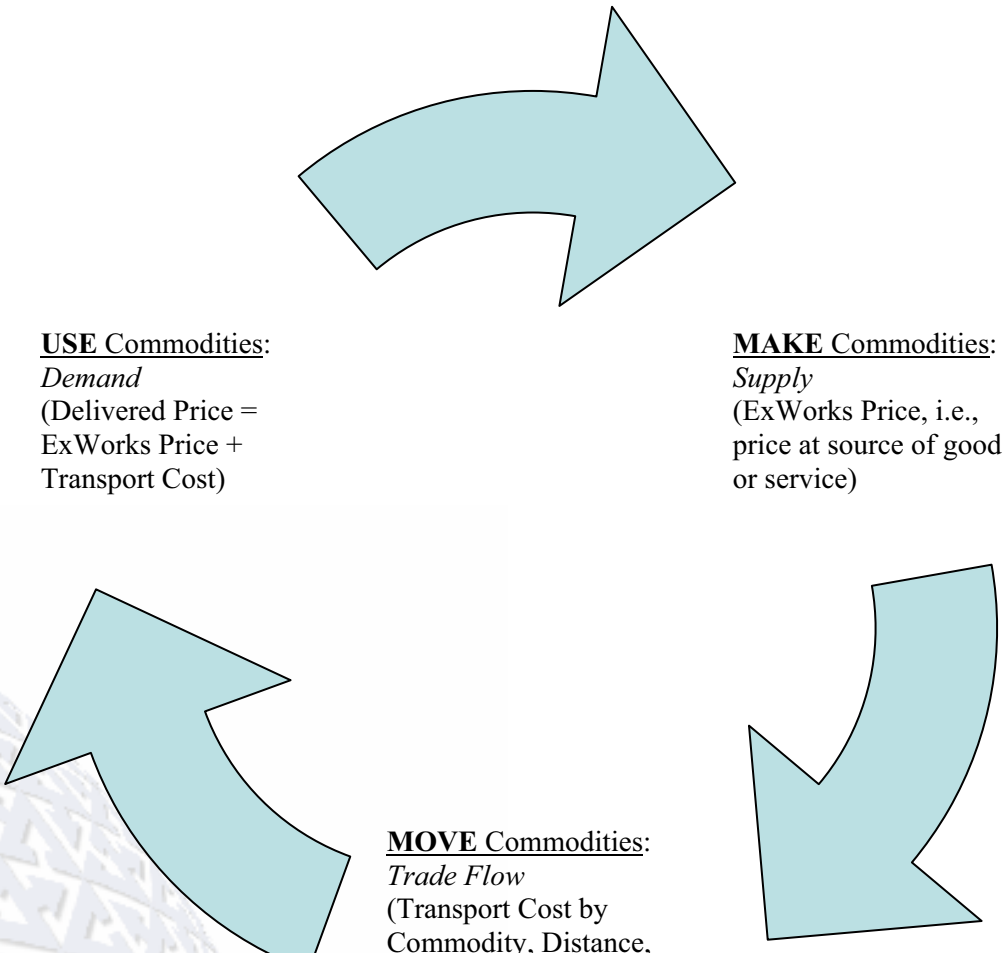
Likewise, governments convert purchases of commodities including industry goods and services and labor's wage bill into government goods and services that are "purchased" primarily through tax revenue. Finally, the model includes "investors" to produce financial capital, "speculators" to produce physical capital, and "land" to anchor each regional economy with its particular attributes so that the regions do not collapse together as would occur if all regions had the same basic labor, farm, water, mineral, and infrastructure resources when multiregional transport costs are considered.

The REDYN model can be visualized as regional entities using, making, and moving commodities in an organized circular process that captures supply (making goods and services), demand (using goods and services), and delivered price (costs for making and moving goods and services) to clear the supply and demand for all commodities in and across all regions.

