

PJM

DE

DC

IL

IN

KY

MD

MI

NJ

NC

OH

PA

TN

VA

WV

14.3: Indiana RTEP Overview

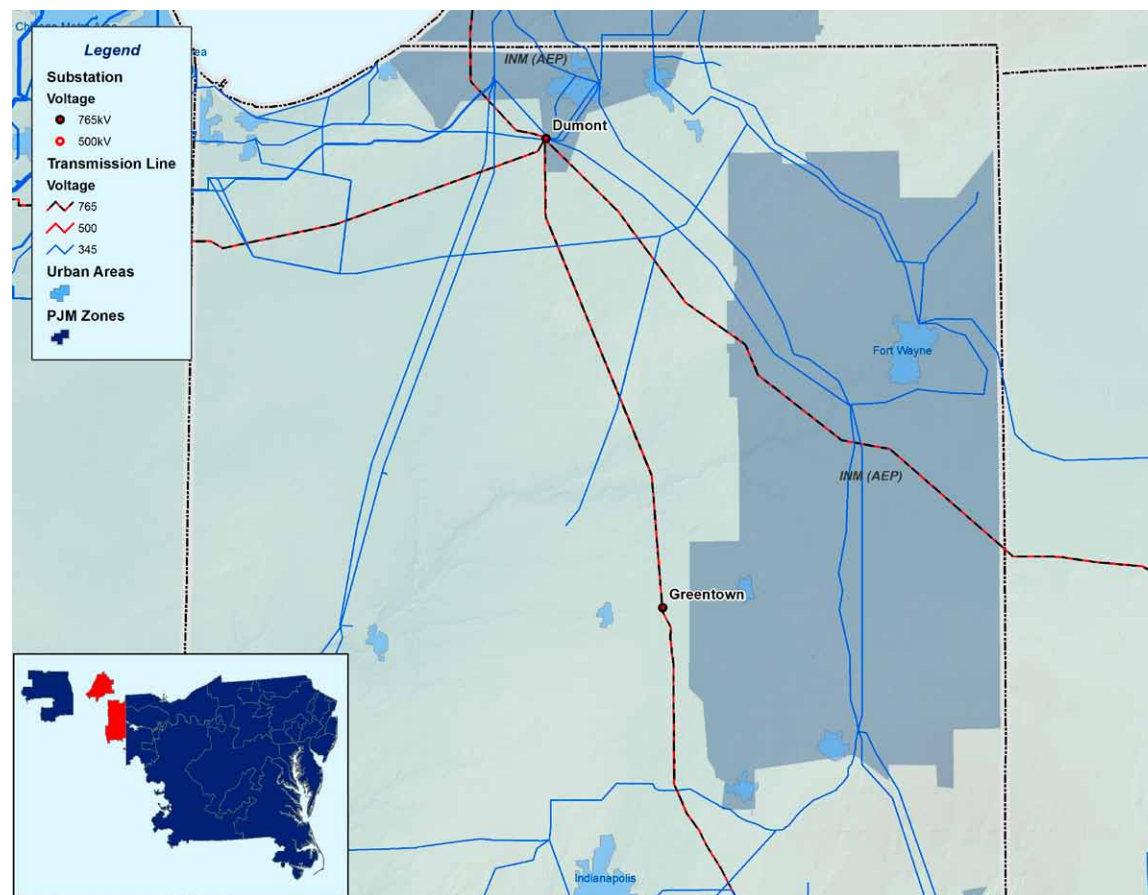
PJM operates the Bulk Electric System (BES) transmission facilities (and others monitored at lower voltages), within Indiana as shown on Map 14.15, including those of American Electric Power (AEP).

The transmission system in Indiana delivers power to customers from native generation resources and power transfers across tie-line facilities with adjoining systems.

Critical Regional Transmission Expansion Plan (RTEP) Issues

PJM's annual RTEP process assesses transmission facilities in Indiana for compliance with NERC reliability criteria violations. In order to solve identified violations, PJM determines necessary baseline upgrades as well as network upgrades to accommodate the interconnection of new generating resources within the AEP transmission owner (TO) zone. **Section 16** provides a topical index of RTEP results, issues and challenges discussed in this report.

