ATTEST

WP8

Dissemination, Communication and Exploitation

Exploitation Plan

D8.3

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1. Executive Summary

The Work Package 8 (WP8) develops dissemination, communication, and exploitation strategies for the ATTEST project. It comprises three tasks (T8.1 Project Dissemination, T8.2 Project Communication, and T8.3 Project Exploitation) and follows the global project schedule.

The Exploitation Plan fits in task T8.3. It draws a set of guidelines for the exploitation of project results and promotes the engagement of stakeholders after the conclusion of the research activities. Such a strategy rests on the identification of relevant target groups, as well as of the results to exploit.

INESC TEC is the leader of task T8.3 and, therefore, of this deliverable. However, other partners of the consortium will play a role in the exploitation of project results, both by collaborating in the execution of tasks and by managing their intellectual property rights (IPR).

The exploitation strategy will observe all guidelines from the Data Management Plan (deliverable D2.1). The Advisory Board (AB) will also be engaged in the definition of exploitation methodologies, ensuring full compatibility between partners' IPR and the sought open-access to information.

This document is the deliverable (D8.3) of task T8.3. All contents will be further revised, updated, and reported on deliverables D8.4 (Follow up on dissemination, communication, and exploitation results) and D8.5 (Final report on dissemination, communication, and exploitation results).

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Abbreviations and Acronyms

AB	Advisory Board
AS	Ancillary Services
CAPEX	Capital Expenditure
D	Deliverable
DA	Day-advance
DG	Distributed Generation
DSO	Distribution System Operator
ICT	Information and Communication Technologies
IEC	International Electrotechnical Commission
IPR	Intellectual Property Rights
KPI	Key Performance Indicators
MES	Multi-Energy System
NA	Non-Applicable
OLTC	On Load Tap Changing Transformers
OPEX	Operational Expenditure
RES	Renewable Energy System
RT	Real-Time
SCOPF	Security Constrained Optimal Power Flow
SW	Software
TG	Target Group
TRL	Technology Readiness Level
TSO	Transmission System Operator

2. Introduction

While fossil-fueled technologies are increasingly turning to green energy, new challenges arise for electricity providers. Not only are there more appliances connected to the power network at once, but they have also become more demanding as to how much energy they need.

Dealing with a more demanding, yet more flexible, energy market requires relevant improvement in current grid management systems. ATTEST addresses that need by developing a set of optimization tools for Transmission System Operators (TSO) and Distribution System Operators (DSO), facilitating market coordination and reducing energy waste with benefits for all market players.

The WP8 develops the strategy for communicating the project, disseminating its results, and engaging stakeholders in the long term. This report settles a strategy to engage target groups in the use, integration, and further development of the ATTEST tools after the project comes to an end.

The identification and description of exploitable results will precede the establishment of exploitation activities. Project target groups – as described in D8.1 and D8.2 – will be considered throughout the process. Pre-defined KPIs will also support the assessment of strategical performance.

Consortium partners, as well as the Advisory Board (AB), will be engaged in the execution of the exploitation strategy, also ensuring the approached solutions (such as open-source dissemination) meet their Intellectual Property Rights.

Finally, and to provide a more complete perspective on the exploitation potential of ATTEST, project results will be analyzed for their impact on future policy-making and their potential to enhance innovation.

3. Exploitation Plan

The identification of exploitable project results sets the start of the exploitation plan, besides the selection of relevant target groups. When concluded, both chapters derive into the development of a strategical plan of exploitation activities.

3.1. Exploitation objectives

The exploitation strategy aims at taking project results as far in time as possible. Generally, its activities will focus on four objectives: (1) promote market adoption; (2) facilitate technology integration; (3) support advanced research; and (4) contribute to policymaking.

3.1.1. Promote market adoption

The ultimate goal of the exploitation strategy is to encourage power market players to use ATTEST tools in their daily operations, standardizing development levels across European countries and setting the ground for future, innovative, and efficient electricity grids.

3.1.2. Facilitate technology integration

Market adoption is heavily dependent on technology integration because energy players are not expected to discard current solutions in favor of ATTEST tools. The exploitation strategy will, therefore, aim at promoting a smooth transition/integration between existing and new systems.

