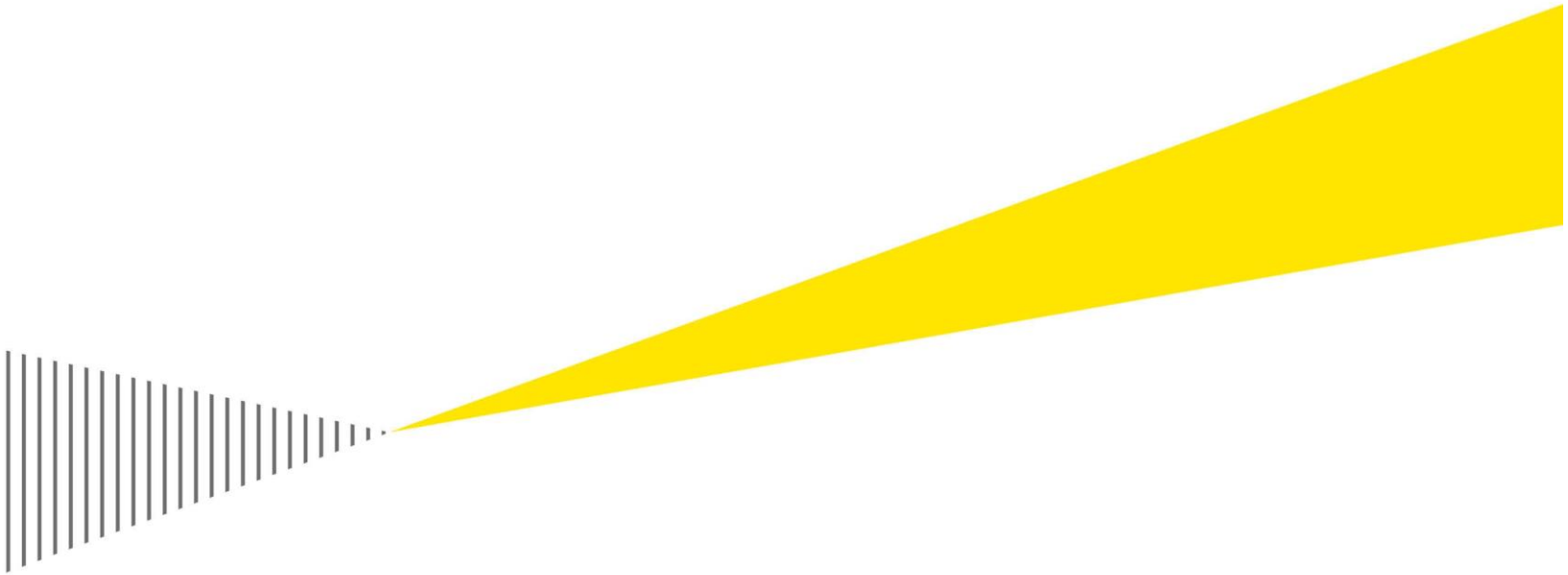


# **Bank of America Corporation**

## Estimated economic benefits of the Environmental Business Initiative 2013-2017

August 2018



# Contents

- Executive summary..... 1
- 1. Bank of America Environmental Business Initiative..... 4
  - 1.1 Environmental Business Initiative description..... 4
  - 1.2 Bank of America financing in 2013-2017..... 4
    - 1.2.1 Project financing ..... 4
    - 1.2.2 Corporate financing..... 6
- 2. Methodology and data ..... 7
  - 2.1 Economic contribution methodology ..... 7
- 3. Economic contributions of Bank of America funded projects .....10
  - 3.1 Employment contributions.....10
  - 3.2 Labor income .....15
  - 3.3 Value added.....18
  - 3.4 Gross economic output .....21
- 4. On-going impacts of solar and wind projects.....24
  - 4.1 Estimating annual contributions of renewable energy project operations .....24
  - 4.2 Annual economic contributions .....24
- Appendix: Economic contribution model using IMPLAN .....26

## Executive summary

Bank of America's second environmental business initiative set a goal to direct \$125 billion in financing by 2025 to projects that help enable the transition to a low-carbon and sustainable economy. As part of this commitment, Bank of America has financed renewable energy projects, energy efficiency upgrades for buildings, new construction of energy efficient buildings, loans for hybrid and electric vehicles, wastewater and drinking water infrastructure upgrades, and urban light rail infrastructure upgrades.<sup>1</sup> The bank has also provided financing to corporations that support energy conservation or production of alternative energy.

EY was commissioned by Bank of America to estimate the economic contributions of a set of projects and companies that received financing through its environmental business initiative. This report presents estimates of the jobs, labor income, value added, and gross economic output in the United States supported by environmental business initiative projects and corporate financing where a direct environmental benefit occurred in years 2013 through 2017. EY did not analyze whether the projects would have occurred without access to Bank of America financing.

EY estimated three types of economic contributions associated with these environmental and sustainable projects:

- (1) **Direct economic contributions** consist of employment, labor income (wages plus benefits), value added, and gross economic output by businesses directly benefiting from Bank of America financing. An example of a direct contribution is the employment at automobile manufacturers that were supported by the purchase of hybrid vehicles with Bank of America loans.
- (2) **Indirect economic contributions** of employment, labor income, value added, and gross economic output resulting from purchases from US suppliers by projects receiving Bank of America financing. An example of an indirect contribution is the employment at firms selling parts to automobile manufacturers.
- (3) **Induced economic contributions** of employment, labor income, value added, and gross economic output resulting from spending by employees at the companies directly benefiting from Bank of America financing and their suppliers. Jobs supported at a restaurant or a grocery store by this spending is an example of an induced contribution.

Table ES-1 shows a summary of the Bank of America financing amount by type and year included in EY's analysis. Between 2013 and 2017, the bank financed \$24.8 billion US projects that yielded a direct environmental benefit by supporting energy conservation or producing alternative energy. Over a third of project financing went towards renewable energy production, primarily wind energy. The remaining project financing supported vehicle loans, construction of energy efficient buildings, implementation of energy conservation measures, water infrastructure upgrades, and urban transit infrastructure upgrades. In this time period, the bank also provided companies with \$4.6 billion in financing to support business activity that yielded direct environmental benefit or

---

<sup>1</sup> Bank of America financing incorporates all of the company's divisions, including Bank of America Merrill Lynch.

supported energy conservation. A majority of the financing amount (84%) went to companies involved in the production of renewable energy, primarily photovoltaic solar and wind energy, while the remaining 16% of financing went towards energy conservation measures, and manufacture of hybrid and electric vehicles. Nearly half of corporate financing across the five years was provided in 2015.

**Table ES-1. Summary of transaction amounts included in the economic contribution analysis, 2013-2017**  
Amounts in millions

<b>Sector</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>TOTAL</b>
<b>Project Financing</b>						
Vehicle loans	\$272	\$427	\$592	\$371	\$343	\$2,005
Energy efficient buildings	\$744	\$739	\$934	\$792	\$724	\$3,933
<i>Apartments</i>	\$591	\$501	\$434	\$358	\$497	\$2,382
<i>Non-residential</i>	\$152	\$238	\$500	\$434	\$227	\$1,552
Energy conservation measures	\$494	\$464	\$523	\$526	\$921	\$2,928
Solar renewable energy	\$254	\$412	\$839	\$765	\$441	\$2,711
Wind renewable energy	\$299	\$818	\$836	\$1,742	\$1,696	\$5,392
Other renewable energy*	\$366	-	-	-	-	\$366
Water	-	-	\$331	\$768	\$3,238	\$4,337
Transportation	-	-	\$188	\$647	\$2,333	\$3,168
<b>Subtotal</b>	<b>\$2,429</b>	<b>\$2,861</b>	<b>\$4,243</b>	<b>\$5,612</b>	<b>\$9,696</b>	<b>\$24,840</b>
<b>Corporate Financing</b>						
Hybrid vehicle manufacturers	-	-	\$94	\$134	\$459	\$687
Energy conservation companies	\$11	-	\$14	\$5	\$4	\$34
Solar renewable energy companies	\$167	\$477	\$1,185	\$273	\$325	\$2,427
<i>Solar energy generation</i>	\$142	\$307	\$836	\$177	\$254	\$1,717
<i>Solar cell manufacturing</i>	\$25	\$169	\$349	\$96	\$71	\$711
Wind renewable energy companies**	\$172	\$345	\$536	\$34	\$128	\$1,215
Other renewable energy companies*	-	\$98	\$76	\$19	-	\$193
<b>Subtotal</b>	<b>\$350</b>	<b>\$919</b>	<b>\$1,905</b>	<b>\$467</b>	<b>\$916</b>	<b>\$4,557</b>
<b>GRAND TOTAL</b>	<b>\$2,779</b>	<b>\$3,780</b>	<b>\$6,148</b>	<b>\$6,078</b>	<b>\$10,612</b>	<b>\$29,397</b>

\*Includes nuclear and BioGas transactions for project financing, and nuclear and hydroelectric energy companies for corporate financing.

\*\*Wind renewable energy companies are involved in wind energy generation.

Note: Figures may not sum due to rounding.

Source: EY analysis using data provided by Bank of America.

Table ES-2 shows the estimated direct economic benefits supported by projects and companies that received Bank of America financing. Many of the projects involved a one-time investment in equipment, upgraded lighting, and HVAC systems, or new construction of buildings. Estimated direct economic benefits supported by Bank of America project financing include 24,576 jobs, \$7.8 billion in labor income, \$10.6 billion in value added, and \$22.0 billion in gross economic output. It is assumed that corporate financing provided by the bank is used to finance capital

expenditures such as asset purchase and development. Estimated direct economic benefits supported by Bank of America corporate financing include 3,185 jobs, \$1.2 billion in labor income, \$1.6 billion in value added, and \$3.3 billion in gross economic output.

