



# ELECTRIC STORAGE RESOURCE FRAMEWORK DEVELOPMENT

RICHARD DILLON

DIRECTOR, MARKET POLICY

*Helping our members work together to keep  
the lights on... today and in the future.*



SouthwestPowerPool



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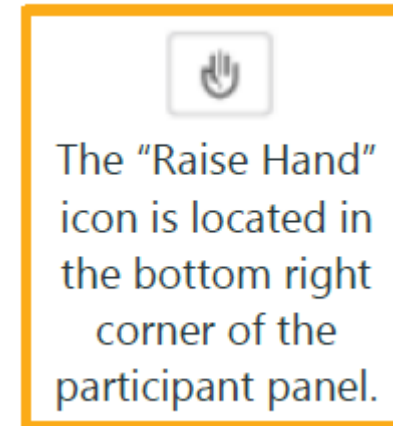
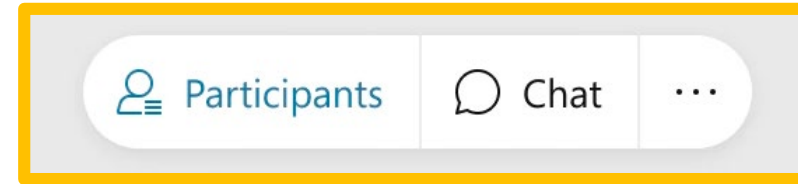


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# **WELCOME AND WEBEX FACILITATION**

# WEBEX PARTICIPATION GUIDE

- Connect audio by using WebEx's "Call Me" feature
- Open the participant and chat panels
- All lines are muted upon entry
  - Panelists: may mute/unmute their own line and broadcast video
  - Attendees: cannot mute/unmute their own line or broadcast video
- Please hold questions until moderators open the floor
- Use "Raise Hand" feature to be unmuted
  - Remember to lower hand when finished
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- To communicate with event hosts, use the Chat or Raise Hand feature. If unable to use these features, please email Emily Pennel ([epennel@spp.org](mailto:epennel@spp.org)) or Jason Tanner ([jtanner@spp.org](mailto:jtanner@spp.org))
- There will be no roll call

# TODAY'S AGENDA

- ESR background & governance
- ESR issue overview
  - Categories
  - Assignments
  - High priority issues
  - Issue status & timeline
- Next steps
- Resources

# PURPOSE AND KEY TAKEAWAYS

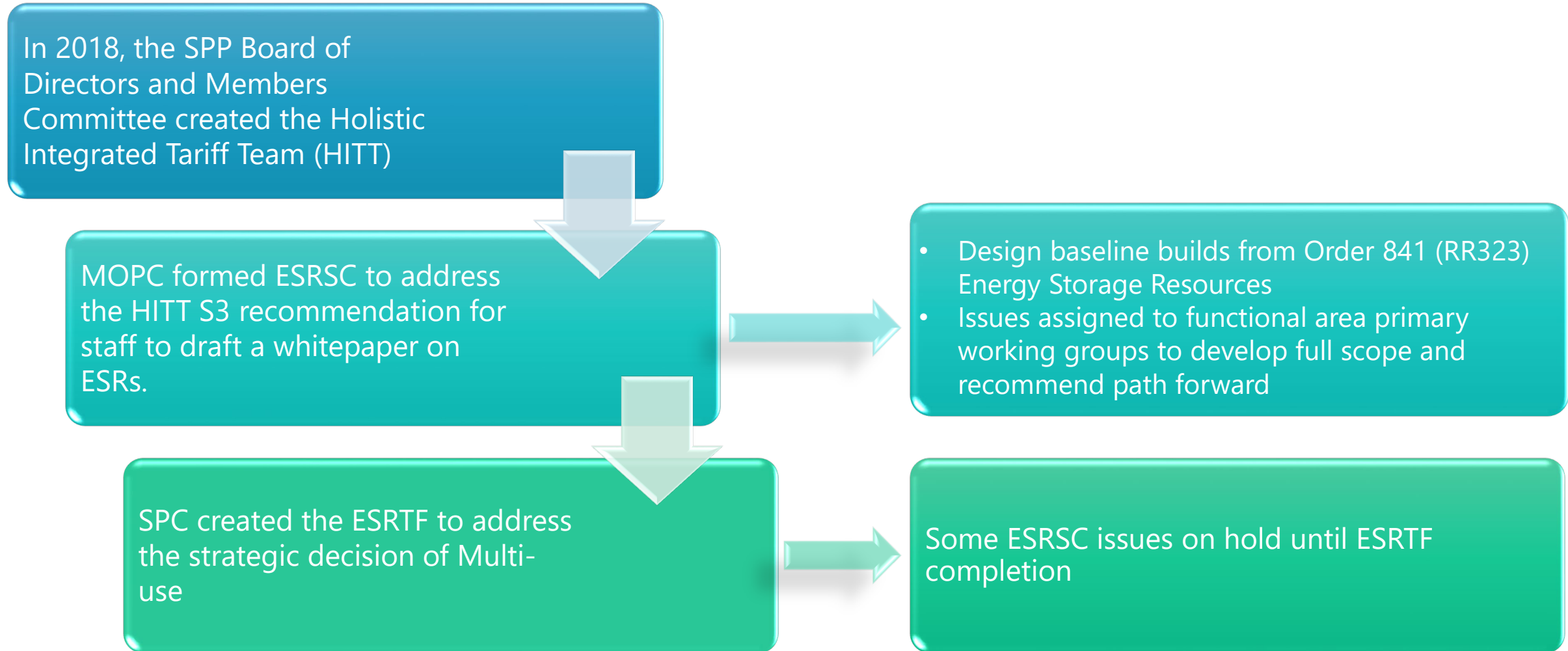
- Today
  - Focus on understanding the big picture of all SPP ESR initiatives
  - Discuss ESR initiative management plan – Stakeholder perspective
  - Working group engagement
- January MOPC
  - Identify dependencies, risks and gaps among ESR initiatives
  - Discuss end goals and map ESR projects to end goals
  - Roll out ongoing ESR initiative management plan and timeline

# ACRONYMS

- ATRR – Annual Tariff Revenue Requirement
- BOD – Board of Directors
- CAWG – Cost Allocation Working Group
- DER – Distributed Energy Resource
- ESR – Electric Storage Resource
- ESRSC – Electric Storage Resource Steering Committee
- ESRTF – Electric Storage Resource Task Force
- ESWG – Economic Studies Working Groups
- FERC – Federal Energy Regulatory Commission
- HITT – Holistic Integrated Tariff Team
- LRE – Load Responsible Entity
- MMU – Market Monitoring Unit
- MOPC – Markets and Operations Policy Committee
- MWG – Market Working Group
- NCL – Non-Conforming Load
- ORWG – Operating Reliability Working Group
- RR – Revision Request
- RTWG – Regional Tariff Working Group
- SAWG – Supply Adequacy Working Group
- SPP – Southwest Power Pool
- TWG – Transmission Working Group
- VER – Variable Energy Resources