3.1.3. Support advanced research

The ATTEST solutions are not designed to be static nor definitive. Instead, the exploitation strategy will encourage the further development of the applications and the creation of new tools, motivating research in the field of energy grids.

3.1.4. Contribute to policymaking

The energy grids of the future will require adjusted regulatory models to which ATTEST can contribute with valuable insights and data. The exploitation strategy will highlight this contribution potential, opening the way to collaboration between regulators, grid operators, and academic institutions.

3.2. Exploitable project results

ATTEST will produce several exploitable foreground results, some of which have been described in the data management plan (D2.1). The exploitation plan focuses on tangible project outcomes – in the case of ATTEST, optimization tools for energy systems operators.

The exploitation of tangible outcomes depends heavily on their characteristics and goals, but also on their technology readiness level (TRL).

TABLE 1 - TRL SCORE OVERVIEW

LEVEL	DEFINITION
1	Basic principles observed
2	Technology concept formulated
3	Experimental proof of concept
4	Technology validated in lab
5	Technology validated in a relevant environment
6	Technology demonstrated in a relevant environment
7	System prototype demonstrated in an operational environment
8	System complete and qualified
9	The actual system proved in an operational environment

The ATTEST toolbox comprises three modules that articulate as a whole. Nevertheless, the optimization tools will be individually considered for exploitation, allowing users to customize their systems with whichever applications they need.

3.2.1. Planning module

The planning module of the open-source toolbox will incorporate three distinct network planning tools, all of them aiming at minimizing CAPEX, increasing reliability, and reducing environmental impacts.

TABLE 2 - EXPLOITABILITY ANALYSIS: OPTIMIZATION TOOL FOR DISTRIBUTION NETWORK PLANNING

OPTIMIZATION TOOL FOR DISTRIBUTION NETWORK PLANNING	
TYPE OF RESULT	Application (SW)
PARTNERS	UNIMAN (LEADER), INESC TEC, HEP ODS
DESCRIPTION	This tool will produce a flexible, adaptive network investment strategy that takes advantage of demand-side flexibility for the provision of network support (i.e., procured by the DSO in ancillary services markets) as a means to maximize network capacity, also considering environmental (e.g., increased losses) and economic impacts (e.g., network support for customers to partake in the markets).
EXPLOITATION POTENTIAL	Free open source tool under a Creative Common License. Services of integration support, updating and fitting the tool to potential users can be exploited separately.
TRL	6

OPTIMIZATION TOOL FOR TRANSMISSION NETWORK PLANNING	
TYPE OF RESULT	Application (SW)
PARTNERS	UNIMAN (LEADER), INESC TEC, LIST, HOPS
DESCRIPTION	This tool will develop optimized strategies for the transmission network to be adaptively upgraded in consideration of the new sources of uncertainty and flexibility that may emerge in different areas of the network, e.g., distributed RES, storage, and MES at the demand side.
EXPLOITATION POTENTIAL	Free open source tool under a Creative Common License. Services of integration support, updating and fitting the tool to potential users can be exploited separately.
TRL	6

TABLE 4 - EXPLOITATION ANALYSIS: OPTIMIZATION TOOL FOR PLANNING TSO/DSO SHARED TECHNOLOGIES

OPTIMIZATION TOOL FOR PLANNING TSO/DSO SHARED TECHNOLOGIES	
TYPE OF RESULT	Application (SW)
PARTNERS	INESC TEC (LEADER), ICENT
DESCRIPTION	This tool will assess the benefits from the installation of TSO/DSO shared technologies (e.g. storage devices) to be managed in a coordinated way to simultaneously provide flexibility to both distribution and transmission networks, thus contributing to postpone investments in assets replacement/reinforcement.
EXPLOITATION POTENTIAL	Free open source tool under a Creative Common License. Services of integration support, updating and fitting the tool to potential users can be exploited separately.
TRL	6

3.2.2. Operation module

The operation module is subdivided into two subgroups of tools, one for distribution and the other for transmission networks. These tools will take into account the functioning of future electricity markets, including the constraints and uncertainty of variable renewable generation and the optimal utilization of networks' assets.