**Table ES-2. Direct economic contributions of Bank of America’s Environmental Business Initiative for years 2013-2017 in the United States**  
Average annual US employment; Amounts in millions

Sector	Employment	Labor income	Value added	Output
<b>Project Financing</b>				
Vehicle loans	951	\$336	\$674	\$1,629
Energy efficient buildings	5,093	\$1,466	\$1,878	\$3,933
<i>Apartments</i>	2,805	\$813	\$1,048	\$2,382
<i>Non-residential</i>	2,288	\$652	\$829	\$1,552
Energy conservation measures	3,718	\$1,079	\$1,393	\$2,928
Solar renewable energy	2,154	\$752	\$1,193	\$2,064
Wind renewable energy	2,351	\$1,175	\$1,405	\$3,580
Other renewable energy	553	\$162	\$223	\$366
Water	5,638	\$1,659	\$2,200	\$4,351
Transportation	4,118	\$1,212	\$1,607	\$3,178
<b>Subtotal</b>	<b>24,576</b>	<b>\$7,841</b>	<b>\$10,573</b>	<b>\$22,029</b>
<b>Corporate Financing</b>				
Hybrid vehicle manufacturers	356	\$131	\$191	\$559
Energy conservation companies	26	\$8	\$12	\$26
Solar renewable energy companies	2,077	\$699	\$1,024	\$1,742
<i>Solar energy generation</i>	679	\$205	\$255	\$416
<i>Solar cell manufacturing</i>	1,398	\$494	\$769	\$1,326
Wind renewable energy companies**	551	\$275	\$329	\$819
Other renewable energy companies*	175	\$60	\$81	\$156
<b>Subtotal</b>	<b>3,185</b>	<b>\$1,173</b>	<b>\$1,636</b>	<b>\$3,302</b>
<b>GRAND TOTAL</b>	<b>27,761</b>	<b>\$9,014</b>	<b>\$12,209</b>	<b>\$25,331</b>

\*Includes nuclear and BioGas transactions for project financing, and nuclear and hydroelectric energy companies for corporate financing.

\*\*Wind renewable energy companies are involved in wind energy generation.

Note: Figures may not sum due to rounding.

Source: EY analysis using data provided by Bank of America and 2015 and 2016 US IMPLAN models.

The direct contributions summarized in Table ES-2 lead to additional contributions due to purchases from US suppliers (indirect impacts) and spending by employees on goods and services (induced impacts). Table ES-3 shows the estimated total (direct, indirect, and induced) economic contributions of the environmental business initiative projects and corporate financing in the United States during the five-year period (2013-2017). Bank of America’s project financing supported nearly 67,000 jobs and \$20.0 billion in labor income (wages and benefits). These projects also supported \$31.1 billion of value added (contribution to GDP) and gross economic

output of \$61.5 billion. Meanwhile, corporate financing provided by Bank of America supported over 9,100 jobs and \$2.9 billion in labor income (wages and benefits). Corporate financing also supported \$4.6 billion of value added (contribution to GDP) and gross economic output of \$8.9 billion.

**Table ES-3. US total (direct, indirect, and induced) economic contributions of Bank of America's Environmental Business Initiative\* for years 2013-2017**

*Average annual US employment; Amounts in millions*

<b>Sector</b>	<b>Employment</b>	<b>Labor income</b>	<b>Value added</b>	<b>Output</b>
<b>Project Financing</b>				
Vehicle loans	3,519	\$1,117	\$2,008	\$4,434
Energy efficient buildings	12,921	\$3,628	\$5,517	\$10,979
<i>Apartments</i>	7,908	\$2,188	\$3,354	\$6,804
<i>Non-residential</i>	5,013	\$1,439	\$2,163	\$4,175
Energy conservation measures	9,407	\$2,664	\$4,058	\$8,073
Solar renewable energy	5,353	\$1,682	\$2,777	\$5,095
Wind renewable energy	10,811	\$3,623	\$5,474	\$11,437
Other renewable energy	1,171	\$338	\$511	\$921
Water	13,729	\$4,017	\$6,207	\$11,886
Transportation	10,027	\$2,934	\$4,533	\$8,681
<b>Subtotal</b>	<b>66,938</b>	<b>\$20,003</b>	<b>\$31,085</b>	<b>\$61,505</b>
<b>Corporate Financing</b>				
Hybrid vehicle manufacturers	1,385	\$439	\$703	\$1,568
Energy conservation companies	68	\$21	\$33	\$68
Solar renewable energy companies	4,805	\$1,486	\$2,378	\$4,274
<i>Solar energy generation</i>	1,352	\$396	\$585	\$1,035
<i>Solar cell manufacturing</i>	3,452	\$1,089	\$1,793	\$3,240
Wind renewable energy companies**	2,409	\$814	\$1,229	\$2,530
Other renewable energy companies*	439	\$137	\$212	\$411
<b>Subtotal</b>	<b>9,105</b>	<b>\$2,896</b>	<b>\$4,554</b>	<b>\$8,850</b>
<b>GRAND TOTAL</b>	<b>76,043</b>	<b>\$22,899</b>	<b>\$35,639</b>	<b>\$70,356</b>

Note: Figures may not sum due to rounding, including jobs which are rounded to the nearest whole job.

Source: EY analysis using data provided by Bank of America and 2015 and 2016 US IMPLAN models.

The renewable energy projects lead to continued (i.e. ongoing) benefits in subsequent years after the initial investment. Table ES-4 shows the estimated economic contributions in 2017 related to the ongoing operation and maintenance of solar and wind projects financed by Bank of America in 2013-2016. Based on the generating capacity of these projects, EY estimated the annual cost of operations for wind and solar power generation in 2017. These projects are estimated to have supported 826 US jobs providing \$64 million in labor income to those employed. Further, the projects contributed \$251 million in value added and \$344 million in gross economic output, which captures all spending by these projects.

The assets that Bank of America corporate financing funds lead to continued benefits in subsequent years after the initial purchase or development of the asset. Table ES-5 shows the estimated economic contributions in 2017 related to the ongoing operation and maintenance of these assets. Bank of America corporate financing is estimated to have supported 4,156 US jobs providing \$1.5 billion in labor income to those employed. Further, corporations supported by Bank of America financing contributed \$3.1 billion in value added and \$5.6 billion in gross economic output.

**Table ES-4. Economic contributions of renewable US solar and wind projects in 2017**  
*Dollar amounts in millions*

Renewable energy generation	Operational nameplate capacity in 2017 (kW)	Total employment	Total labor income	Total value added	Total output
Solar	1,197,520	165	\$15	\$30	\$44
Wind	6,369,095	661	\$49	\$221	\$300
<b>Total</b>	<b>7,566,615</b>	<b>826</b>	<b>\$64</b>	<b>\$251</b>	<b>\$344</b>

Note: Analysis assumes that all wind and solar projects that received funding in 2013-2016 are operational in 2017.

Source: EY analysis using data provided by Bank of America, NREL models and O&M costs in 2017 for PV solar and wind projects, and 2016 US IMPLAN model.

**Table ES-5. Ongoing economic contributions of US corporate financing by Sector in 2017**  
*Dollar amounts in millions*

Sector	Employment	Labor income	Value added	Output
Hybrid vehicle manufacturers	625	\$210	\$408	\$1,082
Energy conservation companies	84	\$24	\$37	\$71
Solar renewable energy companies	1,603	\$639	\$1,193	\$1,915
<i>Solar energy generation</i>	<i>1,070</i>	<i>\$464</i>	<i>\$898</i>	<i>\$1,376</i>
<i>Solar cell manufacturing</i>	<i>533</i>	<i>\$175</i>	<i>\$295</i>	<i>\$539</i>
Wind renewable energy companies**	274	\$105	\$501	\$657
Other renewable energy companies*	1,570	\$528	\$965	\$1,855
<b>TOTAL</b>	<b>4,156</b>	<b>\$1,505</b>	<b>\$3,105</b>	<b>\$5,581</b>

\*Includes BioGas and hydroelectric energy production.

\*\*Wind renewable energy companies are involved in wind energy generation.

Source: EY analysis based on data provided by Bank of America and 2016 US IMPLAN model.

## 1. Bank of America Environmental Business Initiative

This section describes the types of activities that Bank of America's Environmental Business Initiative has financed.

### 1.1 Environmental Business Initiative description

Bank of America currently has a \$125 billion commitment for financing projects that lead to a low-carbon and sustainable economy. This is the bank's second environmental business initiative, which was initiated in 2013. Its first environmental business initiative in 2007 of \$20 billion was met four years ahead of schedule. As part of this second commitment, Bank of America has financed renewable energy generation projects, including photovoltaic solar and wind; energy efficiency upgrades that include LED lighting retrofits and upgraded HVAC systems; new construction of energy efficient buildings; and loans for hybrid vehicles. Since 2013, EY has estimated annually the environmental benefits associated with projects in the United States where a direct environmental benefit could be measured.<sup>2</sup> For example, in 2016, EY estimated the environmental benefits for 134 energy conservation or alternative energy projects and over 15,000 hybrid, plug-in electric or electric vehicles. These projects either supported low-carbon energy production or avoided carbon-emissions.

