



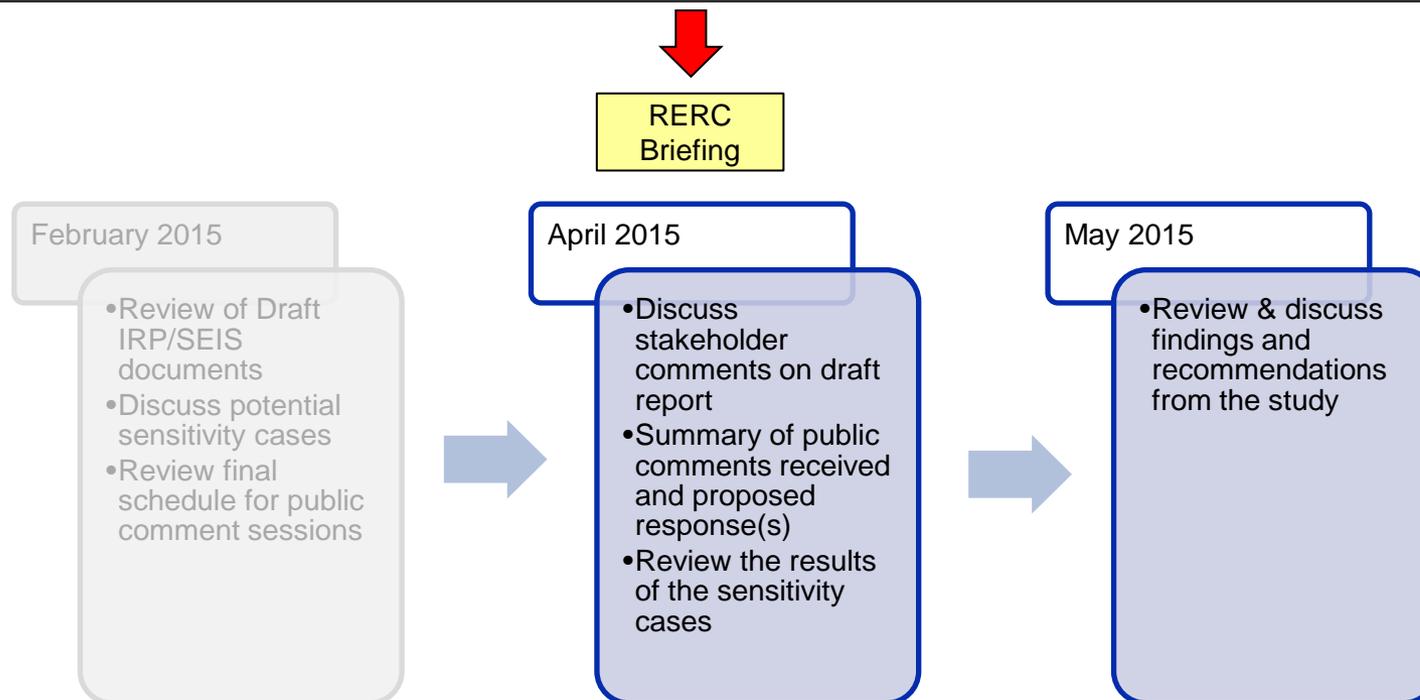
2015 INTEGRATED RESOURCE PLAN

IRPWG Meeting

Session 13

April 9-10

Day 1



During the April meeting, we aim to accomplish the following objectives:

- ◆ Explain actions taken to address and close the open items from previous sessions
- ◆ Solicit feedback from IRPWG members on the draft report
- ◆ Present a summary of public comments received and proposed response(s)
- ◆ Review the results of the sensitivity cases

IRPWG Meeting – April 9th Agenda

| Time | Topic | Presenter |
|------|--|-----------------------------------|
| 3:30 | Welcome – Session Objectives | Randy McAdams |
| 3:35 | Public Comments Received to Date Review of Open Items | Gary Brinkworth |
| 3:45 | IRPWG Input on the Draft Report | Gary Brinkworth/ Randy McAdams |
| 4:45 | Status of Sensitivity Analysis | Tom Rice |
| 5:15 | Overview of Next Day | Randy McAdams |
| 5:20 | Adjourn | |