TABLE 5 - EXPLOITATION ANALYSIS: TOOL FOR AS PROCUREMENT IN DA OPERATION PLANNING FOR THE DISTRIBUTION NETWORK

TOOL FOR ANCILLARY SERVICES PROCUREMENT IN DAY-AHEAD OPERATION PLANNING FOR THE DISTRIBUTION NETWORK	
TYPE OF RESULT	Application (SW)
PARTNERS	LIST (LEADER), ICENT, HEP ODS
DESCRIPTION	This tool will support the DSO on the procurement of ancillary services (for voltage control and congestion management) to mitigate the uncertainty of renewables and ensure that the network capacity is never exceeded during the real-time operation stage. The outputs of the TSO/DSO coordination mechanisms that will run in parallel with the market simulator will define constraints for this tool to avoid that TSOs and DSOs procure conflicting ancillary services in the markets.
EXPLOITATION POTENTIAL	Free open source tool under a Creative Common License. Services of integration support, updating and fitting the tool to potential users can be exploited separately.
TRL	6

TABLE 6 - EXPLOITATION ANALYSIS: TOOL FOR AS ACTIVATION IN RT OPERATION OF THE DISTRIBUTION NETWORK

TOOL FOR ANCILLARY SERVICES ACTIVATION IN REAL-TIME OPERATION OF THE DISTRIBUTION NETWORK	
TYPE OF RESULT	Application (SW)
PARTNERS	ICENT (LEADER), LIST, HEP ODS
DESCRIPTION	This tool optimizes the activation of flexibility provided by DSO assets (e.g. stationary storage and OLTC) and procured by the DSO in the ancillary services market using the day-ahead operation planning tool. The goal is to maintain the distribution network operating in a safe mode when forecasting errors occur while minimizing OPEX and reducing environmental impacts.
EXPLOITATION POTENTIAL	Free open source tool under a Creative Common License. Services of integration support, updating and fitting the tool to potential users can be exploited separately.
TRL	6

TABLE 7 - EXPLOITATION ANALYSIS: TOOL FOR STATE ESTIMATION OF DISTRIBUTION NETWORKS

TOOL FOR STATE ESTIMATION OF DISTRIBUTION NETWORKS	
TYPE OF RESULT	Application (SW)
PARTNERS	KONČAR-KET (LEADER), INESC TEC, HEP ODS
DESCRIPTION	This tool will allow estimating the operating state of the network with minimal available information (by estimating the net load in each node of the grid), thus allowing all the developed tools for network operation management to work even when there is a lack of data.
EXPLOITATION POTENTIAL	Free open source tool under a Creative Common License. Services of integration support, updating and fitting the tool to potential users can be exploited separately.
TRL	6

TABLE 8 - EXPLOITATION ANALYSIS: TOOL FOR AS PROCUREMENT IN DA OPERATION PLANNING FOR THE TRANSMISSION NETWORK

TOOL FOR ANCILLARY SERVICES PROCUREMENT IN DAY-AHEAD OPERATION PLANNING FOR THE TRANSMISSION NETWORK	
TYPE OF RESULT	Application (SW)
PARTNERS	LIST (LEADER), ICENT, HOPS
DESCRIPTION	This tool is an evolution of the conventional deterministic Security Constrained Optimal Power Flow (SCOPF), which will be enhanced to be a multi-temporal SCOPF under uncertainty forecasting. The tool will enable TSOs to procure ancillary services (congestion management, voltage control, and frequency control) on a 24-h ahead basis. Additionally, the TSO/DSO coordination mechanisms will be used together with this tool to avoid that TSOs and DSOs procure conflicting ancillary services in the ancillary services markets.
EXPLOITATION POTENTIAL	Free open source tool under a Creative Common License. Services of integration support, updating and fitting the tool to potential users can be exploited separately.
TRL	6