### 1.2 Bank of America financing in 2013-2017

#### 1.2.1 Project financing

As shown in Table 1, from 2013 to 2017, Bank of America provided loans for nearly 60,000 U.S. projects. Vehicle loans supported the production of over 59,000 hybrid or electric vehicles from 2013 to 2017, with the number of vehicles financed annually reaching a high of 15,375 in 2016. Additionally, Bank of America underwrote green bonds totaling \$563 million in 2014 and 2015 to fund vehicle loans and leases for electric and hybrid vehicles. During the five year period, the construction of energy efficient buildings accounted for 161 projects, while projects involving energy conservation measures such as LED lighting, upgraded HVAC systems and water conservation, accounted for 375 projects. The bank also financed 233 renewable energy generation projects involving solar, wind, nuclear and biogas. Additionally, 38 projects involving water infrastructure upgrades and 8 projects involving urban light rail infrastructure upgrades were financed by the bank through green bonds.

---

<sup>2</sup> For the environmental benefits methodology, see EY report, *Financing for a sustainable future – Estimating the environmental benefits of Bank of America's Environmental Business Initiative*, 2015.



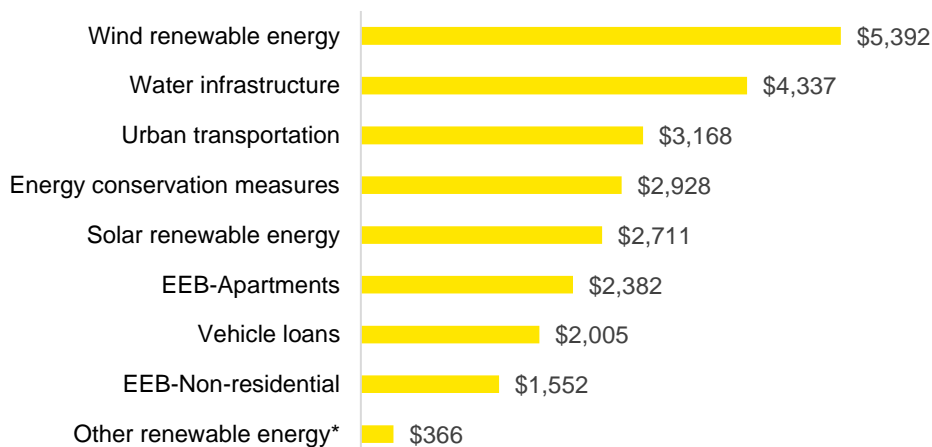
**Table 1. Number of U.S. transactions by project type, 2013-2017**  
*Number of loans or individual projects*

<b>Project financing type</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>TOTAL</b>
Vehicle loans	10,882	7,820	10,721	15,375	14,377	59,175
Energy efficient buildings	44	32	35	18	32	161
Energy conservation measures	69	58	80	83	85	375
Renewable energy projects	21	34	56	74	48	233
Water infrastructure	-	-	11	14	13	38
Urban transportation	-	-	2	4	2	8
<b>TOTAL</b>	<b>11,016</b>	<b>7,944</b>	<b>10,905</b>	<b>15,568</b>	<b>14,557</b>	<b>59,990</b>

Source: EY analysis using data provided by Bank of America

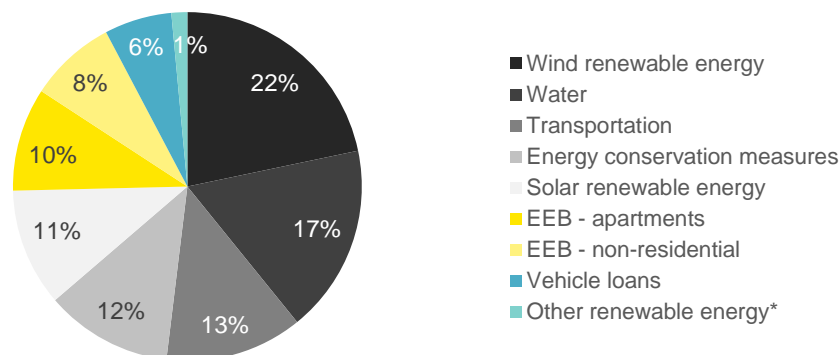
Figure 1 shows the amount of Bank of America financing provided to each project type from 2013 to 2017. Wind and solar projects together accounted for over a third of the total project financing (Figure 2). Wind projects involving installation of wind turbines received \$5.4 billion (22% of total funding), while photovoltaic solar projects received \$2.7 billion (11% of total funding). Projects involving upgrading drinking water and wastewater infrastructure accounted for \$4.3 billion (17% of total funding). Urban light rail transportation projects involving the upgrade of transit infrastructure received \$3.2 billion in project financing (13% of total funding). Energy conservation measure (ECM) projects received Bank of America financing of \$2.9 billion (12% of total) during the five year period, while construction of energy efficient buildings (EEB) received a total of \$3.9 billion in financing, representing 16% of all financing in this study. Figure 1 and Figure 2 show the EEB projects broken into residential (apartments) and non-residential, with residential projects accounting for 61% of new construction project financing. Bank of America provided \$2.0 billion in financing for hybrid and electric vehicle loans while other renewable energy projects (one nuclear and two biogas projects) received \$366 million in financing during the five year period.

**Figure 1. Bank of America project financing of \$24.8 billion by Sector, 2013-2017**  
*Amounts in millions of dollars*



Source: EY analysis using data provided by Bank of America

**Figure 2. Distribution of transaction amounts by project type**  
Totals for 2013-2017



\*Includes nuclear and BioGas transactions

Source: EY analysis using data from Bank of America

## 1.2.2 Corporate financing

From 2013 to 2017, Bank of America provided financing to corporations engaged in or investing in activities that support energy conservation or produce alternative energy. Corporate financing was provided to 16 companies for one or more of these years through 51 deals. As shown in Table 2, corporate financing may support activity in one or more green sectors. For companies assigned by Bank of America to one operating sector – solar energy generation, wind energy generation, hybrid vehicle manufacturing, and biogas energy generation – 100% of financing was allocated to the corresponding industry. For the five companies listed as operating in mixed renewables, Bank of America financing was allocated to sectors based on revenue generated by their various green activities. As shown in Table 2, the largest amount of corporate financing was provided to solar renewable energy companies.

**Table 2. Number of deals and companies associated with green energy types of Bank of America corporate financing, 2013-2017**

Company sector	Number of deals	Number of companies	Amount of financing (\$m)
Solar renewable energy	15	5	\$1,858
Wind renewable energy	10	3	\$744
Hybrid vehicle manufacturing	7	1	\$767
BioGas energy	3	2	\$174
Mixed renewable	16	5	\$1,015
<b>TOTAL</b>	<b>51</b>	<b>16</b>	<b>\$4,557</b>

Note: The amount of financing used for modelling economic benefits is the BAC share of each corporate financing deal provided in data by Bank of America. There is no differentiation between the treatment of this dollar amount based on type of financing (credit facility, equity, debt, etc.)

Source: EY analysis using data provided by Bank of America

The analysis of the economic contributions of corporate financing provided by Bank of America assumes that the bank's full share of financing goes towards asset investment by companies. For

example, hybrid vehicle manufacturers would invest in manufacturing equipment and buildings to expand their operations and production. Further, ongoing annual benefits are estimated as resulting from the operation of these assets (e.g. sale of vehicles by hybrid vehicle manufacturers). For each company, these ongoing annual benefits are estimated based on the share of the company’s annual revenue that is equivalent to the share of the company’s assets reported by Bank of America’s financing.

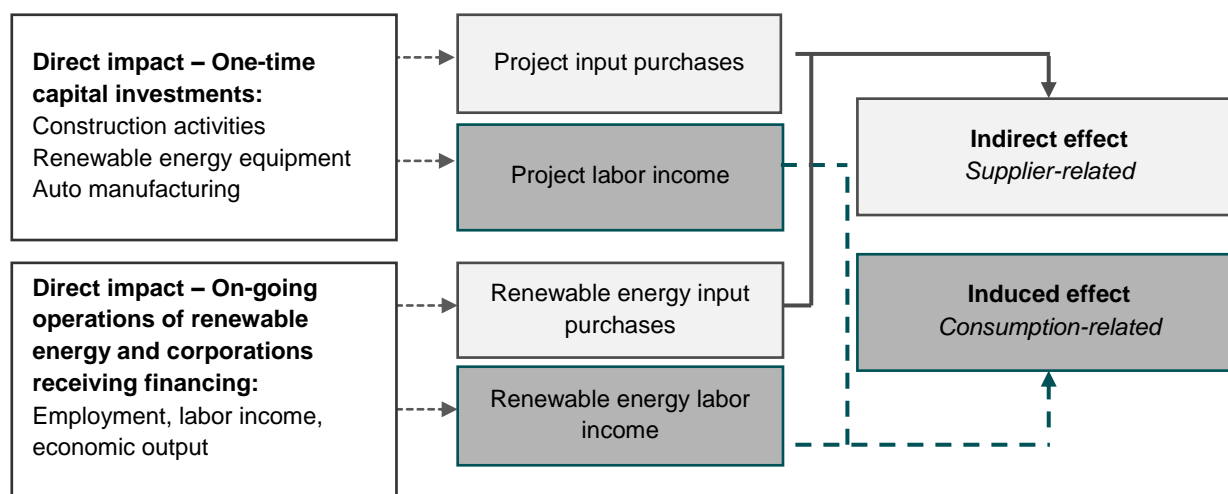
## 2. Methodology and data

### 2.1 Economic contribution methodology

EY estimated three types of US economic contributions of projects receiving Bank of America financing. These contributions are described below and shown in Figure 3.

