

ISA CTEEP uses Asset Management to transform culture and working practices – in just 24 months

How do you change the culture of a large and traditional electricity utility in just 24 months? The answer lies in a very special approach to introducing asset management concepts, practices and tools for better decision-making. ISA CTEEP in Brazil has recently been recognised internationally for such a unique achievement, runner-up in the prestigious IAM Achievement Award for Innovation in Asset Management.

[ISA CTEEP](#) is a regulated electricity transmission company with a 30-year concession to deliver power to more than 50 million people in the South East region of Brazil. The company was created in 1999-2001 from the São Paulo state-owned energy utility company CESP, and the Electrical Transmission Company Paulista (EPTE). ISA CTEEP now delivers electricity across 17 Brazilian states, carrying 25% of the country's energy and 90% in the state of São Paulo. It has over 25,000 km of transmission lines, 2,300 km of optic fibre cables and 126 substations with c.66,000 MVA of transformation capacity. Since 2007 they've invested US\$ 3.7 billion and currently have 1,300 km of network under construction. There are 1600 members of staff.

As part of the international ISA Group, CTEEP was encouraged in 2016 to develop its asset management capabilities. So the organisation contracted subject matter experts, The Woodhouse Partnership ([TWPL](#)), to review existing maturity, and to develop and facilitate implementation of a value-prioritised Asset Management roadmap.

The emerging transformation programme was also recognised by the Brazilian electricity regulator [ANEEL](#) as an innovative Research and Development initiative, in collaboration with the University of Sao Paulo ([USP](#)), and the Brazilian Copper Association, [Procobre](#).



As the work started, the company quickly recognised that developing and embedding an ‘asset management system’ based on [PAS 55](#) / [ISO 55001](#) standards, would help the company to align priorities better, raise competitive advantage and more confidently deliver its strategic objectives.

It was also evident that new methods and tools were needed to improve decision-making agility, transparency and consistency - especially when justifying investments in asset renewals and maintenance.

And a further very important need was recognised: the increased engagement and cross-disciplinary collaboration of ISA CTEEP’s workforce. This was seen as key to delivering added value across the whole asset life cycle.

Asset Management Transformation

The Brazilian electrical sector is subject to an elaborate regulatory control and revenue model. Some maintenance regimes are prescriptive, and the income allowances are based on pre-determined asset ‘lives’. So it can be difficult to fully optimize value and make cost/risk/performance-based decisions for such things as maintenance expenditure and asset replacement timing. Nevertheless, the project has delivered spectacularly on all fronts, largely due to intense multi-disciplined teamwork, selective use of the right tools, and focussed engagement of key stakeholders. It has delivered fundamental changes and big financial returns in such areas as:

- Procurement rationalisation and spares/inventory optimization;
- Adapting and rolling out the corporate risk management model with local calibration and ‘ownership’;



Some of the team involved in Strategic Asset Management planning

- Management of aging assets; health, criticality and optimal renewal investment timings;
- Strategic planning that integrates and aligns group-wide strategic goals and local priorities and opportunities;
- Education, culture change, leadership and employee alignment/engagement.

It is also breaking new ground in the integrated planning of CAPEX and OPEX work programmes.

An Asset Management System

ISA CTEEP is naturally focused on achieving its strategic goals, seeking competitiveness and juggling cost, risk and performance. They recognised the need for an *Asset Management System*, based on PAS 55 and ISO 55001 standards (one of the earliest companies to go down this path in Brazil). But the solution also had to deliver, quickly, a more robust way to justify investments, asset renewals and maintenance expenditure, demonstrating better value and sustainability, within the regulatory framework of the Brazilian electrical sector. The 3 phrases of the programme are shown below:

Aligned with ISA CTEEP’s strategic priorities, the Asset Management (AM) project has therefore been built upon 3 main pillars:

1. Strategic alignment and communication in development and delivery of **AM strategy and priorities**, with clear understanding of roles and responsibilities.
2. **Improvement of decision-making** processes, practices and tools;
3. **Developing human talent**, with an extensive program to enhance workforce understanding of fundamental concepts such as asset life cycles, risk and value-for-money;

The specific deliverables established for the project were:

- Roll out an asset management education and training programme
- Introduce a robust decision-making framework, justifying interventions on optimal life cycle value and Cost/Risk/Performance impact (TOTEX).
- Establish systematic asset renewal and substation modernisation plans
- Establish an integrated asset ‘creation’ strategy (linking requirements analysis, design, procurement, construction and life cycle planning)