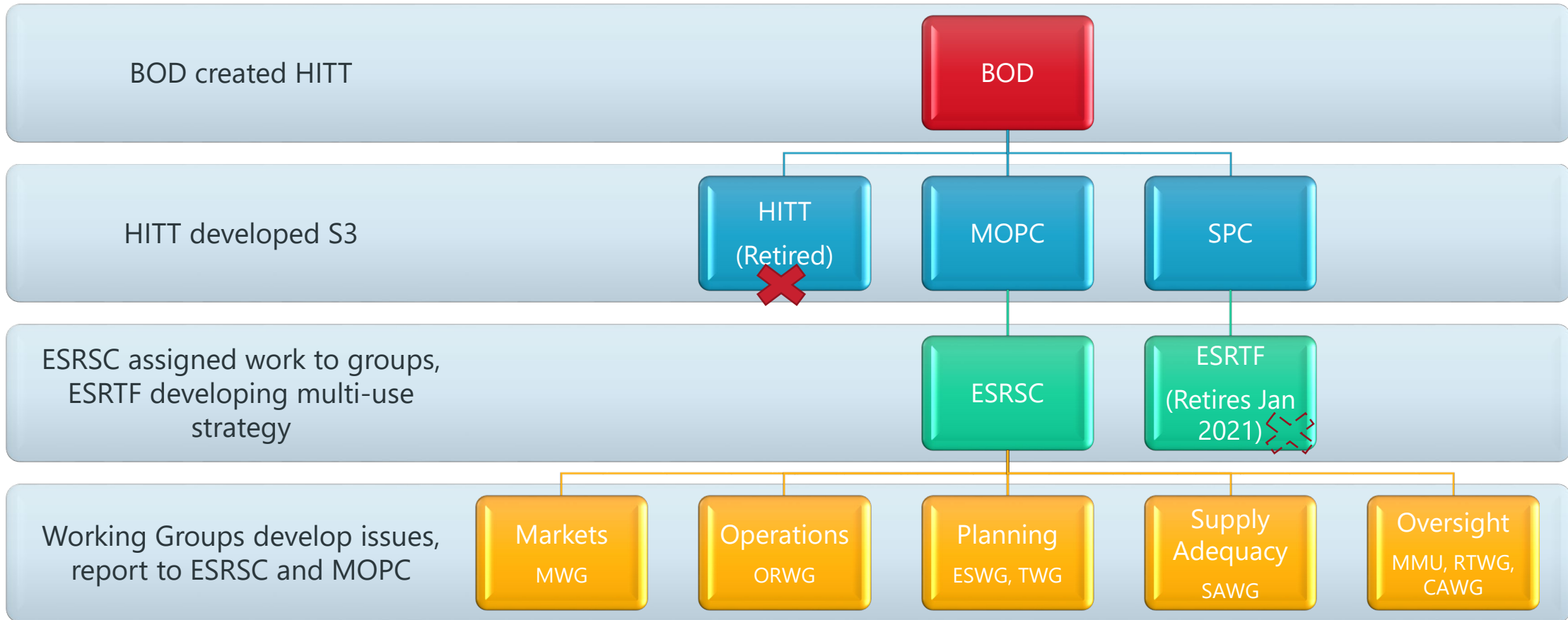
# **BACKGROUND & GOVERNANCE**

# BACKGROUND & GOVERNANCE STRUCTURE





# BACKGROUND & GOVERNANCE STRUCTURE CONTINUED



# ORDER 841/RR323 DESIGN & ESRSC ISSUES

Order 841/RR323  
Electric Storage  
Resources

- February, 2018 FERC Order 841 issued
- October 2018 RR323 approved at MOPC & BOD
- October 2020 FERC approved SPP's ESR design
- Baseline for ESRSC Whitepaper Issue development

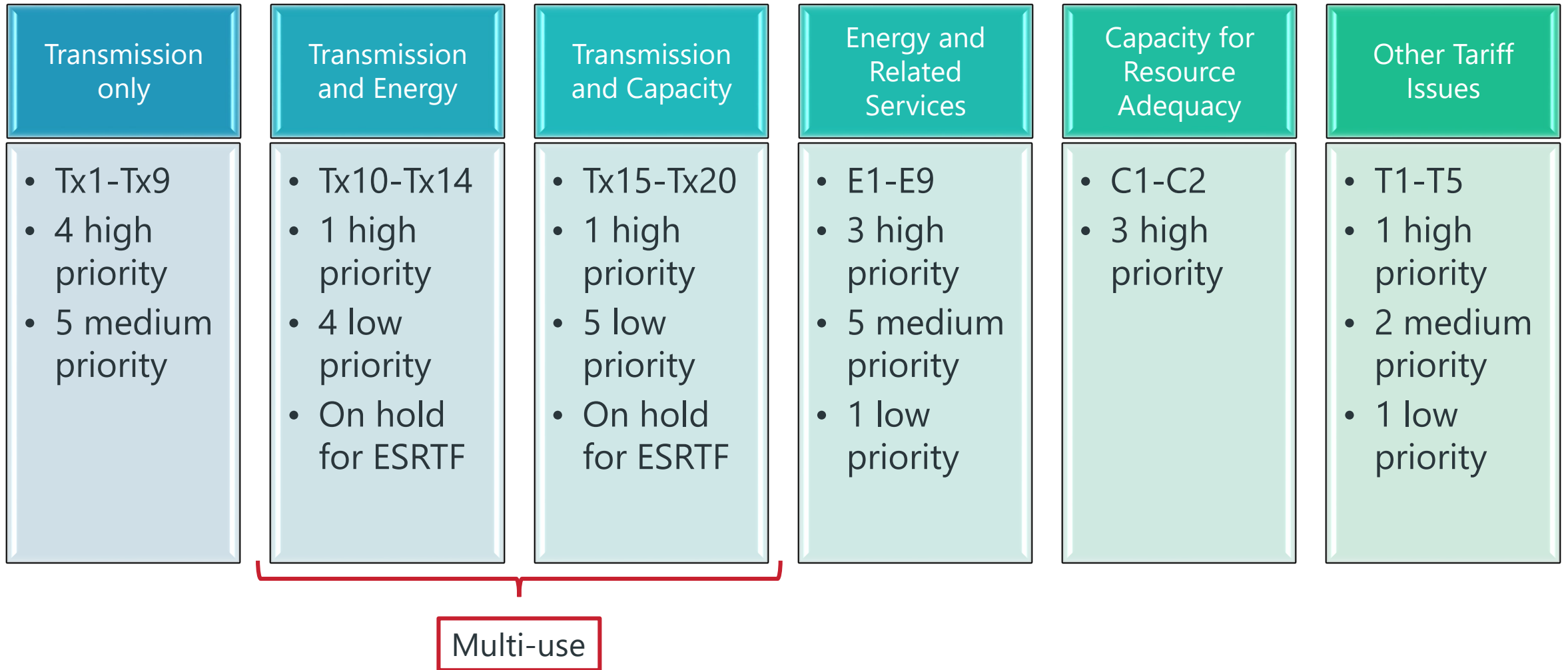
37 ESRSC initiative  
recommendations  
developed

- Transmission only
- Transmission and Energy
- Transmission and Capacity
- Energy and Related Services
- Capacity for Resource Adequacy
- Other Tariff Issues

ESR as DER is out of scope – FERC Order 2222 Task Force will address

# INITIATIVE POPULATION

# SIX ESR ISSUE BUCKETS, 37 INITIATIVES



ESR as DER is out of scope – FERC Order 2222 Task Force will address

# TRANSMISSION ONLY ISSUE INITIATIVES

- |         |  |  |
|---------|--|--|
| Tx1 (H) | • Reconcile ESR duration w/transmission planning scenario                                    | <ul style="list-style-type: none"><li>• FERC did not address ESR as Transmission facility</li><li>• Evaluate ESRs as potential solutions to address identified transmission needs</li><li>• Determine study considerations to properly assess ESRs as transmission</li></ul> |
| Tx2 (M) | • Document tariff changes defining ESR retail vs. wholesale service                          |  |
| Tx3 (M) | • Reconcile lifespans of ESRs and other transmission facilities                              |  |
| Tx4 (H) | • Reconcile ESR cost-recovery policies   |  |
| Tx5 (M) | • Develop policy for ESR costs in ATRR   |  |
| Tx6 (M) | • Decide if SPP invoices energy costs for ESR transmission facilities                        |  |
| Tx7 (H) | • Decide whether to require and invoice transmission service for ESR transmission facilities |  |
| Tx8 (M) | • Determine responsibility for charging ESR Transmission facilities                          |  |
| Tx9 (H) | • Develop market power procedures for ESR transmission facilities                            |  |