IRPWG Meeting – April 10th Agenda

| Time | Topic | Presenter |
|-------|--|-----------------|
| 8:30 | Welcome – Session Objectives Main Takeaways from Day 1 | Randy McAdams |
| 8:45 | Sensitivity Case Results: <ul style="list-style-type: none">- Presentation of results- Feedback From Stakeholders | Tom Rice |
| 11:45 | Public Session Calendar and Next Steps | Gary Brinkworth |
| 12:00 | Lunch/Adjourn | |

Public Comments Received To Date



Summary Comments Received During the Public Sessions

- ◆ Two Public Session have been held to date: Chattanooga on March 19th and Knoxville on April 6th ; the third session is schedule today in Huntsville
- ◆ The main comments received during the sessions around the following themes:

| Topic | Comments |
|---------------------|---|
| Strategic direction | <ul style="list-style-type: none">– Several comments expressed satisfaction with the strategic direction that the IRP is signaling; quoting one of the attendants: “I applaud the fact that the compass is pointing in a better direction”– Others suggested that TVA should consider alternative delivery mechanisms for energy efficiency |
| Portfolio | <ul style="list-style-type: none">– Some attendees wanted to see more investment and funding of EE programs– Several questions and comments around the performance of renewable resources during peak-hours– Some questions about the level of wind resources in the results– Others suggested the use of storage to reduce intermittence issues– Some attendees proposed testing a strategy in which the vast majority of resources are renewable– Several comments around how the IRP covers uncertainties on natural gas supply/price |
| Environment | <ul style="list-style-type: none">– Some comments around the environmental impact of continuing using coal– Some attendants asked if TVA has modelled the impact on public health |



Summary Comments Received During the Public Sessions (Cont.)

| Topic | Comments |
|-------------------|---|
| Model Assumptions | <ul style="list-style-type: none"> – Several attendees asked if TVA is using the most current data when modelling renewables and energy efficiency – Several comments challenging the assumptions around uncertainty in the performance of energy efficiency |
| Financials | <ul style="list-style-type: none"> – Some attendees commented that TVA should consider the full cost to the system & the ratepayers: “One main objective should be to keep the power affordable” – Other commented: “TVA needs to include distributor lost revenue in the cost model” |
| Socioeconomics | <ul style="list-style-type: none"> – Several comments about social impact of increased levels of EE and renewables – Others question if consumers are willing to pay more for renewables – Some attendees proposed increasing the efforts in customer education |



Summary of Public Comments Received On-line

- ◆ We have received 15 emailed comments so far with topics similar to the ones received during the public sessions

| Topic | Comments |
|---------------------|---|
| Strategic direction | <ul style="list-style-type: none">– “Because of budget cuts, TVA has failed to deliver on its promise in the 2011 IRP to become a regional leader in energy efficiency”– “Maximize energy efficiency because it is the lowest cost and least environmentally damaging energy resource”– “Over long term, lowest cost, cleanest solution is energy efficiency, wind, and solar, backed up by natural gas plants”– General support for increased use of solar energy |
| Portfolio | <ul style="list-style-type: none">– Some suggest TVA has used improper cost assumptions for energy efficiency and unreasonably restricted the growth of energy efficiency programs– Other comments stay that TVA has used incorrect and/or outdated assumptions for wind energy: overestimation of cost while underestimating its value and not properly addressed foreseeable improvements in wind turbine technology– Some comments express concerns over impacts from the extraction of the increased quantities of natural gas required by all strategies |
| Environment | <ul style="list-style-type: none">– “Given the relatively similar costs of the strategies, select the strategy with the lowest CO2 emissions” |
| Socioeconomics | <ul style="list-style-type: none">– Some comments ask to emphasize education as component of energy efficiency programs– Others ask for time-of-day pricing to reduce peak demand |



Review of Open Items Draft IRP Content

| # | IRPWG Comment/Question/Recommendation | TVA Response |
|-----|---|--|
| ✓ 1 | When laying out preferred planning direction, preserve flexibility of Board to make decisions down the road (don't shut off options). | No preferred direction yet: addressed in Final IRP |
| ✓ 2 | Include qualitative discussion addressing rates, jobs, and economic impacts in some way beyond valley econ metric. Rates and jobs are critical to valley residents. | Language addressing these items was inserted into Chapter 8 of the Draft IRP |
| ✓ 3 | Include discussion of rates and how they impact vulnerable populations. | |
| ✓ 4 | Include discussion of policy questions: cost shifting, emissions levels, asset ownership, relationships between TVA and LPCs, etc. | |
| ✓ 5 | Include qualitative discussion of strategy results after the planning period (2034-2043). | Will be considered in future resource planning studies |