- Revise and optimize maintenance strategies
- Optimise supply chain processes (including logistics, warehousing, inventory optimisation)



Given its unique context, ISA CTEEP realised that a customised solution would be needed. So they worked in close partnership with TWPL, and parent ISA, in scoping, prioritising and personalising an appropriate way forward (a rolling 3-year AM roadmap, now embedded within a strategic asset management plan). This has involved:

- Spreading the understanding of AM practices and methods in a way that gets converted to ‘normal behaviour’, at all levels of the company (from President to field technicians). Two key initiatives were required for this: a very effective multi-route communications plan and a rigorous learning programme for everyone.
- Identifying, investigating and resolving ‘quick win’ studies to generate concrete evidence of value benefits and reinforce everybody’s commitment to the strategic programme
- Achieving acceptance and/or changes in planning, decision-making and cross-functional processes and responsibilities.
- Introduction and alignment/acceptance of mechanisms to quantify TOTEX in all stages of the asset life cycle

Multi-route Communication Plan

The multi-route communication plan included the use of the corporate intranet (‘transNet’) to widely and regularly disseminate news and updates. A printed Asset Management Mini-guide was developed, with extensive use of cartoons and story-telling to summarise the main concepts, supported by ISA CTEEP local examples and how “*Asset Management is part of everything we do*”. A rolling programme of visits and consultations has been underway with all the regional offices to

help to spread the word, reinforce messages, capture feedback and ensure that everyone is part of the journey. And they have a very active group of ‘Champions’ who are actively harvesting ideas, innovations and success stories to maintain the sense of excitement and motivation.

Externally ISA CTEEP are engaging in an increasing number of national, industry sector, cross-sector and international Asset Management events to network and learn from others and share experiences.

Education and Training

The corporate education programme had been built on an innovative 70:20:10 learning model¹. This acknowledges that only 10% of effective learning comes from classroom-type activities. Whereas 20% is obtained through workplace assignments, team-based activities and feedback, and 70% through ongoing ‘*learning while doing*’ (with coaching, mentoring and reinforcement methods).

This programme is on track to train 100% of employees in the generic AM concepts and relevant life cycle activities, according to their level and need for understanding the subjects. This is also geared to promotion and reinforcement of desired behaviours necessary for the sustainable implementation of AM practices.

The training scope covers the 28 topics of the IAM [Competences Framework](#), organised in 5 main sections (Strategy and Planning, Decision Making, Culture, Life Cycle Management and Risk Management), further expanded into three main levels: Strategic, Tactical and Operational.

¹ The 70:20:10 model for Learning & Development, © Michael Lombardo & Robert Eichinger

Governance

The programme management structure at ISA CTEEP is based on 3 tiers:

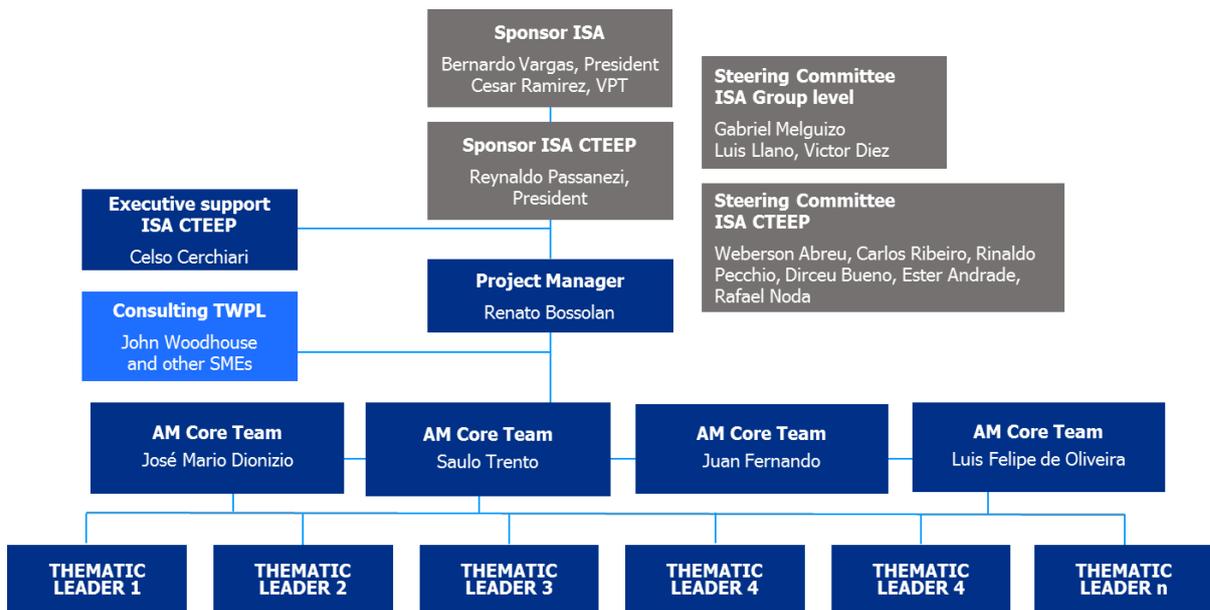
- **Senior executive sponsorship** (President, ISA CTEEP and wider ISA Group Steering Committees)
- **Project management:** dedicated resource, with executive and ISA support and subject matter expertise (TWPL)
- The AM **'Core' Team**, with network of champions and other ISA subsidiaries