# TRANSMISSION & ENERGY ISSUE INITIATIVES (MULTI-USE)

Tx10 (L)	• Develop procedures for ESRs used as Energy and Transmission
Tx11 (H)	• Coordinate interconnection and transmission planning studies
Tx12 (L)	• Determine policy for market revenues of ESR transmission facilities
Tx13 (L)	• Develop settlement procedures for separating energy and transmission
Tx14 (L)	• Determine responsibility for charging multi-use ESRs

- ESRs may be used for transmission only and energy and related services
- Cost allocation challenge
- Multi-use policy TBD
  - ESRTF work

# TRANSMISSION & CAPACITY ISSUE INITIATIVES (MULTI-USE)

Tx15 (L)	• Develop policy for ESRs used for capacity, energy, and transmission
Tx16 (H)	• Coordinate interconnection, deliverability and transmission planning studies
Tx17 (L)	• Develop policy regarding upgrade costs for ESRs used for transmission and capacity
Tx18 (L)	• Determine appropriateness of capacity resource cost recovery in transmission charges
Tx19 (L)	• Develop procedure for identifying capacity resource costs of ESR transmission facilities
Tx20 (L)	• Develop capacity accreditation and testing methodology

- ESRs may be used for transmission and capacity to meet resource adequacy requirements
- Cost allocation challenge
- Multi-use policy TBD
  - ESRTF work

# ENERGY & RELATED SERVICES ISSUE INITIATIVES

E1 (H)	• Develop ESR transmission planning study process
E2 (H)	• Develop process for modeling and controlling ESR hybrid configurations
E3 (M)	• Study cost/benefits and develop Tariff changes for fast-start ESR charging
E4 (H)	• Determine limits for fast-responding ESRs
E5 (M)	• Determine feasibility of regional aggregation for reserve-only ESRs
E6 (H)	• Develop requirements for non-conforming load from unregistered ESRs
E7 (M)	• Determine ESR qualification for essential and other reliability services
E8 (M)	• Reconcile ESR duration with reserve duration requirement
E9 (L)	• Analyze the cost/benefit of adding SPP charging control

- ESRs possess ability to store excess energy, respond instantly, and balance supply/demand
- Determine most efficient means to address use of ESRs in SPP



# CAPACITY FOR RESOURCE ADEQUACY ISSUE INITIATIVES

- C1 (H) { • Determine ESR capacity accreditation process
- C2 (H) { • Determine ESR duration and availability requirement
- C3 (H) { • Determine maximum amount of ESRs allowed in resource adequacy portfolio

- No retail open access in SPP region
- LREs must have sufficient capacity to serve their loads
- SPP requires LREs demonstrate ability to meet SPP’s resource adequacy obligation
- ESRs staged in SPP queue to be used for energy and resource adequacy capacity
- Capacity requirements must be reviewed

# OTHER TARIFF RELATED ISSUE INITIATIVES

- T1(M) • Review tariff's VER definition
- T2 (H) • Develop tariff changes defining ESR retail vs. wholesale service
- T3 (L) • Evaluate impact of commercial mobile ESRs
- T4 (M) • Evaluate changes to market registration requirement
- T5 (L) • Recommend tariff changes for mobile retail ESRs

- Addresses other various legal and regulatory ESR concerns

# **INITIATIVE MANAGEMENT – STAKEHOLDER ENGAGEMENT**

# STAKEHOLDER GROUP ASSIGNMENTS

Transmission Only												
Priority	Issue	CAWG	ESWG	MWG	MMU	ORWG	RTWG	SAWG	TWG	Staff	Status	MOPC
H	Tx1		✓			✓			✓		Research	Jan 2021
M	Tx2									✓	Not Started	TBD
M	Tx3						✓		✓		Not Started	TBD
H	Tx4	✓									Research	TBD
M	Tx5						✓				Not Started	TBD
M	Tx6			✓					✓		Not Started	TBD
H	Tx7			✓			✓				Design	TBD
M	Tx8					✓					Research	Jan 2021
H	Tx9				✓						Research	TBD

- Tx1 and Tx8 may be combined in the Design phase
  - Both white papers are complete and going to January MOPC
- TX7 recommendation approved at October MOPC

**Status Key:**

- **Research** - Initiative is in the research and analysis phase. Develop analysis strategy, gap analysis, research, gather information, develop primary stakeholder and SPP position, proof-of-concept, cost-benefit, analysis, whitepaper
- **Design** - Develop and refine concept, high-level business rules and SW requirements, Governing document language

# STAKEHOLDER GROUP ASSIGNMENTS (MULTI-USE)

Transmission and Energy												
Priority	Issue	CAWG	ESWG	MWG	MMU	ORWG	RTWG	SAWG	TWG	Staff	Status	MOPC
L	Tx10	x	x	✓		✓	x		x		On Hold	TBD
H	Tx11								✓	✓	On Hold	TBD
L	Tx12	✓		✓			✓				On Hold	TBD
L	Tx13			✓		✓	✓				On Hold	TBD
L	Tx14			✓		✓					On Hold	TBD

Transmission and Capacity												
Priority	Issue	CAWG	ESWG	MWG	MMU	ORWG	RTWG	SAWG	TWG	Staff	Status	MOPC
L	Tx15			✓		✓		✓			On Hold	TBD
H	Tx16							✓	✓	✓	On Hold	TBD
L	Tx17							✓	✓	✓	On Hold	TBD
L	Tx18	✓						✓			On Hold	TBD
L	Tx19	✓	✓					✓		✓	On Hold	TBD
L	Tx20		x					✓	x	✓	On Hold	TBD

- Dependent on outcome of ESRTF decision regarding multi-use

# STAKEHOLDER GROUP ASSIGNMENTS

Energy and Related Services												
Priority	Issue	CAWG	ESWG	MWG	MMU	ORWG	RTWG	SAWG	TWG	Staff	Status	MOPC
H	E1		✓						✓	✓	Research	TBD
H	E2			✓		✓				✓	Design	TBD
M	E3			✓		✓					Not Started	TBD
H	E4			✓		✓				✓	Design	TBD
M	E5			✓		✓			✓		Not Started	TBD
H	E6					✓					Research	Jan 2021
M	E7			✓		✓	✓				Not Started	TBD
M	E8					✗				✓	Not Started	TBD
L	E9			✓		✓				✓	Not Started	TBD

- E4 is assigned to MWG per October MOPC

#### Status Key:

- Research** - Initiative is in the research and analysis phase. Develop analysis strategy, gap analysis, research, gather information, develop primary stakeholder and SPP position, proof-of-concept, cost-benefit, analysis, whitepaper
- Design** - Develop and refine concept, high-level business rules and SW requirements, Governing document language

# STAKEHOLDER GROUP ASSIGNMENTS

Capacity for Resource Adequacy												
Priority	Issue	CAWG	ESWG	MWG	MMU	ORWG	RTWG	SAWG	TWG	Staff	Status	MOPC
H	C1					✗		✓			Design	TBD
H	C2					✓		✓			Design	TBD
H	C3					✓		✓			Research	TBD

- C3 did not move forward at October MOPC, SAWG and ORWG will continue work to develop a recommendation or seek MOPC approval