Map 14.15: PJM Service Area in Indiana



14.3.1 – Load Growth and Existing Generation

Internal Load Growth

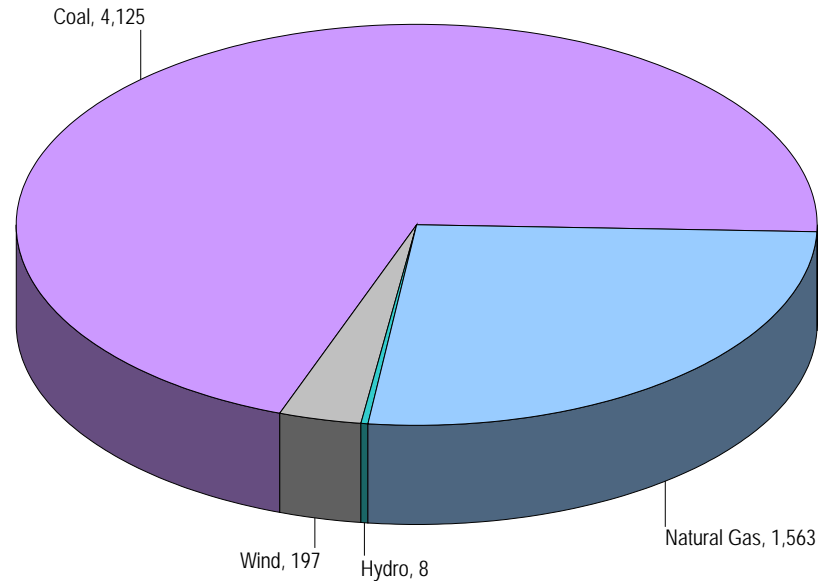
Load growth for summer and winter periods is shown in **Section 14.0.2**. Peak summer load growth rates for the AEP Transmission Owner zone within PJM is expected to be 1.4 percent on average over ten years through 2020. The peak winter load growth rate for AEP is expected to be 0.9 percent on average over ten years through 2019/20.

Forecasted summer peak loads are modeled in power flow studies used in PJM’s 2010 RTEP studies. PJM’s RTEP includes baseline transmission upgrades to meet expected near-term 2015 peak load conditions. RTEP studies also assess anticipated needs for additional transmission expansion plans to meet long-term load growth requirements out through 2025 as well.

Existing Generating Capability

Figure 14.9 provides a snapshot of the existing installed capacity by fuel type in Indiana.

Figure 14.9: Existing Installed Capacity in Indiana (MW)



14.3.2 – Generator Interconnection

PJM has received 47 interconnection requests for installation in Indiana since AEP’s integration into PJM in 2004, as summarized through Queue W4 in the table below.

	MW	# of Projects
Active	5,807	30
In Service	1,158	8
Under Construction	450	2
Withdrawn	3,563	10
Total	10,339	47

Table 14.12 includes interconnection requests for new generating resources or incremental additions to existing resources in Indiana, shown on Map 14.16 received through the close of Queue W4 on January 31, 2011. **Section 2.3** of this report describes how generation interconnection requests are modeled in RTEP studies.

For the sake of reporting, generating resources that are fully in-service (designated “IS”) are included in the summary tabulation above but are NOT separately enumerated in Table 14.12.

A status code of “IS-NC” (in-service, no capacity) indicates a generator that is in-service for energy only. Such units have not requested consideration for capacity status.

A status code of “ISP” (in-service, partial) denotes a generating resource that is only partially in-service and has not reached full capacity status.

A generating unit is ineligible for full capacity status until all transmission upgrades needed to ensure deliverability are completed. Only then will PJM grant capacity status designation.



NOTE

In this table the MW and MWC columns represent two different values:

The MW column represents the total site nameplate capacity of the generators including the existing generation as well as the requested up rate.

The MWC column represents the installed capacity portion of the upgrade. For renewable projects the installed capacity portion of the project varies as described in **Section 2**.

