Transmission & Substations

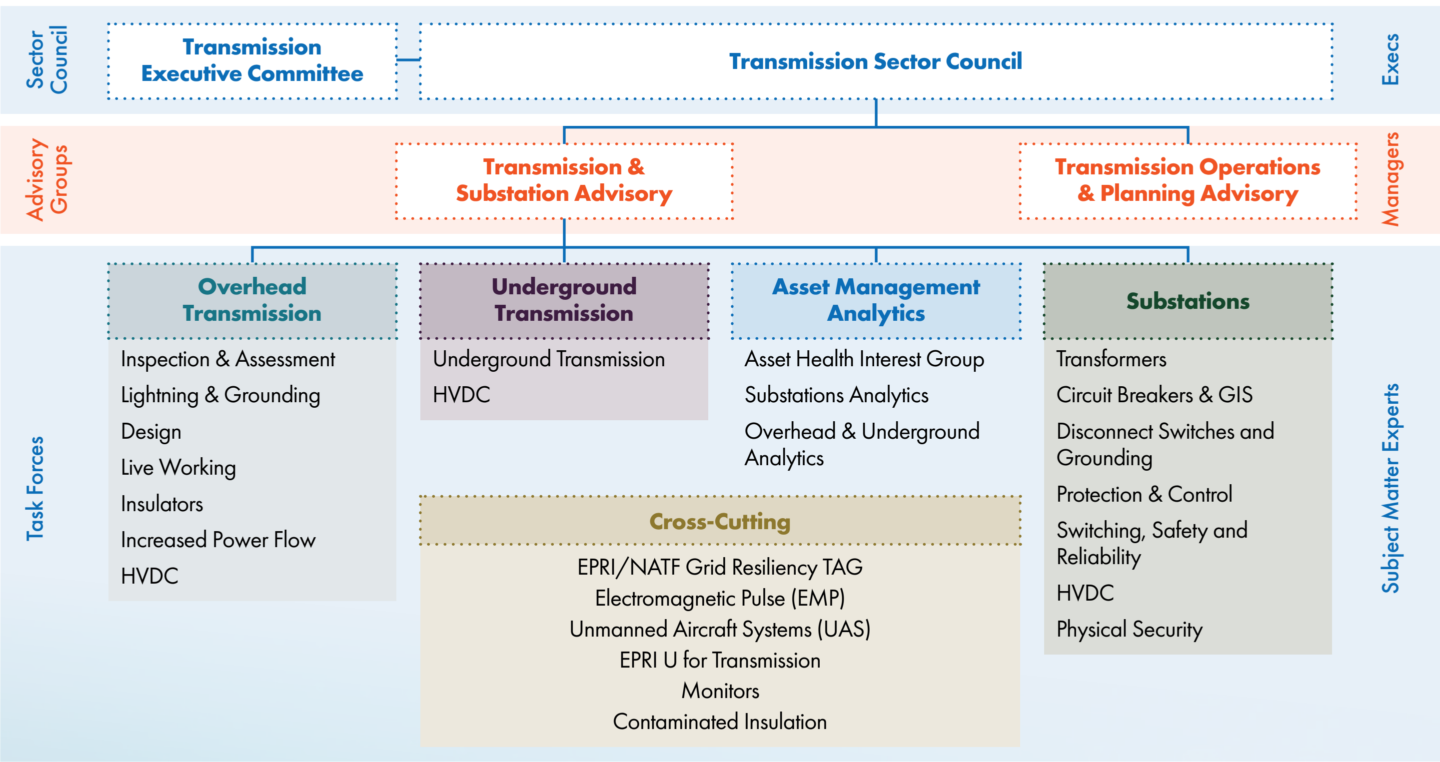
Quick Reference Guide January 2024

Transmission & Substations Area (T&S): Performs research to provide the technical basis, and technologies, to support member utilities' ability to make effective transmission asset management decisions and help make their operations more
Safe, Reliable, Affordable and Environmentally Responsible.