TABLE 9 - EXPLOITATION ANALYSIS: TOOL FOR AS ACTIVATION IN RT OPERATION OF THE TRANSMISSION NETWORK

TOOL FOR ANCILLARY SERVICES ACTIVATION IN REAL-TIME OPERATION OF THE TRANSMISSION NETWORK	
TYPE OF RESULT	Application (SW)
PARTNERS	ICENT (LEADER), LIST, HOPS
DESCRIPTION	This tool will optimize the activation of flexibility provided by TSO assets (e.g. stationary storage and capacitors banks) and procured by the TSO in the ancillary services market using the day-ahead operation planning tool. The goal is to keep the transmission network operating in a safe mode when forecasting errors occur while minimizing OPEX and reducing environmental impacts.
EXPLOITATION POTENTIAL	Free open source tool under a Creative Common License. Services of integration support, updating and fitting the tool to potential users can be exploited separately.
TRL	6

TABLE 10 - EXPLOITATION ANALYSIS: TOOL FOR ON-LINE DYNAMIC SECURITY ASSESSMENT

TOOL FOR ON-LINE DYNAMIC SECURITY ASSESSMENT	
TYPE OF RESULT	Application (SW)
PARTNERS	INESC TEC (LEADER), LIST, HOPS
DESCRIPTION	This tool will perform a security assessment of transmission networks considering both static (i.e. voltages and currents) and dynamic constraints (i.e. stability) violations caused by N-1 contingency analysis.
EXPLOITATION POTENTIAL	Free open source tool under a Creative Common License. Services of integration support, updating and fitting the tool to potential users can be exploited separately.
TRL	4

3.2.3. Asset management module

The asset management module will incorporate three distinct tools to help the management of assets in the distribution and transmission networks. By providing information about assets' remaining useful life, it supports the anticipation of changing conditions of operation.

TABLE 11 - EXPLOITATION ANALYSIS: TOOL FOR CHARACTERIZATION OF THE CONDITION OF ASSETS

TOOL FOR THE CHARACTERIZATION OF THE CONDITION OF ASSETS	
TYPE OF RESULT	Application (SW)
PARTNERS	COMILLAS (LEADER), HEP ODS, HOPS, KONČAR-KET
DESCRIPTION	This tool will characterize and model the life of important network assets. It will use the fault history to support the characterization of asset reliability and the history of maintenance actions to support the characterization of the mean repair time. It will also consider patterns in data extracted from sensors and utilization rates to predict component behavior and condition.
EXPLOITATION POTENTIAL	Free open source tool under a Creative Common License. Services of integration support, updating and fitting the tool to potential users can be exploited separately.
TRL	6

TABLE 12 - EXPLOITATION ANALYSIS: TOOL FOR THE DEFINITION OF CONDITION INDICATORS BASED ON HETEROGENEOUS INFORMATION SOURCES

TOOL FOR THE DEFINITION OF CONDITION INDICATORS BASED ON HETEROGENEOUS INFORMATION SOURCES	
TYPE OF RESULT	Application (SW)
PARTNERS	COMILLAS (LEADER), HEP ODS, HOPS, KONČAR-KET
DESCRIPTION	This tool will incorporate an innovative approach to translate the results obtained from the previous tool into a set of harmonized, easily measurable, and comparable life indicators for different types of assets. These indicators will facilitate the determination of the remaining useful life and the underlying sensitivities of assets towards different operation conditions.
EXPLOITATION POTENTIAL	Free open source tool under a Creative Common License. Services of integration support, updating and fitting the tool to potential users can be exploited separately.
TRL	4

TABLE 13 - EXPLOITATION ANALYSIS: TOOL FOR THE DEFINITION OF SMART ASSET MANAGEMENT STRATEGIES

TOOL FOR THE DEFINITION OF SMART ASSET MANAGEMENT STRATEGIES	
TYPE OF RESULT	Application (SW)
PARTNERS	COMILLAS (LEADER), HEP ODS, HOPS, KONČAR-KET
DESCRIPTION	This tool will define common approaches to evaluate assets under different perspectives (operation, maintenance, cost, impact) and establish asset priority lists. Smart strategies for asset management based on indicators produced by the previous tool will also be developed. Finally, the outputs of this tool will be embedded in the grid planning and operation tools available in the toolbox to allow optimized decisions taking into account not only CAPEX but also OPEX costs.
EXPLOITATION POTENTIAL	Free open source tool under a Creative Common License. Services of integration support, updating and fitting the tool to potential users can be exploited separately.
TRL	4

3.2.4. Other exploitable results

The ATTEST ICT platform will also integrate a set of interactive visualization tools (graphical user interfaces) tailored according to the purpose and requirements of each component in the toolbox. The objective of the visualization tools is to enable enhanced and straightforward collaboration between TSOs and DSOs and facilitate their network operation, maintenance, and planning tasks.