## Status Key:

- **Research** - Initiative is in the research and analysis phase. Develop analysis strategy, gap analysis, research, gather information, develop primary stakeholder and SPP position, proof-of-concept, cost-benefit, analysis, whitepaper
- **Design** - Develop and refine concept, high-level business rules and SW requirements, Governing document language

# STAKEHOLDER GROUP ASSIGNMENTS

Other Tariff Related Issues												
Priority	Issue	CAWG	ESWG	MWG	MMU	ORWG	RTWG	SAWG	TWG	Staff	Status	MOPC
M	T1						✓			✓	Not Started	TBD
H	T2	✓					✓			✓	Research	TBD
L	T3						✓			✓	Not Started	TBD
M	T4			✓			✓			✓	Not Started	TBD
L	T5	✓					✓				Not Started	TBD
M	T1						✓			✓	Not Started	TBD

- (T2) FERC Order 2222 may impact wholesale/retail split

## Status Key:

- **Research** - Initiative is in the research and analysis phase. Develop analysis strategy, gap analysis, research, gather information, develop primary stakeholder and SPP position, proof-of-concept, cost-benefit, analysis, whitepaper
- **Design** - Develop and refine concept, high-level business rules and SW requirements, Governing document language



# HIGH PRIORITY ESR ISSUES

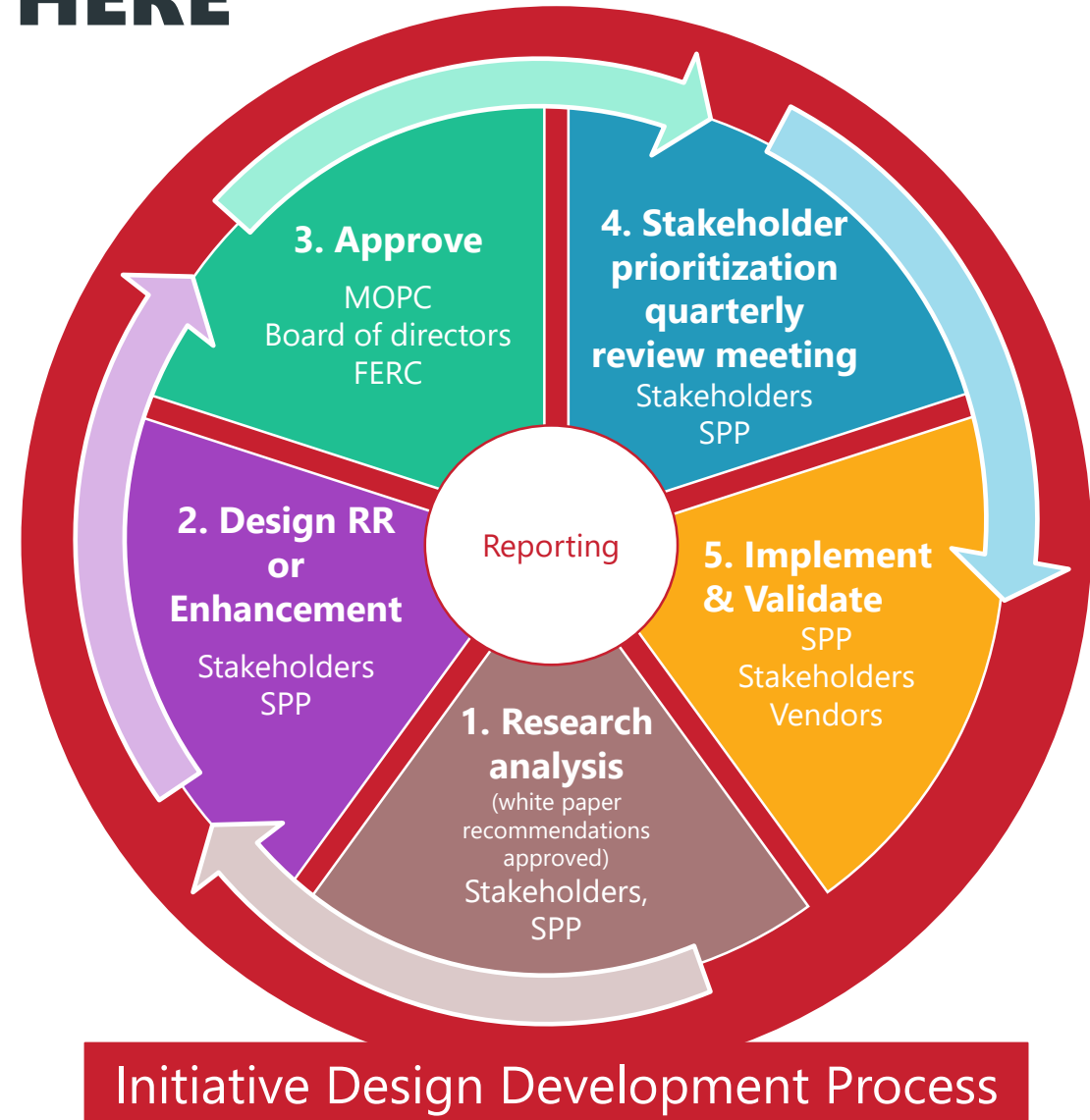
Initiative	Groups	Phase	MOPC
Tx1. Reconcile ESR duration w/transmission planning scenario	TWG, ORWG, <b>ESWG</b>	Research	Jan 21
Tx4. Reconcile ESR cost-recovery policies	<b>CAWG</b>	Research	TBD
Tx7. Decide whether to require & invoice transmission service for ESR transmission facilities	<b>RTWG</b> , MWG	Design	TBD
Tx9. Develop market power procedures for ESR transmission facilities	<b>MMU</b>	Research	TBD
Tx11. Coordinate interconnection & transmission planning studies	<b>Staff</b>	On hold	TBD
Tx16. Coordinate interconnection, deliverability and transmission planning studies	<b>Staff</b>	On hold	TBD
E1. Develop ESR transmission planning study process	TWG, <b>Staff</b>	Research	TBD
E2. Develop process for modeling & controlling hybrid ESRs	MWG, ORWG, <b>Staff</b>	Design	TBD
E4. Determine limits for fast-responding ESRs	<b>MWG</b> , ORWG	Research	TBD
E6. Develop requirements for NCL from unregistered ESRs	<b>ORWG</b>	Research	Jan 21
C1. Determine ESR capacity accreditation process	<b>SAWG</b> , ORWG	Design	TBD
C2. Determine ESR duration and availability requirement	<b>SAWG</b> , ORWG	Design	TBD
C3. Determine maximum amount of ESRs allowed in resource adequacy portfolio	<b>SAWG</b> , ORWG	Research	TBD
T2. Develop tariff changes defining ESR retail vs. wholesale service	RTWG, CAWG, <b>Staff</b>	Research	TBD

- Planning items are high priority due to the lead time on studies
- Reliable response items (capacity, fast-start) are high priority
- Hybrid resources are high priority due to existing/planned hybrids

\***Bold** font indicates leads group

# IN SUMMARY - YOU ARE HERE

- January 2021
  - Tx1, Tx8, E6
- Approved October 2020
  - E2, E4, C1, C2
- On hold until ESRTF decides multi-use direction
  - Tx10-Tx20