The charts on the next five pages summarize the model's operation as follows…

- Circular Flow Economic Entity Process
- Commodity Make Table by Entity
- Commodity Use Table by Entity
- Entity Production Function Form by Region
- Demographics and Migration
- Economic Model Schematic Summary
- Economic Model Production Function and Commodities by Entity
- Economic Model Prices and Trade Flow

CIRCULAR FLOW ECONOMIC ENTITY PROCESS In & Between All Regions



USE Commodities:
Demand
(Delivered Price = ExWorks Price + Transport Cost)

MAKE Commodities:
Supply
(ExWorks Price, i.e., price at source of good or service)

MOVE Commodities:
Trade Flow
(Transport Cost by Commodity, Distance, Mode, and Direction for all Regional Pairs)
5 Modes: Road, Rail, Water, Air, Other

ENTITIES **MAKE:**	Producer Goods	Wage Bills	Transfr Pmts	Govt Goods	Fincl Cap (Div-Int-Rent)	Phys Cap (Resid, P&E)	Land
Producers	**x**						
Labor		**x**					
Remittance Cohorts			**x**				
Governments				**x**			
Financial Capital Providers (Investors)					**x**		
Physical Capital Makers (Speculators)						**x**	
Land							**x**

ENTITIES	Producers	Labor	Remits	Govts	Investors	Spec	Land
USE—							
Producer Goods&Svcs	**x**	**x**	**x**	**x**	**x**	**x**	
Labor (Wage Bill)	**x**			**x**		**x**	
Transfr Pmts/Taxes				**x**			
Govt Goods&Svcs	**x**	**x**	**x**	**x**	**x**	**x**	
Fincl Cap (Div-Int-Rent)						**x**	**x**
Phys Cap (Resid, P&E)	**P&E**	**Res**	**Res**	**P&E**	**Res**		
Land	**x**	**x**	**x**	**x**	**x**	**x**	

Entity PRODUCTION FUNCTION FORM by Region

Input Demanded					**Output (Sales) Supplied**			
Commodity	Qty	RPC	Dlvrd Price	Jobs	Commodity	Qty	ExWorks Price	Intl Pct
Land	**x**	**1.0**	**x**		Primary	**x**	**x**	**x**
Residential	**x**	**x**	**x**		2nd	**x**	**x**	**x**
Financial	**x**	**x**	**x**		3rd	**x**	**x**	**x**
Plant&Equip	**x**	**x**	**x**		4th	**x**	**x**	**x**
Wage Bill	**x**	**x**	**x**	**x**	Others/Misc	**x**	**x**	**x**
Goods&Svcs	**x**	**x**	**x**		Scrap	**x**	**x**	**x**