TABLE 14 - EXPLOITATION ANALYSIS: DA AND RT OPTIMIZATION TOOLS TO SUPPORT MES AGGREGATORS

DAY-AHEAD AND REAL-TIME OPTIMIZATION TOOLS TO SUPPORT MES AGGREGATORS	
TYPE OF RESULT	Application (SW)
PARTNERS	INESC TEC (LEADER), UNIMAN, ICENT
DESCRIPTION	This tool will define optimal bidding strategies for eligible clients and aggregators which participate in energy and ancillary services markets by intelligently using flexibility from MES, including electricity and thermal storage, RES, combined heat and power, etc.
EXPLOITATION POTENTIAL	Exploitation via an external vendor or consortium partner; spin-off company.
TRL	6

TABLE 15 - EXPLOITATION ANALYSIS: MARKET SIMULATOR

MARKET SIMULATOR	
TYPE OF RESULT	Application (SW)
PARTNERS	INESC TEC (LEADER), ICENT
DESCRIPTION	The market simulator will allow defining network operating states for future scenarios of grid development, which enable a more effective network planning taking into account the foreseen existence of DER flexibility and its optimal utilization. To ensure effective interaction between TSOs/DSOs, the market simulator will be designed to extend the current roles of DSOs in the electricity market, enabling the participation of DSOs in energy and ancillary services markets for technical validation and procurement of ancillary services for congestion management and voltage control at the distribution level.
EXPLOITATION POTENTIAL	Exploitation via an external vendor or consortium partner.
TRL	4

3.3. Target groups

The target groups of exploitation activities comprise a selection of stakeholders previously identified in T8.1 and T8.2.

As stakeholders may have a variable interest on the ATTEST tools, they will be categorized into four groups. These groups establish the positioning of all players and support the design of tailored exploitation activities, matching exploitation objectives with the interest of stakeholders.

TABLE 16 - EXPLOITATION TARGET GROUPS

GROUP 1 R&D	Academic institutions Other EU-funded projects Consortium partners
GROUP 2 TECHNOLOGY SUPPLIERS	ICT community Consortium partners
GROUP 3 ENERGY GRID PLAYERS	Distribution system operators Transmission system operators Smart Grids community Consortium partners
GROUP 4 REGULATORS	Energy regulators Governmental bodies Policymakers

3.3.1. Group 1: R&D

R&D is an ongoing process. Even after being released to the market, the ATTEST tools can be further developed – or, at least, become the starting point for other research projects within the energy management field. In this context, some stakeholders become relevant because they are actively engaged in developing new and existing energy management systems.

3.3.1.1. Academic institutions

Universities and other teaching institutions will be targeted by exploitation activities related to the possibility of further developing the ATTEST tools. Exploitation messages will focus mainly on open access to the project's foreground results.

3.3.1.2. Other EU-funded projects

European projects may capitalize on the ATTEST results by using them to support research. Messages to them will focus on open access to the project's foreground results and informational activities.

3.3.2. Group 2: technology suppliers

Technology suppliers hold deep knowledge of market needs and focus their activity on providing tailored solutions. Once embedding the ATTEST tools into their portfolio, they accelerate market adoption by widening the range of solutions offered to the DSOs and TSOs.

3.3.2.1. ICT community

The ICT community has the skills to take the ATTEST tools further from a technological perspective. Messages addressed to them will include open access to the tools, but may also promote trials and other activities designed to encourage the integration of the ATTEST software on their portfolio.

3.3.3. Group 3: energy grid players

Agents operating in the energy grid – either as main or ancillary services providers – are end-beneficiaries of the ATTEST tools. They are the ultimate target groups of the ATTEST project, and therefore highly relevant stakeholders of the exploitation strategy.