✓ = Item has been addressed or method of addressing item has been established and resolution is in process



Review of Open Items Modeling

| # | IRPWG Comment/Question/Recommendation | TVA Response |
|------|---|--|
| ✓ 6 | Clarify the EE Net-to-Gross calculation. | Clarifying language inserted into the draft document and/or a technical appendix |
| ✓ 7 | Explain differences between realization rate and net to gross. Is there some double counting going on? | |
| ✓ 8 | What mechanisms will be put in place to learn over time to improve the modeling methodology? | |
| ✓ 9 | Explain basis for block lifespan. | |
| ✓ 10 | Are contingency costs built into the design of the block? | |
| ✓ 11 | Consider including water evaporation due to temperature differential between return and river. Run sensitivity to minimize water consumption in the Cumberland Watershed. | These factors will be considered in future resource planning studies |
| ✓ 12 | Consider Load factor as a measure of flexibility (Peak over Average). | |
| ✓ 13 | Consider looking at CO2 over 111(d) compliance period. Instead of planning period. | |
| ✓ 14 | How is winter net dependable peak factored into the analysis? | Response will be posted to the Accellion site |

✓ = Item has been addressed or method of addressing item has been established and resolution is in process





Review of Open Items Modeling (Cont'd)

| # | IRPWG Comment/Question/Recommendation | TVA Response | |
|------|---|--|---|
| ✓ 15 | Recognize there are risks associated with the Focus on Long-Term Market-Supplied Resources strategy that are not necessarily captured | To be addressed through sensitivity analysis | |
| ✓ 16 | Run sensitivities around EE modeling: adjust planning factor, Tier 2 & 3 costs, and the ramp rate, and conduct a combined sensitivity case adjusting all three simultaneously (SACE and SELC letters received early March). | | |
| ✓ 17 | Run sensitivities around RE modeling: increase NDC factor for wind, reduce wind and solar cost assumptions (SACE and SELC letters received early March). | | |
| ✓ 18 | Rerun strategy B with a more aggressive emissions target to stress results further – may see emergence of nuclear? | | |
| ✓ 19 | Are we double counting delivery risk already accounted for in block design? | | |
| ✓ 20 | Research shows EE portfolio costs go down over time, but these escalate? | | |
| ✓ 21 | Realization risk is modeled as a downside risk when it could go (and has been shown to typically go) the other way? | | |
| ✓ 22 | Look at strategies D&E without restricting nuclear or change the stated parameters so they don't suggest that nuclear is excluded from the optimization process. | | |
| ✓ 23 | How would you treat the study or inform the results in a high CO2 environment? | | Strategy B and Scenario 4 address this question |

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Review of Open Items

Communicating/Reporting Results

| # | IRPWG Comment/Question/Recommendation | TVA Response |
|------|---|---|
| ✓ 24 | Consider implications of DG on system (must be able to back-up those resources with TVA cap/energy) - perhaps show overall level of renewables on system, not just on utility side of meter. Also, state explicitly that TVA is NOT backing up any portion of the DG included in the load forecast. | Clarifying language and/or data visualization included in the Draft IRP, chapters 7 and 8 |
| ✓ 25 | Break out Wind and Solar in capacity/energy charts. | |
| ✓ 26 | Be careful with labeling. Specifically: Risk is TVA financial Risk (make that clear); "short term cost impact" is confusing when talking about 2nd decade of study period; size of bubbles in trade-off graph overemphasize differences and importance of risk exposure. | |
| ✓ 27 | Specify self-build versus market purchases. | |
| ✓ 28 | Show evolution of System Turndown Factor over time – similar to representation of System Regulating Capability. | |
| ✓ 29 | Show balance sheet accounts over time in addition to cost accounts. | This type of business sensitive information is not included in the IRP report |
| ✓ 30 | Show historical system average cost trend (past 20 years). | Response will be posted to the Accellion site |
| ✓ 31 | Show reserve margins over time. | Response will be posted to the Accellion site |

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Input From IRPWG on Draft Report