# **DEEPER DIVE – INITIATIVE SCOPE AND RECOMMENDATIONS**

# TRANSMISSION ONLY INITIATIVE RECOMMENDATIONS

- Tx1 (H) • Reconcile ESR duration w/transmission planning scenario
- Tx2 (M) • Document tariff changes defining ESR retail vs. wholesale service
- Tx3 (M) • Reconcile lifespans of ESRs and other transmission facilities
- Tx4 (H) • Reconcile ESR cost-recovery policies
- Tx5 (M) • Develop policy for ESR costs in ATRR
- Tx6 (M) • Decide if SPP invoices energy costs for ESR transmission facilities
- Tx7 (H) • Decide whether to require and invoice transmission service for ESR transmission facilities
- Tx8 (M) • Determine responsibility for charging ESR Transmission facilities
- Tx9 (H) • Develop market power procedures for ESR transmission facilities

# TRANSMISSION ONLY

## Tx1. Reconcile ESR duration w/transmission planning scenario

- Scope: Develop procedure to handle ESR transmission facility when ESR's duration is insufficient to meet the transmission issue
- Recommendation: ORWG to accept this procedure as practical in real-time operations before using in transmission planning cases
  - Example - Either derate transmission facilities' output to increase ESRs' duration or combine multiple ESRs to increase duration
- Priority: High
- Stakeholder Groups: TWG, ORWG
- Status: Research & Analysis
- Timeline: January MOPC

# TRANSMISSION ONLY

## Tx2. Document primary transmission use of ESRs

- Recommendation: SPP staff determine documentation necessary for ESRs selected as transmission assets and how to re-evaluate continued need for ESRs
  - Example – ESR could be included in SPP’s annual transmission revenue requirement (ATRR) for voltage support and would require a rebuild after 10 yrs. At end of 10 yrs, an evaluation would be conducted to determine if voltage support is still required and if it is necessary to rebuild the ESR
- Priority: Medium
- Stakeholder Groups: Staff, others TBD
- Status: Not started
- Timeline: TBD

# TRANSMISSION ONLY

## Tx3. Reconcile lifespans of ESRs and other transmission facilities

- Recommendation: The TWG and CAWG are to develop consistent ESR assumptions for use in SPP's transmission planning studies
  - Example – Should the ESR be assumed in service in the 20-year study versus the 10-year study
- Priority: Medium
- Stakeholder Groups: TWG, CAWG
- Status: Not started
- Timeline: TBD

# TRANSMISSION ONLY

## Tx4. Reconcile ESR cost recovery policies

- Scope: SPP uses different cost allocation methods for different transmission facility voltages based on transmission upgrades' operating voltages. SPP to determine whether cost allocation should be based on: ESR operating voltage, transmission facility voltage that needs an ESR, transmission facility voltage that did need an ESR, or some other criterion
- Recommendation: Review the impact of ESRs on cost allocation and recommend a policy for ESRs used as transmission solutions
- Priority: High
- Stakeholder Groups: CAWG
- Status: Research and Analysis
- Timeline: TBD



# TRANSMISSION ONLY

## Tx5. Reconcile ESR duration w/transmission planning scenario

- Scope: Due to significant difference in the lifespans of traditional transmission facilities and ESRs, SPP needs to develop a policy regarding the amortization of ESR costs
- Recommendation: Develop a policy regarding the amortization of ESR costs
- Priority: Medium
- Stakeholder Groups: TWG
- Status: Not started
- Timeline: TBD

# TRANSMISSION ONLY

## Tx6. Decide if SPP invoices energy costs for ESR transmission facilities

- Scope: A transmission-only ESR must be charged (receive electricity) to inject. SPP must determine how charging costs will be recovered
- Recommendation: Determine if ESR charging costs will be explicitly settled or included in energy losses and/or revenue neutrality uplift
- Priority: Medium
- Stakeholder Groups: TWG, MWG
- Status: Not started
- Timeline: TBD

# TRANSMISSION ONLY

## Tx7. Decide whether to require and invoice transmission service for ESR transmission facilities

- Scope: Generally, load pays transmission service charges. ESRs are viewed as a load when charging. When an ESR is a transmission-only facility, it is operating not to provide energy but to provide reliability. It is not a “sale for resale” activity. A transmission-only ESR is held by a transmission owner, not a market participant. SPP needs to determine if transmission owners should be billed for providing transmission service via transmission-only ESRs, and if so, allow for appropriate recovery of such costs
- Recommendation: Address whether a transmission-only ESR should pay for transmission service related to the charging activity
- Priority: High
- Stakeholder Groups: RTWG, MWG
- Status: Design, determined path during October 2020 MOPC
- Timeline: TBD

# TRANSMISSION ONLY

## Tx8. Determine responsibility for charging ESR transmission facilities

- Scope: SPP needs to determine whether SPP, transmission operators or ESR operators should be responsible for maintaining a transmission-only ESR's charge to ensure the resources are available for reliability needs
- Recommendation: Determine who is responsible for maintaining a transmission-only ESR's charge and submit tariff changes
- Priority: Medium
- Stakeholder Group: ORWG
- Status: Research and Analysis
- Timeline: January MOPC

# TRANSMISSION ONLY

## Tx9. Develop market power procedures for ESR transmission facilities

- Recommendation: The SPP MMU should study whether market power issues arise from the use of an ESR as a transmission-only asset. If the MMU has concerns, it should work with the MWG and ORWG to develop procedures to mitigate and/or monitor these issues
- Priority: High
- Stakeholder Groups: MMU, MWG, ORWG
- Status: Research and Analysis
- Timeline: TBD

# TRANSMISSION & ENERGY INITIATIVE RECOMMENDATIONS

Tx10 (L)

- Develop procedures for ESRs used as Energy and Transmission

Tx11 (H)

- Coordinate interconnection and transmission planning studies

Tx12 (L)

- Determine policy for market revenues of ESR transmission facilities

Tx13 (L)

- Develop settlement procedures for separating energy and transmission

Tx14 (L)

- Determine responsibility for charging multi-use ESRs

# TRANSMISSION & ENERGY

## Tx10. Develop procedures for ESRs used as Energy and Transmission

- Scope: For ESRs used for energy and transmission, SPP must define which purpose has priority and coordinate these two functions. For instance, energy may incidentally result from an ESR's use as a transmission facility, regardless of the energy pricing. Conversely, an ESR may need to be charged for transmission use even if market prices are high
- Recommendation: The ORWG and MWG are to develop procedures for ESRs used as both energy and transmission. They should coordinate with the CAWG, RTWG and TWG on these procedures
- Priority: Low
- Stakeholder Group: ORWG, MWG, CAWG, RTWG, TWG
- Status: Waiting on ESRTF strategic decision on multi-use
- Timeline: TBD

# TRANSMISSION & ENERGY

## Tx11. Coordinate interconnection and transmission planning studies

- Scope: SPP will study a transmission-only ESR as part of a transmission study. For an ESR to participate in the energy market, it must also have an interconnection study
- Recommendation: Recommend and document a process for studying ESRs as both a transmission and energy facility
- Priority: High
- Stakeholder Group: Staff, others TBD
- Status: Waiting on ESRTF strategic decision on multi-use
- Timeline: TBD



# TRANSMISSION & ENERGY

## Tx12. Determine policy for market revenues of ESR transmission facilities

- Scope: An ESR receiving revenues from both energy and transmission may be in an unfair competitive position when transmission revenues, including a rate-of-return, reduce costs of Integrated Marketplace participation. An ESR could either earn a return in excess of the allowed return for a transmission asset (“double-dip”) or bid into the market at lower than its marginal cost.
- Recommendation: Develop a policy recommendation to address an ESR’s potential “double-dip” of revenues or below-cost bidding in the Integrated Marketplace
- Priority: Low
- Stakeholder Group: MWG, CAWG
- Status: Waiting on ESRTF strategic decision on multi-use
- Timeline: TBD