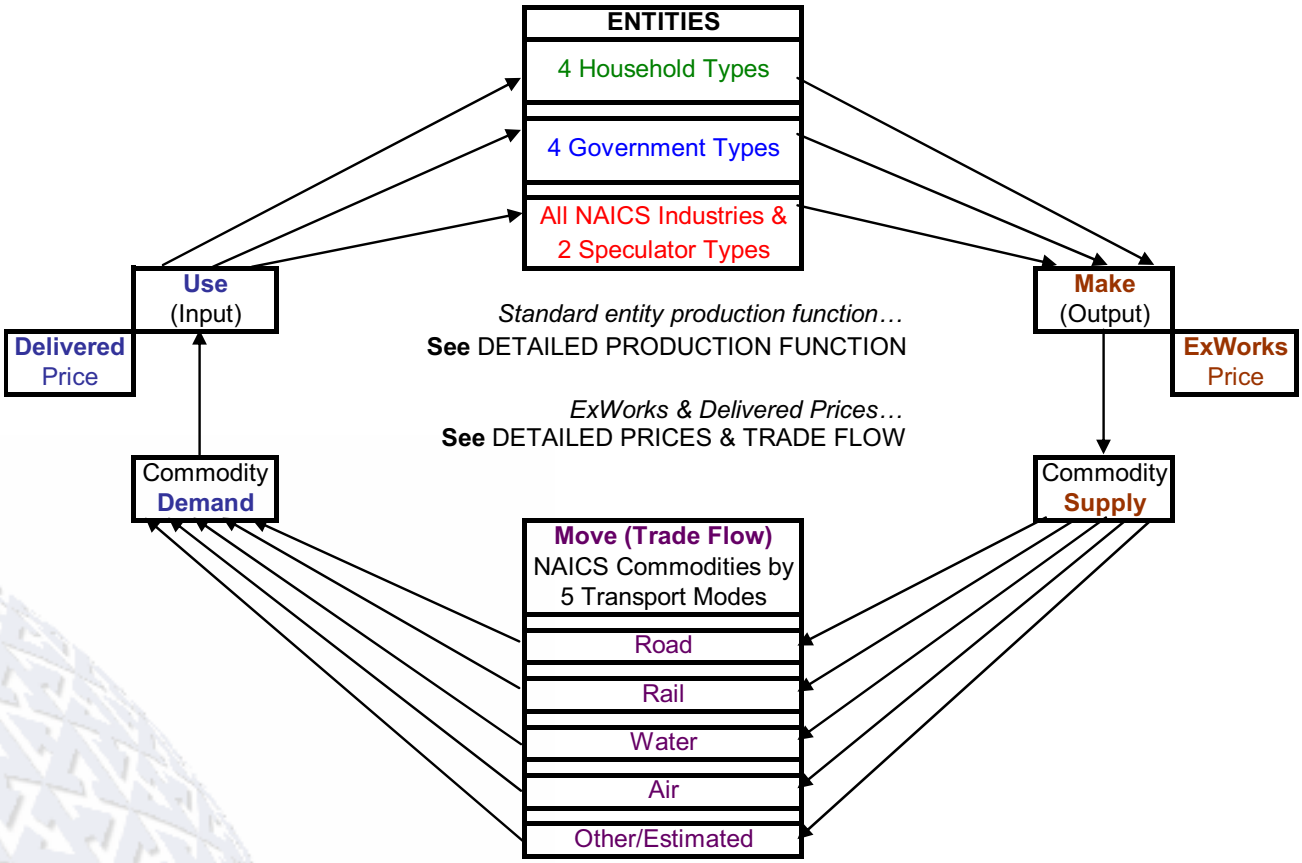
DEMOGRAPHICS: Cohort-survival estimation

- White, non-Hispanic
- Black, non-Hispanic
- Other, non-Hispanic
- Hispanic
- Male or Female
- Ages 0-1, 2-99 by year, 100+ years

MIGRATION: Induced by economic activity

- Intrinsic behavior of economic labor's wage bill commodity (historical relationships by region across wage bill, output, jobs, and people)
- Estimate wage bill and output changes, then scale to jobs and people (rational expectations notion)
- Subject to regional constants by cohort (controls for demographic composition)

REDYN Economic Model Schematic-SUMMARY
1/21/2006



REDYN Economic Model Schematic-DETAILED ENTITY PRODUCTION FUNCTION
1/21/2006

Standard Make & Use Production Function for All Entities
Entities … Producers, Labor, Remittance Cohorts, Govts, Investors, Speculators
Standard Make & Use Production Function by Entity Group …

Industries (By NAICS Code); **Speculators** (Capital Goods Makers: Residential, and Nonres Plant & Equip)
Use Commodites: Land, P&E (Indus only), Financial (Spec only), Labor, Goods&Svcs [Dlvrd Prices]
Make Commodities: Producer Indus (Primary, Others, Misc, Scrap); Spec (Res, P&E) [ExWorks Prices]

Households (Workers; Unemployed & Retired; and Savers)
Use Commodites: Land, Res, Goods&Svcs [Dlvrd Prices]
Make Commodities: Wage Bill, Proprietors Income, Transf Pmts, Div-Int-Rent [ExWorks Prices]