- ◆ The goal of this session is to give each and every stakeholder group an opportunity to speak so that we can capture your input
- ◆ We would like to hear from you about your feedback on the draft IRP report: your main observations on findings, the format and the information provided
- ◆ We will transmit your feedback to the RERC group during their next session
- ◆ Guidelines
 - Each member will have three minutes to discuss any observations, feedback, questions, or input
 - Stakeholders will be respectful while others are speaking and respectful of the time limit when it is his/her turn to provide input
 - This is not a time for debate or response. During this session, we want to capture each participant's input



Sensitivity Analysis: Updated Case Listing

| Sensitivity Case Name |
|-----------------------------------|
| Nuclear Sensitivities |
| Bellefonte U1 and U1 & U2 |
| AP 1000 |
| SMRs |
| EEDR Sensitivities |
| No EE Planning Factor Adjustment |
| EE Ramp Rate |
| No EE Resources |
| No DR Resources |
| No EEDR Resources |
| Renewable Sensitivities |
| Extension of Solar Tax Credits |
| Higher HVDC Wind NDC & Lower cost |
| Slower Solar Cost De-escalation |
| Slower Wind Cost De-escalation |

| Sensitivity Case Name |
|-------------------------------|
| Resource Sensitivities |
| Pumped Storage |
| Compressed Air Energy Storage |
| PC with CCS |
| IGCC with CCS |
| Biomass |
| Other Sensitivities |
| Higher load |
| No CO2 |
| Low gas price |
| High gas price |
| Strategy C Sensitivity |



Day 2 Overview

| Time | Topic | Presenter |
|-------|--|-----------------|
| 8:30 | Welcome – Session Objectives Main Takeaways from Day 1 | Randy McAdams |
| 8:45 | Sensitivity Case Results: <ul style="list-style-type: none">- Presentation of results- Feedback From Stakeholders | Tom Rice |
| 11:45 | Public Session Calendar and Next Steps | Gary Brinkworth |
| 12:00 | Lunch/Adjourn | |

During tomorrow's session, we aim to accomplish the following objective:

- ◆ Review the results of the sensitivity cases

Adjourn



2015 INTEGRATED RESOURCE PLAN

IRPWG Meeting

Session 13

April 9-10

Day 2

IRPWG Meeting – April 10th Agenda

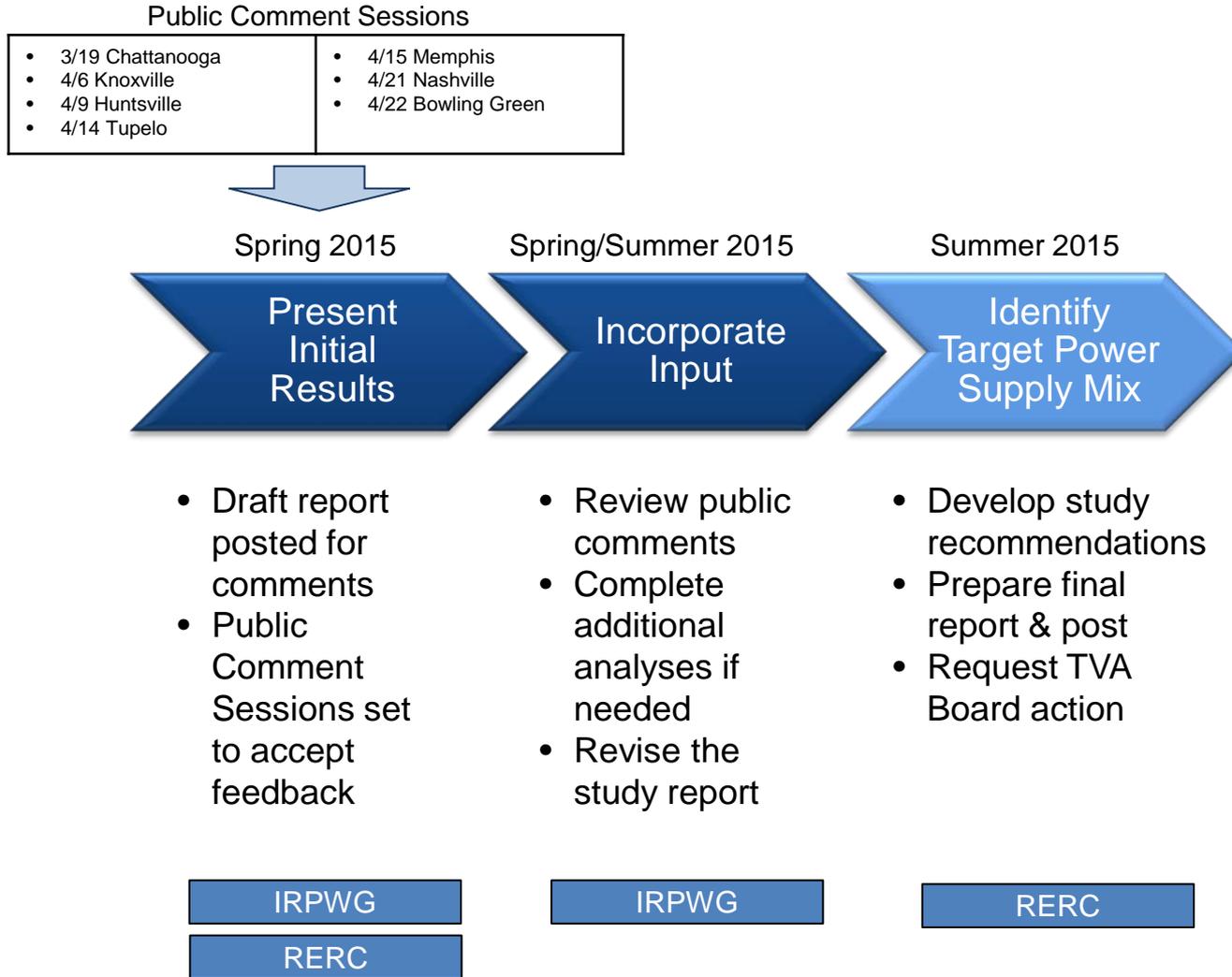
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Main Takeaways from Day 1

