

# IEEE Std 1547™-2018

Status of Adoption across the U.S.  
September 2022

IEEE Standards Coordinating Committee 21 (SCC21)  
Fuel Cells, Photovoltaics, Dispersed Generation, and Energy Storage

<https://sagroups.ieee.org/scc21/standards/1547rev/>

Courtesy of Electric Power Research Institute (EPRI)  
<https://www.epri.com/#/pages/product/000000003002012048/>



# IEEE Std 1547™-2018 Adoption Methods



## General Reference



- Full adoption of standard by general reference
- Specification of
  - performance categories
    - normal category
    - abnormal category
  - functional settings (utility-required profiles)
  - standardized comms. protocols



## Detailed Reference



- Full or partial adoption of std
- Clause-by-clause references
- Any additional requirements

**EPRI's Generic TIIR Template & DER Settings Forms (3002022563)**

**Benefit:** Consistency to standard

**Risk:** Fragmentation of requirements, certification challenges, addl. costs



## Full Specification



- All on the left
- Clause-by-clause own language
- Any additional requirements

**Benefit:** No need to buy standard

**Risk:** Inconsistencies to standard and fragmentation of requirements, certification challenges, additional costs

# Common Performance Category / Capability Assignments

→ Refer to IEEE 1547-2018 Annex B for justification

## Normal Performance Categories

Power Conversion	Prime Mover / Energy Source	Category
Inverter	Solar PV, Battery Energy Storage	Category B
	Wind	Category B
	Hydrogen Fuel Cell	Mutual Agreement
Synchronous generator	Bio-/landfill gas, fossil fuel, hydro, combined heat & power	Category A
Induction generator	Hydro	Mutual Agreement

## Abnormal Performance Categories

Power Conversion	Prime Mover / Energy Source	Category
Inverter	Solar PV, Battery Energy Storage	Category III <sup>1</sup> (amended)
	Wind	Category II
	Hydrogen Fuel Cell	Mutual Agreement
Synchronous generator	Bio-/landfill gas, fossil fuel, hydro, combined heat & power	Category I
Induction generator	Hydro	Mutual Agreement

<sup>1</sup> Category II prior to Amendment

# U.S. States adopting IEEE Std 1547™-2018

- No activity
- Inquiry or open docket
- Completed order, not yet enforced (general reference)
- Completed order, not yet enforced (detailed reference)
- In force date
- Completed order, adoption deferred into future

