European Commission DG MOVE Support study on the development of a governance framework for the Public Key Infrastructure (PKI) under the standard ISO 15118

Electric Vehicle Symposium and Exposition (EVS36)
Sacramento, USA

Presentation by **PwC**
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INTRODUCTION

EC Support Study on the development of a governance framework for the Public Key Infrastructure (PKI) under the standard ISO 15118

1. The Support Study aims at planning for the **preparation of secondary legislation** (i.e. implementing act) under the new proposal on **Alternative Fuels Infrastructure Regulation** (AFIR)

2. It describes the preferred **governance and architecture framework** for a **Public Key Infrastructure** (PKI) under the standard **ISO 15118** for the bidirectional communication between the EV and the recharging infrastructure, including the **identification of the policy, governance and technical elements** to support it

3. The initial focus of the PKI is on the **Plug&Charge**, however in the future it would be open for other potential use cases in the context of e-Mobility.

4. It has been carried out hand-in-hand with the **Sustainable Transport Forum** (STF) **Sub-group on Governance and Standards, building on the recommendations of said group and** complementing them with an **additional set of recommendations**, which then acted as a guideline to define **all technical aspects** in later stages.

Sustainable Transport Forum

1. The **Sustainable Transport Forum** (STF) is a platform for **structural dialogue**, **exchange of technical knowledge**, **cooperation** and coordination between EU Member States and relevant **public and private stakeholders**

2. It aims at fostering the deployment of **alternative fuels infrastructure** to contribute to the European Union energy and climate goals. In fact, it is the main expert group associated to the **Alternative Fuels Infrastructure Directive** (2014), including the new Regulation (2023).

3. The STF was set-up by the **European Commission** in 2015. The STF operates with the following structure: a plenary, a secretariat, and several technical sub-groups to further develop the actions, namely:

   a) **STF Sub-group on Governance & Standards***

   b) STF Sub-group on Data

   c) STF Sub-group on Public Authorities

   d) STF Sub-group on Implementation with Member States

* The STF sub-group on G&S aims at gathering recommendations from industry members on key aspects such as electromobility interoperability, data, digital aspects, etc.

The STF webpage: https://transport.ec.europa.eu/transport-themes/clean-transport/sustainable-transport-forum-stf_en

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THE PROJECT JOURNEY

| Sept '22 | Oct '22 | Nov '22 | Dec '22 | Jan '23 | Feb '23 | Mar '23 | Apr '23 | May '23 | June '23 |

Phase 1 of the support study | **Phase 2 of the support study**

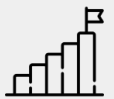|	Phase 1	Phase 2
Aim	Define **high-level specifications of the EU PKI Ecosystem for e-Mobility** in relation to ISO 15118	Build upon Phase 1 recommendations to develop a **detailed set of deliverables** to support the EC in the development of the **secondary legislation under AFIR**
Methodology	• **In-depth interviews** with PKI project providers of the STF Subgroup on G&S to map their positions • **Validation checkpoints with the STF Subgroup on G&S**	Creation and engagement of a **working group of experts** (PKI Project Providers, CPOs, OEMs, PKI service providers, energy generation companies, etc.) meeting once per week to elaborate and review a set of detailed deliverables.
Output	• **Recommendation 1** - A regulated or non-regulated governance and architecture approach* • **Recommendation 2** - A Single or Multi Root CA model* • **Recommendation 3** - Interoperability across Multi Root CAs • **Recommendation 4** - Governance model • **Recommendation 5** - Ownership model • **Recommendation 6** - Implementation scheme	• **Deliverable 1** - **Mutually recognised set of criteria** for Root CAs, Subscribers and the CTL of the European PKI Ecosystem for e-Mobility • **Deliverable 2** - **Relevant standards and technical aspects of the PKI** to allow interoperability across V2G Root CAs • **Deliverable 3** - **Market rules** and onboarding guidelines • **Deliverable 4** - **Security policy** (SP) for the deployment and operation of the EU PKI Ecosystem for e-Mobility • **Deliverable 5** - **Implementation plan** for the preferred governance and architecture model • **Deliverable 6** - **Architecture, governance, and operating models** for a PKI under ISO 15118

Addressed prior to the support study

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PHASE 1: METHODOLOGY AND RECOMMENDATIONS

Methodology

6 questionnaires developed

26 interviews

6 recommendations

Main stakeholders consulted

Additional stakeholders

Recommendations (R)

R1 - Agreement on a regulated approach for the PKI governance and architecture in the EU due to the advantage of providing a **clear legal basis** covering the key elements of the PKI.

R2 - Agreement on a Multi Root CA model for the PKI governance and architecture in the EU due to the **benefits of having competition** in the market among several V2G Root CAs – increased variety and quality of service, reduced prices - as well as the **increased operational resilience** of the PKI

R3 - General preference on interoperability across Multi Root CAs by means of a Certificate Trust List (CTL). This results from the potential for **scalability, centralised maintenance**, and fitting logic of certificate verification.