3.3.3.1. Distribution system operators

DSOs are end-users of the ATTEST tools. Messages addressed to them will encourage the familiarization with the developed solutions and, ultimately, promote technology adoption.

3.3.3.2. Transmission system operators

TSOs are equally end-users of the ATTEST tools. Messages to them will also encourage familiarization with the new tools and aim for adoption.

3.3.3.3. Smart Grids community

Ancillary services providers and other agents of the energy grid may or may not be end-users of the ATTEST tools. Nevertheless, their solutions must be compatible with these tools to support market adoption. Messages addressed to them will promote familiarization with the project results and encourage software integration.

3.3.4. Group 4: regulators

The approval of the energy regulators is essential for effective market adoption of the ATTEST tools. These stakeholders will, therefore, be targeted by the exploitation strategy to become familiar (and comfortable) with the *modus operandi* of project results.

3.3.4.1. Energy regulators

Messages to energy regulators will aim at clarifying the inner workings of the ATTEST tools, reducing regulatory barriers to market adoption. By approving the use of project foreground results, regulators may support wider market adoption.

3.3.4.2. Governmental bodies

Governmental bodies become particularly relevant when TSOs and/or DSOs are state-owned. Additionally, they, too, have a say on energy regulations and can provide official support to the ATTEST tools. The exploitation strategy will approach them with messages related to the security, reliability, and transparency of the project results.

3.3.4.3. Policymakers

Policymakers may benefit from project results and use them to adjust current market regulatory models. Messages addressed to them will focus mainly on the potential of the generated information to support the regulation of future energy systems.

3.4. Exploitation activities

3.4.1. Organization of consortium partners

As co-authors of ATTEST, all the consortium partners are eligible to exploit project results. However, their strategy depends heavily on their business activity – which, in this case, can be (1) R&D and Academic; (2) Industrial; or (3) Utility.

TABLE 17 - GROUPS OF CONSORTIUM PARTNERS

R&D AND ACADEMIC	INESC TEC
	UNIMAN
	ICENT
	LIST
	Comillas
INDUSTRIAL	Techrain
	Končar-KET
UTILITY	HEP ODS
	HOPS

As different partners have different business activities – and reach different external stakeholders –, the exploitation activities will be distributed among them according to their expertise and institutional goals.

3.4.2. Distribution of activities

As exploitation of results is only possible when such results are available, some of the activities described below can take place during the final months of the project schedule (and beyond).

3.4.2.1. INESC TEC

Being an R&D institution with strong links to academia, INESC TEC will use the ATTEST project to host Ph.D. theses and release several articles in top scientific publications (such as IEEE, Elsevier, or Wiley) and conferences (such as IEEE Powertech or Medpower).

The partner will also include project results in its portfolio of advanced training for regulators, TSOs, and DSOs.

3.4.2.2. UNIMAN

UNIMAN is particularly interested in the future exploitation of the tools within the "planning module" category (i.e., optimization tool for distribution and transmission networks and TSO/DSO shared technologies). The different tools and studies associated with the development and use of these tools will be disseminated in the top conference and journal publications (e.g., IEEE transactions on smart grid), as well as various workshops and seminars.

This partner's activities will target academics and industrial partners, particularly the Greater Manchester Combined Authority, and local network companies, i.e., Electricity Northwest, National Grid System Operator, and National Grid Electricity Transmission.

3.4.2.3. ICENT

ICENT will develop a series of Ph.D. theses in the topic of ATTEST and exploit project results for future project applications. It will publish a set of papers and also use the project to strengthen collaboration with the energy industry (particularly DSOs and TSOs) and invest in the further development and upgrading of the ATTEST tools and models.

Finally, ICENT will work on presenting the concepts, ideas, results, and benefits of the project to regional and national regulatory authorities (In Croatia Hrvatska Regulatorna Agencija – HERA).