Govts (Fed Mil & Nonmil, and State & Local Educ & Noneduc)
Use Commodites: Land, Transf Pmts/Fees&Taxes, P&E, Labor, Goods&Svcs [Dlvrd Prices]
Make Commodities: Primary, Others, Misc, Scrap [ExWorks Prices]

Commodites
All NAICS Commodities ... Supplied & Demanded …
Aggregated by Detailed NAICS Commodity Across All Entities by Region …

Supplied Categories (Make By)
Land (Fixed by Region)
Residential (Speculators)
Div-Int-Rent (Households)
Plant & Equip (Speculators)
Wage Bill & Prop Income (HH)
Transf Pmt/Fee/Tax (HH/Indus/Spec)
Primary/Others/Misc/Scrap (Producers & Govts)

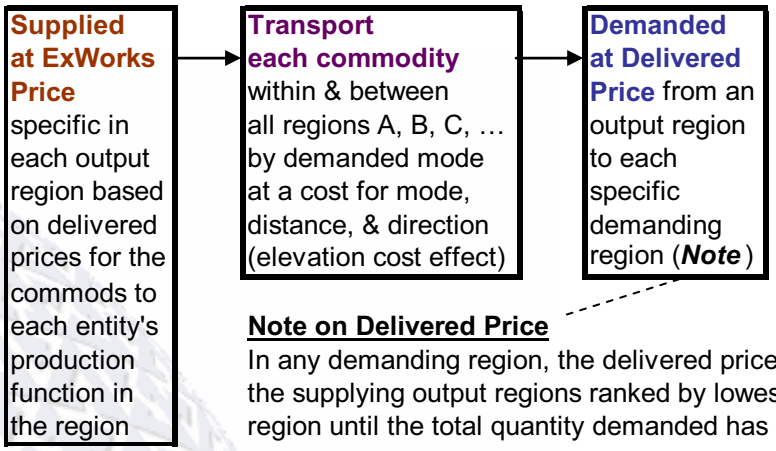
Demanded Categories (Use By)
Land (HH, Govts, Indus, Spec)
Residential Capital (HH)
Financial/D-I-R Capital (Spec)
Plant & Equip Capital (Govts, Indus)
Labor (Govts, Indus, Spec)
Transf Pmts/Fees&Taxes (Govts)
Goods&Svcs (HH, Govts, Indus, Spec)

REDYN Economic Model Schematic-DETAILED PRICES & TRADE FLOW

1/21/2006

Prices & Trade Flow …

Details on Prices & Flows …



Note on Delivered Price

In any demanding region, the delivered price by commodity is the blend across the supplying output regions ranked by lowest delivered price to the demanding region until the total quantity demanded has been met for the demanding region.

Exhibit 3:
REDYN Model Data Sources and Baseline Estimation Process:
Where the REDYN Model Gets Data – Source: Regional Dynamics, Inc.

REDYN Model Data Sources and Baseline Estimation Process

Where the REDYN Model Gets Data

Regional Dynamics uses several sources to estimate county-level employment and output for its baseline database. The REDYN model applies the North American Industrial Classification System (NAICS) at the five-digit detail level (703 industries), and also uses NAICS to identify all the goods and services (over 180 commodities) consumed and produced by the detailed industries. NAICS is used by the US Government to classify and organize information about all the various industries making up the US economy, such as retail stores, automobile manufacturing, insurance firms, and so forth. NAICS reports five levels of detail. The two-digit level aggregates all activity into 24 broad economic industries, and the five-digit level identifies activity across 703 specific industries.

The primary data sources are the County Business Patterns (CBP) from the Bureau of the Census, and the Regional Economic Information System (REIS) from the Bureau of Economic Analysis (BEA). Wage Bill (payroll) data are derived from the same sources and with the same techniques as the employment data. The CBP reports the total annual payroll for each NAICS code up to the five-digit level of detail for the US as a whole and for every region, state, and county. However, total employment data and total payroll data are subject to data suppressions for privacy. Regional Dynamics developed a sophisticated row-and-column sum (RAS) analytic system to fill all data suppressions by using all information available in the CBP series and guaranteeing internal consistency with unsuppressed wage and employment data. All the furnished and estimated CBP wage bill and employment data are then totaled and scaled to match the wage bill and employment data reported in the BEA's REIS, which includes all county and state wage bill data at three-digit NAICS detail and employment data at two-digit NAICS detail.