# TRANSMISSION & ENERGY

## Tx13. Develop settlement procedures for separating energy and transmission

- Scope: When an ESR is participating as both energy and transmission, it is necessary to separate those activities and billing determinants to allow the settlement of both energy and transmission service
- Recommendation: Develop the measurement and verification processes for properly settling transmission and energy markets
- Priority: Low
- Stakeholder Group: ORWG, MWG, CAWG, RTWG
- Status: Waiting on ESRTF strategic decision on multi-use
- Timeline: TBD

# TRANSMISSION & ENERGY

## Tx14. Determine responsibility for charging multi-use ESRs

- Scope: Under FERC Order 841, an ESR participating in the energy and related products market defaults to self-determination on charging decisions. If the ESR is participating as transmission-only, SPP needs to determine whether SPP, transmission operators or ESR operators should be responsible for maintaining an ESR's charge (see recommendation Tx8). When an ESR is also participating as both energy and transmission, it may be necessary to determine a different charging responsibility
- Recommendation: Determine and submit tariff changes regarding the responsibility for maintaining charge for ESRs used as transmission and energy
- Priority: Low
- Stakeholder Group: ORWG, MWG
- Status: Waiting on ESRTF strategic decision on multi-use
- Timeline: TBD

# TRANSMISSION & CAPACITY

- Tx15 (L) • Develop policy for ESRs used for capacity, energy, and transmission
- Tx16 (H) • Coordinate interconnection, deliverability and transmission planning studies
- Tx17 (L) • Develop policy regarding upgrade costs for ESRs used for transmission and capacity
- Tx18 (L) • Determine appropriateness of capacity resource cost recovery in transmission charges
- Tx19 (L) • Develop procedure for identifying capacity resource costs of ESR transmission facilities
- Tx20 (L) • Develop capacity accreditation and testing methodology

# TRANSMISSION & CAPACITY

## Tx15. Develop policy for ESRs used for capacity, energy, and transmission

- Scope: An ESR justified for transmission purposes might later be considered as capacity to meet resource adequacy obligations. Both policy and operational concerns arise over this cross-functional use. The policy concern is over the ESR's availability to provide energy when called on to perform as capacity versus the ESR's availability to provide the transmission reliability function. The operational concern is the same as that for a resource providing energy and related products: coordinating its use for energy or capacity versus transmission reliability
- Recommendation: Determine whether an ESR installed for transmission reliability can also be considered capacity to meet the resource adequacy obligation. The groups should develop procedures for this cross-functional use, if appropriate
- Priority: Low
- Stakeholder Group: ORWG, MWG, SAWG
- Status: Waiting on ESRTF strategic decision on multi-use
- Timeline: TBD

# TRANSMISSION & CAPACITY

## Tx16. Coordinate interconnection, deliverability and transmission planning studies

- Scope: SPP will study a transmission-only ESR as part of a transmission study. An ESR used as capacity to meet resource adequacy obligations must be studied for deliverability to load. For the ESR to inject and withdraw energy to perform as capacity, it must also have an interconnection study
- Recommendation: SPP staff is to recommend and document the processes by which an ESR is studied as a transmission facility, for deliverability to load and for interconnection
- Priority: High
- Stakeholder Group: Staff, others TBD
- Status: Waiting on ESRTF strategic decision on multi-use
- Timeline: TBD

# TRANSMISSION & CAPACITY

## Tx17. Develop policy regarding upgrade costs for ESRs used for transmission and capacity

- Scope: When an ESR is studied in transmission planning to resolve a transmission reliability issue, any resulting transmission expansion is considered part of the solution. When an ESR is participating as capacity to meet a resource adequacy obligation, transmission expansion may be necessary under the deliverability analysis to specific load. An ESR's capacity use could result in additional transmission costs when the primary purpose of the ESR is to provide transmission reliability while mitigating or reducing costs.
- Recommendation: Recommend a policy to address studies that result in an increase rather than decrease in transmission costs due to ESRs used for both transmission and capacity
- Priority: Low
- Stakeholder Group: TWG, CAWG
- Status: Waiting on ESRTF strategic decision on multi-use
- Timeline: TBD

# TRANSMISSION & CAPACITY

## Tx18. Determine appropriateness of capacity resource cost recovery in transmission charges

- Scope: Most capacity resources recover their capital costs through either rates charged to their load or through contracts with third parties. An ESR that is a transmission facility will recover its costs (including a return) with an ATRR included in transmission charges. Those transmission charges may be paid by transmission customers throughout the region, including the capacity resource's retail load. When the ESR used for transmission is also considered capacity to satisfy a resource adequacy obligation, the costs of that capacity may actually be borne by parties other than the load-responsible entity.
- Recommendation: Recommend a policy regarding cost recovery through transmission revenues for an ESR that is also used as resource adequacy capacity
- Priority: Low
- Stakeholder Group: CAWG, SAWG
- Status: Waiting on ESRTF strategic decision on multi-use
- Timeline: TBD



# TRANSMISSION & CAPACITY

## Tx19. Develop procedure for identifying capacity resource costs of ESR transmission facilities

- Scope: If an ESR provides both transmission and capacity, its costs for each service are charged differently (see Tx18). Appropriate cost allocation needs to separate the costs for provision of each service. This separation impacts economic analysis in SPP's transmission planning studies
- Recommendation: Recommend a mechanism that separates facility costs related to capacity provision from costs related to transmission provision. The mechanism should consider the impact on SPP's economic planning studies
- Priority: Low
- Stakeholder Group: CAWG, SAWG, TWG, Staff
- Status: Waiting on ESRTF strategic decision on multi-use
- Timeline: TBD

# TRANSMISSION & CAPACITY

## Tx20. Develop capacity accreditation and testing methodology

- Scope: As discussed in recommendation C1, SPP does not have an explicit accreditation policy for ESRs. When an ESR is cross-functional, there is an impact on how much accreditation should be attributed to the capacity for resource adequacy and how much should be attributed as a transmission facility. An ESR's cross-functional ability increases accreditation complexity. Additionally, when an ESR is tested for capacity accreditation, there may be a conflict if the ESR is being used for transmission
- Recommendation: Determine an accreditation and testing methodology that reflects ESRs' use as transmission and capacity
- Priority: Low
- Stakeholder Group: SAWG, Staff
- Status: Waiting on ESRTF strategic decision on multi-use
- Timeline: TBD

# ENERGY & RELATED SERVICES INITIATIVE RECOMMENDATIONS

- E1 (H) • Develop ESR transmission planning study process
- E2 (H) • Develop process for modeling and controlling ESR hybrid configurations
- E3 (M) • Study cost/benefits and develop tariff changes for fast-start ESR charging
- E4 (H) • Determine limits for fast-responding ESRs
- E5 (M) • Determine feasibility of regional aggregation for reserve-only ESRs
- E6 (H) • Develop requirements for non-conforming load from unregistered ESRs
- E7 (M) • Determine ESR qualification for essential and other reliability services
- E8 (M) • Reconcile ESR duration with reserve duration requirement
- E9 (L) • Analyze the cost/benefit of adding SPP charging control

# ENERGY & RELATED SERVICES

## E1. Develop ESR transmission planning study process

- Scope: ESR is similar to a generator when it injects energy onto the transmission grid. When an ESR is charging, it is load. SPP analyzes new generators in its generator interconnection study process and analyzes new load in its delivery-point-addition study process. Because these are two separate study processes, SPP needs to determine how to study a resource that acts as generation and load.
- Recommendation: Develop a process for analyzing an ESR as both a load and generation
- Priority: High
- Stakeholder Group: TWG, Staff
- Status: Research and Analysis
- Timeline: TBD

