**STATE OF INDIANA**

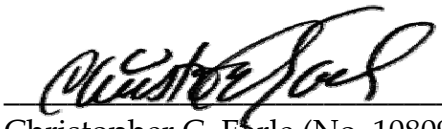
**INDIANA UTILITY REGULATORY COMMISSION**

| | | |
|---|---|---|
| **PETITION OF NORTHERN INDIANA PUBLIC SERVICE COMPANY FOR APPROVAL OF MODIFICATIONS TO AND AN EXTENSION OF ITS ELECTRIC RENEWABLE FEED-IN TARIFF PROVIDING FOR THE PURCHASE OF ENERGY FROM RENEWABLE ENERGY RESOURCES PURSUANT TO IND. CODE CH. 8-1-8.8. AND FOR THE CONTINUED RECOVERY OF COSTS ASSOCIATED WITH THOSE PURCHASES UNDER IND. CODE § 8-1-2-42(a) OR SUCCESSOR MECHANISMS IN ACCORDANCE AND CONSISTENT WITH THE INDIANA UTILITY REGULATORY COMMISSION'S ORDER DATED JULY 13, 2011 IN CAUSE NO. 43922.** | ) | **CAUSE NO. 44393** |

## COMPLIANCE FILING – ANNUAL REPORT

In compliance with Paragraph 9 of the Stipulation and Settlement Agreement approved by the Indiana Utility Regulatory Commission's Order dated February 4, 2015 in this Cause, Northern Indiana Public Service Company LLC, by counsel, hereby files the attached Annual Report on the Renewable Feed-in-Tariff.

Respectfully submitted,



Christopher C. Earle (No. 10809-49)
NiSource Corporate Services - Legal
150 West Market Street, Suite 600
Indianapolis, Indiana 46204
Phone: (317) 684-4904
Fax: (317) 684-4918
Email: cearle@nisource.com

Attorney for Petitioner
Northern Indiana Public Service Company LLC

**CERTIFICATE OF SERVICE**

The undersigned hereby certifies that the foregoing was served by email transmission upon the following:

Karol H. Krohn
Office of Utility Consumer Counselor
115 W. Washington Street,
Suite 1500 South
Indianapolis, Indiana 46204
kkrohn@oucc.in.gov
infomgt@oucc.in.gov

J. David Agnew
Christopher L. King
LORCH NAVILLE WARD LLC
506 State Street
P.O. Box 1343
New Albany, Indiana 47151-1343
dagnew@lnwlegal.com
cking@lnwlegal.com

Laura Ann Arnold
Indiana Distributed Energy Alliance, Inc.
545 E. Eleventh Street
Indianapolis, Indiana 46202
laura.arnold@thearnoldgroup.biz

Jennifer A. Washburn
Citizens Action Coalition
603 East Washington Street, Suite 502
Indianapolis, Indiana 46204
jwashburn@citact.org

Stuart R. Gutwein
Gutwein Law
250 Main Street, Suite 590
Lafayette, IN 47901
stuart.gutwein@gutweinlaw.com

Dated this 11th day of July, 2019.

Christopher C. Earle

# Northern Indiana Public Service Company LLC

# Cause No. 44393

## Rate 765: Renewable Feed-In Tariff

Annual Report to the Indiana Utility Regulatory Commission

July 15, 2019

**Executive Summary**

On July 12, 2011, the Indiana Utility Regulatory Commission ("Commission") approved NIPSCO's Feed-in Tariff ("FIT") Phase I in Cause No. 43922. Implementation began immediately as a three-year pilot program with a 30 megawatt ("MW") capacity cap. Phase I of the FIT offered a rate greater than the retail electric rate in the then currently approved sales tariffs and provided an incentive to encourage development of renewable generating resources. The pilot program was designed to help maximize the development of renewable energy in Indiana, which welcomed biomass, wind, new hydro and solar resources. The FIT Phase I provided the customer a sell-back opportunity to NIPSCO at a predetermined price for up to 15 years through a renewable power purchase agreement ("RPPA"). Participating customers received payment from NIPSCO for the amount of electricity generated and delivered to NIPSCO through an approved interconnection and metering point.

On October 23, 2013, the Commission issued an Interim Order in Cause No. 44393 approving the continuation of NIPSCO's FIT which was set to expire on December 31, 2013. On March 4, 2015, the Commission issued an Order in Cause No. 44393 approving a Stipulation and Settlement Agreement by and among NIPSCO, the Indiana Office of Utility Consumer Counselor ("OUCC"), Citizens Action Coalition of Indiana, Inc. ("CAC"), the Hoosier Chapter of the Sierra Club ("Sierra Club"), Indiana Distributed Generation Alliance, Inc. ("IDEA") and Bio Town Ag, Inc. ("BTA") (the "Settling Parties") for a proposed Phase II of the FIT program ("FIT Phase II"). This program provides an additional 16 MW of renewable capacity into the FIT program, with a particular focus on smaller projects.

Phase II of the FIT also offers a rate greater than the retail electric rate in the currently approved sales tariffs and provides an incentive to encourage development of renewable generating resources. The second phase of the program was designed to assist in the transition to the market –based development of renewable energy while continuing to increase opportunities for the expansion of renewable resources by NIPSCO's customers through a well-defined, productive program in Indiana and still includes biomass, wind and solar resources. The FIT Phase II continues to provide the customer a sell-back opportunity to NIPSCO at a predetermined price for up to 15 years through a RPPA, but provides a mechanism for NIPSCO to experiment with differing rates to determine market interest, as well as stepping down the subsidy offered. Participating customers still receive payment from NIPSCO for the amount of electricity generated and delivered to NIPSCO through an approved interconnection and metering point.

This annual report provides an update on Phase II Allocation I and encompasses the time frame from January 1, 2018 through December 31, 2018 (unless otherwise noted).

**FIT Phase I Summary**

Phase I concluded in March of 2015 with a total subscription of 29.7 MW and is summarized in the following table. Table 1 lists by technology and size segment, the generation interconnected and operating.

**Table 1: FIT Phase I In-Service**

| Technology | Capacity Final (kW) |
|---|---|
| **Biomass** | 14,348.0 |
| **Large Solar** | 14,500.0 |
| **Small Solar** | 690.0 |
| **Large Wind** | 150.0 |
| **Small Wind** | 10.2 |
| **Total** | ***29,698.2*** |

A total of 108 customers participating in Phase I, with 84 residential and small commercial customers utilizing the Small Solar and Wind segments of 5 to 10 kW. Twenty four customers participated in the other categories of Large Solar, Large Wind and Biomass generating facilities. Local businesses selling and installing wind and solar residential systems enable customers to participate in NIPSCO's FIT. In addition, large solar installations have been built by commercial developers and biomass generators have been installed at local, established agricultural operations with existing fuel sources such as landfill methane or agricultural waste streams that were converted to methane. All of the large solar projects and one biomass project were developed by out-of-state developers who secured a relationship with an existing NIPSCO electric customer and assisted the customer in securing an interconnection agreement and RPPA with the understanding that the developer would purchase the existing customer's property. The out-of-state developers then established a new NIPSCO customer electric account after the agreements were in place and subsequently had the original customer assign the agreements to the developer. This approach allowed developers to build multiple projects and secure a larger portion of the available capacity.