Table 14.12: Queued Generation Interconnection Requests in Indiana

Queue	Project Name	MW	MWC	Status	Schedule	TO	Fuel Type
Q01	Olive - Dequine 345 kv	500	100	IS-NC	7/1/2009	AEP	Wind
Q03	Olive - Dequine 345 kv	250	50	UC	7/1/2012	AEP	Wind
R03	Adams - Allen 138 kv	130	26	Active	12/31/2008	AEP	Wind
R60	Convoy - East Lima 345 kv	350	70	Active	12/31/2011	AEP	Wind
R97	Rockport 765 kv	1320	20	Active	6/27/2007	AEP	Coal
S06	Olive - DeQuine 345 kv	202	40	IS-NC	10/6/2009	AEP	Wind
S71	Bluff Point 138 kv	120	24	Active	10/1/2012	AEP	Wind
S72	Convoy - East Lima 345 kv	300	60	Active	12/1/2010	AEP	Wind
S73	Lincoln - North Delphos	200	40	Active	12/1/2010	AEP	Wind
T127	Olive - Dequine 345 kv	200	40	ISP	10/15/2010	AEP	Wind
T183	Olive - Dequine 345 kv	200	40	Active	10/30/2010	AEP	Wind
T184	Olive - Dequine 345 kv	200	40	Active	10/30/2010	AEP	Wind
U1-087	Dequine 345 kv	150	19.5	Active	12/31/2010	AEP	Wind
U1-088	Dequine 345 kv	100	13	Active	12/31/2010	AEP	Wind
U2-090	Desoto - Tanners Creek 345 kv	200	26	UC	10/31/2012	AEP	Wind
U2-091	Delaware - Richmond 138 kv	100	13	Active	12/31/2011	AEP	Wind
U2-092	Delaware - Centerville 138 kv	100	13	Active	12/31/2011	AEP	Wind
U3-002	Deer Creek - Fisher Body - Mullin 138 kv	200	26	Active	7/1/2013	AEP	Wind
U4-003	Olive - Dequine 345 kv	200	26	Active	6/1/2012	AEP	Wind
U4-038	Mullin - Greentown Tap 138 kv	100	13	Active	9/1/2013	AEP	Wind
U4-039	Greentown 138 kv	800	104	Active	9/1/2013	AEP	Wind
V3-007	Desoto - Tanners Creek #1 345 kv	200	26	Active	12/31/2013	AEP	Wind
V3-008	Desoto - Tanners Creek #1 345 kv	200	26	Active	12/31/2014	AEP	Wind
V3-009	Desoto - Tanners Creek #2 345 kv	200	26	Active	12/31/2013	AEP	Wind
V3-010	Delaware - Modoc 138 kv	100	13	Active	12/31/2013	AEP	Wind
V3-053	Desoto 138 kv	150	19.5	Active	9/15/2012	AEP	Wind
V4-021	Keystone 345 kv	300	39	Active	12/1/2012	Dayton	Wind
V4-033	Desoto - Tanners Creek 345 kv	299.2	39	Active	12/31/2012	AEP	Wind
W3-024	Columbia 138 kv	149.4	19.4	Active	10/1/2013	AEP	Wind



NOTE

In this table the MW and MWC columns represent two different values:
 The MW column represents the total site nameplate capacity of the generators including the existing generation as well as the requested up rate.
 The MWC column represents the installed capacity portion of the upgrade. For renewable projects the installed capacity portion of the project varies as described in **Section 2**.

Table 14.12: Queued Generation Interconnection Requests in Indiana (Continued)

Queue	Project Name	MW	MWC	Status	Schedule	TO	Fuel Type
W3-060	Kendallville 138 kV	120	15.6	Active	11/1/2012	AEP	Wind
W4-004	Madison - Tanners Creek 138 kV	90	11.7	Active	12/31/2013	AEP	Wind
W4-008	Madison - Tanners Creek 138 kV	90	11.7	Active	12/31/2013	AEP	Wind
U2-062	Randolph 138 kV	187.5	24.4	Active	12/1/2010	AEP	Wind
V3-015	Keystone 345 kV	300	39	Active	8/1/2012	Dayton	Wind
W2-068	Bluff Point 138 kV	150	19.5	Active	12/31/2011	AEP	Wind

Figure 14.10 shows the fuel mix of queued generation interconnection requests in Indiana that have requested capacity injection rights through the close of Queue W4 on January 31, 2011, excluding projects that are in-service and those that have withdrawn.

Map 14.16 shows the location of each generation interconnection request in Indiana.