R4 - General preference on a "mixed approach" PKI governance involving **both private and public stakeholders** (i.e. businesses organisation, industry consortia and public authorities) as it allows to leverage the strengths of each of them while minimising the downsides.

R5 - The consulted stakeholders advocate for a central **public authority (i.e. COM) to perform the governance roles** of the PKI[1] while **managing and operating** roles[2] would be covered by a combination of **business organisations, industry consortia** and **public authorities**.

R6 - Implementation scheme for the preferred governance and architecture model will be articulated in two phases**: (A) 1st phase - market-driven,** based on existing solutions with further testing and scaling up; **(B) 2nd phase - common PKI interoperability solution implemented**, subject to agreed market rules and a series of legal provision (i.e., AFIR and its delegated acts).
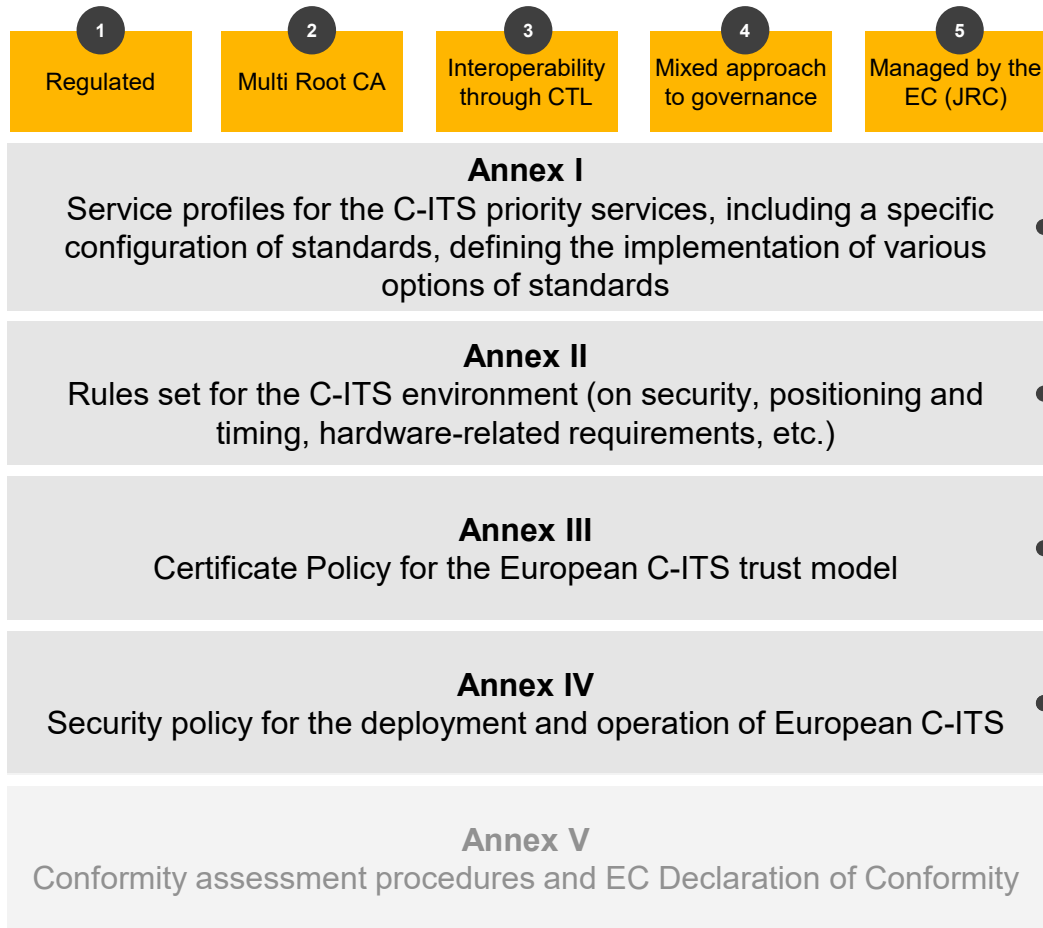
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[1] Definition of criteria for Root CAs operators, check of the criteria, and distribution of the CTL
[2] Operations of the PKI and the actual provision of the emission of certificates and signing service)
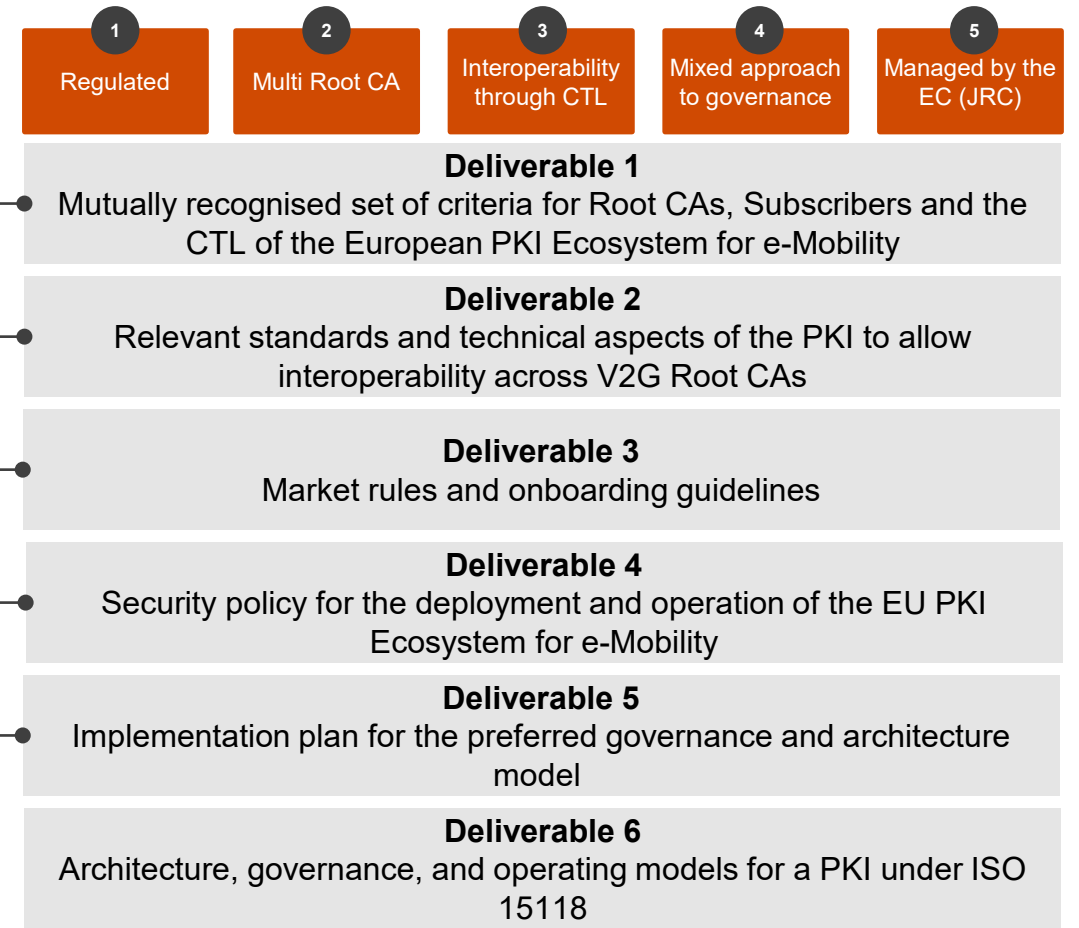
C-ITS AS A REFERENCE PRACTICE FOR THE DELIVERABLES OF PHASE 2