**Table 2: FIT Generator Status at the Conclusion of Phase I**

| Technology | In-Service Generators |
|---|---|
| Biomass | 7 |
| Large Solar | 15 |
| Small Solar | 82 |
| Large Wind | 2 |
| Small Wind | 2 |
| **Total FIT Phase I Customers** | **108** |

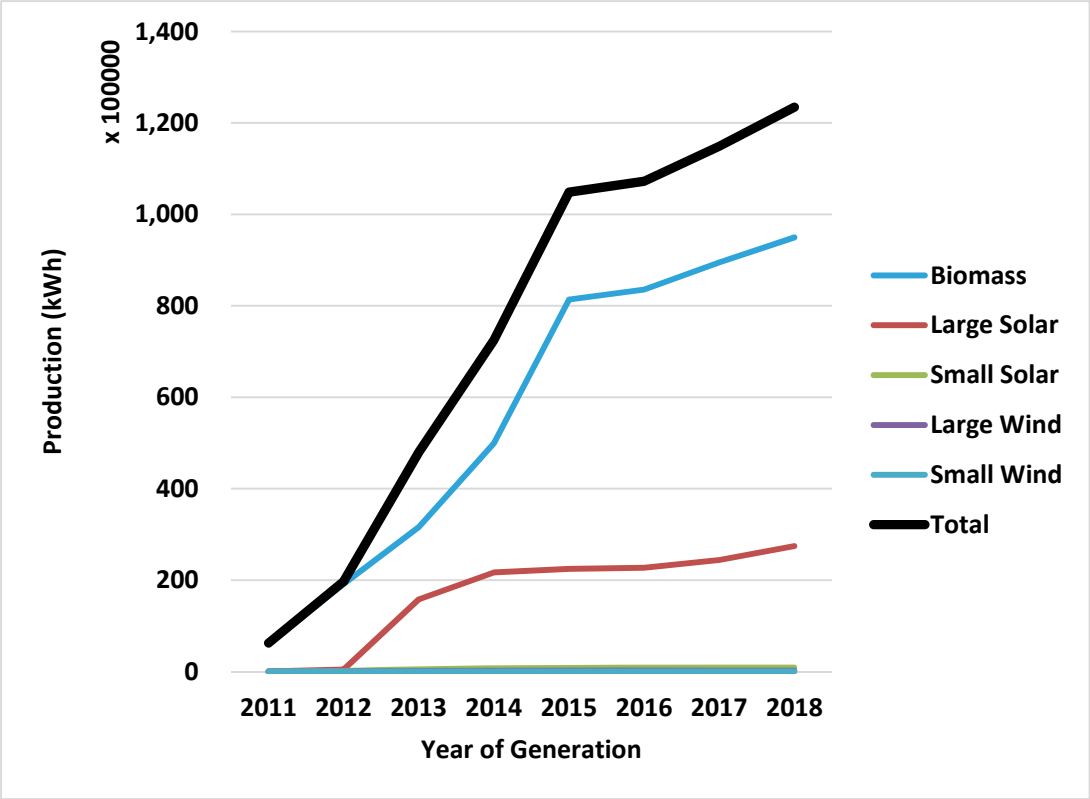
**FIT Generation – Phase I and Phase II Allocation I**

NIPSCO began purchasing energy from customers contracted under the FIT in 2011 and added kWh purchases as more generators and technologies interconnected to the grid. The following table describes the annual generation of the FIT Phase I generators, as well as the current FIT Phase II generation, from the inception of the program through December 31, 2018.

**Table 3: Annual FIT Production by Technology - Generation (kWh)**

| Technology Type | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | *Total* |
|---|---|---|---|---|---|---|---|---|---|
| Biomass | 6,219,791 | 19,152,432 | 31,602,728 | 49,916,700 | 81,369,723 | 83,552,339 | 89,486,440 | 94,942,135 | ***456,242,288*** |
| Large Solar | - | 433,758 | 15,789,457 | 21,665,115 | 22,436,103 | 22,696,839 | 24,391,349 | 27,450,274 | ***134,862,895*** |
| Small Solar | - | 118,895 | 471,806 | 718,758 | 818,332 | 825,066 | 848,789 | 907,706 | ***4,709,352*** |
| Large Wind | - | - | 90,113 | 165,880 | 217,949 | 165,593 | 167,807 | 179,797 | ***987,139*** |
| Small Wind | - | 3,588 | 15,721 | 12,051 | 9,462 | 8,019 | 8,487 | 15,352 | ***72,680*** |
| Total | ***6,219,791*** | ***19,708,673*** | ***47,969,825*** | ***72,478,504*** | ***104,851,569*** | ***107,247,856*** | ***114,902,872*** | ***123,495,264*** | ***596,874,354*** |

**Graph 1 – Annual FIT Production per Year**



**FIT Phase II**

NIPSCO used the success of Phase I to build and launch FIT Phase II in the first quarter of 2015. Phase II redefined the tiers of each technology based on the lessons learned through the first phase of the FIT. Small and Large Solar/Wind was further refined to Micro and Intermediate Solar/Wind, respectively, with Micro defined as between 5 kW and 10 kW for solar and 3 kW up to 10 kW for wind, and Intermediate being any project more than 10 kW. The Intermediate technologies have a maximum allowance of 200 kW per project. Biomass projects are capped at a maximum of 1 MW per project, with a single customer and/or its affiliates limited to 1 MW of projects.

The total available capacity for FIT Phase II provides for an additional 16 MW, allocated as shown in the table below.

**Table 4: Phase II Available Capacity**

| Cause No. 44393 Technology | Phase II MW Available |
|---|---|
| Micro Solar | 2 |
| Intermediate Solar | 8 |
| Micro Wind | 1 |
| Intermediate Wind | 1 |
| Biomass | 4 |
| **Total** | **16** |

FIT Phase II offers fixed rates instead of an annual increase to the rates for all technology types excluding biomass, which continues to have an annual escalation rate. Biomass projects established after the second year of FIT Phase II will be subject to a reverse auction with the rate not to exceed the rate in effect for the first two years of FIT Phase II. These rates are shown below.

**Table 5: FIT Purchase Rates**

| Phase I Technology | Phase I Purchase Rate per kWh |
|---|---|
| Small Wind | $0.1700 |
| Large Wind | $0.1000 |
| Small Solar | $0.3000 |
| Large Solar | $0.2600 |
| Biomass | $0.1060 |
| New Hydro | $0.1200 |

| Phase II Technology | Phase II Allocation I Purchase Rate per kWh | Phase II Allocation II Purchase Rate per kWh |
|---|---|---|
| Micro Wind | $0.2500 | $0.2300 |
| Intermediate Wind | $0.1500 | $0.1380 |
| Micro Solar | $0.1700 | $0.1564 |
| Intermediate Solar | $0.1500 | $0.1380 |
| Biomass | $0.0918 | ≤ $0.0918 |
| New Hydro | No Longer Available | |

**Implementation of FIT Phase II, Allocation I**

NIPSCO received approval of Phase II on March 4, 2015. NIPSCO had 30 days from the date of the Order to provide the Participation Request Form ("PRF") on the Company's website. On April 3, 2015, NIPSCO published the PRF on the NIPSCO website and continued to collect them from interested customers until June 4, 2015. NIPSCO received 89 PRFs over the course of 60 days, with the majority expressing interest in the Intermediate Solar category. Since the interest level exceeded the total capacity available for Intermediate Solar, NIPSCO held a lottery to determine the eligible participants for the 4 MW of Allocation I on July 8, 2015 at NIPSCO's Indianapolis office. All stakeholders involved in Cause No. 44393 were invited to the lottery drawing. NIPSCO also developed a webcast so that all customers who submitted a PRF could watch the results populate as numbers were drawn. Over the next 1-2 business days, every customer who submitted a PRF was notified of the results of the lottery. If customers were awarded capacity for Phase II Allotment I, they were advised to submit an interconnection application.

**Implementation of FIT Phase II, Allocation II**

NIPSCO's Phase II Allocation I concluded on March 4, 2017. From this date forward, any interconnection applications submitted receive Allocation II purchase rates.

NIPSCO again held an intermediate solar lottery to award the 4 MWs available in Allocation II. NIPSCO began accepting PRFs on March 31, 2017. The submission of PRFs concluded on May 30, 2017, and the last day to accept revised PRFs was June 29, 2017. In total, there were 56 participation forms submitted and ultimately 55 participation forms accepted into the lottery to be held in July 2017. One PRF was not accepted into the lottery because the interconnection location was outside of the NIPSCO electric service territory. The total amount of capacity requested on the PRFs for the 2017 intermediate solar lottery was 10,842 kW. Stakeholders were invited to attend the lottery drawing at NIPSCO's Merrillville office or join the conference call on July 12, 2017. Each customer who submitted a PRF was then notified within two days of the lottery outcome. The first 20 PRFs selected in the lottery were awarded capacity and instructed to submit a Level 2 interconnection application to begin the interconnection process.

**Interconnection Process**

NIPSCO follows the Commission's administrative rules governing interconnection applications. Micro solar and micro wind installations connect to single phase 7.2 kV distribution circuits at the service voltage of 120 Volts and use the NIPSCO owned and maintained service cable and transformer. For larger capacity projects, NIPSCO's Distribution System Planning department conducts the review and engineering study to interconnect the customer's generator. NIPSCO's engineers hold information meetings with the applicant and the customer's engineers to ensure there is a clear understanding of the project requirements.