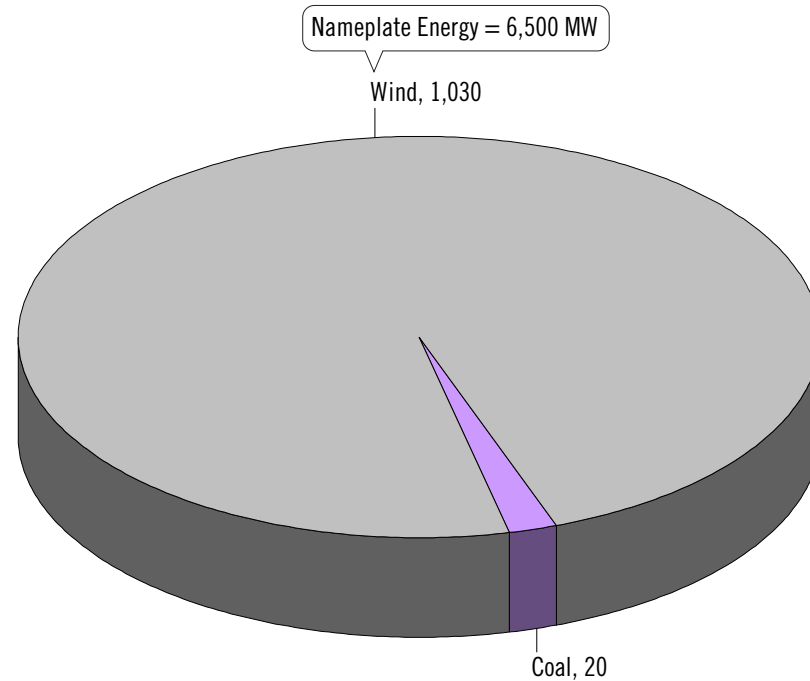
14.3.3 – Generation Deactivations

Through December 31, 2010, PJM has not received notice of any anticipated generator deactivations in Indiana. A full list of all generation deactivation information is accessible on PJM’s website at URL: <http://pjm.com/planning/generation-retirements/gr-summaries.aspx>.

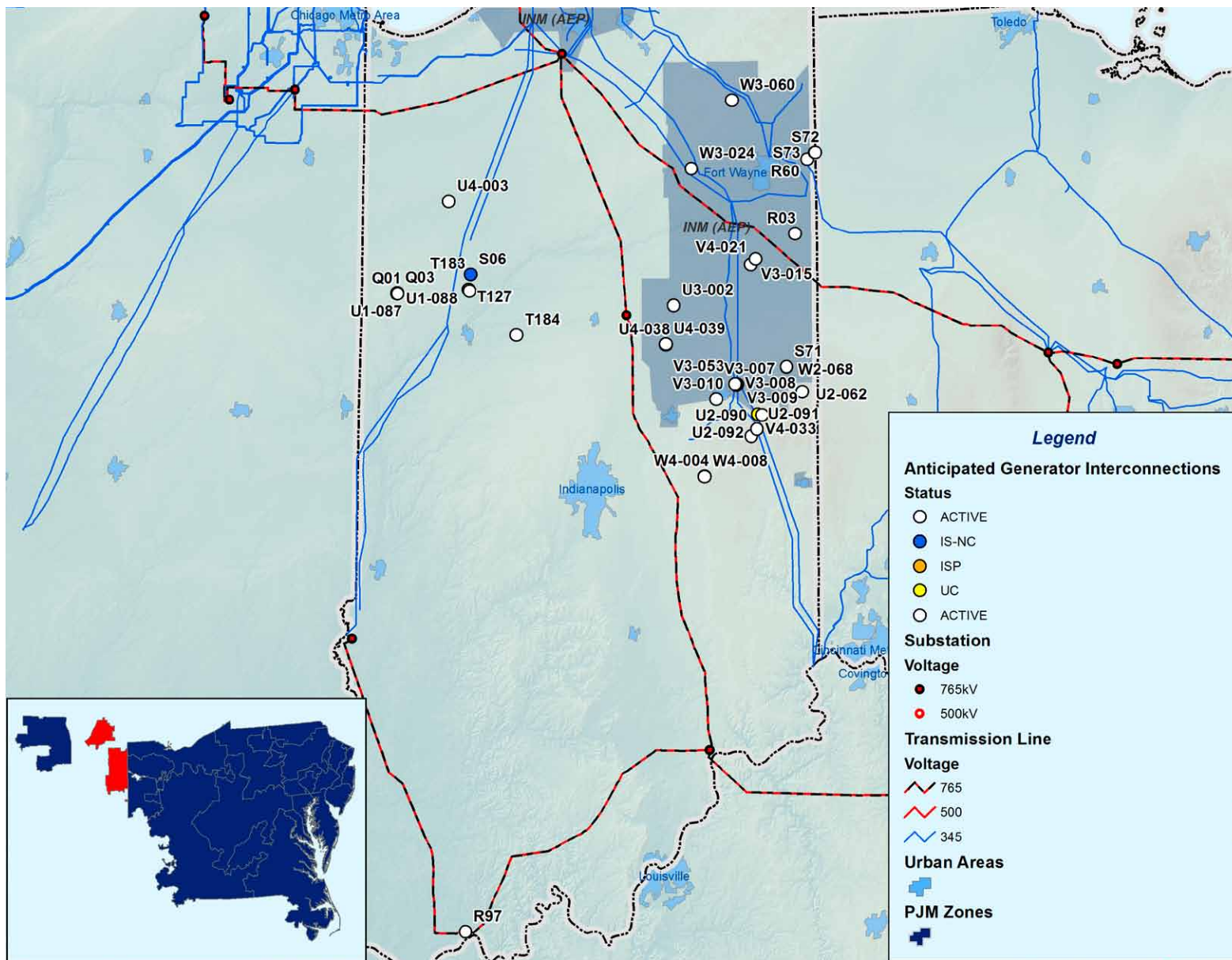
14.3.4 – Merchant Transmission Interconnection Requests