3.4.2.4. LIST

LIST will invest in further expanding and leveraging the two tools developed in ATTEST in the coming years on the TRL scale from 3 to 9. To achieve this goal, the partner will seek other funding sources through the submission of continuity projects to national (e.g. FNR Luxembourg) and international schemes (Horizon Europe), aiming to produce fully functional, market-ready tools by 2025. LIST commits to publishing several articles in top scientific journals (e.g. IEEE, Elsevier) and top conferences (IEEE Powertech, PSCC, etc.).

LIST will present three tools as well as relevant project results to local stakeholders in Luxembourg such as the TSO/DSO CREOS.

3.4.2.5. Comillas

Comillas has a particular interest in the innovative tools that are part of the "Asset management module" of the open-source toolbox of ATTEST. It will use the results of the project for attracting new Ph.D. students and submit several publications to high impact international journals in the energy field.

3.4.2.6. Techrain

Techrain will deepen its industry knowledge with the ATTEST project so that to be able to participate in European tenders and extend its customer base in other European countries. The partner will also invest in the commercial exploitation of the tools, both as an integrated set and individually.

The ATTEST project will also set the ground for the development of augmented-reality interfaces that could be exploited in different markets, for example, environment monitoring, where Techrain is working with an Italian Public Administration.

3.4.2.7. HEP ODS

Regarding the planning tools module, HEP ODS will focus on optimization tools for distribution network planning to change the current practice of determining the limitations on the allowable amount of DG that can be introduced to a specific part of the network.

Besides, the aforementioned tool, in combination with the tool for state estimation of distribution networks from the operation tools module, will also be used to determine cost-effective network enhancement solutions to mitigate power quality issues and include the influence of DG into planning, which is currently not the case.

The state estimation tool will also be used as a starting point for developing a cost-benefit analysis regarding the implementation of a state estimator as a prerequisite for reducing losses and detecting voltage issues in the distribution network.

Upon a successful technology demonstration within the project, HEP ODS will, together with the partnering TSO and invested third parties, comprise an economic and regulatory study, based on the results obtained in ATTEST and, if necessary, propose a redefinition of the regulatory framework in order exploit benefits of TSO-DSO cooperation.

3.4.2.8. HOPS

HOPS will use the ATTEST tools to maximize flexibility assets usage in the TSO-DSO environment. The partner will aim at the introduction of a common approach for improved planning/investment signals for assets in the TSO-DSO grid, the implementation of online visualization tools, and possible multiplication on the complete TSO-DSO environment.

Finally, the partner will use the demos for future flexibility market development as well as for the development of tools and procedures.

3.4.2.9. Končar-KET

As a long-time development and integration partner for the TSOs and DSOs, ATTEST results are in line with the business of KONCAR-KET. The partner will, therefore, exploit the ATTEST results to provide flagship software solutions and services beyond the year 2030.

KONCAR-KET's future services and solutions will be compatible with ATTEST tools. The partner will continue the development of the software solutions and include them in its portfolio of services and solutions tailored for the system operator of the future.

Furthermore, following up on previous successful experiences from H2020-funded projects, KONCAR-KET's experts plan to utilize knowledge and experience gathered through the ATTEST project in their participation in IEC standardization working groups.

3.5. IPR

The definition of the Intellectual Property Rights (IPR) concerning the project results is currently being discussed among the partners in the ATTEST consortium. Meanwhile, the norms stated in the Consortium Agreement apply: the partners hold joint IPR over project results, divided according to the effort each institution has dedicated to its development.

At such an initial stage of project development, the effort of each partner is calculated by the person-month value submitted in the Grant Agreement.

This is, however, a preliminary approach to IPR and the topic will be revised later on the project.

3.6. Exploitation roadmap

The exploitation of project results is set to begin in month 22 when the toolbox is officially released. Workshops and informative sessions will be the first activities to take place because they present the tools to the target audiences and provide practical insights and hands-on experiences.

Trials and integration in networks and portfolios will be held only after preliminary tests and demos. Open-source availability of software and other project results will also happen towards the end of the project schedule.

Theses and scientific publications may happen throughout the project schedule. New and continuity projects, on the other hand, will only happen after ATTEST comes to an end.

Finally, eventual policy and regulatory recommendations will be produced after the end of ATTEST, when all results are available and duly contextualized.