At the leadership level, the latest (annual) maturity level assessment observed that *"There is remarkable leadership and authority in the AM project. In addition to evident strong Presidential sponsorship, there is clear commitment from all the Directors, with documented evidence from all executive meetings."*

business. Fortnightly full team meetings share and discuss issues encountered, results achieved and the project's ongoing development.

Better Decision-making & Strategic thinking

ISA CTEEP is already demonstrating increased value generation through better, more transparent and more consistent decision-making. This has resulted from introducing the SALVO (Strategic Assets: Lifecycle Value Optimisation)² process, which creates a structured, 6-step method of targeting the most important issues, understanding their true nature, identifying candidate solutions and evaluating/optimising their usage for total value and cost/risk/performance impact (including 'intangibles' and handling of uncertainties and 'what if?' scenarios).



The AM Core Team is one of the biggest success factors, supported by more than 15 embedded departmental, regional and subject matter champions ('Thematic Leaders'). These champions are responsible for leading AM initiatives into all areas of the

The organisation is now better able to justify and support strategic growth plans, and the improved AM capability is increasing competitive advantage in new acquisitions, concessions and other investments. ISA CTEEP is itself also becoming a more attractive investment: the ROI for

² See www.SALVOproject.org

shareholders is increasing by the TOTEX benefits already being generated, while also showing improvements in service levels and risk management.

Tangible business benefits plus fundamental culture change

The company is transforming organisational culture, moving from traditional and functional structure approach to a collaborative, multi-disciplined, team-based responsibility for asset management.

In the first 24 months, the company's Asset Management journey has already delivered a tremendous cultural shift: understanding and competencies are being improved through the learning programme, and the level of engagement and motivation is remarkable. There is widespread enthusiasm and appetite to use the new tools and implement the new ways of working established by the AM thinking. This has involved:

Education:

- 8,314 man-hours of training and coaching sessions since August 2017
- 145 trainees in the [SALVO](#) Process and various [DST Asset Strategy Evaluator™](#) software tools for optimal AM decision-making
- 45 engineers trained in RCM+ (Reliability Centred Maintenance Plus) and development/revision of MSRs (Maintenance Standard Routines) and other 21 employees trained in Eliminating Causes of Risks (ECR)
- 2,360 online Asset Management education sessions were realised via the company's learning platform

Processes, disciplines, tools and guidance:

- Procedures to identify, quantify and investigate 'Improveability' opportunities

- Asset criticality and health assessment procedures
- Risk management system and procedures
- Iterative 'live' Strategic Asset Management Plan ([SAMP](#)) and asset life cycle management plans
- Proactive Continuous Improvement (ECR - Eliminating Causes of Risks)
- Revised business case screening and prioritizing of improvement projects, reinforcement projects and 'unplanned' projects
- Development of a decision-making framework as a mandated decision-making 'Playbook'
- Management of Change (MoC) Procedure
- Development of reliability data analytics tool, using USP's theoretical and technical support and ISA CTEEP's maintenance data, for better targeting of reliability problems;
- Assets remuneration tool (to navigate the regulatory basis for revenue implications of asset management strategies).