PJM’s interconnection queues did not contain any requests for merchant transmission interconnection in Indiana.

Figure 14.10: Queued Capacity by Fuel Type in Indiana (MW)



Map 14.16: Queued Generation Interconnection Requests in Indiana



14.3.5 – Transmission Expansion Plans in Indiana

New RTEP planned transmission upgrades in Indiana greater than \$5 million as approved by the PJM Board during 2010 included those listed in Table 14.13.

A complete listing and status of all PJM Board – approved BES reinforcements – baseline enhancements as well as network upgrades to accommodate interconnection requests – can be found on PJM’s website via the following URL: <http://www.pjm.com/planning/rtep-upgrades-status.aspx>.

Map 14.17: Major 2009 RTEP Plans in Indiana

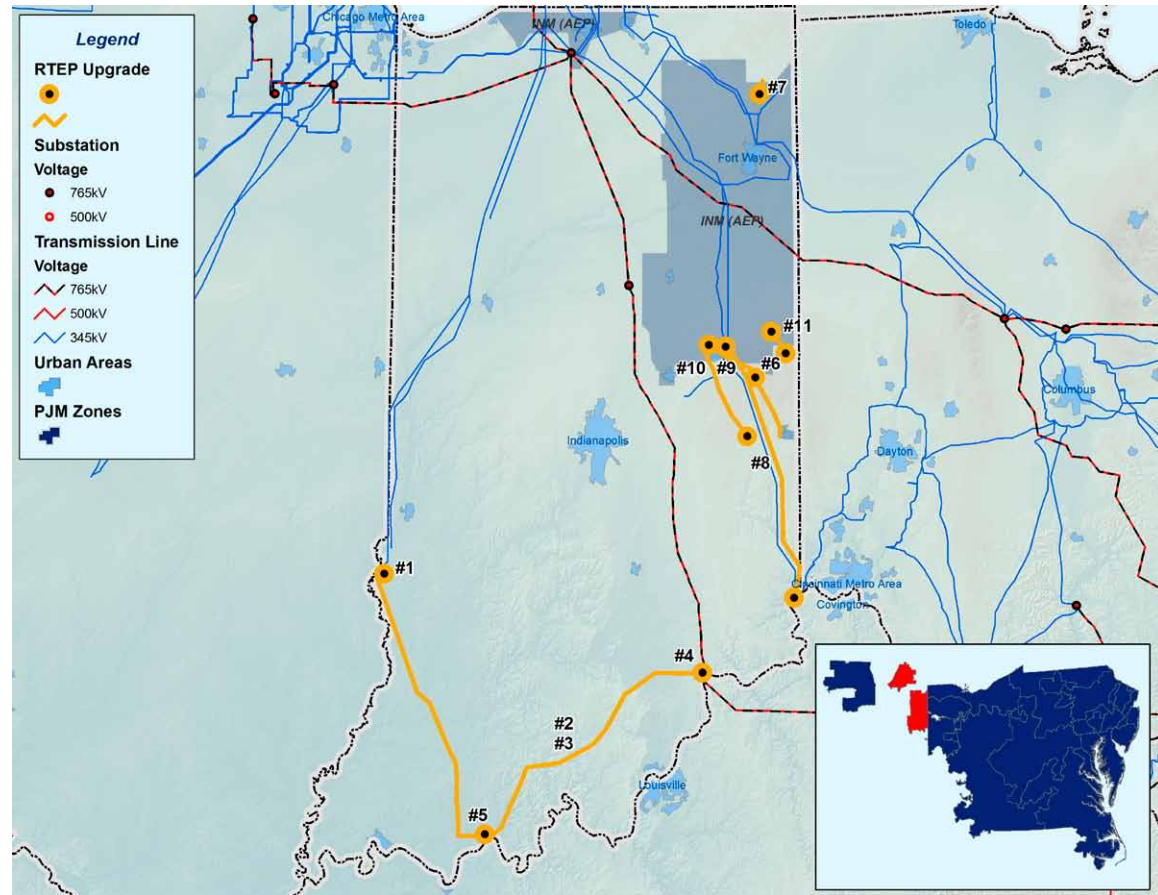


Table 14.13: Major 2010 RTEP Plans in Indiana

		System Upgrade Drivers									Date	Cost (M)	TO Zone(s)	2010 TEAC Review
		Baseline Upgrades					Network Upgrades			Supplemental Upgrade				
Upgrade		Baseline Load Growth / Deliverability & Reliability	Congestion Relief - Economic	Operational Performance	Generator Deactivation	TO Criteria Violation	Generation Interconnection	Merchant Transmission Interconnection	Long - term Firm Transmission Service	Criteria Compliance other than for Baseline				
1	Add a 3rd 2250 MVA 765/345 kV transformer at Sullivan station	▲									June 2015	37	AEP	10/28/2010
2	Replace the 100 MVar 765 kV shunt reactor bank on Rockport - Jefferson 765 kV line with a 300 MVar bank at Rockport Station	▲									June 2015	16	AEP	10/28/2010
3	Transpose the Rockport - Sullivan 765 kV line and the Rockport - Jefferson 765 kV line	▲									June 2015	10	AEP	10/28/2010