**CA** – April 1, 2023, for UL1741 SB  
Interim period Aug 1, 2022, to March 31, 2023: SA and SB

**NM** – Dec 31, 2022

**HECO** – Oct 1, 2022<sup>1</sup>

**MN** – “Commission Notice”

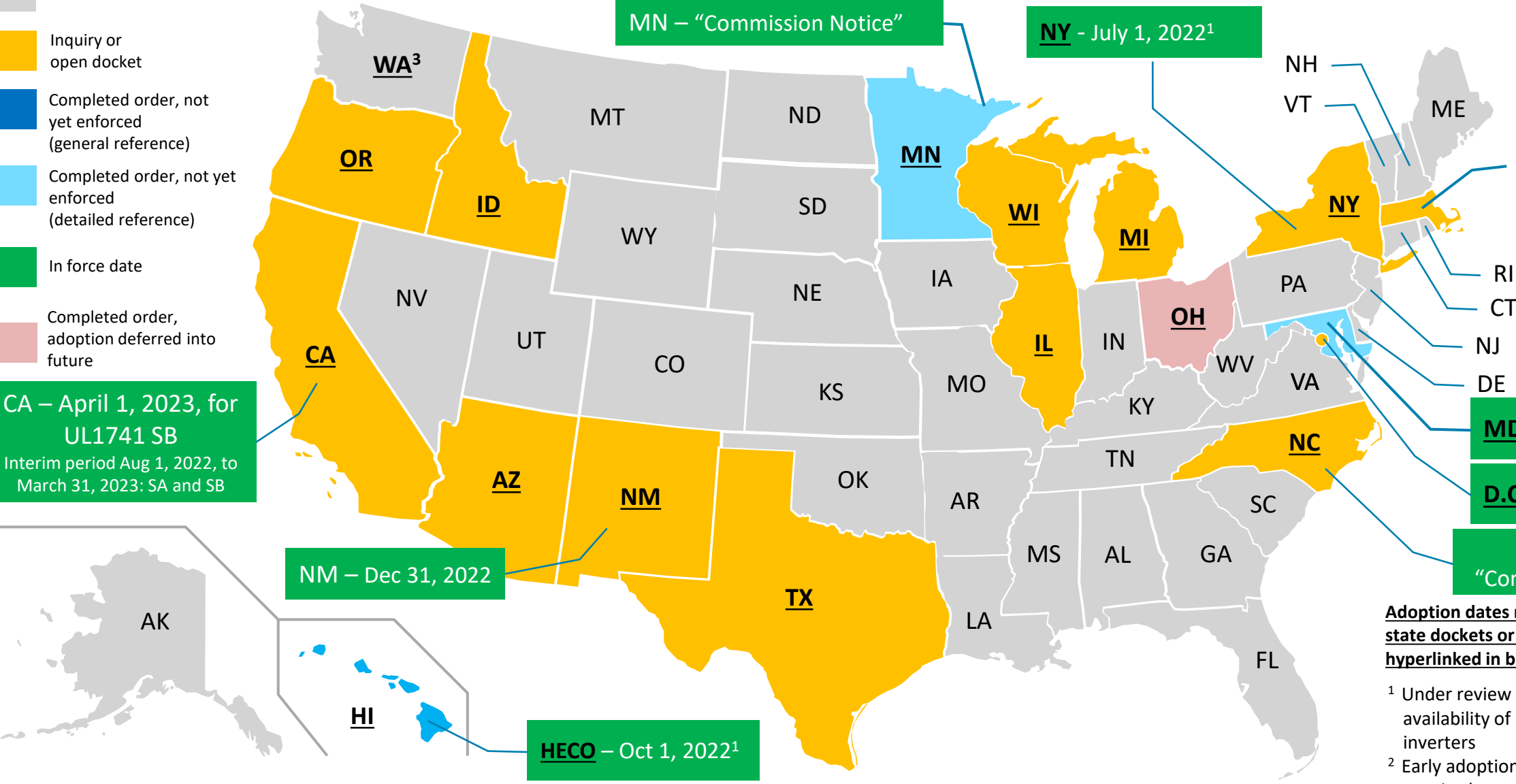
**NY** - July 1, 2022<sup>1</sup>

**MA** **TSRG**  
June 1, 2022\*  
\* Exception for DER < 100 kW:  
October 1, 2022

**MD** – Jan 1, 2022<sup>1</sup>

**D.C.** - Jan 1, 2022<sup>1</sup>

**NC** **TSRG**  
“Commission Notice”



**Adoption dates refer to official state dockets or websites hyperlinked in bold underline font**

<sup>1</sup> Under review due to delayed availability of UL 1741 SB certified inverters  
<sup>2</sup> Early adoption allowed but not required  
<sup>3</sup> Reference to “latest” IEEE 1547