- ▶ **Direct contribution.** Direct contribution includes the total full-time and part-time employees and labor income (wages/salary and benefits) at businesses that directly benefited from Bank of America financing. Economic output is generally measured as revenue.
- ▶ **Indirect contribution.** The indirect economic contribution is attributable to purchases from suppliers. The indirect contribution also captures the additional input purchases from those businesses supplying companies that directly benefited from BAC financing. These additional purchases create subsequent rounds of indirect effects.
- ▶ **Induced contribution.** The induced contribution includes the spending by employees of businesses receiving financing, and the employees of suppliers, at US businesses including grocery stores, restaurants, and service providers.

**Figure 3. Overview of the components of economic contributions**



Data describing projects included in the environmental benefit analysis was provided by Bank of America. This data included the project type, amount financed by Bank of America, total project cost, date of financing, electricity generation capacity (for renewable power generation projects), and type of structure (for energy efficient building construction). EY analyzed these projects and

used the 2015 and 2016 IMPLAN models<sup>3</sup> to estimate the direct economic contributions for these projects:

- ▶ *Vehicle loans.* The loan amount financed by Bank of America was modeled as a change in industry demand for automobile manufacturers. The model takes into account the share of automobiles manufactured within the US.
- ▶ *Energy conservation measures.* This activity was modeled as renovation to an existing building within the construction sector.
- ▶ *Energy efficient buildings.* These projects were evaluated based on the type of structure. For example, office structures were modeled separately from apartment buildings.
- ▶ *Renewable energy projects.* Data from the National Renewable Energy Laboratory (NREL) was used to model the purchases of wind and solar projects. The Bank of America financing amounts were then allocated to industries used in the production of these technologies and the labor used for the installation.
- ▶ *Water infrastructure.* This activity was modeled as expenditures on civil construction activities.
- ▶ *Transportation.* This activity was modeled as expenditures on civil construction.

Data describing corporate financing activities was provided by Bank of America. This data included the corporate financing deal type, amount financed by Bank of America, total deal cost, year of financing, and green energy type. EY analyzed the companies receiving financing and used the 2016 IMPLAN model to estimate the direct economic contributions:

- ▶ *Hybrid vehicle manufacturers.* Financing to these companies was modeled as capital expenditures in machinery. The model takes into account the share of machinery manufactured within the US.
- ▶ *Energy conservation companies.* Financing to these companies was modeled as capital expenditures on HVAC equipment, lighting fixture manufacturing and construction services. The model takes into account the share of equipment manufactured within the US.
- ▶ *Renewable energy generation companies.* Data from the National Renewable Energy Laboratory (NREL) was used to model the capital expenditures of solar, wind and hydroelectric energy generation companies. The Bank of America financing amounts were then allocated to industries used in the production of these technologies and the labor used for the installation.

---

<sup>3</sup> Projects financed from 2013 to 2016 were modeled using the 2016 IMPLAN model. Projects financed in 2017 were modeled using the 2017 IMPLAN model.

- ▶ *Solar cell manufacturers.* Financing to solar cell manufacturers was modeled as capital investments in semiconductor machinery and buildings. The model takes into account the share of machinery manufactured within the US.

Indirect and induced economic contributions were then estimated using the 2015 and 2016 IMPLAN economic model for the United States. The magnitude of the economic contribution of the financed projects and corporations is determined by several factors, including supplier relationships with businesses in the United States. This impact can be expressed using an “economic multiplier” which is equal to the total economic impact per unit of direct impact. For each good and service purchased by businesses for the Bank of America projects and by businesses receiving corporate financing, the model predicts the portion that will be supplied by U.S. businesses using trade flow data from the U.S. Department of Commerce and the U.S. Department of Transportation. For example, certain components of photovoltaic solar equipment are primarily manufactured outside the United States. The supplier (i.e. indirect) jobs associated with this production that is outside the U.S. is not included in our analysis. The IMPLAN model also estimates the spending impacts of direct and indirect employees, reflecting typical consumption expenditure profiles and the estimated proportion of consumption goods that are imported from outside the United States. This gives an estimate of the induced economic contributions. A description of the IMPLAN model and methodology is included in Appendix A.

### 3. Economic contributions of Bank of America funded projects

#### 3.1 Employment contributions

Table 3 shows the employment contributions of US projects receiving the \$24.8 billion Bank of America project and corporate financing. Since many employment effects are temporary, such as one-year construction jobs, Table 3 shows the average annual employment during the five-year time period. EY estimates that Bank of America financing supported an average of 27,761 direct jobs and 48,282 indirect and induced jobs, for a total average annual US employment contribution of 76,043.

Project financing benefits include:

- ▶ Energy efficient building construction projects supported the largest number of direct jobs among the project types. Construction of energy efficient apartment buildings supported over 2,800 direct jobs, and construction of non-residential energy efficient buildings supported nearly 2,300 direct jobs, summing to nearly 5,100 direct jobs. These projects supported over 7,800 indirect and induced jobs.
- ▶ Nearly 5,060 direct jobs were supported by renewable energy projects involving the installation of wind turbines, production of photovoltaic cells and solar equipment, construction of a nuclear energy generating station, and gasification projects. The additional indirect and induced employment effects of these projects supported an additional 12,300 jobs.
- ▶ Projects involving energy conservation measures supported 3,718 direct jobs and 5,690 indirect and induced jobs.
- ▶ Financing of hybrid and electric car production created supported 951 direct jobs, and nearly 2,600 indirect and induced jobs.
- ▶ Projects involving wastewater and drinking water infrastructure upgrades supported 5,638 direct jobs and over 8,000 indirect and induced jobs.
- ▶ Urban transportation projects involving infrastructure upgrades to light rail systems supported 4,118 direct jobs, and over 5,900 indirect and induced jobs. The employment shown by year in Figure 4 reflects jobs supported by financing provided in the year shown assuming all the financing is spent on construction related work.

Corporate financing benefits include:

- ▶ Solar renewable energy companies supported the highest total number of jobs among the company types. Through their capital investments, companies that generate solar energy and those that manufacture solar cells together support 2,077 direct jobs and over 2,700 indirect and induced jobs.
- ▶ Capital investments in wind turbines and structures by wind energy generation companies supported 551 direct jobs and nearly 1,900 indirect and induced jobs.

- ▶ Hybrid vehicle manufacturers supported 356 direct jobs through their capital investments. The additional indirect and induced employment effects of these companies supported an additional 1,000 jobs.
- ▶ Renewable energy companies engaged in hydroelectric and biomass energy generation supported 175 direct jobs and nearly 264 indirect and induced jobs.
- ▶ Energy conservation companies that install HVAC and lighting in buildings supported 26 direct jobs and 42 indirect and induced jobs through their capital investments.

**Table 3. Employment impacts by sector for the period 2013-2017**  
Average annual US employment

<b>Sector</b>	<b>Direct jobs</b>	<b>Indirect &amp; induced jobs</b>	<b>Total jobs</b>
<b>Project Financing</b>			
Vehicle loans	951	2,568	3,519
Energy efficient buildings	5,093	7,827	12,921
Apartments	2,805	5,103	7,908
Non-residential	2,288	2,725	5,013
Energy conservation measures	3,718	5,690	9,407
Solar renewable energy	2,154	3,199	5,353
Wind renewable energy	2,351	8,460	10,811
Other renewable energy*	553	618	1,171
Water	5,638	8,091	13,729
Transportation	4,118	5,909	10,027
<b>Subtotal</b>	<b>24,576</b>	<b>42,362</b>	<b>66,938</b>
<b>Corporate Financing</b>			
Hybrid vehicle manufacturers	356	1,029	1,385
Energy conservation companies	26	42	68
Solar renewable energy companies	2,077	2,728	4,805
Solar energy generation	679	673	1,352
Solar cell manufacturing	1,398	2,055	3,452
Wind renewable energy companies**	551	1,858	2,409
Other renewable energy companies*	175	264	439
<b>Subtotal</b>	<b>3,185</b>	<b>5,920</b>	<b>9,105</b>
<b>GRAND TOTAL</b>	<b>27,761</b>	<b>48,282</b>	<b>76,043</b>

\*Includes nuclear and BioGas transactions for project financing, and nuclear and hydroelectric energy production for corporate financing.

\*\*Wind renewable energy companies are involved in wind energy generation.

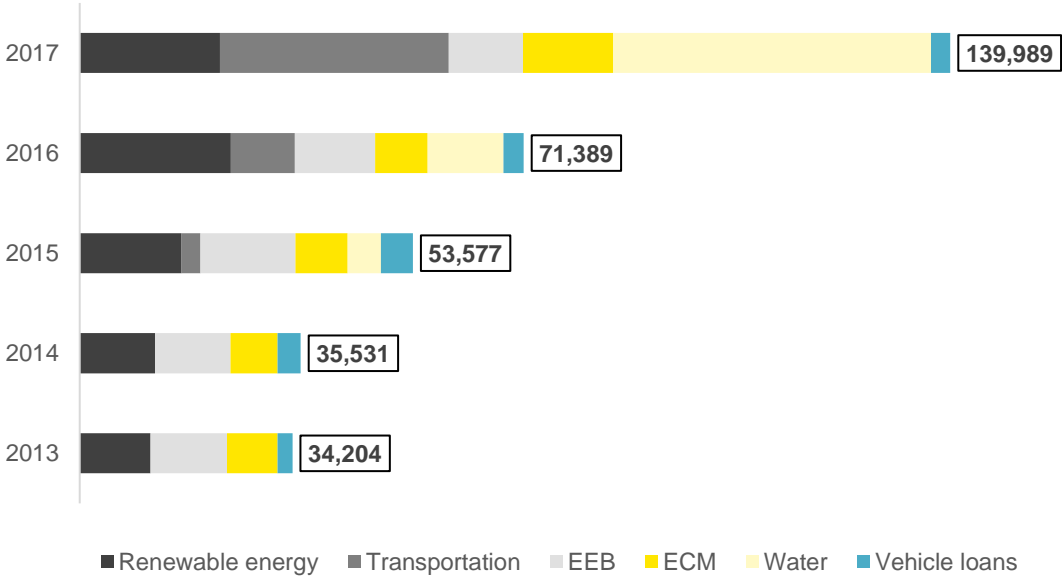
Note: Figures may not sum due to rounding.