- *Micro Solar and Micro Wind – Single Phase Interconnection*

NIPSCO received nine applications for the micro solar and micro wind category in 2015. Four micro solar applications were submitted in 2016, nine micro solar applications were collected in 2017, and four micro solar applications were received in 2018. In 2015, the estimated infrastructure upgrade cost for solar and wind applications ranged from a high of $3,706 to a low of $397. The estimated infrastructure upgrade cost for all micro solar applications in 2016, 2017 and 2018 was $397 since only a meter installation and its associated labor was involved. Of the nine applications received in 2015, six ultimately did interconnect. All four applications received in 2016, as well as, each of the nine applications received in 2017 have interconnected. Three of the four applications submitted in 2018 have also interconnected.

- *Intermediate Solar, Intermediate Wind and Biomass —Three Phase Interconnection*

NIPSCO received twenty-three applications for the intermediate solar and intermediate wind categories in 2015. NIPSCO did not receive any biomass applications. The estimated infrastructure upgrade cost for three phase interconnection applications ranged from a high of $1,050,000 to a low of $15,433. The average estimated interconnection cost was about $25,000.

In 2016, six winning lottery participants in Allocation I withdrew their interconnection applications and the available capacity was then offered to the next participants in the lottery queue. Each customer offered the capacity submitted an application and was approved. The estimated costs to interconnect ranged from $21,440 to $30,917. There were a total of three intermediate solar interconnections completed in 2016. There were no wind or biomass applications submitted in 2016.

Fourteen intermediate solar projects associated with Allocation I interconnected in 2017. One participant awarded capacity in the Allocation II lottery also interconnected. Two intermediate solar participants from Allocation I withdrew their applications in 2017. Overall, three intermediate solar projects remain from Allocation I and continue with the interconnection process. The estimated cost for intermediate solar to interconnect in 2017 was approximately $38,800. Intermediate wind has received applications to fulfill all the available Phase II capacity; however, no intermediate wind is generating. No biomass applications were received in 2017.

In 2018, one Allocation I intermediate solar participant came online and another intermediate solar application was approved. Additionally, another intermediate solar participant's approved application was withdrawn from Allocation I and offered to the next participant in the queue. A total of ten micro solar customers from Allocation II began generating in 2018 at a cost of $397 each. Ten intermediate solar Allocation II projects were approved in 2018. Applications to fulfill the intermediate wind capacity have been received for Phase II. No biomass applications were received in 2018.

**Interconnection Queue and Impact of Externalities**

There is no impact of externalities to biomass, micro solar and micro wind because no interconnection queue exists. The Allocation II intermediate solar interconnection queue was impacted by large solar developers. Few of the participants in the Allocation II lottery were first time solar installers. A total of 55 PRFs were accepted in the July 2017 lottery. Two of the participants each submitted a PRF. Thus, five participants were responsible for the remaining 53 PRFs. No capacity was initially awarded to either participant who only submitted one PRF. There have been many inquiries by NIPSCO customers about intermediate solar since the last lottery; however, no capacity is available.

**FIT Operational Issues**

No impact.

The current status of Phase II Allocation I is shown below.

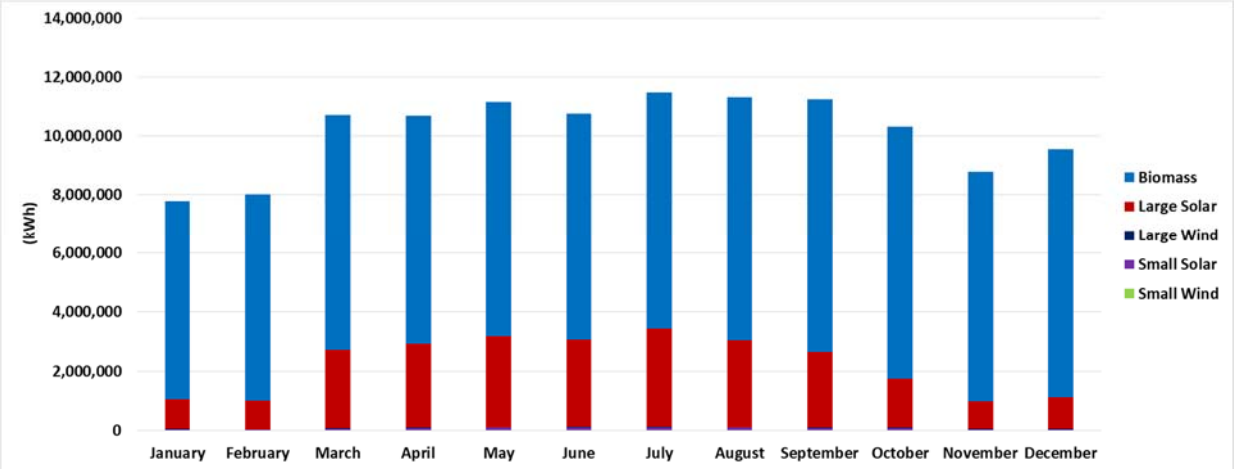
**Table 6: FIT Phase II Status**

| Technology | In-service (kW) | Queue (kW) | Total FIT (kW) | % Capacity |
|---|---|---|---|---|
| Micro Solar | 189 | 10 | 199 | 10% |
| Intermediate Solar | 3,776 | 4,200 | 7,976 | 100% |
| Micro Wind | 20 | 0 | 20 | 2% |
| Intermediate Wind | 0 | 1,000 | 1,000 | 100% |
| Biomass | 0 | 0 | 0 | 0% |
| Total | 3,985 | 5,210 | 9,195 | |

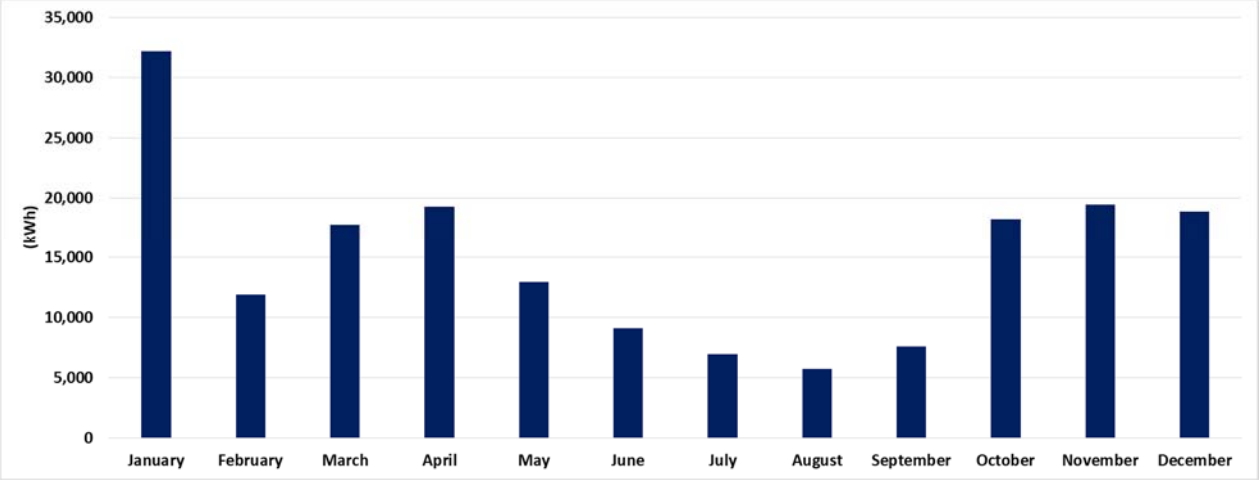
**Data**

The following graphs show the growth of the generation output by technology in the stacked bar charts.