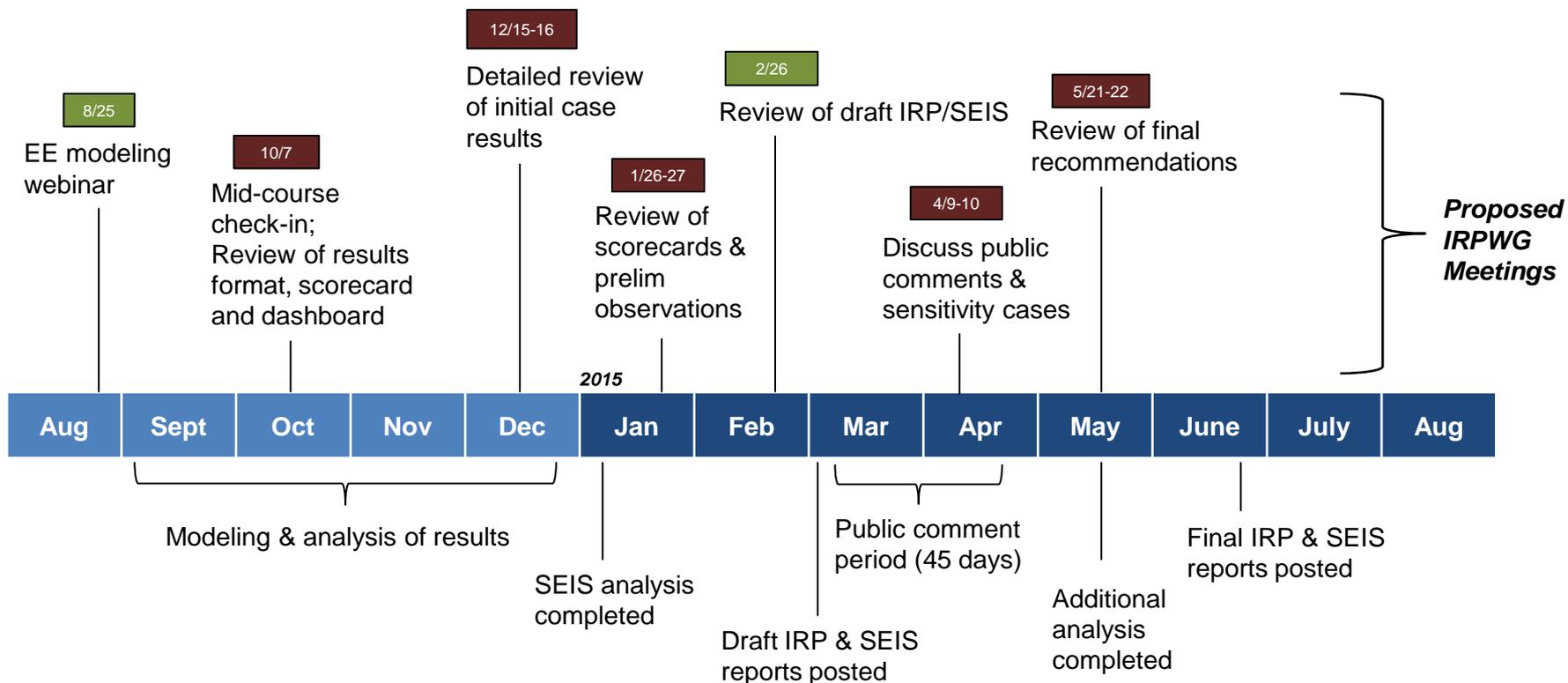
Placeholder...