# ENERGY & RELATED SERVICES

## E2. Develop process for modeling and controlling ESR hybrid configurations

- Scope: The majority of ESRs in SPP are being combined with solar projects for tax credit purposes. The prime locations for ESRs are where wind and solar installations already exist. Storage could be co-located with other generation types as well
- Recommendation: Evaluate and recommend a modeling process for co-located ESR and generation
- Priority: High
- Stakeholder Group: MWG, ORWG, Staff
- Status: Design, modeling option determined
- Timeline: TBD

# ENERGY & RELATED SERVICES

## E3. Study cost/benefits and develop Tariff changes for fast-start ESR charging

- Scope: FERC's Section 206 fast-start proceeding caused SPP to begin analyzing the concept of "fast-start negative generation": an offline ESR being directed to receive energy (charging) from the transmission grid. This is similar to the fast-start market design that orders a conventional resource "on" from an offline state to inject energy. With a conventional resource, the costs associated with generating from an offline state are well defined and included in the submitted start-up and no-load costs that the resource submits to SPP
- Recommendation: Evaluate the costs and benefits of using an ESR as fast-start negative generation. The groups should develop tariff changes for ESRs as fast-start negative generation, including market mitigation measures as necessary
- Priority: Medium
- Stakeholder Group: MWG, ORWG
- Status: Not started
- Timeline: TBD

# ENERGY & RELATED SERVICES

## E4. Determine limits for fast-responding ESRs

- Scope: The bulk electric system depends on a diversity of generator response to operate reliably. An excess of fast-responding ESRs for specific services, such as regulation, may be detrimental to reliability.
- Recommendation: Determine and recommend fast-response ESR participation limits that may be necessary for specific services, such as regulation, to maintain reliable operations
- Priority: High
- Stakeholder Group: ORWG, Staff
- Status: Design
- Timeline: TBD

# ENERGY & RELATED SERVICES

## E5. Determine feasibility of regional aggregation for reserve-only ESRs

- Scope: ESR developers have discussed with SPP staff the possibility of only providing operating reserves. Generally, within SPP, reserves are not locationally constrained; they can be regional. If ESRs provide only reserves, SPP could consider allowing aggregation of smaller ESRs across the SPP region.
- Recommendation: Evaluate whether the aggregation of ESRs across the SPP region would be appropriate from operational and market perspectives. If so, the groups should recommend tariff changes
- Priority: Medium
- Stakeholder Group: ORWG, MWG, Staff
- Status: Not started
- Timeline: TBD



# ENERGY & RELATED SERVICES

## E6. Develop requirements for non-conforming load from unregistered ESRs

- Scope: ESRs could impact retail load and be unregistered in the SPP market; SPP would not have visibility into the separate load and ESR. Eventually, the impact on the retail load could be of such magnitude that SPP would be unable to forecast the load accurately and would need LSEs to submit data to properly balance load and generation.
- Recommendation: Analyze and recommend procedure changes necessary to account for load not forecastable by SPP (non-conforming load)
- Priority: High
- Stakeholder Group: ORWG, Staff
- Status: Research and Analysis
- Timeline: January MOPC

# ENERGY & RELATED SERVICES

## E7. Determine ESR qualification for essential and other reliability services

- Scope: The HITT recommended that SPP identify essential reliability services (ERS) and other reliability services (ORS). Once these services are identified, the ability of an ESR to provide those services needs to be evaluated
- Recommendation: Identify necessary changes to the tariff for an ESR to provide the appropriate ERS and ORS
- Priority: Medium
- Stakeholder Group: MWG, ORWG, RTWG
- Status: Not started
- Timeline: TBD

# ENERGY & RELATED SERVICES

## E8. Reconcile ESR duration with reserve duration requirement

- Scope: The SPP market co-optimizes resources between energy and operating reserves. Currently, an operating reserve must be able to provide energy for at least an hour. If an ESR has been providing energy and is then identified to provide contingency reserves, it could have insufficient charge to meet the reserve duration obligation.
- Recommendation: Recommend necessary system changes to prevent an inappropriate market co-optimization
- Priority: Medium
- Stakeholder Group: Staff, Others TBD
- Status: Not started
- Timeline: TBD

# ENERGY & RELATED SERVICES

## E9. Analyze the cost/benefit of adding SPP charging control

- Scope: FERC Order 841 was explicit in its direction to allow an ESR to manage its own state of charge. In some respects, this self-determination has made it easier for SPP to design and implement the initial phase of storage. The market participant can decide the most opportune times to charge. SPP should discuss a longer, financially binding solution that can control ESR charging for future projected needs and ensure it is economically beneficial for the ESR. There are multiple ways to solve the optimization issues that are presented with increased storage penetration.
- Recommendation: Evaluate the cost/benefit of providing an SPP charging control option
- Priority: Low
- Stakeholder Group: MWG, ORWG, Staff
- Status: Not started
- Timeline: TBD

# CAPACITY FOR RESOURCE ADEQUACY INITIATIVE RECOMMENDATIONS

C1 (H)

- Determine ESR capacity accreditation process

C2 (H)

- Determine ESR duration and availability requirement

C3 (H)

- Determine maximum amount of ESRs allowed in resource adequacy portfolio

# CAPACITY FOR RESOURCE ADEQUACY

## C1. Determine ESR capacity accreditation process

- Scope: It is recognized that ESRs will be eligible to meet SPP's resource adequacy requirement. In its FERC Order 841 compliance filing, SPP stated that, per SPP Planning Criteria Section 7, an ESR requires a four-hour accreditation value. For example, a 100 MW-hour battery would have an accreditation value of 25 MW, as it would need to be available for four hours
- Due to the uncertainty of exactly how ESRs will be used in future day-to-day operations, SPP staff and the SAWG are studying ESR accreditation using the effective load-carrying capability (ELCC) methodology.
- Recommendation: Recommend the ESR accreditation process and coordinate with the ORWG as to the practical application of the process
- Priority: High
- Stakeholder Group: SAWG
- Status: Design
- Timeline: TBD

# CAPACITY FOR RESOURCE ADEQUACY

## C2. Determine ESR duration and availability requirement

- Scope: The ELCC study for capacity accreditation will evaluate several different aspects of potential ESR operation to determine if the four-hour duration is appropriate. The ELCC study will evaluate the possibility of ESRs being dispatched solely to preserve reliability, presumably via SPP market dispatch. It will also evaluate an economic arbitrage dispatch option, which is dispatch by the user when prices are optimal. Additional scenarios will analyze the impact of hybrid facilities (such as ESR/solar, ESR/wind, and ESR/wind/solar) in which the ESR is only charged by its co-located generation, which limits charging capability
- Recommendation: Recommend the duration and real-time availability criteria for an ESR to be considered as capacity for resource adequacy obligation
- Priority: High
- Stakeholder Group: SAWG, ORWG
- Status: Design
- Timeline: TBD

# CAPACITY FOR RESOURCE ADEQUACY

## C3. Determine maximum amount of ESRs allowed in resource adequacy portfolio

- Scope: An ESR does not create new energy but rather shifts when energy is used. Meeting SPP's resource adequacy obligation with 100% ESRs would create reliability issues because there would be insufficient new energy to charge the ESRs. SPP should consider putting limits on how much ESR capacity could be included in the resource adequacy portfolio.
- Recommendation: Analyze and recommend a maximum amount of ESRs to be allowed to provide capacity for SPP's resource adequacy obligation as well as any necessary parameters related to application of such a maximum
- Priority: High
- Stakeholder Group: SAWG, ORWG
- Status: Design
- Timeline: TBD