# U.S. States adopting IEEE Std 1547™-2018

Nr.	State	Docket Status	Adoption Method	Enforcement Date	Link
1	Arizona	Open	N/A	N/A	<a href="https://apps.azsos.gov/public_services/Title_14/14-02.pdf">https://apps.azsos.gov/public_services/Title_14/14-02.pdf</a>
2	California	Open	N/A	April 1, 2023, for UL1741 SB Interim period Aug 1, 2022, to March 31: SA and SB	<a href="https://www.cpuc.ca.gov/General.aspx?id=4154">https://www.cpuc.ca.gov/General.aspx?id=4154</a>
3	Hawaii	Open	Detailed Reference*	October 1, 2022*	<a href="https://puc.hawaii.gov/energy/der/">https://puc.hawaii.gov/energy/der/</a> <a href="https://www.hawaiianelectric.com/products-and-services/customer-renewable-programs/rooftop-solar/customer-energy-resource-(cer)-equipment">https://www.hawaiianelectric.com/products-and-services/customer-renewable-programs/rooftop-solar/customer-energy-resource-(cer)-equipment</a>
4	Idaho	Open	N/A	N/A	<a href="https://puc.idaho.gov/case/Details/6541">https://puc.idaho.gov/case/Details/6541</a>
5	Illinois	Open	N/A	N/A	<a href="https://www.icc.illinois.gov/programs/Interconnection-Working-Group">https://www.icc.illinois.gov/programs/Interconnection-Working-Group</a>
6	Kentucky	Exploration	N/A	N/A	Some stakeholders recommend KYPSA to open a IEEE 1547-2018 stakeholder process
7	Maryland	Completed	Detailed Reference	January 1, 2022** (under review)	<a href="http://mdrules.elaws.us/comar/20.50.09">http://mdrules.elaws.us/comar/20.50.09</a> (2020) <a href="https://webapp.psc.state.md.us/newintranet/AdminDocket/NewIndex3_VOpenFile.cfm?FilePath=//Coldfusion/AdminDocket/PublicConferences/PC44/273/PC44-IWGFinalReportConsolidatedPhaseIII-jb-051421.pdf">https://webapp.psc.state.md.us/newintranet/AdminDocket/NewIndex3_VOpenFile.cfm?FilePath=//Coldfusion/AdminDocket/PublicConferences/PC44/273/PC44-IWGFinalReportConsolidatedPhaseIII-jb-051421.pdf</a> (2021)
8	Massachusetts	Open	N/A	June 1, 2018: UL 1741 SA June 1, 2022*: UL 1741 SB * Exception for DER < 100 kW: October 1, 2022	<a href="https://eeonline.eea.state.ma.us/DPU/Fileroom/dockets/bynumber/19-55">https://eeonline.eea.state.ma.us/DPU/Fileroom/dockets/bynumber/19-55</a> (Docket) <a href="https://www.mass.gov/info-details/massachusetts-technical-standards-review-group">https://www.mass.gov/info-details/massachusetts-technical-standards-review-group</a> (TSRG) <a href="https://www.mass.gov/doc/draft-in-progress-default-new-england-bulk-system-area-settings-requirement/download">https://www.mass.gov/doc/draft-in-progress-default-new-england-bulk-system-area-settings-requirement/download</a>
9	Michigan	Open	N/A	N/A	<a href="https://mi-psc.force.com/s/case/500t000000CwYNEAA3/in-the-matter-on-the-commissions-own-motion-to-promulgate-rules-governingelectric-">https://mi-psc.force.com/s/case/500t000000CwYNEAA3/in-the-matter-on-the-commissions-own-motion-to-promulgate-rules-governingelectric-</a>
10	Minnesota	Completed	Detailed Reference	Commission Notice	<a href="https://mn.gov/puc/energy/distributed-energy/interconnection/">https://mn.gov/puc/energy/distributed-energy/interconnection/</a>
11	New Mexico	Notice of Inquiry 20-00171	N/A	March 28, 2023 (Recommendation by Advanced Inverter WG, not official)	<a href="https://edocket.nmprc.state.nm.us/Login.aspx?ReturnUrl=%2fIndex.aspx">https://edocket.nmprc.state.nm.us/Login.aspx?ReturnUrl=%2fIndex.aspx</a> (register for account and search for docket "20-00171-UT") <a href="http://www.nmprc.state.nm.us/docs/Minutes%20of%20January%2013%202021%20Open%20Meeting.pdf">http://www.nmprc.state.nm.us/docs/Minutes%20of%20January%2013%202021%20Open%20Meeting.pdf</a> (Order of Notice of Inquiry) <a href="http://www.nmprc.state.nm.us/docs/Minutes%20of%20February%2015%202021%20Special%20Open%20Meeting.pdf">http://www.nmprc.state.nm.us/docs/Minutes%20of%20February%2015%202021%20Special%20Open%20Meeting.pdf</a> (NMPRC 2021-23 WP) <a href="http://www.nmprc.state.nm.us/#gsc.tab=0">http://www.nmprc.state.nm.us/#gsc.tab=0</a> (Notice reg. Interconnection WG, Technical Session, 4/22/21)
12	New York	2017: Completed NEW: Open	2017: General Reference NEW: Detailed Reference, under discussion in ITWG*	2017: In force NEW: July 1, 2022	<a href="http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7BA7780F50-4D4D-45D4-8B83-A1832488C12D%7D">http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7BA7780F50-4D4D-45D4-8B83-A1832488C12D%7D</a> (2017) <a href="https://www3.dps.ny.gov/W/PSCWeb.nsf/ArticlesByTitle/DEF2BF0A236B946F85257F71006AC98E?OpenDocument">https://www3.dps.ny.gov/W/PSCWeb.nsf/ArticlesByTitle/DEF2BF0A236B946F85257F71006AC98E?OpenDocument</a> (NEW)
13	North Carolina	Open	N/A	N/A	<a href="https://www.duke-energy.com/business/products/renewables/generate-your-own/tsrg">https://www.duke-energy.com/business/products/renewables/generate-your-own/tsrg</a> > Select North Carolina > Select either Duke Energy Carolinas or Duke Energy Progress  Comission resolution: <a href="https://www.duke-energy.com/_media/pdfs/for-your-business/generate-your-own-renewable/tsrg/e100-sub101-dec-dep-report-ieee-1547-2018-results.pdf?la=en">https://www.duke-energy.com/_media/pdfs/for-your-business/generate-your-own-renewable/tsrg/e100-sub101-dec-dep-report-ieee-1547-2018-results.pdf?la=en</a>