Source: EY analysis based on data provided by Bank of America and 2015 and 2016 US IMPLAN model.

Figure 4 shows the estimated total (direct, indirect, and induced) employment contributions of project financing by project type and year. In 2017, nearly 140,000 US jobs were estimated to

have been supported by Bank of America financed projects. Water infrastructure projects had the largest employment contribution in 2017. Renewable energy projects had the largest employment contributions in years 2015 and 2016 while energy efficient building construction activities supported the most jobs in 2013 and 2014.

**Figure 4. US total (direct, indirect, and induced) employment impacts of project financing distributed by project type by year**

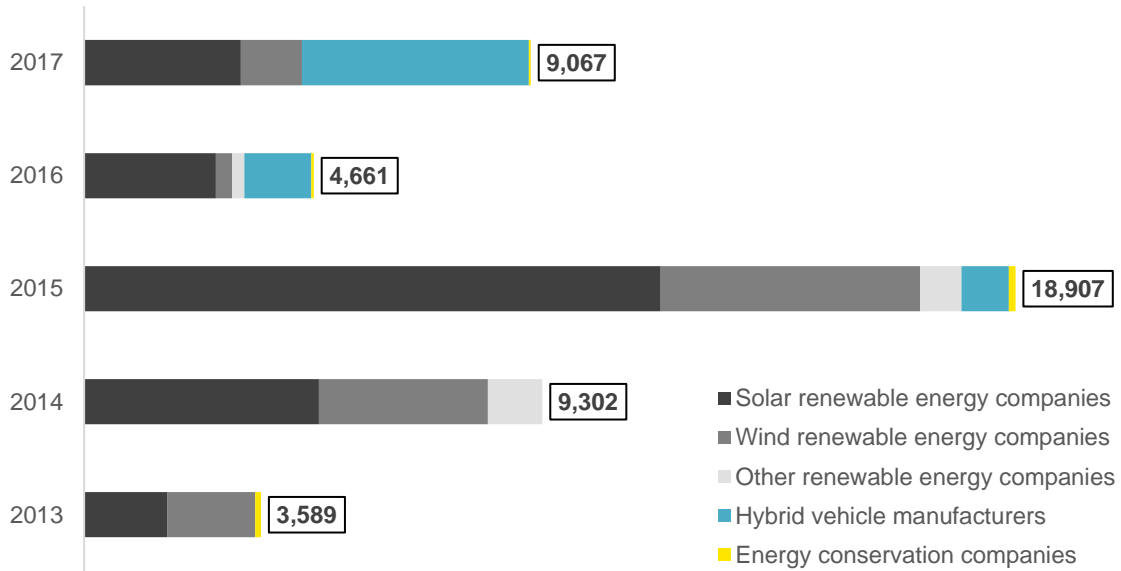


Source: EY analysis based on data provided by Bank of America and 2015 and 2016 US IMPLAN model.

Figure 5 shows the estimated total (direct, indirect, and induced) employment contributions of corporate financing by company type and year. In 2015, the year with the largest employment impacts, nearly 19,000 US jobs were estimated to have been supported by companies receiving Bank of America financing. Hybrid vehicle manufacturers had the largest employment contributions in 2017, while solar renewable energy companies had the largest employment contributions in 2016, 2015 and 2014. Wind renewable energy companies supported the largest number of jobs in 2013.



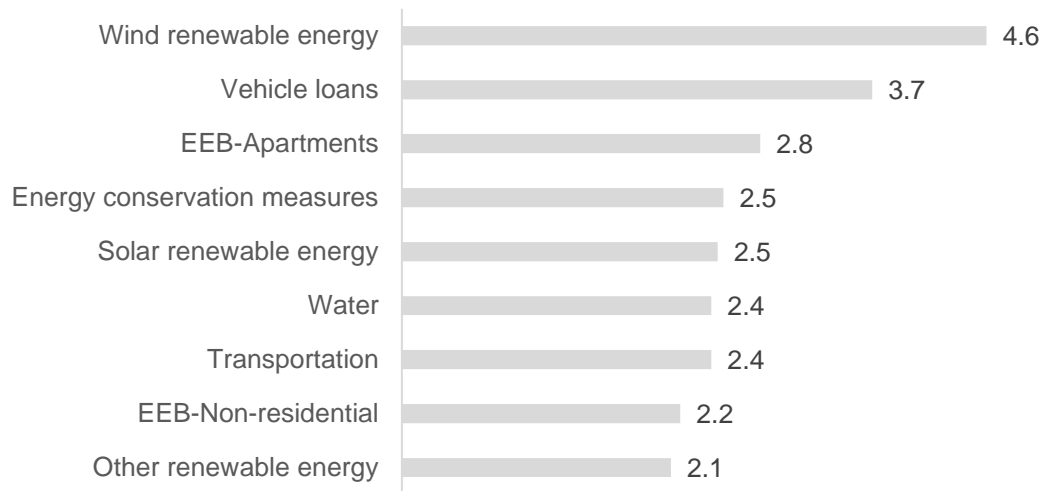
**Figure 5. US total (direct, indirect, and induced) employment impacts from corporate financing distributed by company type by year**



Source: EY analysis based on data provided by Bank of America and 2015 and 2016 US IMPLAN model.

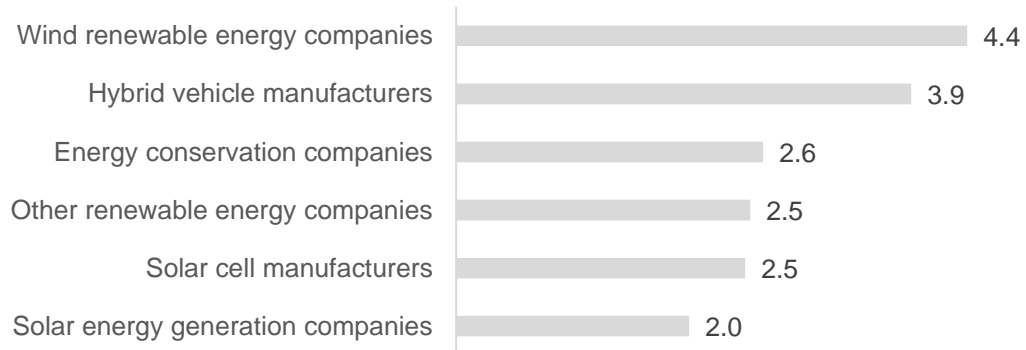
Figure 6 and Figure 7 shows the total employment multipliers by project type. This is the sum of the direct, indirect, and induced employment contribution for each direct job due to projects financed by Bank of America. Subtracting one from the total provides the indirect and induced contribution per direct job. Most projects supported one to two additional jobs in other industries. For example, a direct jobs in the construction of energy efficient apartments is estimated to support 1.8 jobs for a total employment contribution of 2.8 jobs. Wind turbine installation has a higher multiplier (4.6) due to employees receiving above-average compensation that they then spend on US goods and services (induced impacts).

**Figure 6. Total (direct, indirect, and induced) employment multipliers for project financing by project type**



Source: EY analysis based on data provided by Bank of America and 2015 and 2016 US IMPLAN models.

**Figure 7. Total (direct, indirect, and induced) employment multipliers for corporate financing by company type**



Source: EY analysis based on data provided by Bank of America and 2016 US IMPLAN model.

## 3.2 Labor income

Labor income contributions due to Bank of America financed projects are shown in Table 4. The 76,043 jobs annually supported by Bank of America financed projects (see Table 3) resulted in a cumulative \$22.9 billion in labor income (wages and benefits paid to employees plus proprietor's income) during 2013 through 2017. Of the \$22.9 billion, \$9.0 billion is estimated as direct labor income and nearly \$13.9 billion in labor income for indirect and induced employment. Figure 8 and Figure 9 show the labor income by year. In 2017, Bank of America financed projects supported \$8.3 billion in labor income compared to \$2.0 billion in 2013. Companies receiving Bank of America financing supported \$1.2 billion in labor income in 2015, which was twice the amount supported in any other year.