4	Make switching changes at Jefferson 765 kV station	▲									June 2015	7.5	AEP	10/28/2010
5	Make switching changes at Sullivan 765 kV station	▲									June 2015	29.5	AEP	10/28/2010
6	Expand Selma Parker Station and install a 138/69/34.5 kV transformer, rebuild and convert Winchester 34.5 kV line to 69 kV, and retire the 34.5 kV line from Haymond to Selma Wire	▲									June 2015	8	AEP	10/28/2010
7	Establish a new 138/69 kV Butler Center station, build a new 138 kV line from Auburn station to Woods Road station, replace the existing 40 MVA 138/69 kV transformer at Auburn station with a 90 MVA 138/69 kV transformer, and improve the switching arrangement at Kendallville station	▲									June 2015	25	AEP	10/28/2010
8	Construct a new switching station connecting to the Desoto - Tanners Creek 345 kV line						U2-090				December 2011	8.5	AEP	7/14/2010
9	Construct a new switching station connecting to the Delaware - Richmond 138 kV line						U2-091				December 2011	5.3	AEP	7/14/2010
10	Construct a new switching station connecting to the Delaware - Centerville 138 kV line						U2-092				December 2011	5.3	AEP	7/14/2010
11	Add 3 breaker 138 kV ring bus interconnection station at Bluff Point - Randolph						U2-062				December 2010	5.3	AEP	7/14/2010

14.3.6 – Interconnection Requests for Generation Powered by Renewable Fuel Sources

PJM’s RTEP process offers a structure that assures consistent, equal opportunity across fuel types while flexible enough to adapt to specific technical realities and market challenges. Presently, PJM’s queues include interconnection requests in Indiana for plants fueled by wind, as summarized in Table 14.14 and shown on Map 14.18.