\* Likely \*\*Likely to be changed

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# U.S. States adopting IEEE Std 1547™-2018

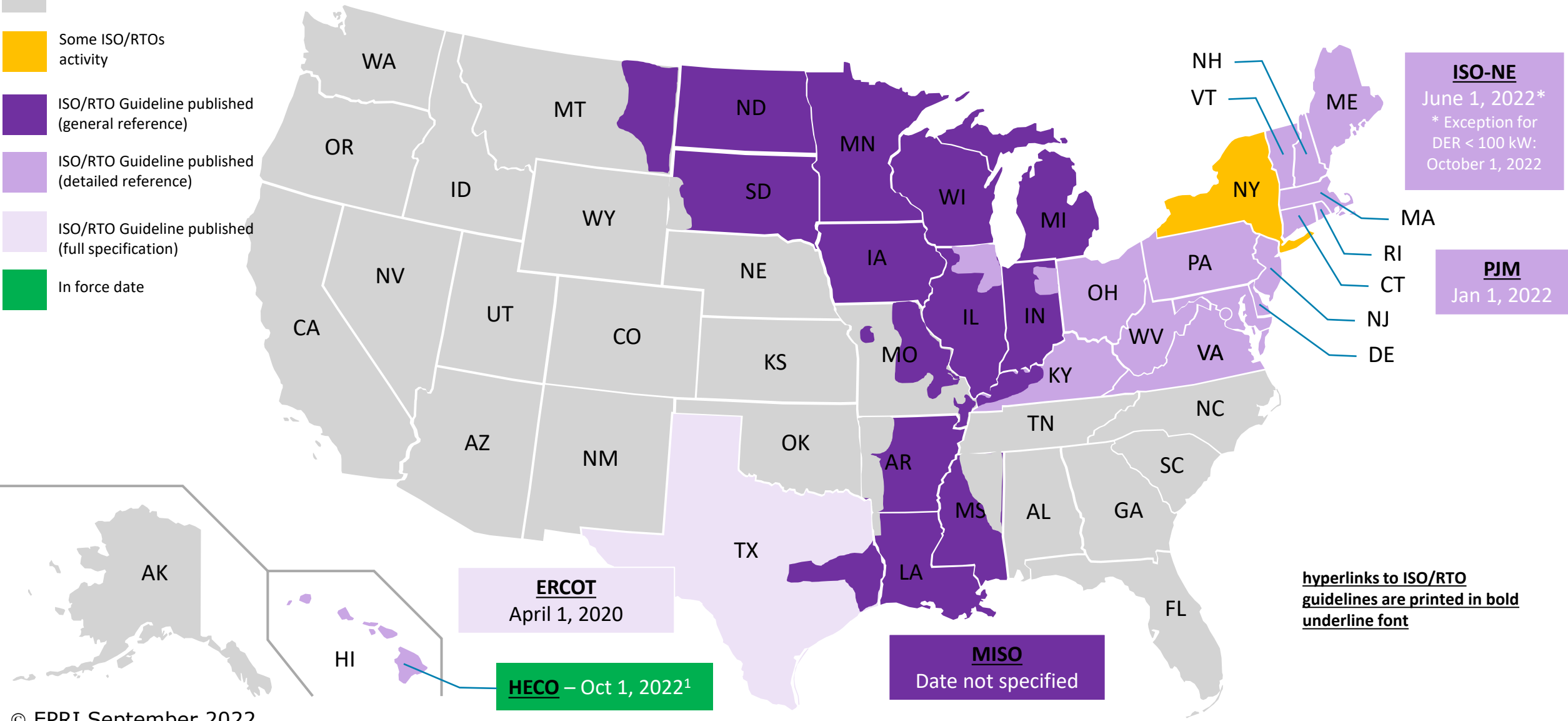
Nr.	State	Docket Status	Adoption Method	Enforcement Date	Link
14	Ohio	Closed	Deferred to future	Deferred to future	<a href="https://puco.ohio.gov/utilities/electricity/resources/der-stakeholder-group">https://puco.ohio.gov/utilities/electricity/resources/der-stakeholder-group</a> <a href="https://djs.puc.state.oh.us/ViewImage.aspx?CMID=A1001001A21L15B44414B00097">https://djs.puc.state.oh.us/ViewImage.aspx?CMID=A1001001A21L15B44414B00097</a> - commission notice
15	Oregon	Open	N/A	N/A	<a href="https://apps.puc.state.or.us/edockets/docket.asp?DocketID=22475">https://apps.puc.state.or.us/edockets/docket.asp?DocketID=22475</a>
16	Texas	Open	N/A	N/A	<a href="https://interchange.puc.texas.gov/Search/Documents?controlNumber=51603&amp;itemNumber=1">https://interchange.puc.texas.gov/Search/Documents?controlNumber=51603&amp;itemNumber=1</a> <a href="https://interchange.puc.texas.gov/Search/Documents?controlNumber=51603&amp;itemNumber=1">https://interchange.puc.texas.gov/Search/Documents?controlNumber=51603&amp;itemNumber=1</a> <a href="https://interchange.puc.texas.gov/search/filings/?UtilityType=A&amp;ControlNumber=53911&amp;ItemMatch=Equal&amp;DocumentType=ALL&amp;SortOrder=Ascending">https://interchange.puc.texas.gov/search/filings/?UtilityType=A&amp;ControlNumber=53911&amp;ItemMatch=Equal&amp;DocumentType=ALL&amp;SortOrder=Ascending</a> <a href="https://interchange.puc.texas.gov/Search/Documents?controlNumber=51603&amp;itemNumber=1">https://interchange.puc.texas.gov/Search/Documents?controlNumber=51603&amp;itemNumber=1</a> <a