**Table 4. Total US labor income contributions by sector for the period 2013-2017**  
Millions of dollars

<b>Sector</b>	<b>Direct</b>	<b>Indirect &amp; Induced</b>	<b>Total</b>
<b>Project Financing</b>			
Vehicle loans	\$336	\$782	\$1,117
Energy efficient buildings	\$1,466	\$2,162	\$3,628
<i>Apartments</i>	\$813	\$1,375	\$2,188
<i>Non-residential</i>	\$652	\$787	\$1,439
Energy conservation measures	\$1,079	\$1,585	\$2,664
Solar renewable energy	\$752	\$930	\$1,682
Wind renewable energy	\$1,175	\$2,448	\$3,623
Other renewable energy*	\$162	\$176	\$338
Water	\$1,659	\$2,358	\$4,017
Transportation	\$1,212	\$1,722	\$2,934
<b>Subtotal</b>	<b>\$7,841</b>	<b>\$12,162</b>	<b>\$20,003</b>
<b>Corporate Financing</b>			
Hybrid vehicle manufacturers	\$131	\$308	\$439
Energy conservation companies	\$8	\$13	\$21
Solar renewable energy companies	\$699	\$787	\$1,486
<i>Solar energy generation</i>	\$205	\$191	\$396
<i>Solar cell manufacturing</i>	\$494	\$596	\$1,089
Wind renewable energy companies**	\$275	\$539	\$814
Other renewable energy companies*	\$60	\$77	\$137
<b>Subtotal</b>	<b>\$1,173</b>	<b>\$1,723</b>	<b>\$2,896</b>
<b>GRAND TOTAL</b>	<b>\$9,014</b>	<b>\$13,886</b>	<b>\$22,899</b>

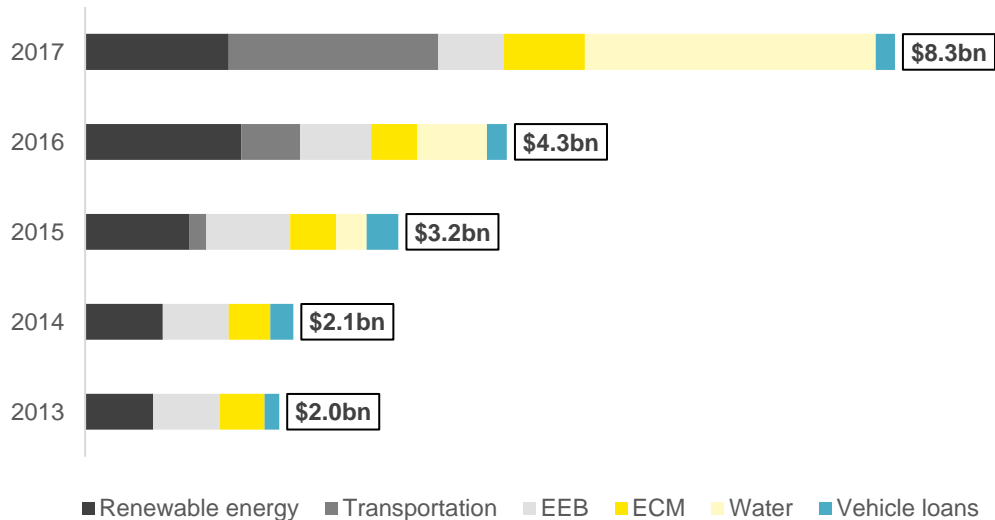
\*Includes nuclear and BioGas transactions for project financing, and nuclear and hydroelectric energy production for corporate financing.

\*\*Wind renewable energy companies are involved in wind energy generation.

Note: Figures may not sum due to rounding.

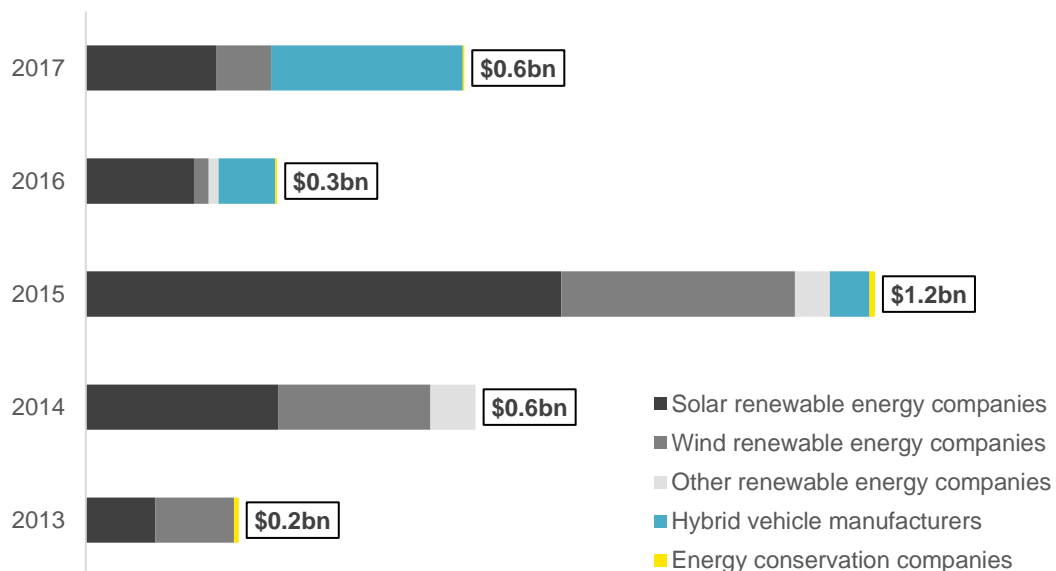
Source: EY analysis based on data provided by Bank of America and 2015 and 2016 US IMPLAN model.

**Figure 8. Total US labor income contributions from project financing distributed by project type by year**  
*Millions of dollars*



Source: EY analysis based on data provided by Bank of America and 2015 and 2016 US IMPLAN model.

**Figure 9. Total US labor income contributions from corporate financing distributed by company type by year**  
*Millions of dollars*

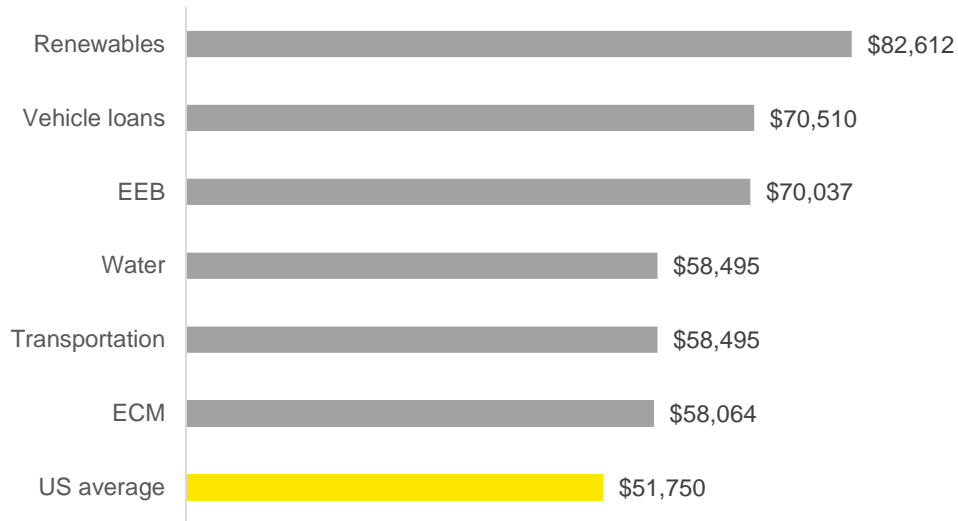


Source: EY analysis based on data provided by Bank of America and 2015 and 2016 US IMPLAN model.

The average compensation (wages plus benefits) of employees in industries where Bank of America project financing supported a direct benefit is shown in Figure 10. The US average

compensation is also shown for comparison. All project types supported a higher average compensation than the US average. Renewable energy projects and vehicle loans supported high average compensation while energy conservation, water infrastructure upgrades and urban transit projects supported compensation near the US average.

**Figure 10. Average compensation of U.S employees supported by Bank of America financed projects**  
*Compensation shown in 2017 dollars*



Source: EY analysis based on data provided by Bank of America and 2015 and 2016 US IMPLAN model.

### 3.3 Value added

During the five-year period, the estimated contribution to value added due to the Bank of America financing is \$35.6 billion. This includes \$12.2 billion in direct value added and \$23.4 billion in value added from indirect and induced contributions. Estimated annual contributions to value added is shown in Figure 13 and Figure 14. In 2017, the estimated value added contributions from project financing and corporate financing were \$12.9 billion and \$900 million, respectively.

Table 5 shows the contributions to value added by Bank of America projects. Value added is equal to compensation paid to US employees, proprietor's income, indirect business taxes and nontax payments, and gross operating surplus. Similarly, value added can be thought of as the sales (or revenue) associated with these projects, less the cost of intermediate inputs. For example, the value added for a hybrid car purchased with a vehicle loan is equivalent to the revenue from the sale of the car minus the purchases for parts used in producing the car.

During the five-year period, the estimated contribution to value added due to the Bank of America financing is \$35.6 billion. This includes \$12.2 billion in direct value added and \$23.4 billion in value added from indirect and induced contributions. Estimated annual contributions to value added is shown in Figure 13 and Figure 14. In 2017, the estimated value added contributions from project financing and corporate financing were \$12.9 billion and \$900 million, respectively.