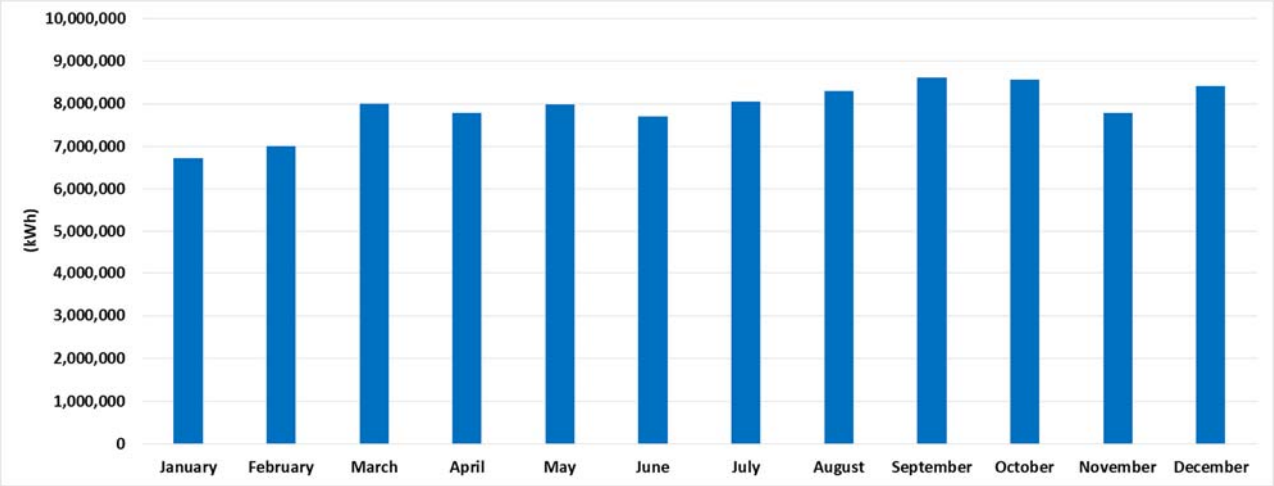
**Graph 2 –2018 FIT Generation by Month by Technology**



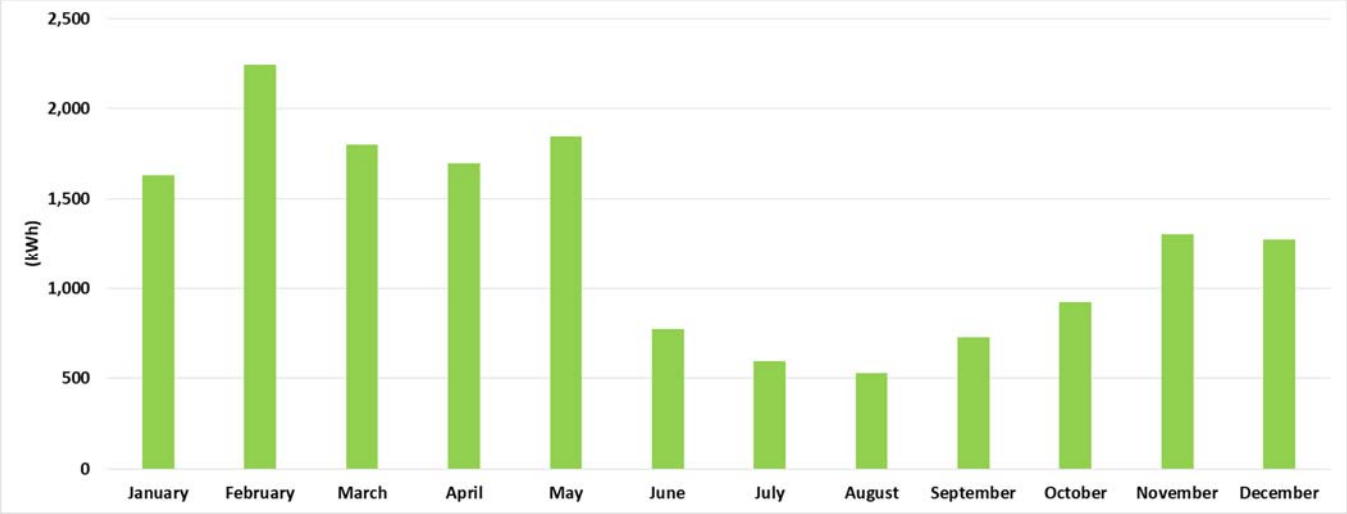
**Graph 3 – 2018 FIT Intermediate Wind (>10 kW to 5,000 kW) Production by Month**



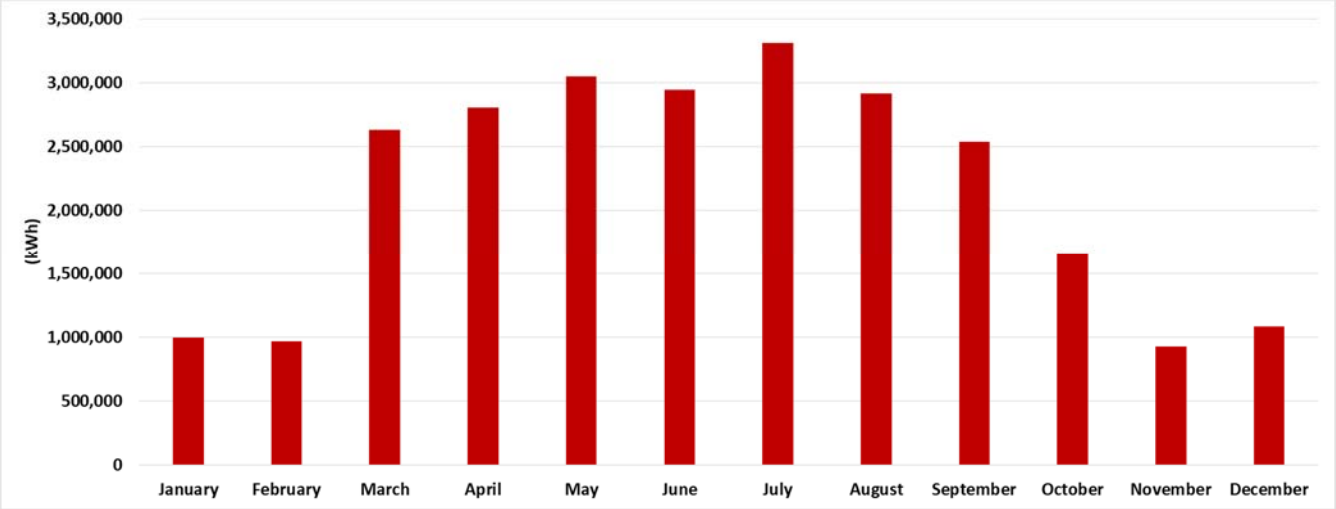

**Graph 4: 2018 FIT Biomass (<5,000 kW) Production by Month**



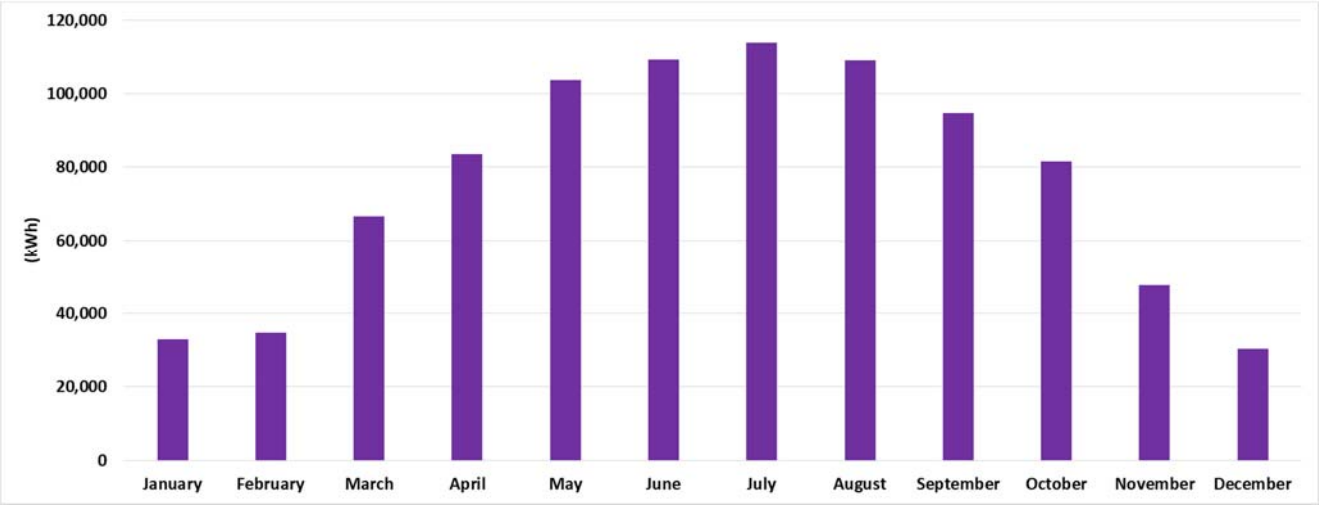
**Graph 5 – 2018 FIT Micro Wind (5 kW to 1 kW) Production by Month**




**Graph 6: 2017 FIT Intermediate Solar (>10 kW to 5,000 kW) Production by Month**



**Graph 7: 2018 FIT Micro Solar (5 kW to 10 kW) Production by Month**




The following table shows the annual output for FIT renewable energy generation. In 2018, 76.92% of the energy generated came from biomass sources, with 22.24% being generated by intermediate solar projects. The other technologies provided the remaining generation.