For example, the pragmatic and innovative merger of risk management, asset health and asset criticality concepts has enabled identification of systematic improvement priorities via the matrix format below:

This effort has already shown very significant tangible benefits, particularly through the ECR (Eliminating the Causes of Risks), the SALVO (Strategic Assets: Lifecycle Value Optimization) Process and the modular [DST™](#) toolkit, which are used to evaluate and justify the optimal solution to each problem/opportunity.

Assets Risks Matrix – May/2018

Health (Probability)	313	623	49	25
	1214	3235	493	60
	1272	1294	151	17
	3027	2484	158	63
Criticality (Impact)				

Business benefits are quantified in cost, risk and performance impact from each case as it is resolved. A consultation and validation process, with financial department endorsement, is required for reporting the ‘added value’ that they represent to the company. A small sample of the cases, and their business impact, is shown below:

Case	Strategy/Decision	Benefits NPV kRS
Acquisition of spare parts	Analyze the optimal inventory of spares for current assets.	5,994
Alternative equipment in stock	Evaluate alternative uses of existing over-stocked equipment.	993
Asset renewal	Define the best strategy & timing for renewing substation assets.	3,227
Inventory optimization	Dimensioning of inventory and distribution center.	4,000
Maintenance evaluation	Evaluate business case for maintenance and optimum periodicity	2,600
TOTAL		16,814

= aprox. US\$ 4.8 million NPV

The strong focus on quantified value is part of the core design of the programme, to ensure that stakeholders remain enthusiastic supporters and that the journey is self-sustaining. With this evidence, the company is achieving a step-change in service value-for-money to customers and showing a scale of opportunities that might help improving the future regulatory framework in Brazil in collaboration with USP, Procobre and TWPL as part of the P&D Project.

The project has completed its second year now, and the gains achieved have been closely monitored and validated. Overall, using an independent IAM Endorsed

Assessor, their AM maturity level has risen by c.20% in the first 12 months and is now averaging c.3.0 on the 0-4 IAM scale. ISA CTEEP is also building internal auditor capability, so that the ongoing sustainment and continual improvement can be verified, and plans refined.

Business value and maturity scores are very important, but the ‘people change’ evidence is also recognised to be vital. So there is a check on the effectiveness of communications and the 10:20:70 competency development work. The latest survey (330 staff) showed 86% with positive engagement / understanding about asset management concepts and the project. And

all participants in training courses, such as RCM+ and MSR (Standardised Routines for Maintenance), go through pre- and post-knowledge evaluations, including training effectiveness checks, showing an 89% retention rate for the new knowledge.

ISA CTEEP’s validation processes are built into the programme, to avoid over-expectations and under-realisation of what can be achieved. Results are tracked month by month on an asset management dashboard, and there is a 12-monthly independent review of total progress, both from their IAM Endorsed Assessor partner, TWPL, and from their ISA Group head office team. They are

benchmarking their performance in the international electricity industry (via the ITOMS and CIER networks), among the other members of the ISA Group and through cross-sector events with Brazilian mining, healthcare and manufacturing businesses. Procobre has also been using ISA CTEEP's Asset Management success story in demonstrating ISO 55000 benefits to other asset intensive organisations and regulators.

Conclusions

ISA CTEEP has clearly demonstrated that building and embedding an asset management system in a particular style can deliver outstanding business benefits. The customised mix of targeted training in underlying concepts, interwoven with personalised focus on addressing real issues and prioritised opportunities, has worked extremely well. This has delivered multi-million \$'s of verified benefits at the same time as achieving a radical change in atmosphere, behaviours and corporate culture, all in just 24 months.

Key success factors have been the combining of human factors with the introduction of new processes, tools and performance criteria. The breaking down of inter-departmental barriers has come from investments in education and recognising the benefits of collaboration, following structured approaches such as the SALVO process. Local pride and ownership of the technical solutions is widely recognised and there is clear and strong support from the senior leaders of the organisation. And, throughout the transformation, the organisation has been making good use of ISA Group support and the flexible and adaptive 'knowledge transfer' style of TWPL subject experts in adapting core asset management principles to the local environment and value priorities.

The project is already delivering ahead of plan, both in the maturity assessments and in economic return on investment. Now ISA CTEEP is consolidating the new practices and setting its sights on becoming the first power transmission company in Brazil to be Certified to the ISO 55001 standard for asset management.

For more information

www.isactEEP.com.br

www.twpl.com

www.assetmanagementacademy.com

www.usp.br

www.procobre.org.br

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