href="https://interchange.puc.texas.gov/search/filings/?UtilityType=A&amp;ControlNumber=53911&amp;ItemMatch=Equal&amp;DocumentType=ALL&amp;SortOrder=Ascending">https://interchange.puc.texas.gov/search/filings/?UtilityType=A&amp;ControlNumber=53911&amp;ItemMatch=Equal&amp;DocumentType=ALL&amp;SortOrder=Ascending</a>
17	Washington D.C.	Open	N/A	Jan 1, 2022*	<a href="https://edocket.dcpsc.org/public/search/casenumbr/fc1050">https://edocket.dcpsc.org/public/search/casenumbr/fc1050</a>
18	Washington State	N/A	General reference to IEEE 1547-2018 without any specifics	July 20, 2018	<a href="https://app.leg.wa.gov/WAC/default.aspx?cite=480-108-999">https://app.leg.wa.gov/WAC/default.aspx?cite=480-108-999</a>
19	Wisconsin	Open	N/A	N/A	<a href="https://apps.psc.wi.gov/ERF/ERFview/viewdoc.aspx?docid=426014">https://apps.psc.wi.gov/ERF/ERFview/viewdoc.aspx?docid=426014</a>

\* Likely    \*\*Likely to be changed

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# U.S. ISOs adopting IEEE Std 1547™-2018

- No activity
- Some ISO/RTOs activity
- ISO/RTO Guideline published (general reference)
- ISO/RTO Guideline published (detailed reference)
- ISO/RTO Guideline published (full specification)
- In force date



hyperlinks to ISO/RTO guidelines are printed in bold underline font

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# RTOs/ISOs Guidelines for IEEE Std 1547™-2018 Adoption



## ISO New England – UL 1741 SA (stopgap) and UL 1741 SB (2022 onwards)

- Coordination between ISO-NE and the MA's utilities in the [Massachusetts TSRG](#)
- Reference to UL 1741 SA as a stopgap to verify DER ride-through capability in the interim ([Link](#))
- Detailed reference to IEEE 1547-2018 for all DER; UL 1741 SB certification required for inverters-based DER ([Link](#))