**Table 7: 2018 FIT Generation by Technology**

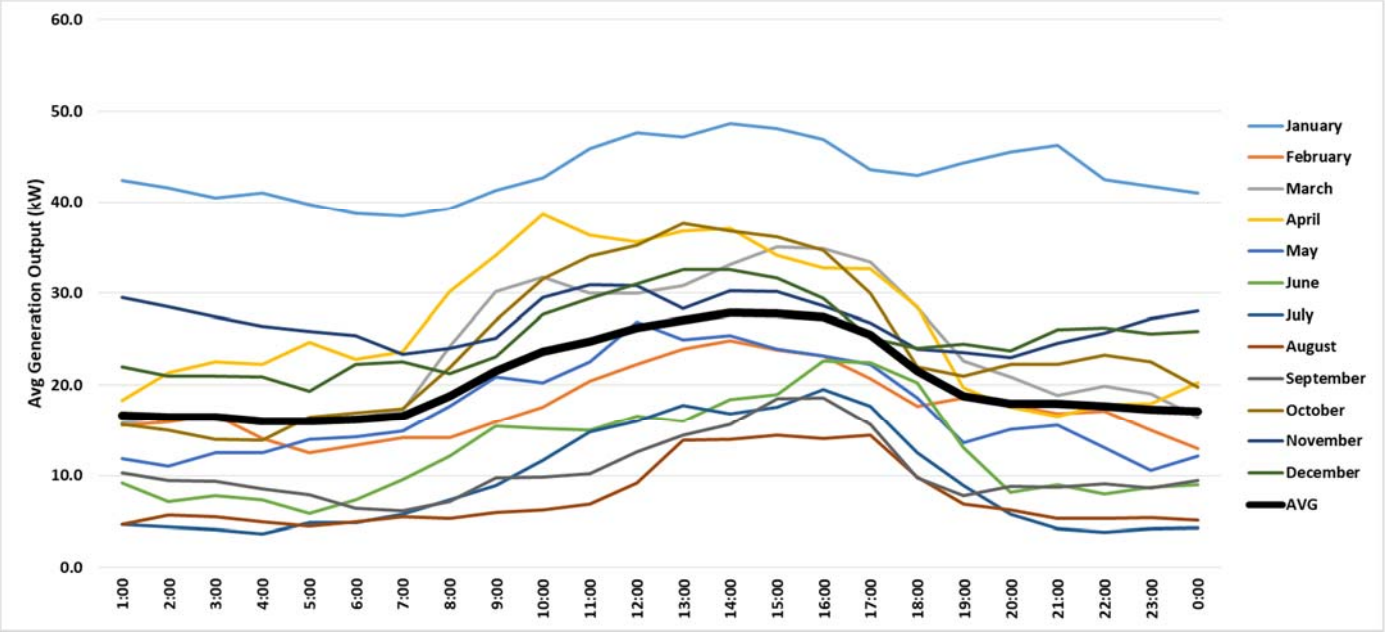
| Technology Type | Capacity Final (kW) | Annual Production (kW) | Technology Capacity Factor | Renewable Generation % |
|---|---|---|---|---|
| Biomass | 14,348 | 94,942,135 | 75.5% | 77% |
| Intermediate Solar | 18,276 | 27,450,274 | 17.3% | 22% |
| Micro Solar | 818 | 907,706 | 12.7% | 1% |
| Intermediate Wind | 150 | 179,797 | 13.7% | 0% |
| Micro Wind | 30.2 | 15,352 | 5.8% | 0% |
| Total | 33,622 | 123,495,264 | | 100% |

The information in the following tables and graphs represent the “typical daily production” for the intermediate wind, intermediate solar and biomass for each month. Micro production data is not included because the best available data is at the monthly level.

## Table 8: Intermediate Wind Production by Hour and Month

| Intermediate Wind 2017 (Average Generation by Hour per Month) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR End | January | February | March | April | May | June | July | August | September | October | November | December | AVG |
| *1:00* | 42.4 | 15.6 | 15.9 | 18.3 | 11.8 | 9.2 | 4.7 | 4.7 | 10.3 | 15.6 | 29.5 | 22.0 | **16.7** |
| *2:00* | 41.6 | 15.9 | 16.6 | 21.3 | 11.1 | 7.2 | 4.4 | 5.7 | 9.4 | 15.0 | 28.5 | 21.0 | **16.5** |
| *3:00* | 40.5 | 16.6 | 16.4 | 22.5 | 12.5 | 7.8 | 4.1 | 5.5 | 9.4 | 14.0 | 27.4 | 21.0 | **16.5** |
| *4:00* | 41.0 | 14.1 | 15.7 | 22.2 | 12.5 | 7.3 | 3.7 | 5.0 | 8.6 | 13.9 | 26.4 | 20.9 | **16.0** |
| *5:00* | 39.8 | 12.5 | 15.8 | 24.6 | 13.9 | 5.8 | 4.9 | 4.5 | 7.9 | 16.5 | 25.9 | 19.3 | **16.0** |
| *6:00* | 38.7 | 13.3 | 16.3 | 22.8 | 14.3 | 7.3 | 4.8 | 5.0 | 6.4 | 16.9 | 25.4 | 22.3 | **16.2** |
| *7:00* | 38.5 | 14.2 | 17.2 | 23.6 | 14.9 | 9.5 | 5.8 | 5.5 | 6.2 | 17.4 | 23.4 | 22.5 | **16.6** |
| *8:00* | 39.3 | 14.1 | 24.2 | 30.2 | 17.7 | 12.1 | 7.4 | 5.3 | 7.1 | 21.8 | 24.0 | 21.2 | **18.7** |
| *9:00* | 41.3 | 15.9 | 30.1 | 34.1 | 20.8 | 15.4 | 8.9 | 5.9 | 9.7 | 27.0 | 25.1 | 23.1 | **21.5** |
| *10:00* | 42.7 | 17.5 | 31.7 | 38.7 | 20.3 | 15.2 | 11.7 | 6.2 | 9.9 | 31.6 | 29.5 | 27.6 | **23.6** |
| *11:00* | 45.9 | 20.4 | 30.0 | 36.3 | 22.5 | 15.0 | 14.8 | 6.9 | 10.2 | 34.0 | 30.9 | 29.4 | **24.7** |
| *12:00* | 47.6 | 22.2 | 30.0 | 35.6 | 26.8 | 16.6 | 16.0 | 9.2 | 12.6 | 35.2 | 30.8 | 31.0 | **26.2** |
| *13:00* | 47.2 | 23.9 | 30.8 | 36.8 | 24.9 | 16.0 | 17.7 | 13.9 | 14.5 | 37.6 | 28.3 | 32.6 | **27.1** |
| *14:00* | 48.6 | 24.8 | 33.1 | 37.0 | 25.4 | 18.4 | 16.8 | 14.0 | 15.6 | 36.8 | 30.2 | 32.6 | **27.8** |
| *15:00* | 48.1 | 23.8 | 35.0 | 34.1 | 23.9 | 18.9 | 17.6 | 14.4 | 18.5 | 36.2 | 30.1 | 31.6 | **27.7** |
| *16:00* | 46.9 | 23.2 | 34.9 | 32.8 | 23.2 | 22.6 | 19.5 | 14.0 | 18.6 | 34.7 | 28.6 | 29.4 | **27.4** |
| *17:00* | 43.6 | 20.7 | 33.4 | 32.6 | 22.3 | 22.4 | 17.7 | 14.4 | 15.6 | 30.0 | 26.7 | 25.1 | **25.4** |
| *18:00* | 42.9 | 17.6 | 28.4 | 28.5 | 18.5 | 20.2 | 12.5 | 9.8 | 9.8 | 21.9 | 23.9 | 24.0 | **21.5** |
| *19:00* | 44.4 | 18.5 | 22.7 | 19.7 | 13.6 | 13.1 | 8.9 | 6.9 | 7.8 | 21.0 | 23.5 | 24.5 | **18.7** |
| *20:00* | 45.5 | 17.9 | 20.9 | 17.5 | 15.0 | 8.2 | 5.7 | 6.3 | 8.8 | 22.2 | 23.0 | 23.7 | **17.9** |
| *21:00* | 46.2 | 16.8 | 18.9 | 16.5 | 15.5 | 9.0 | 4.2 | 5.3 | 8.7 | 22.2 | 24.6 | 26.1 | **17.9** |
| *22:00* | 42.5 | 17.1 | 19.8 | 17.8 | 13.0 | 8.0 | 3.9 | 5.3 | 9.1 | 23.3 | 25.7 | 26.2 | **17.7** |
| *23:00* | 41.8 | 14.9 | 19.1 | 17.9 | 10.6 | 8.7 | 4.2 | 5.4 | 8.6 | 22.5 | 27.3 | 25.6 | **17.2** |
| *0:00* | 41.0 | 13.0 | 16.5 | 20.2 | 12.2 | 9.0 | 4.3 | 5.1 | 9.5 | 19.8 | 28.0 | 25.8 | **17.1** |
| DAYS | *31* | *28* | *31* | *30* | *31* | *30* | *31* | *31* | *30* | *31* | *30* | *31* | *365* |
| Max | 48.6 | 24.8 | 35.0 | 38.7 | 26.8 | 22.6 | 19.5 | 14.4 | 18.6 | 37.6 | 30.9 | 32.6 | **27.8** |
| Min | 38.5 | 12.5 | 15.7 | 16.5 | 10.6 | 5.8 | 3.7 | 4.5 | 6.2 | 13.9 | 23.0 | 19.3 | **16.0** |
| 24 HR Sum | 1,038.0 | 424.4 | 573.1 | 641.6 | 417.2 | 302.8 | 224.1 | 184.3 | 252.7 | 586.9 | 646.7 | 608.5 | **492.6** |
| | | | | | | | | | | | | | |
| Produced | 32,179 | 11,883 | 17,767 | 19,249 | 12,934 | 9,085 | 6,946 | 5,713 | 7,580 | 18,195 | 19,402 | 18,863 | 179,797 |
| Capacity | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | |
| Theoretical | 111,600 | 100,800 | 111,600 | 108,000 | 111,600 | 108,000 | 111,600 | 111,600 | 108,000 | 111,600 | 108,000 | 111,600 | *13.68%* |
| Cap Factor | *28.83%* | *11.79%* | *15.92%* | *17.82%* | *11.59%* | *8.41%* | *6.22%* | *5.12%* | *7.02%* | *16.30%* | *17.96%* | *16.90%* | |