**Table 5. Value added contributions due to Bank of America financing by sector for the period 2013-2017**  
*Millions of dollars*

<b>Sector</b>	<b>Direct</b>	<b>Indirect &amp; Induced</b>	<b>Total</b>
<b>Project Financing</b>			
Vehicle loans	\$674	\$1,334	\$2,008
Energy efficient buildings	\$1,878	\$3,639	\$5,517
<i>Apartments</i>	\$1,048	\$2,305	\$3,354
<i>Non-residential</i>	\$829	\$1,333	\$2,163
Energy conservation measures	\$1,393	\$2,665	\$4,058
Solar renewable energy	\$1,193	\$1,584	\$2,777
Wind renewable energy	\$1,405	\$4,069	\$5,474
Other renewable energy*	\$223	\$288	\$511
Water	\$2,200	\$4,007	\$6,207
Transportation	\$1,607	\$2,926	\$4,533
<b>Subtotal</b>	<b>\$10,573</b>	<b>\$20,512</b>	<b>\$31,085</b>
<b>Corporate Financing</b>			
Hybrid vehicle manufacturers	\$191	\$511	\$703
Energy conservation companies	\$12	\$21	\$33
Solar renewable energy companies	\$1,024	\$1,354	\$2,378
<i>Solar energy generation</i>	\$255	\$330	\$585
<i>Solar cell manufacturing</i>	\$769	\$1,024	\$1,793
Wind renewable energy companies**	\$329	\$900	\$1,229
Other renewable energy companies*	\$81	\$131	\$212

<b>Subtotal</b>	<b>\$1,636</b>	<b>\$2,918</b>	<b>\$4,554</b>
<b>GRAND TOTAL</b>	<b>\$12,209</b>	<b>\$23,430</b>	<b>\$35,639</b>

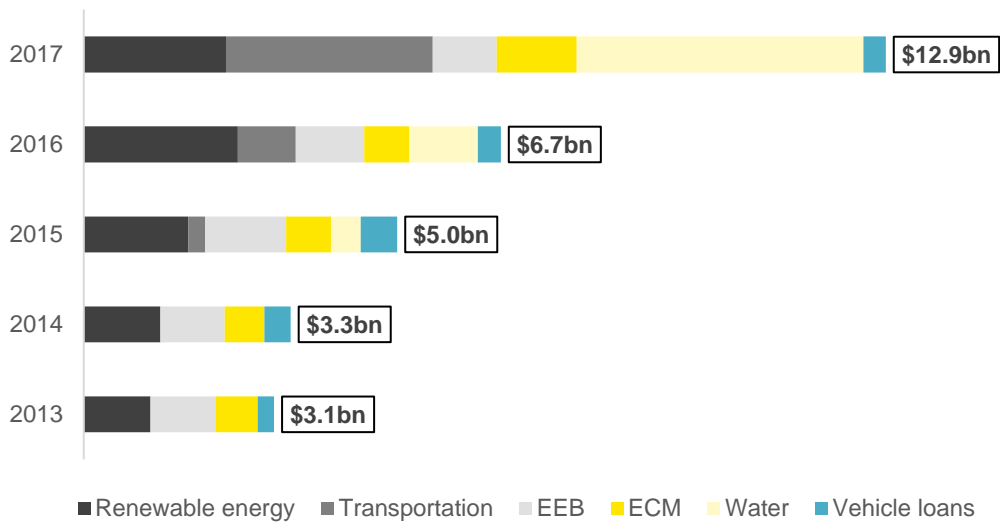
\*Includes nuclear and BioGas transactions for project financing, and nuclear and hydroelectric energy production for corporate financing.

\*\*Wind renewable energy companies are involved in wind energy generation.

Note: Figures may not sum due to rounding.

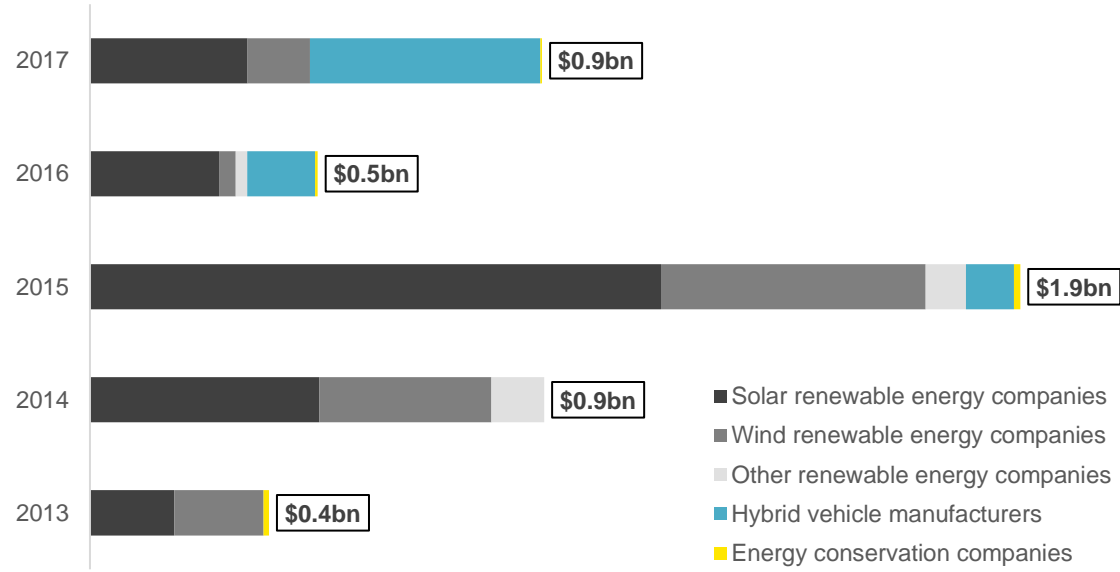
Source: EY analysis based on data provided by Bank of America and 2015 and 2016 US IMPLAN model.

**Figure 11. Total contributions to US GDP from project financing distributed by project type by year**  
*Millions of dollars*



Source: EY analysis based on data provided by Bank of America and 2015 and 2016 US IMPLAN model.

**Figure 12. Total contributions to US GDP from corporate financing distributed by company type by year**  
*Millions of dollars*



Source: EY analysis based on data provided by Bank of America and 2015 and 2016 US IMPLAN model.



### **3.4 Gross economic output**

The final economic contribution measure is gross economic output related to projects receiving Bank of America financing. This is also equivalent to value added plus intermediate purchases used in the production of a good or service rendered by a Bank of America financed project. It is equivalent to the sales or receipts associated with the project. For example, the sale price of a domestically manufactured car would be the gross economic output associated with the hybrids purchased by the Bank of America vehicle loans.

Table 6 shows the economic output supported by Bank of America financing during the five-year period. It is estimated that Bank of America financing supported \$70.4 billion in US economic output, of which \$25.3 billion was direct and \$45.0 billion was output associated with indirect and induced activity. Figure 15 and Figure 16 show the estimated gross economic output by sector and year for project financing and corporate financing. Gross economic output supported by Bank of America financed projects is estimated to have grown from \$6.1 billion in 2013 to \$25.0 billion in 2017. Gross economic output supported by Bank of America corporate financing reached a high of \$3.6 billion in 2015.

**Table 6. Total US gross economic output contributions of Bank of America financing by sector for the period 2013-2017**

*Millions of dollars*

<b>Sector</b>	<b>Direct</b>	<b>Indirect &amp; Induced</b>	<b>Total</b>
<b>Project Financing</b>			
Vehicle loans	\$1,629	\$2,805	\$4,434
Energy efficient buildings	\$3,933	\$7,046	\$10,979
<i>Apartments</i>	\$2,382	\$4,422	\$6,804
<i>Non-residential</i>	\$1,552	\$2,623	\$4,175
Energy conservation measures	\$2,928	\$5,144	\$8,073
Solar renewable energy	\$2,064	\$3,031	\$5,095
Wind renewable energy	\$3,580	\$7,857	\$11,437
Other renewable energy*	\$366	\$555	\$921
Water	\$4,351	\$7,535	\$11,886
Transportation	\$3,178	\$5,503	\$8,681
<b>Subtotal</b>	<b>\$22,029</b>	<b>\$39,476</b>	<b>\$61,505</b>
<b>Corporate Financing</b>			
Hybrid vehicle manufacturers	\$559	\$1,009	\$1,568
Energy conservation companies	\$26	\$42	\$68
Solar renewable energy companies	\$1,742	\$2,532	\$4,274
<i>Solar energy generation</i>	\$416	\$619	\$1,035
<i>Solar cell manufacturing</i>	\$1,326	\$1,914	\$3,240
Wind renewable energy companies**	\$819	\$1,710	\$2,530
Other renewable energy companies*	\$156	\$255	\$411
<b>Subtotal</b>	<b>\$3,302</b>	<b>\$5,549</b>	<b>\$8,850</b>
<b>GRAND TOTAL</b>	<b>\$25,331</b>	<b>\$45,025</b>	<b>\$70,356</b>

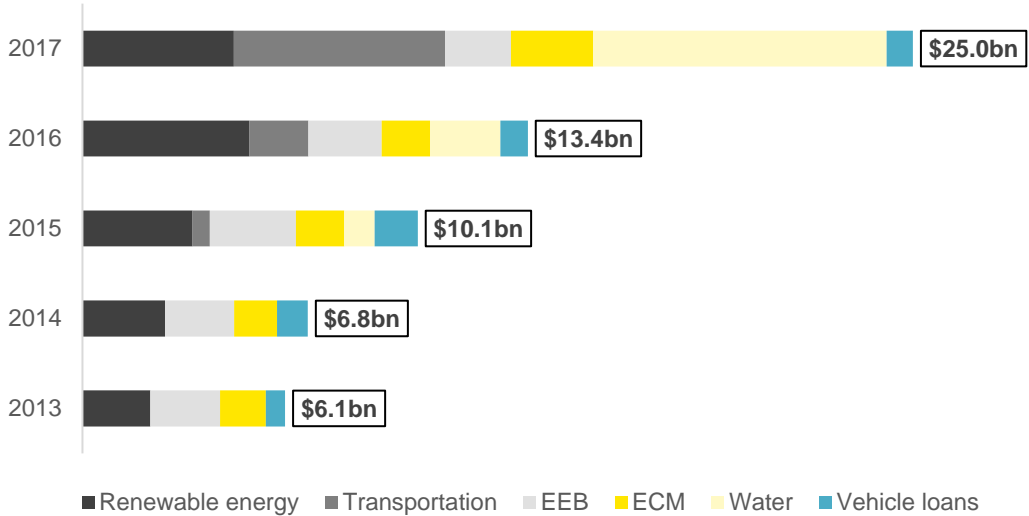
\*Includes nuclear and BioGas transactions for project financing, and nuclear and hydroelectric energy production for corporate financing.