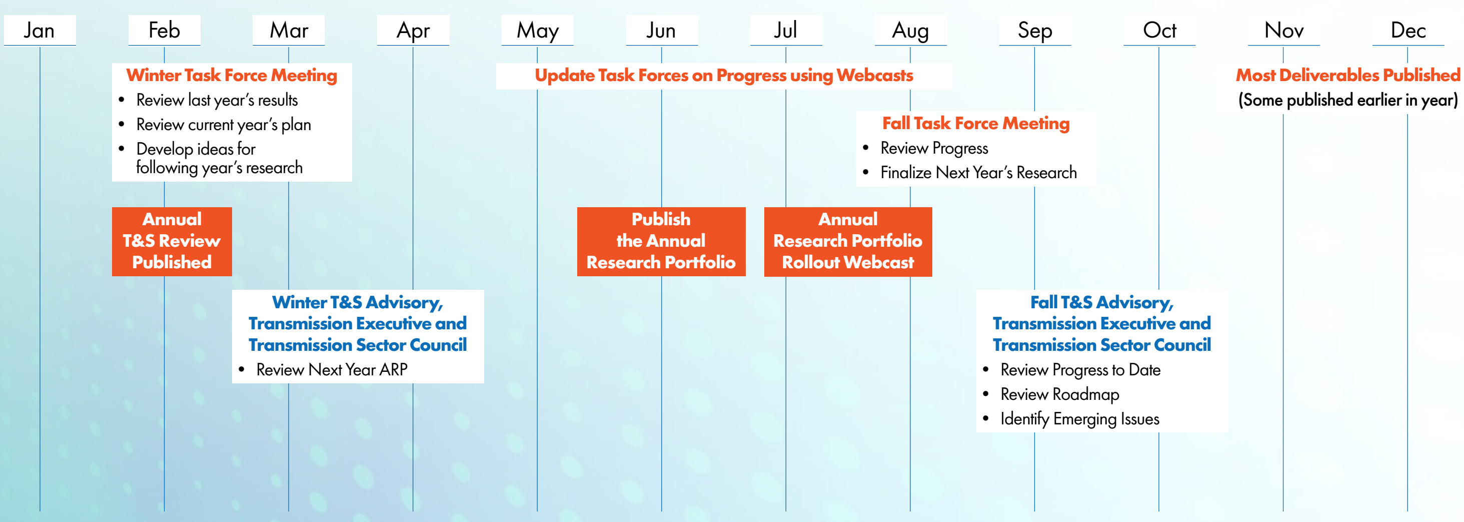
The T&S portfolio reflects a holistic, ***Life-Cycle Approach*** for Transmission Assets. In addition, issue-based research is performed on a range of topics including:
safety, increased power flow, asset management, cost reduction, and resilience.

The T&S Area is part of EPRI's Energy Delivery and Customer Solutions (ED&CS) sector

Advisory Structure



Timeline



Programs and Types of Projects

Programs

What T&S Area Programs address specific asset classes: Program 34: Transmission Asset Management Analytics, Program 35: Overhead Transmission Lines, Program 36: Underground Transmission Lines, and Program 37: Substations.

Who Lead by EPRI Program Managers. EPRI T&S technical staff execute research and manage the projects. Supporting members often collaborate on research, serve as host sites, and provide feedback to, and advise, EPRI on real world research needs.

How Programs consist of individual projects in which utilities participate. Project funders are provided no-cost access to the project deliverables released for a particular year or years of funding.

When Programs are ongoing research efforts. EPRI, in collaboration with program funders, determines the most important research needs ready to be handled in current-year projects in each program. A particular project can take one or more years, with updates provided to funders.

Annual Research Portfolio (ARP)

Also referred to as Base Funded, Membership

What EPRI T&S ARP programs are groups of projects addressing classes of research topics offered to members on an annual basis. Projects generally address issues that are of interest to a large number of utilities. Projects are mostly multiyear encompassing significant areas (e.g., transformers, insulators, cables).

Who EPRI's subject matter experts (SMEs) and leadership team collaborate with advisors and members to chart the direction of the ARP by considering real world conditions, existing roadmaps, and other ancillary information (see cover for the advisory structure).

How The following year ARP offering is published in June. Companies join the entire program or, in some cases, individual projects or project sets. During the year, research is performed and deliverables are created for members which have funded the research without further charge. Typically, EPRI owns the research results and provides an internal use license for the deliverables to funders. In the T&S area, the funding required to join ARP projects is based on the transmission MW peak of each utility in the prior year. Annual ARP selections are made using the Research Portfolio Agreement (RPA).

When Members can join an ARP offering anytime during the year up until December 31. Deliverables, and other forms of technology transfer, are provided throughout the year, but most are delivered near the end of the year.