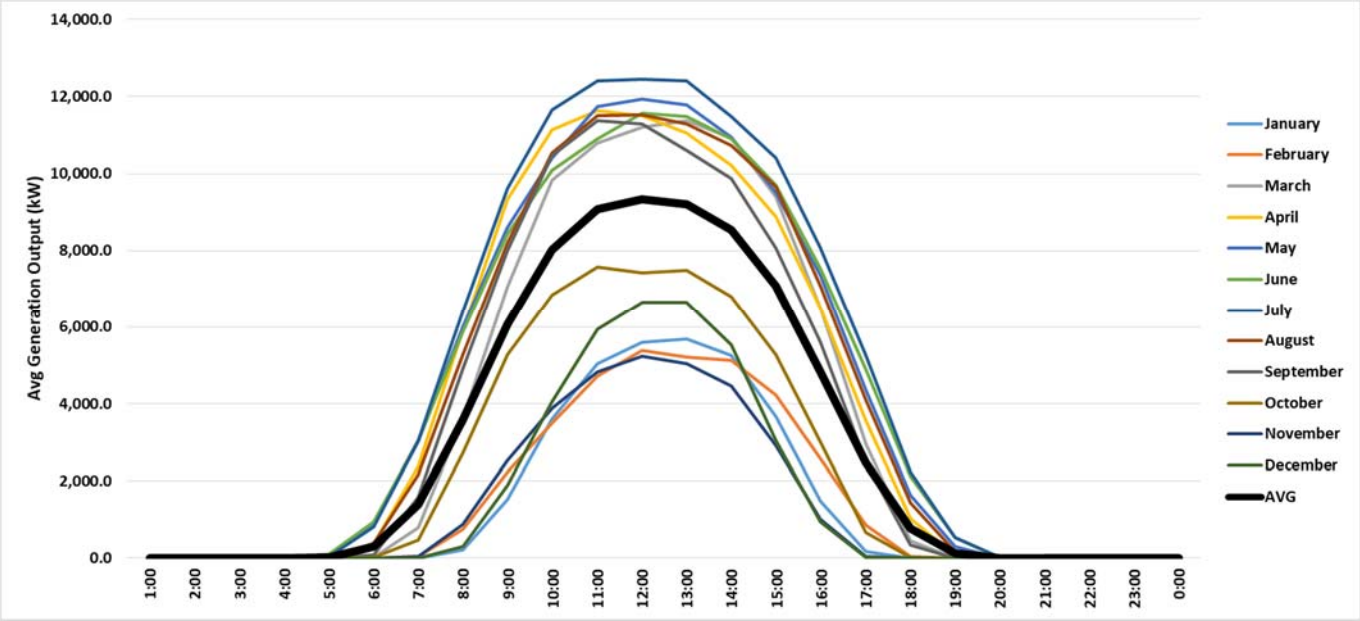
## Graph 8: Intermediate Wind Production by Month