\*\*Wind renewable energy companies are involved in wind energy generation.

Note: Figures may not sum due to rounding.

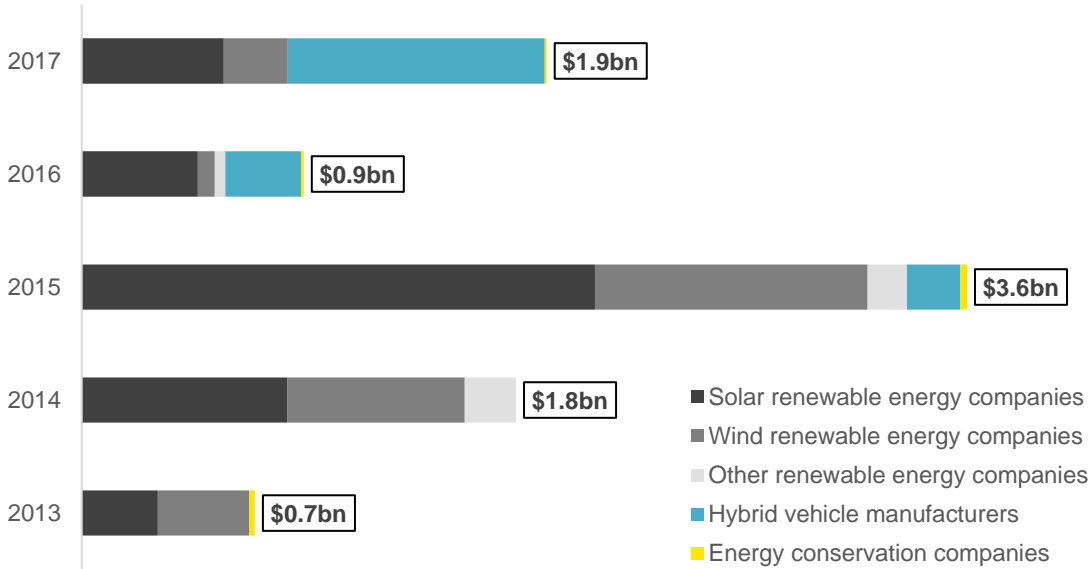
Source: EY analysis based on data provided by Bank of America and 2015 and 2016 US IMPLAN model.

**Figure 13. Total US economic output contributions from project financing distributed by project type by year**  
*Millions of dollars*



Source: EY analysis based on data provided by Bank of America and 2015 and 2016 US IMPLAN model.

**Figure 14. Total US economic output contributions from corporate financing distributed by company type by year**  
*Millions of dollars*



## 4. On-going impacts of solar and wind projects

### 4.1 Estimating annual contributions of renewable energy project operations

Some of the projects financed by Bank of America have ongoing US economic impacts after the initial capital investment occurs. Annual expenditures on operations and maintenance of wind and solar renewable energy supports employment, labor income, and output in years after the equipment is purchased. For the renewable wind and solar projects, EY estimated the annual expenditures associated with operation and maintenance of the equipment. The cost per kilowatt hour of electricity generation is from the US National Renewable Energy Laboratory 2016 data. Bank of America provided the capacity in kilowatt hours for the renewable power generation.

Since 2013, the nameplate capacity developed by solar and wind renewable energy generation projects is 11.3 million kW. EY assumed that all projects that were financed in 2013 through 2016 were operational in 2017 and that projects financed in 2017 were under construction that year and not operational. In 2017, EY estimates that operational solar and wind renewable energy projects had nameplate capacity of 7.6 million kW. Based on these parameters, EY estimates that \$220 million was spent in 2017 on renewable power generation using the Bank of America financed equipment.

### 4.2 Annual economic contributions of renewable energy project operations

The total economic contributions associated with the generation of renewable wind and solar power in 2017 is shown in Table 7. EY estimates that the \$220 million in expenditures supported 826 total (direct, indirect, and induced) US jobs, \$64 million in labor income, \$241 million in value added, and \$344 million in gross economic output in 2017.

**Table 7. Total US economic contributions of renewable solar and wind projects in 2017**  
*Dollar amounts in millions*

Renewable energy generation	2013-2017 Developed nameplate capacity (kW)	Operational nameplate capacity in 2017 (kW)	Total employment	Total labor income	Total value added	Total economic output
Solar	1,721,140	1,197,520	165	\$15	\$30	\$44
Wind	9,621,195	6,369,095	661	\$49	\$221	\$300
<b>Total</b>	<b>11,342,335</b>	<b>7,566,615</b>	<b>826</b>	<b>\$64</b>	<b>\$251</b>	<b>\$344</b>

Note: Analysis assumes that all wind and solar projects that received funding in 2013-2015 are operational in 2016.

Source: EY analysis using data provided by Bank of America, NREL models and O&M costs in 2016 for PV solar and wind projects, and 2015 and 2016 US IMPLAN model

### 4.3 Estimating ongoing contributions of companies receiving corporate financing

The companies financed by Bank of America have ongoing US economic impacts after the initial capital investment. Annual expenditures on operations and maintenance supports employment, labor income, and output in years after the equipment is purchased. For each company, EY estimated the revenue generated as a result of the capital investments they made using Bank of America financing. For each company, the revenue per dollar of total assets obtained from the company's financial statements was applied to the amount of financing they received from Bank of America that was used to make capital investments. This provided an estimate of how much revenue was generated by the operation of those assets, and hence, how much revenue could be attributed to Bank of America financing. The total amount of revenue from operation of the capital assets related to Bank of America financing was \$927 million.

### 4.4 Ongoing economic contributions of companies receiving corporate financing

The total economic contributions associated with ongoing operations of companies receiving corporate financing are shown in Table 8. EY estimates that the \$927 million in revenues supported 4,156 total (direct, indirect, and induced) US jobs, \$1.5 billion in labor income, \$3.1 billion in value added, and \$5.6 billion in gross economic output from 2013 to 2017.

**Table 8. Total US economic contributions from ongoing operations of companies supported by corporate financing, 2013-17**

*Average annual US employment; Dollar amounts are in millions and cumulative*

<b>Sector</b>	<b>Employment</b>	<b>Labor income</b>	<b>Value added</b>	<b>Output</b>
Hybrid vehicle manufacturers	625	\$210	\$408	\$1,082
Energy conservation companies	84	\$24	\$37	\$71
Solar renewable energy companies	1,603	\$639	\$1,193	\$1,915
<i>Solar energy generation</i>	1,070	\$464	\$898	\$1,376
<i>Solar cell manufacturing</i>	533	\$175	\$295	\$539
Wind renewable energy companies**	274	\$105	\$501	\$657
Other renewable energy companies*	1,570	\$528	\$965	\$1,855
<b>TOTAL</b>	<b>4,156</b>	<b>\$1,505</b>	<b>\$3,105</b>	<b>\$5,581</b>

## Appendix: Economic contribution model using IMPLAN

This analysis uses an input-output model to estimate the economic contributions of US projects receiving Bank of America financing. The regional economic multipliers in this study were estimated using the 2015 and 2016 IMPLAN input-output models of the United States. IMPLAN is used by more than 500 universities and government agencies. Unlike other economic models, IMPLAN includes the interaction of 530 industry sectors, thus identifying the interaction of specific industries that relate to the projects studied in this report.

Total contributions presented in this report include direct, indirect, and induced contributions. Direct contributions are related to sectors receiving Bank of America financing. Indirect effects are attributable to suppliers. Induced effects are attributable to spending by direct and indirect employees, based on regional household spending patterns for different levels of income.

Indirect and induced effects are driven by (1) input purchases by businesses and their suppliers; (2) the percentage of each type of commodity that is purchased from within the United States; and (3) household consumption profiles for employees. The implied multipliers for the indirect and induced activity are shown in Table A-1.

**Table A-1. Multipliers used in analysis**

<b>Sector</b>	<b>Employment</b>	<b>Labor income</b>	<b>Value added</b>	<b>Output</b>
<b>Project Financing</b>				
Vehicle loans	3.7	3.3	3.0	2.7
Energy efficient buildings				
<i>Apartments</i>	2.8	2.7	3.2	2.9
<i>Non-residential</i>	2.2	2.2	2.6	2.7
Energy conservation measures	2.5	2.5	2.9	2.8
Solar renewable energy	2.5	2.2	2.3	2.5
Wind renewable energy	4.6	3.1	3.9	3.2
Other renewable energy	2.1	2.1	2.3	2.5
Water	2.4	2.4	2.8	2.7
Transportation	2.4	2.4	2.8	2.7
<b>Corporate Financing</b>				
Hybrid vehicle manufacturers	3.9	3.3	3.7	2.8
Energy conservation companies	2.6	2.5	2.8	2.6
Solar renewable energy companies				
<i>Solar energy generation</i>	2.0	1.9	2.3	2.5
<i>Solar cell manufacturing</i>	2.5	2.2	2.3	2.4
Wind renewable energy companies	4.4	3.0	3.7	3.1
Other renewable energy companies	2.5	2.3	2.6	2.6

Source: EY analysis based on 2015 and 2016 IMPLAN economic model of the United States