Handouts will be provided on the day of the session





2015 IRP/SEIS Schedule: Major Milestones & Stakeholder Sessions

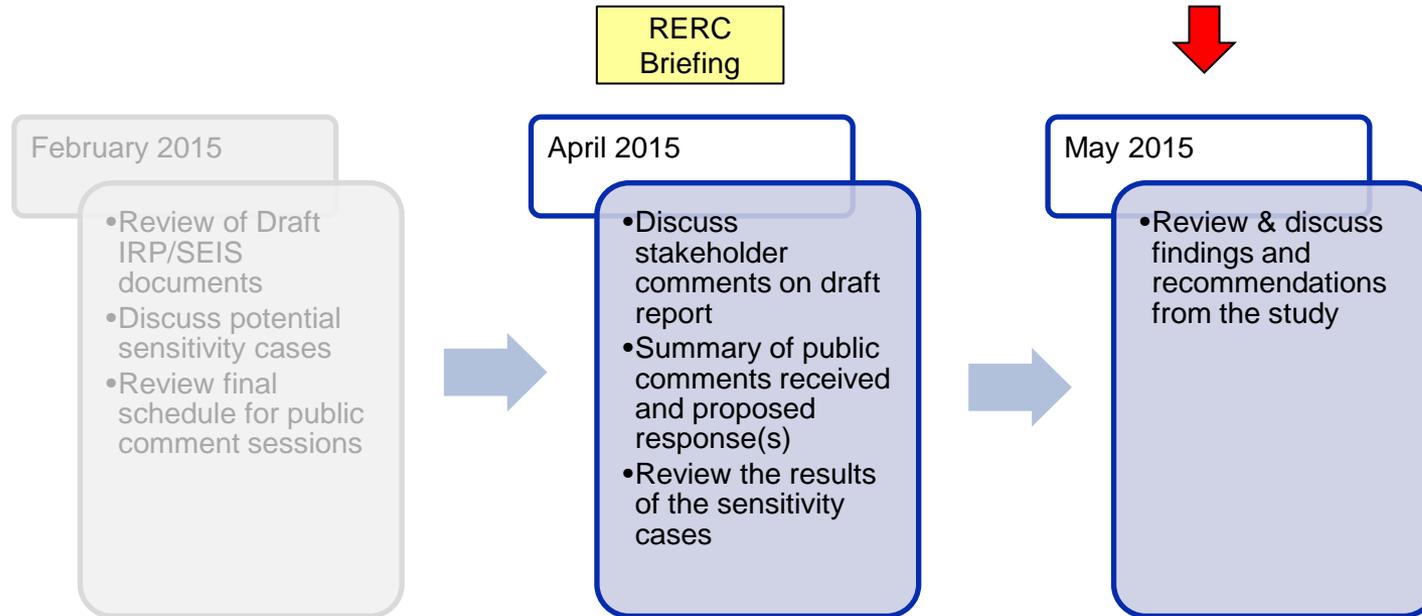


Schedule changes since the February stakeholder meeting:

- May session dates have shifted a week later than originally planned
- Start time for May 21 will be noon to accommodate a morning conflict
- Please plan to attend a thank-you dinner on May 21st



TVA April IRPWG Meeting Objectives



During the May meeting will review and discuss the final findings that will be included in the final report

Adjourn