## Table 9: Intermediate Solar Production by Hour and Month

| Intermediate Solar 2017 (Average Generation by Hour per Month) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR End | January | February | March | April | May | June | July | August | September | October | November | December | AVG |
| 1:00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5.1 | 0.0 | 0.0 | 0.4 |
| 2:00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5.0 | 0.0 | 0.0 | 0.4 |
| 3:00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5.1 | 0.0 | 0.0 | 0.4 |
| 4:00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5.0 | 0.0 | 0.0 | 0.4 |
| 5:00 | 0.0 | 0.0 | 0.0 | 1.7 | 49.0 | 95.4 | 45.9 | 0.9 | 0.0 | 5.0 | 0.0 | 0.0 | 16.6 |
| 6:00 | 0.0 | 0.0 | 8.5 | 359.4 | 846.2 | 950.7 | 804.3 | 372.8 | 72.9 | 6.8 | 0.0 | 0.0 | 286.8 |
| 7:00 | 0.0 | 29.3 | 785.4 | 2,381.7 | 3,026.5 | 3,035.4 | 3,052.2 | 2,171.6 | 1,580.9 | 478.0 | 40.6 | 0.2 | 1,388.8 |
| 8:00 | 219.8 | 746.5 | 3,632.2 | 5,931.7 | 6,002.9 | 5,869.9 | 6,423.8 | 5,282.1 | 4,910.7 | 2,721.8 | 877.7 | 298.2 | 3,590.7 |
| 9:00 | 1,528.1 | 2,234.2 | 7,054.6 | 9,342.6 | 8,596.0 | 8,432.4 | 9,618.6 | 8,193.3 | 8,012.8 | 5,278.0 | 2,539.1 | 1,887.5 | 6,080.0 |
| 10:00 | 3,600.9 | 3,492.0 | 9,833.7 | 11,145.0 | 10,401.7 | 10,081.3 | 11,648.6 | 10,529.0 | 10,473.7 | 6,841.3 | 3,884.7 | 4,060.1 | 8,026.6 |
| 11:00 | 5,048.6 | 4,723.0 | 10,803.6 | 11,625.8 | 11,737.2 | 10,910.0 | 12,406.2 | 11,501.7 | 11,369.8 | 7,567.0 | 4,819.4 | 5,945.0 | 9,066.5 |
| 12:00 | 5,590.2 | 5,394.9 | 11,203.5 | 11,494.5 | 11,936.2 | 11,562.9 | 12,440.0 | 11,517.0 | 11,288.6 | 7,432.2 | 5,242.6 | 6,648.6 | 9,338.4 |
| 13:00 | 5,694.9 | 5,221.8 | 11,374.7 | 11,041.7 | 11,787.8 | 11,490.6 | 12,408.8 | 11,290.2 | 10,600.8 | 7,483.6 | 5,050.6 | 6,647.0 | 9,202.8 |
| 14:00 | 5,265.0 | 5,134.5 | 10,918.6 | 10,207.6 | 10,953.3 | 10,909.9 | 11,489.6 | 10,736.8 | 9,871.7 | 6,794.7 | 4,462.6 | 5,524.1 | 8,546.5 |
| 15:00 | 3,662.3 | 4,231.5 | 9,397.4 | 8,887.0 | 9,506.6 | 9,698.4 | 10,418.8 | 9,651.1 | 8,062.5 | 5,270.4 | 2,922.3 | 3,041.4 | 7,082.1 |
| 16:00 | 1,474.1 | 2,577.2 | 6,492.0 | 6,492.1 | 7,364.0 | 7,532.2 | 8,065.8 | 7,081.9 | 5,608.0 | 2,995.6 | 998.0 | 941.5 | 4,816.2 |
| 17:00 | 171.7 | 843.7 | 2,966.6 | 3,553.1 | 4,356.1 | 4,895.5 | 5,266.0 | 4,097.4 | 2,481.7 | 665.4 | 46.9 | 21.6 | 2,457.1 |
| 18:00 | 0.0 | 35.2 | 443.3 | 1,018.1 | 1,617.0 | 2,117.6 | 2,222.2 | 1,426.6 | 335.2 | 15.1 | 0.0 | 0.0 | 774.2 |
| 19:00 | 0.0 | 0.0 | 0.3 | 53.9 | 300.2 | 534.0 | 527.2 | 175.7 | 0.8 | 5.0 | 0.0 | 0.0 | 134.0 |
| 20:00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.6 | 12.4 | 14.1 | 0.5 | 0.0 | 5.0 | 0.0 | 0.0 | 2.7 |
| 21:00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5.1 | 0.0 | 0.0 | 0.4 |
| 22:00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5.0 | 0.0 | 0.0 | 0.4 |
| 23:00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5.1 | 0.0 | 0.0 | 0.4 |
| 0:00 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5.1 | 0.0 | 0.0 | 0.4 |
| DAYS | 31 | 28 | 31 | 30 | 31 | 30 | 31 | 31 | 30 | 31 | 30 | 31 | 365 |
| Max | 5,694.9 | 5,394.9 | 11,374.7 | 11,625.8 | 11,936.2 | 11,562.9 | 12,440.0 | 11,517.0 | 11,369.8 | 7,567.0 | 5,242.6 | 6,648.6 | 9,338.4 |
| Min | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5.0 | 0.0 | 0.0 | 0.4 |
| 24 HR Sum | 32,255.6 | 34,663.8 | 84,914.5 | 93,535.9 | 98,481.4 | 98,128.6 | 106,852.1 | 94,028.5 | 84,670.2 | 53,605.4 | 30,884.6 | 35,015.3 | 70,813.4 |
| | | | | | | | | | | | | | |
| Produced | 999,923 | 970,035 | 2,632,350 | 2,806,078 | 3,052,923 | 2,943,857 | 3,312,416 | 2,914,885 | 2,540,105 | 1,661,767 | 926,538 | 1,085,473 | 25,846,350 |
| Capacity | 17,076 | 17,076 | 17,076 | 17,076 | 17,076 | 17,076 | 17,076 | 17,076 | 17,076 | 17,076 | 17,076 | 17,076 | |
| Theoretical | 12,704,544 | 11,463,072 | 12,704,544 | 12,294,720 | 12,704,544 | 12,294,720 | 12,704,544 | 12,704,544 | 12,294,720 | 12,704,544 | 12,294,720 | 12,704,544 | 17.28% |
| Cap Factor | 7.87% | 8.46% | 20.72% | 22.82% | 24.03% | 23.94% | 26.07% | 22.94% | 20.66% | 13.08% | 7.54% | 8.54% | |

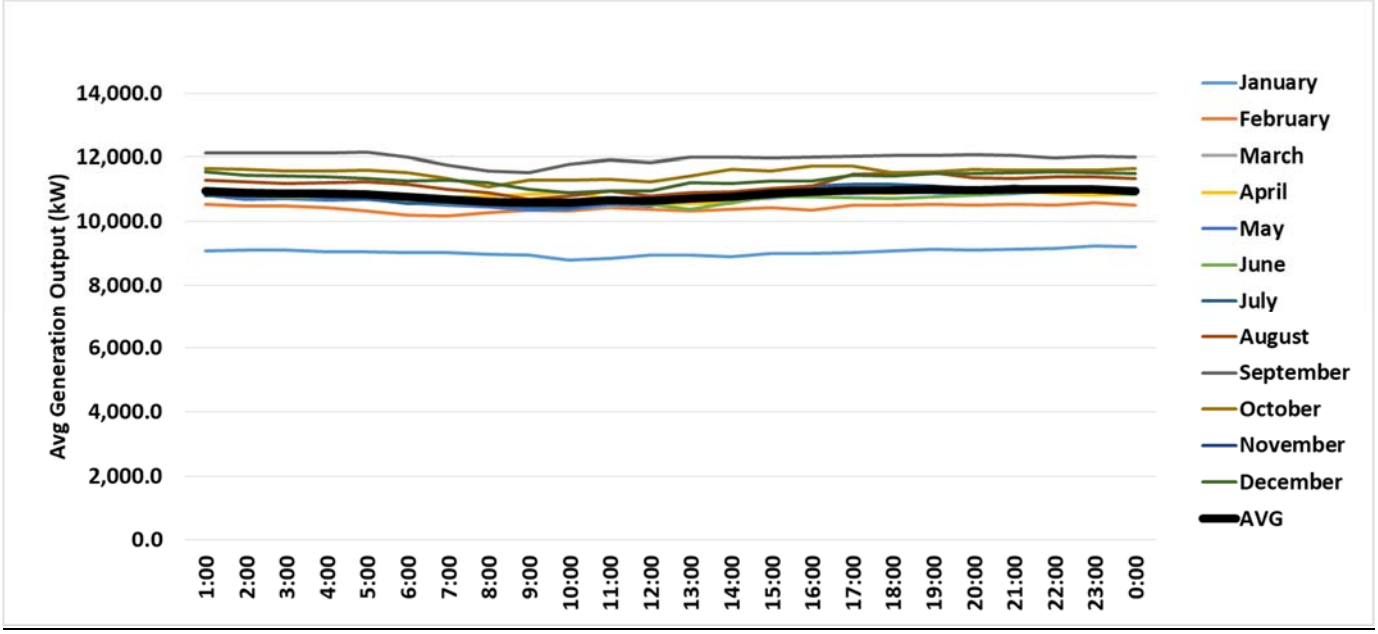
## Graph9: Intermediate Solar Production by Month