Technology Innovation (TI) Projects

What TI projects generally have longer-term goals (greater than five to ten years out) and have higher research risks. Learnings from TI projects can inform and inspire future ARP projects and provide thought leadership for EPRI, its members and other relevant stakeholders.

Who Allocation of funding and the associated process for TI projects is managed by the EPRI TI group. EPRI technical staff executes TI projects. The TI program is advised on key aspects of its research, development and demonstration programs by EPRI's Research Advisory Council (RAC), comprised of a group of senior management of EPRI members.

How Twelve percent of ARP funding is used for the TI program. An internal proposal system is used to allocate funding. All TI deliverables in a given year are available to all EPRI members investing in an EPRI research program in that year.

When Funding is allocated on an annual basis.

Supplemental Projects

Includes Tailored Collaboration (TC), Self-directed Funding (SDF), and Co-Funding Projects

What Supplemental projects address specific issues that may only be of interest to a smaller group of members, or a single member, and often involve research, the implementation or demonstration of advanced technology or technology transfer. If a supplemental project has multiple funders, the scope and funding is identical for all participants. Typically, EPRI owns the research results and provides funders an internal use license for the project deliverables. The research results can be further developed by EPRI in other projects.

Who An EPRI technical staff member is designated as the project manager to lead each project. Each participating member usually designates a technical advisor to lead the utility's collaboration in the project, including serving as a host site and/or providing real world examples, experience, and data.

How The EPRI project manager and the project funders agree upon a statement of work (SOW) defining the scope, schedule, and deliverables. Companies join the supplemental by signing a revenue agreement, which usually adopts pre-determined terms and conditions in a master agreement between EPRI and the funder. ARP Funders can join using SDF, TC funding, or co-funding (see below). Project funders receive the project deliverable(s) at no additional charge. Others who did not fund the project, but desire access to the deliverables, must purchase or license the priced deliverable(s).

When Supplemental projects can be initiated any time during the year and can be initiated quickly. Deliverables are generally delivered on the schedule identified in the SOW. Supplemental projects may be multi-year.

Supplemental Project Funding Types

Self-Directed Funding (SDF), Tailored Collaboration Funding (TC), and Co-funding of Supplemental Projects

What When participants join an ARP project, 25% of funding is placed into either a SDF or TC "account" or "pool" that can be used by the funder to join supplemental projects. Projects must meet criteria defined in the Supplemental Funding Policy document found on the EPRI Member Center website.

Self Directed Funding (SDF): Pooled SDF funds can be used entirely to participate in a supplemental project or joined with co-funding (see below).

Tailored Collaboration Funding (TC): Pooled TC funding must be matched by the funder with an equal amount of funding to participate in a supplemental project. TC "pool" plus the matching funding may also be combined with co-funding (see below).

Co-funding is funding provided directly from a utility through an invoicing process. Members may join supplemental projects using entirely co-funding, or using a combination of co-funding and SDF (or TC) funding.

Who The SDF or TC account is usually managed by the member's Manager of EPRI Technology Transfer (METT) - designated by the participant. Participating companies decide whether to have TC (see below) or SDF funding when they submit their ARP selections each year.

How Funding is transferred from the SDF or TC "pools" to a supplemental project using a revenue agreement, including a statement of work (SOW). Where co-funding is involved the revenue agreement includes invoicing terms. The revenue agreement usually incorporates terms and conditions pre-established by a master agreement between the funder and EPRI. Participation using TC, SDF, or co-funding funding can be initiated via an online tool or through discussion with EPRI staff.

When Funding in the TC or SDF pool must be committed to a project under written contract by the end of the year in which it is generated or the funds lapse.

Billable Service Agreement (BSA)

What A BSA is available for EPRI to do services work. Typically, if the deliverable is a report that report is "owned" by the funder, EPRI owns the background technology and any improvements to the background technology which occur during the contract period. The amount of BSA-related work EPRI is able to perform in aggregate is limited by EPRI's non-profit tax status because it does not meet the public benefit research criteria. Billable Services work is not eligible for TC or SDF. There can be limits on the types of services work which EPRI can undertake; for example, EPRI does not provide expert witness services in court cases. These limitations are guided by EPRI's tax exempt status and independence requirements.