**April 1, 2022\***  
Exception for DER < 100 kW:  
June 1, 2022



## PJM Interconnection – UL 1741 SA/SB

- Initiation of formal stakeholder proceedings in 2019
- Published PJM *Guideline for Ride Through Performance of Distribution-Connected Generators* for voluntary DER ride-through in Oct 2019 ([PJM Website](#))
- Established minimum ride-through requirements and trip time settings

**Jan 1, 2022**



## Midcontinent Independent System Operator (MISO) – UL 1741 SB

- MN PUC requested stakeholder process, see [MISO's IEEE 1547 website](#)
- Published the MISO Guideline for IEEE Std 1547-2018 Implementation ([Link](#))
- Established the regional ride-through capabilities and trip time settings

**date not specified**

**See also NERC's Reliability Guideline  
Bulk Power System Reliability Perspectives on the Adoption of IEEE 1547-2018 (March 2020)**



# U.S. ISOs adopting IEEE Std 1547™-2018

Nr.	RTO/ISO	Guideline Status	Adoption Method	Enforcement Date	Link
1	Alberta Electric System Operator (AESO)	Published	Detailed Reference Modified Category II, references C22.3 No.9-2020	December 31, 2021	<a href="https://www.aeso.ca/assets/Uploads/DER-Ride-Through-FINAL-26MAR2021.pdf">https://www.aeso.ca/assets/Uploads/DER-Ride-Through-FINAL-26MAR2021.pdf</a>
2	California ISO (CAISO)	No activity			
3	Electric Reliability Council of Texas (ERCOT)	Published August 11, 2020	Full Specification (only for resources participating in the ERCOT markets)	April 1, 2020 (exceptions may apply to resources with earlier initial synchronization date)	<a href="http://www.ercot.com/content/wcm/key_documents_lists/203876/212NOGRR-11_Board_Report_081120.doc">http://www.ercot.com/content/wcm/key_documents_lists/203876/212NOGRR-11_Board_Report_081120.doc</a>
4	ISO New England	Published in 2018, under revision	Detailed Reference General Reference	June 1, 2018: UL 1741 SA June 1, 2022*: UL 1741 SB <small>* Exception for DER &lt; 100 kW: October 1, 2022</small>	New URP: <a href="https://drive.google.com/file/d/10iB8_x91g_J1PEsZiOugn2JwkK8HSSRh/view?usp=sharing">https://drive.google.com/file/d/10iB8_x91g_J1PEsZiOugn2JwkK8HSSRh/view?usp=sharing</a>  <a href="https://www.mass.gov/doc/draft-in-progress-default-new-england-bulk-system-area-settings-requirement/download">https://www.mass.gov/doc/draft-in-progress-default-new-england-bulk-system-area-settings-requirement/download</a>  SRD 1.1: <a href="https://www9.nationalgridus.com/non_html/ISO%20New%20England%20Source%20Requirement%20Document-2018-02-06.pdf">https://www9.nationalgridus.com/non_html/ISO New England Source Requirement Document-2018-02-06.pdf</a>
5	Midcontinent Independent System Operator (MISO)	Published	General Reference	Date not specified	<a href="https://www.misoenergy.org/planning/generator-interconnection/ieee-1547/">https://www.misoenergy.org/planning/generator-interconnection/ieee-1547/</a>
6	New York ISO (NY ISO)	No activity			
7	Independent Electric System Operator (IESO)	Under development	Detailed Reference Modified Category II, references C22.3 No.9-2020		<a href="https://www.ieso.ca/-/media/Files/IESO/Document-Library/system-reliability/2019-IESO-Operability-Assessment.ashx">https://www.ieso.ca/-/media/Files/IESO/Document-Library/system-reliability/2019-IESO-Operability-Assessment.ashx</a>
8	PJM Interconnection	Published	Detailed Reference Full Specification	January 1, 2022	<a href="https://www.pjm.com/-/media/committees-groups/task-forces/derrtf/20190913/20190913-pjm-guideline-for-ride-through-performance-rev1.ashx">https://www.pjm.com/-/media/committees-groups/task-forces/derrtf/20190913/20190913-pjm-guideline-for-ride-through-performance-rev1.ashx</a>
9	Southwest Power Pool (SPP)	No activity			

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For suggested updates, please [contact EPRI](#) or use the form at the bottom of [this website](#).