## Table 10: Biomass Production by Hour and Month

| Biomass 2017 (Average Generation by Hour per Month) | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HR End | January | February | March | April | May | June | July | August | September | October | November | December | AVG |
| 1:00 | 9,058.4 | 10,532.0 | 10,867.0 | 10,894.4 | 10,830.7 | 10,803.7 | 10,840.4 | 11,295.4 | 12,119.3 | 11,659.7 | 10,808.8 | 11,539.6 | 10,938.4 |
| 2:00 | 9,091.0 | 10,490.0 | 10,786.9 | 10,873.2 | 10,692.5 | 10,798.8 | 10,842.8 | 11,244.2 | 12,111.5 | 11,620.4 | 10,800.4 | 11,453.2 | 10,901.1 |
| 3:00 | 9,093.6 | 10,471.7 | 10,744.9 | 10,820.8 | 10,723.4 | 10,775.7 | 10,832.8 | 11,191.7 | 12,128.2 | 11,570.9 | 10,803.8 | 11,421.1 | 10,882.2 |
| 4:00 | 9,055.0 | 10,431.8 | 10,777.3 | 10,838.2 | 10,650.2 | 10,745.4 | 10,740.8 | 11,221.8 | 12,120.2 | 11,570.7 | 10,791.4 | 11,383.2 | 10,861.1 |
| 5:00 | 9,054.7 | 10,329.2 | 10,717.2 | 10,792.3 | 10,680.1 | 10,706.1 | 10,708.8 | 11,228.6 | 12,145.1 | 11,594.6 | 10,810.7 | 11,329.9 | 10,842.7 |
| 6:00 | 9,015.1 | 10,199.4 | 10,649.6 | 10,769.5 | 10,579.8 | 10,619.2 | 10,563.6 | 11,164.2 | 12,001.3 | 11,532.6 | 10,792.2 | 11,270.0 | 10,764.6 |
| 7:00 | 9,028.8 | 10,168.7 | 10,534.1 | 10,728.1 | 10,499.6 | 10,559.8 | 10,571.3 | 11,011.2 | 11,752.2 | 11,330.8 | 10,733.3 | 11,276.5 | 10,684.2 |
| 8:00 | 8,967.0 | 10,273.4 | 10,465.4 | 10,791.8 | 10,441.4 | 10,519.9 | 10,507.7 | 10,895.3 | 11,565.7 | 11,078.5 | 10,670.6 | 11,209.2 | 10,615.3 |
| 9:00 | 8,946.3 | 10,336.9 | 10,474.3 | 10,849.9 | 10,354.9 | 10,589.6 | 10,463.6 | 10,679.9 | 11,519.5 | 11,294.0 | 10,503.0 | 10,997.4 | 10,583.0 |
| 10:00 | 8,781.0 | 10,317.3 | 10,423.1 | 10,893.5 | 10,386.9 | 10,529.8 | 10,415.8 | 10,791.4 | 11,796.2 | 11,279.4 | 10,634.5 | 10,890.5 | 10,593.2 |
| 11:00 | 8,840.8 | 10,420.3 | 10,457.1 | 10,711.2 | 10,533.9 | 10,593.3 | 10,625.8 | 10,947.3 | 11,924.3 | 11,320.5 | 10,623.8 | 10,945.6 | 10,660.7 |
| 12:00 | 8,945.1 | 10,383.0 | 10,657.0 | 10,541.1 | 10,479.8 | 10,522.9 | 10,663.6 | 10,795.0 | 11,830.5 | 11,229.6 | 10,640.7 | 10,945.9 | 10,635.5 |
| 13:00 | 8,934.9 | 10,330.0 | 10,572.7 | 10,552.3 | 10,735.8 | 10,367.4 | 10,798.4 | 10,892.1 | 11,999.6 | 11,407.4 | 10,702.4 | 11,218.8 | 10,710.3 |
| 14:00 | 8,893.5 | 10,366.0 | 10,686.9 | 10,561.7 | 10,879.2 | 10,578.2 | 10,853.0 | 10,912.5 | 11,983.0 | 11,624.8 | 10,725.5 | 11,190.7 | 10,772.5 |
| 15:00 | 9,004.8 | 10,419.0 | 10,726.8 | 10,838.4 | 10,968.5 | 10,754.6 | 10,976.0 | 11,020.0 | 11,967.7 | 11,572.2 | 10,767.0 | 11,269.2 | 10,858.1 |
| 16:00 | 9,004.4 | 10,339.0 | 10,857.0 | 10,865.7 | 10,944.9 | 10,769.2 | 11,101.8 | 11,118.4 | 11,998.9 | 11,741.0 | 10,934.7 | 11,269.9 | 10,914.3 |
| 17:00 | 9,008.1 | 10,512.1 | 10,967.3 | 10,887.5 | 10,866.3 | 10,732.5 | 11,164.9 | 11,466.1 | 12,030.5 | 11,739.5 | 10,913.7 | 11,437.1 | 10,979.1 |
| 18:00 | 9,073.2 | 10,494.7 | 10,977.1 | 10,878.2 | 10,915.1 | 10,716.5 | 11,154.2 | 11,494.0 | 12,043.3 | 11,520.6 | 11,048.5 | 11,424.2 | 10,980.2 |
| 19:00 | 9,115.3 | 10,527.7 | 10,960.3 | 10,965.1 | 10,903.2 | 10,761.9 | 11,093.3 | 11,515.5 | 12,052.9 | 11,556.9 | 11,016.1 | 11,484.4 | 10,997.7 |
| 20:00 | 9,097.4 | 10,514.7 | 10,966.4 | 11,017.2 | 10,814.3 | 10,812.3 | 10,992.9 | 11,376.6 | 12,062.6 | 11,616.5 | 11,035.1 | 11,487.4 | 10,983.9 |
| 21:00 | 9,125.8 | 10,538.1 | 10,950.2 | 10,975.5 | 10,883.5 | 10,890.0 | 11,112.2 | 11,348.9 | 12,056.4 | 11,602.8 | 11,025.5 | 11,535.5 | 11,005.0 |
| 22:00 | 9,154.5 | 10,514.0 | 10,959.2 | 10,862.9 | 10,947.1 | 10,910.9 | 10,990.0 | 11,391.0 | 11,973.1 | 11,606.1 | 11,050.4 | 11,541.4 | 10,993.4 |
| 23:00 | 9,220.6 | 10,571.2 | 10,927.3 | 10,809.5 | 10,968.7 | 10,917.0 | 11,030.0 | 11,383.6 | 12,009.6 | 11,607.6 | 10,986.9 | 11,523.7 | 10,997.8 |
| 0:00 | 9,213.7 | 10,498.2 | 10,919.6 | 10,848.7 | 10,846.7 | 10,842.2 | 10,881.2 | 11,350.1 | 12,001.5 | 11,658.5 | 10,956.4 | 11,499.1 | 10,961.2 |
| DAYS | 31 | 28 | 31 | 30 | 31 | 30 | 31 | 31 | 30 | 31 | 30 | 31 | 365 |
| Max | 9,220.6 | 10,571.2 | 10,977.1 | 11,017.2 | 10,968.7 | 10,917.0 | 11,164.9 | 11,515.5 | 12,145.1 | 11,741.0 | 11,050.4 | 11,541.4 | 11,005.0 |
| Min | 8,781.0 | 10,168.7 | 10,423.1 | 10,541.1 | 10,354.9 | 10,367.4 | 10,415.8 | 10,679.9 | 11,519.5 | 11,078.5 | 10,503.0 | 10,890.5 | 10,583.0 |
| 24 HR Sum | 216,722.8 | 249,978.2 | 258,024.5 | 259,566.9 | 257,526.4 | 256,817.0 | 259,924.8 | 267,734.8 | 287,192.8 | 276,335.5 | 259,775.2 | 271,543.7 | 260,115.4 |
| | | | | | | | | | | | | | |
| Produced | 6,718,407 | 6,999,391 | 7,998,761 | 7,787,006 | 7,983,319 | 7,704,509 | 8,057,669 | 8,299,780 | 8,615,784 | 8,566,400 | 7,793,256 | 8,417,854 | 94,942,135 |
| Capacity | 14,348 | 14,348 | 14,348 | 14,348 | 14,348 | 14,348 | 14,348 | 14,348 | 14,348 | 14,348 | 14,348 | 14,348 | |
| Theoretical | 10,674,912 | 9,641,856 | 10,674,912 | 10,330,560 | 10,674,912 | 10,330,560 | 10,674,912 | 10,674,912 | 10,330,560 | 10,674,912 | 10,330,560 | 10,674,912 | 75.54% |
| Cap Factor | 62.94% | 72.59% | 74.93% | 75.38% | 74.79% | 74.58% | 75.48% | 77.75% | 83.40% | 80.25% | 75.44% | 78.86% | |

## Graph 10: Biomass Production by Month



**Environmental Violations**

NIPSCO is not aware of any environmental violations that occurred during 2018.

**Customer Surveys and Customer Complaints**

NIPSCO did not conduct any additional customer surveys in 2018 and there were no justified complaints filed with the Commission during 2018.

**Going Forward**

NIPSCO will continue to track FIT generation, monitor capacity availability and assist customers throughout the interconnection process.

**Conclusion**

NIPSCO continues to work with and learn from its customers regarding their operational relationship with NIPSCO. In addition, NIPSCO continues to adapt its operating procedures and safety protocol for line employees to ensure the safe and reliable operation of the grid for all customers. As part of FIT Phase II, NIPSCO continues to adapt operations as necessary to ensure safe and relaiable service to all customers.