# OTHER TARIFF ISSUES INITIATIVE RECOMMENDATIONS

- T1 (M) • Review tariff's VER definition
- T2 (H) • Develop tariff changes defining ESR retail vs. wholesale service
- T3 (L) • Evaluate impact of commercial mobile ESRs
- T4 (M) • Evaluate changes to market registration requirement
- T5 (L) • Recommend tariff changes for mobile retail ESRs

# OTHER TARIFF ISSUES

## T1. Review tariff's VER definition

- Scope: An ESR does not create new energy but rather shifts when energy is used. Meeting SPP's resource adequacy obligation with 100% ESRs would create reliability issues because there would be insufficient new energy to charge the ESRs. SPP should consider putting limits on how much ESR capacity could be included in the resource adequacy portfolio
- Recommendation: review the tariff's VER definition to determine if changes are necessary regarding ESRs co-located with VERs. The groups should propose tariff changes if needed
- Priority: Medium
- Stakeholder Group: Staff, RTWG
- Status: Not started
- Timeline: TBD

# OTHER TARIFF ISSUES RECOMMENDATIONS

## T2. Develop tariff changes defining ESR retail vs. wholesale service

- Scope: Order 841 recognized that an ESR may simultaneously provide retail and wholesale service. Currently, the load-service entity (through a market participant) separates wholesale from retail activity. SPP should consider if the tariff needs to include more specificity on this issue
- Recommendation: Determine if tariff changes are necessary to delineate whether an ESR is providing retail or wholesale service
- Priority: High
- Stakeholder Group: CAWG, RTWG, Staff
- Status: Research and Analysis
- Timeline: TBD

# OTHER TARIFF ISSUES

## T3. Evaluate impact of commercial mobile ESRs

- Scope: FERC is considering rule changes for commercial mobile ESRs.<sup>7</sup> An example of a commercial mobile ESR is a battery on a railroad car. SPP needs to consider the implications of mobile ESRs, such as whether the transmission service incurred is an export and whether limitations should be placed on treatment of such ESRs as capacity
- Recommendation: Monitor commercial mobile storage developments and recommend any necessary tariff changes regarding transmission service
- Priority: Low
- Stakeholder Group: RTWG, Staff
- Status: Not started
- Timeline: TBD

# OTHER TARIFF ISSUES

## T4. Evaluate changes to market registration requirement

- Scope: The SPP tariff states that any behind-the-meter (on the distribution system) generation of 10 MW or greater must be registered in the energy market. FERC Order 841 states that ESRs injecting to the transmission system may be considered FERC jurisdictional and included in wholesale energy markets, even if the ESR is less than 10 MW and connected to distribution facilities. This issue is one of the items currently appealed to the DC Circuit Court.<sup>8</sup> The SPP tariff registration requirement for behind-the-meter generation may be inconsistent with FERC Order 841.
- Recommendation: Recommend any necessary tariff changes to address behind-the-meter generation
- Priority: Medium
- Stakeholder Group: RTWG, MWG, Staff
- Status: Not started
- Timeline: TBD

# OTHER TARIFF ISSUES

## T5. Recommend tariff changes for mobile retail ESRs

- Scope: In addition to stationary ESRs, advances in plug-in electric vehicles open the possibility of using vehicles as mobile retail ESRs. SPP should discuss if mobile retail ESRs could participate in SPP's wholesale energy market
- Recommendation: Consider if mobile retail ESRs should be able to participate in SPP's market and recommend any necessary tariff changes
- Priority: Low
- Stakeholder Group: RTWG, CAWG
- Status: Not started
- Timeline: TBD

# NEW & ADDITIONAL POLICY ISSUES

- Impact of storage as transmission on LMP
- Qualification of storage to be a transmission facility
- Use of storage to resolve N-0, N-1, and N-2 issues
- Other ongoing initiatives
  - Planning ESR project
  - Market roadmap SIR 30 – ESR state of charge management, etc.

# WRAPPING UP

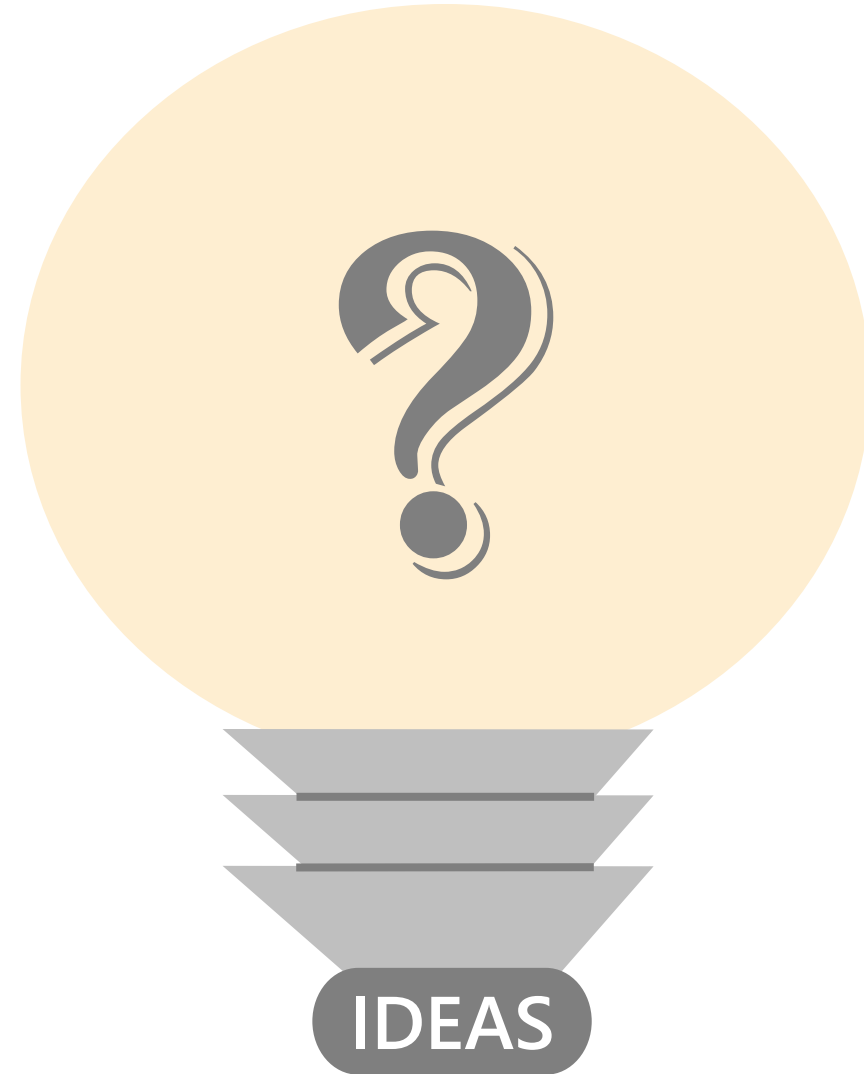


# WHAT'S NEXT

- January 2021 - ongoing
  - ESR initiative discussions staged consistently across working groups
- January 2021 MOPC
  - Deeper dive into initiatives
  - ESR initiative workflow/reporting structure development
  - Full ESR initiative management plan development
- Continued updates at ESRSC
- ESR initiative master list, other resources and tools coming soon

# WHAT DO YOU THINK?

Tell us more, complete the [ESR framework management survey](#)



# RESOURCES & REFERENCE

- [ESRSC Webpage](#)
- [ESRTF Webpage](#)
- [FERC Order 841](#)
- [FERC Order 2222](#)
- Coming soon: ESR Initiative Master List



## **CONTACT SLIDE**

Richard Dillon

[rdillon@spp.org](mailto:rdillon@spp.org)

Tech Dir, Market Policy, Market Policy