The REIS directly provides wage bill and employment data for the government and agriculture sectors, and also disposable personal income data by county. The REIS county income data are used to allocate national consumption to counties from the BEA's National Income and Product Accounts (NIPA).

Annual Input-Output (IO) tables are constructed using BEA IO make-and-use tables, as well as biennial 10-year IO forecast tables from the Bureau of Labor Statistics (BLS). Make tables describe all the commodities made by each economic entity, and use tables describe all the commodities used by each economic entity. The very detailed BEA IO make-and-use tables are extended year-by-year to match the annual changes in make-and-use composition implied by the current 10-year BLS IO tables. This generates a detailed annual forecast series of national IO make-and-use tables.

Each county's wage bill by industry is used to allocate each industry's national output to counties from the NIPA, and then the regional output by industry is allocated to commodities based on the national IO make table proportions. This assumes that the commodities produced by an industry are truly joint in the production process, as dictated by a uniform production function for all firms in each industry based on competitive pressures to diffuse advantages quickly across all firms in an industry.

Exhibit 4:
The Regional Dynamics Economic Analysis Model:
What the REDYN Model Does – Source: Regional Dynamics, Inc.

The Regional Dynamics Economic Analysis Model

What the REDYN Model Does

Regional Dynamics offers REDYN, a fundamentally new, web-based, massively multi-regional, dynamic, nonlinear New Economic Geography analysis engine with a complete economic database and baseline forecast. After subscribing to the system, users input online changes by region and year: e.g., jobs, wages, output, income, intermediate demand, and final consumption, investment, and government demand. REDYN then estimates detailed, annual, gravity-based trade flows and impacts in all US counties and industries. The model is a live, online Internet service. It's also available to run batch mode jobs to process massively multi-regional tasks (3,100+ regions) for automated or scripted work.

The REDYN model applies a fresh I-O methodology based on very detailed make-and-use tables with social accounting matrix features for all entities, a comprehensive commodity production transformation function, and impedance-based commodity trade flows by five transport modes. Oak Ridge National Laboratories developed the impedance measures.

The model automatically includes an explicit extra region for all US counties outside any given simulation to identify the full US output and trade flow response. The model also automatically seeks the suppliers of suppliers to find the complete US supply chain response by region and industry in any simulation.

REDYN excels at offering a uniquely complete and consistent model-building edge that no other modeling process can replicate for configuring and assessing plans, events, and risks fully and rapidly across regions and years.

Here's how it works. At run time, users apply their subscribed resources as an online tool kit to build and run custom models at will. This design flexibility lets users quickly build models scaled correctly for any studies, event analysis, overlapping or alternative analytic perspectives, or backcast analysis.

The REDYN model estimates employment, output, wages, occupations, income, gross product, demand, self-supply, trade flow, etc. Within a user's subscription, the model generates year-by-year reports by county and year, for all subscribed counties, or for any aggregation into user-defined areas for each study. For easy regional comparison at no extra cost, each report focuses on one concept (jobs, output, wages, and so forth) arranged by region by year on a sheet in a spreadsheet book. Users then can apply full spreadsheet tools for sorting and charting. Online and phone support are included.

The model is available to all users across agency levels. Clients can offer access to other users through user-group web pages with discounts or rebates based on the size of the client's subscription. Clients subscribe to a regional area (one or more counties, states, or groups); to 703 industries (North American Industrial Classification System); and to an analytic type (I-O only, or equilibrium and I-O). The client sets the number and identity of its subscribing users; one user is free. Subsequently added users including consultants or staff can be managed by one or more additional users on an incremental fee basis.