Who A BSA is used for specific results that can solve an issue or specific problem without limiting EPRI from performing the same approach, idea, or concept for other funders.

How Funding is transferred to a BSA project using a revenue agreement which includes invoicing terms and a SOW. Terms and conditions are often incorporated from a master agreement in place between EPRI and the funder. A BSA is initiated by discussions with EPRI staff.

When A BSA can be executed at any time during the year.

Master Agreement

What Almost all members have a master agreement in place setting out the terms and conditions for most projects involving EPRI and the member. Pre-negotiating terms such as confidentiality requirements, export control, and licensing requirements, means that supplemental projects can be easy to sign once the SOW and member funding sources (e.g. SDF or co-funding) are determined. There are limited occasions where a vendor involvement, government funding, or special project needs, leads to additional terms (e.g. special host utility access requirements for those working on, or visiting its site).

Who The master agreement is usually negotiated, agreed upon, and signed by the legal departments and management of the member and EPRI.

How The master agreement is referenced in the RPA, in supplemental agreements (SDF, TC, co-funding), and in BSA (co-funding only).

When The master agreement is typically in place for a longer duration; recent agreements have had a duration of 10 years.

Delivery of Results

Deliverables

What EPRI research deliverables may include technical reports, technical updates, software, workshops, hardware demonstrations, field guides, and reference manuals [each released with product identification (PID) numbers, with the exception of BSA deliverables].

Who Companies that have joined specific ARP or supplemental projects receive an internal use license and access to the deliverables from that project at no additional charge under the terms of their agreement. For ARP, the funding for the program/project must be provided in the year of release for the funder to receive access at no additional charge. Typically, companies that did not fund the specific project can license or purchase a specific deliverable provided they meet all licensing and export control requirements. Specific BSA deliverables are usually not available for purchase by others.

How EPRI deliverables from ARP and supplemental projects are stored and available for download from EPRI's Member Center (membercenter.epri.com). Typically, only eligible users can download specific EPRI deliverables for no additional fee, based upon which programs and projects they have joined. In most cases if a utility has not joined a specific program, they may license or purchase the EPRI deliverables (subject to license and export control requirements). Some project deliverables (webcasts, conference call updates) are not available to non-funders.

When Most ARP deliverables are provided at the end of the year. Supplemental deliverables are provided as defined in the project's SOW.

Existing Product Credits

What In exchange for a minimum, multi-year commitment at a mutually agreed level and type, EPRI provides credits for members to use towards the purchase or license of existing EPRI deliverables for which a member would otherwise not be eligible (for example, where a member did not fund the work producing the deliverable).

Who The Product Credit Pool is usually managed by the METT at each utility.

How Participant SMEs engage their company's METT to request that Product Credits are used to gain access to a specific EPRI deliverable.

When Product Credits are used in the year they are generated.

Advisory

Transmission Sector Council (TSC)

What The TSC provides executive level advice to the T&S and Grid Operations and Planning (GOP) areas. The TSC is regularly briefed on ongoing research, development, and demonstration progress. They provide guidance on broad technical issues, research areas, and help EPRI identify operational areas for improvement. The TSC is a subset of the Power Delivery & Utilization (PDU) Sector Council, which also includes the Distribution, Energy Utilization, and Information Communication & Cyber Security (ICCS) areas.

Who PDU and TSC positions are generally filled by executives from EPRI's members. EPRI's Transmission Collaboration Leader (presently the director of the T&S Area) leads the TSC, with a utility Chairperson and Vice Chairperson.

How During PDU and TSC meetings, EPRI staff and members make presentations and roundtable discussions follow.

When Sector Council meets twice each year (winter and fall), on the Wednesday and Thursday following the T&S advisory.

T&S Advisory Group

What The T&S Advisory provides guidance to the T&S area and is: 1) made aware of R&D progress; 2) shares member practices including use of EPRI research results; 3) shares utility operational experiences that can help inform EPRI's research programs; 4) develops and maintains a T&S roadmap for R&D needs; and 5) helps identify EPRI operational areas for improvement.

Who Members are directors and managers from member utilities, led by the EPRI T&S area director, program managers, and T&S Advisory Group chair and program chairs.

How Presentations are made by EPRI staff and member utilities with roundtable discussions following.

When T&S Advisory group meets with other PDU Advisory Groups twice each year (winter and fall). Meets Monday through Wednesday (midday).