FIGURE 1 - EXPLOITATION ROADMAP

3.7. KPI

The exploitation strategy may be adjusted to market needs, meaning some activities will be happening as target audiences so require. These activities will be reported but will not have KPI.

To all the others, minimum key performance indicators apply:

TABLE 18 - EXPLOITATION KPIS

	KPI
PH.D. THESES	**5**
INESC TEC	3
ICENT	2
COMILLAS	1
PUBLICATIONS IN JOURNALS	**17**
INESC TEC	3
UNIMAN	4
ICENT	3
LIST	2
COMILLAS	2
KONČAR-KET	3
CONFERENCE PAPERS	**33**
INESC TEC	4
UNIMAN	5
ICENT	6
LIST	4
COMILLAS	2
TECHRAIN	3
HEP ODS	2
HOPS	2
KONČAR-KET	5

4. Impact of ATTEST results in future policy-making

The objectives of ATTEST are fully in line with the ambitious Energy and Climate targets for 2050 and will make significant contributions to the implementation of policies aimed at mitigating climate change.

4.1. Promoting green energy sources

The ATTEST models and algorithms will target maximization of RES usage and avid curtailment. Environmentally smart management systems offer better support to the implementation of (and compliance with) stricter climate policies.

4.2. Increasing grid flexibility

The predictable electrification of the transportation and heating sectors will lead to an increase in electricity demand and peak load, posing new operation and planning challenges to the infrastructure of power systems.

By coordinating the operation of TSOs and DSOs, the ATTEST toolbox ensures better use of the network capacity. Upon achieving the optimal management of flexible resources, the tools contribute to the reduction of unnecessary investment in network assets, even in cases of a large increase in electricity consumption.

Besides allowing the grid to cope with load peaks, the ATTEST solutions also enhance its response to low consumption times, reducing overall energy waste, and contributing to more eco-efficient energy systems.

4.3. Building user-centric energy markets

The energy markets of the future must meet consumer needs – and the only way to know those needs is through consumer engagement in the energy system value chain.

To realize the vision of a user-centric energy system, ATTEST will develop an innovative market simulator that is ready to include the participation of aggregators of prosumers in the energy and ancillary services markets.

5. Integration potential of project results

The ATTEST project aims to produce knowledge that stays. Project results must become effectively integrated into operational energy systems, and technical research results may open the way to innovations and tools.

Starting with effective integration, the ATTEST tools deployed in the Croatian demonstrator will remain in operation beyond the scope of the project. HEP ODS and HOPS will be, therefore, the first active clients of the ATTEST toolbox.

On the other end, experts of Končar-KET plan to use the knowledge produced by ATTEST to support their participation in (and contribution to) IEC standardization workgroups.

ATTEST will also significantly stimulate the innovation capacity of Europe's universities, research institutions, and industry by allowing them to fully exploit the potential of the next-generation power system management tools.

Moreover, the impact of the project is expected to go even deeper and wider. The increased innovation capacity of universities, research institutions, and industry will stimulate rethinking the business processes in the entire power system value chain. It may open up for new value constellations and business models that engage aggregators of prosumers, innovative ICT companies, and traditional electricity companies, encouraging new notions of cooperation in power systems management ecosystems.

The ATTEST ICT platform and tools will thus reinforce and expand Europe's innovation capacity across all energy-related sectors, consolidating its leading position in green technologies.

6. Conclusion

The exploitation plan is deeply connected to the dissemination plan, as the latter brings project results to the attention of stakeholders and triggers their interest in future exploitation activities. The communication strategy also plays a vital role in supporting the exploitation of results, mainly by engaging target groups from the beginning and thus easing the process of keeping their interest after the project conclusion.

Communication and dissemination channels become, thus, an essential part of the exploitation strategy and must not be dissociated from it. The exploitation activities will, therefore, appear as an extension of the previous two strategies and will take place for a few months after the end of ATTEST.

Finally, one must look at the exploitation strategy as an ongoing process that may simultaneously be the beginning of future projects and innovations. For that reason, there is no specific end date for exploitation activities, which will carry on as long as it proves to be beneficial to the accomplishment of project goals.