While some renewable resources can operate in a manner similar to the traditional fossil fueled power plants, other renewable energy sources, such as wind, are recognized as intermittent resources. Their ability to generate power is directly determined by the immediate availability and/or magnitude of their specific fuel. For example, wind turbines can generate electricity only when wind speed is within a range consistent with the physical

Table 14.14: Interconnection Requests for Generation Powered by Renewable Fuel Sources

Queue	Project Name	MW	MWC	Status	Schedule	TO	Fuel Type
S06	Olive - DeQuine 345 kV	202	40	IS - NC	10/6/2009	AEP	Wind
S71	Bluff Point 138 kV	120	24	ACTIVE	10/1/2012	AEP	Wind
S72	Convoy - East Lima 345 kV	300	60	ACTIVE	12/1/2010	AEP	Wind
S73	Lincoln - North Delphos	200	40	ACTIVE	12/1/2010	AEP	Wind
Q01	Olive - Dequine 345kv	500	100	IS - NC	7/1/2009	AEP	Wind
R03	Adams - Allen 138 kV	130	26	ACTIVE	12/31/2008	AEP	Wind
R60	Convoy - East Lima 345 kV	350	70	ACTIVE	12/31/2011	AEP	Wind
T127	Olive - Dequine 345 kV	200	40	ISP	10/15/2010	AEP	Wind
T183	Olive - Dequine 345 kV	200	40	ACTIVE	10/30/2010	AEP	Wind
T184	Olive - Dequine 345 kV	200	40	ACTIVE	10/30/2010	AEP	Wind
U1 - 087	Dequine 345 kV	150	19.5	ACTIVE	12/31/2010	AEP	Wind
U1 - 088	Dequine 345 kV	100	13	ACTIVE	12/31/2010	AEP	Wind
U2 - 090	Desoto - Tanners Creek 345 kV	200	26	UC	10/31/2012	AEP	Wind
U2 - 091	Delaware - Richmond 138 kV	100	13	ACTIVE	12/31/2011	AEP	Wind
U2 - 092	Delaware - Centerville 138 kV	100	13	ACTIVE	12/31/2011	AEP	Wind
U3 - 002	Deer Creek - Fisher Body - Mullin 138 kV	200	26	ACTIVE	7/1/2013	AEP	Wind
U4 - 003	Olive - Dequine 345 kV	200	26	ACTIVE	6/1/2012	AEP	Wind
U4 - 038	Mullin - Greentown Tap 138 kV	100	13	ACTIVE	9/1/2013	AEP	Wind
U4 - 039	Greentown 138 kV	800	104	ACTIVE	9/1/2013	AEP	Wind
Q03	Olive - Dequine 345 kV	250	50	UC	7/1/2012	AEP	Wind
V3 - 007	Desoto - Tanners Creek #1 345 kV	200	26	ACTIVE	12/31/2013	AEP	Wind
V3 - 008	Desoto - Tanners Creek #1 345 kV	200	26	ACTIVE	12/31/2014	AEP	Wind
V3 - 009	Desoto - Tanners Creek #2 345 kV	200	26	ACTIVE	12/31/2013	AEP	Wind
V3 - 010	Delaware - Modoc 138 kV	100	13	ACTIVE	12/31/2013	AEP	Wind
V3 - 053	Desoto 138 kV	150	19.5	ACTIVE	9/15/2012	AEP	Wind
V4 - 021	Keystone 345 kV	300	39	ACTIVE	12/1/2012	Dayton	Wind
V4 - 033	Desoto - Tanners Creek 345 kV	299.2	39	ACTIVE	12/31/2012	AEP	Wind
W3 - 024	Columbia 138 kV	149.4	19.4	ACTIVE	10/1/2013	AEP	Wind
W3 - 060	Kendallville 138 kV	120	15.6	ACTIVE	11/1/2012	AEP	Wind
W4 - 004	Madison - Tanners Creek 138 kV	90	11.7	ACTIVE	12/31/2013	AEP	Wind
W4 - 008	Madison - Tanners Creek 138 kV	90	11.7	ACTIVE	12/31/2013	AEP	Wind

NOTE

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The MWC column represents the installed capacity portion of the upgrade. For renewable projects the installed capacity portion of the project varies as described in **Section 2**.