Transmission Executive Committee (TEC)

What The TEC advises the EPRI Transmission Sector leadership and collaborates with EPRI to produce the TSC agenda.

Who The TEC is comprised of a subset of executives from the TSC and is led by the TSC Chair and EPRI Transmission Collaboration Leader (presently the director of the T&S area).

How The TEC regularly communicates through webcasts, face-to-face meetings, and surveys.

When Webcasts are held on an as-needed basis. Breakfast meetings are usually held on the Thursday morning of the Sector Council Meeting.

T&S Task Forces (TF)

What T&S Task Forces guide ARP projects or groups of ARP projects based on technical area (e.g., transformers, insulators). The TFs are made aware of R&D progress and results in their areas of funding, collaborate on ongoing research, identify new areas of research, share how other members are using EPRI results, share utility operational experiences, and visit test sites or related technical sites.

Who Task Forces are generally staffed by SMEs from member utilities. To be a member of a TF, utilities must fund at least one ARP project that the TF covers. TFs are led by a member of EPRI technical staff together with a utility SME chairperson.

How Presentations are made by EPRI staff, subcontractors, vendors, and member utilities with following roundtable discussions as part of the collaborative process. Vendors, and often subcontractors, are present by specific invitation only and only allowed to participate in the section in which they present.

When The TFs meet twice a year -- in winter and fall. For winter, all T&S task forces meet in parallel/series sessions in Charlotte, NC. For fall, TFs may meet separately, although an effort is often made to co-locate TFs. A webcast is held in the middle of the year to update the TF on progress.

Research Planning

T&S Roadmap

What The T&S Roadmap is a document defining the Mission and Drivers for transmission asset research. It then serves as the vision for six potential Future States to strive for in the next 15 years, and identifies the Gaps to be bridged to reach these.

Who The Mission and Drivers are developed by EPRI in collaboration with the TSC. The Future States and Gaps are advised by the T&S Advisory Group.

How The T&S Advisory Group reviews and collaborates with EPRI on revisions to the Future States. EPRI staff, in collaboration with task forces and other advisory groups, use the roadmap as guidance in developing and executing Action Plans.

When The T&S Roadmap is reviewed and revised at the Advisory meeting.

T&S Action Plans

What Action plans describe research and related tasks that are underway in a specific topic (e.g. insulators or transformers). Tasks are linked to the T&S area roadmap's "future states and gaps", and a brief description, actions underway, and research schedule. Action Plans include tasks from all collaborative types of projects—ARP, supplemental, and TI.

Who Action plans are owned by EPRI technical staff, and developed in collaboration and advice from the task forces.

How Action plans are updated on an annual basis and are reviewed by EPRI technical staff, with collaboration and advice from the task forces.

When Action plans are reviewed prior to the winter Task Force meetings.

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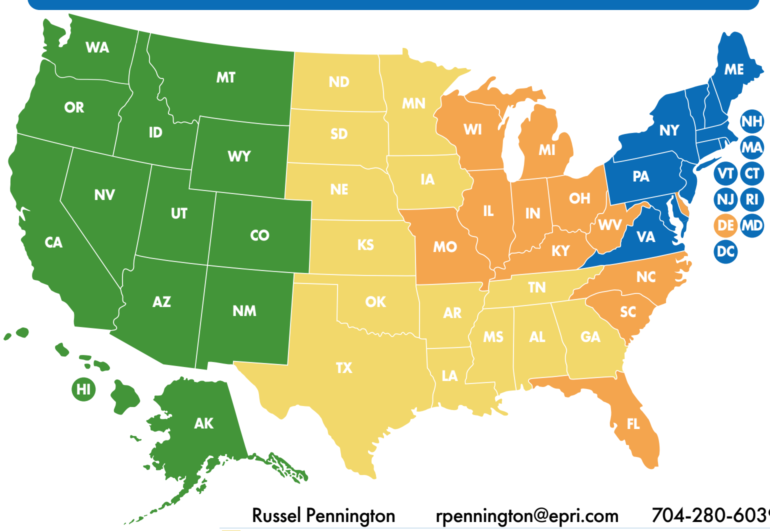

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This document is intended to be a "quick reference" and does not provide a complete description of the background policies and contractual terms. If you have any questions or require more detail, please ask an EPRI staff member and we'll provide you with the appropriate resources.