Table 14.14: Interconnection Requests for Generation Powered by Renewable Fuel Sources (Continued)

Queue	Project Name	MW	MWC	Status	Schedule	TO	Fuel Type
U2 - 062	Randolph 138 kV	187.5	24.4	Active	12/1/2010	AEP	Wind
V3 - 015	Keystone 345 kV	300	39	Active	8/1/2012	Dayton	Wind
W2 - 068	Bluff Point 138 kV	150	19.5	Active	12/31/2011	AEP	Wind



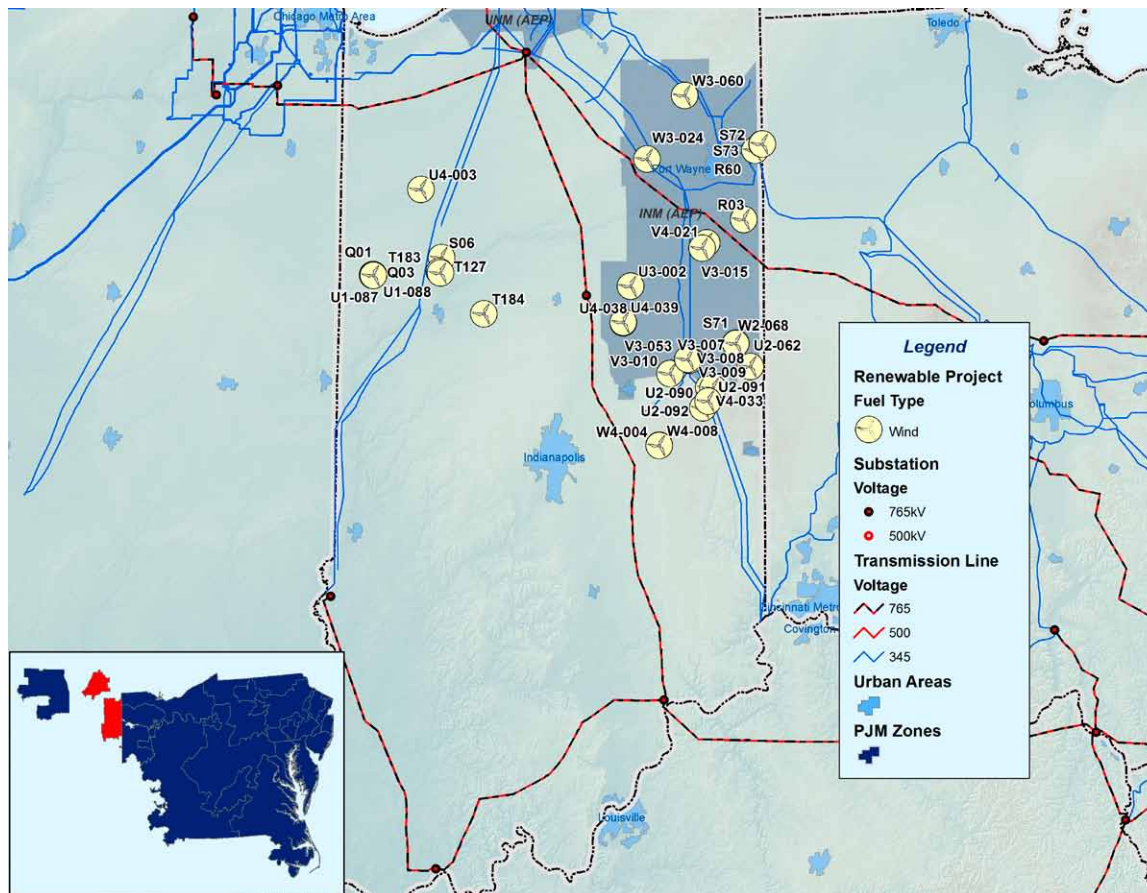
NOTE

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The MW column represents the total site nameplate capacity of the generators including the existing generation as well as the requested up rate.

The MWC column represents the installed capacity portion of the upgrade. For renewable projects the installed capacity portion of the project varies as described in **Section 2**.

Map 14.18: Interconnection Requests in Indiana for Generation Powered by Renewable Fuel Sources



specifications of the related turbines. This presents challenges with respect to real-time operational dispatch and specific capacity value. To address the latter issue, PJM has established a set of business rules unique to intermittent resources that provide for the determination of capacity values sufficiently credible to represent capacity during the PJM summer peak period. These are described in Manuals M21 (<http://pjm.com/~media/documents/manuals/m21.ashx>) and M14A (<http://pjm.com/~media/documents/manuals/m14a.ashx>).