Cooperative Intelligent Transport System (C-ITS)

1	2	3	4	5
Regulated	Multi Root CA	Interoperability through CTL	Mixed approach to governance	Managed by the EC (JRC)

Annex I
Service profiles for the C-ITS priority services, including a specific configuration of standards, defining the implementation of various options of standards

Annex II
Rules set for the C-ITS environment (on security, positioning and timing, hardware-related requirements, etc.)

Annex III
Certificate Policy for the European C-ITS trust model

Annex IV
Security policy for the deployment and operation of European C-ITS

Annex V
Conformity assessment procedures and EC Declaration of Conformity

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1	2	3	4	5
Regulated	Multi Root CA	Interoperability through CTL	Mixed approach to governance	Managed by the EC (JRC)

Deliverable 1
Mutually recognised set of criteria for Root CAs, Subscribers and the CTL of the European PKI Ecosystem for e-Mobility

Deliverable 2
Relevant standards and technical aspects of the PKI to allow interoperability across V2G Root CAs

Deliverable 3
Market rules and onboarding guidelines

Deliverable 4
Security policy for the deployment and operation of the EU PKI Ecosystem for e-Mobility

Deliverable 5
Implementation plan for the preferred governance and architecture model

Deliverable 6
Architecture, governance, and operating models for a PKI under ISO 15118

THEY ARE NOT THE SAME, BUT SIMILARITIES APPLY THAT ALLOW TO CREATE SYNERGIES AND REDUCE COSTS

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PHASE 2: METHODOLOGY AND DELIVERABLES

Methodology

6 deliverables

16 weekly working group meetings

2 hybrid workshop of two days

22 participants to the Working Group spread across **14 stakeholders**

Deliverables

D1 - **Mutually recognised set of criteria for Root CAs, Subscribers and the CTL** of the European PKI Ecosystem for e-Mobility

D2 – Identification of **relevant standards, protocols and technical aspects of the PKI** to allow **interoperability across Root CAs** including the identification of gaps and the action plan to fill such gaps

D3 - **Market rules and onboarding guidelines** for the European PKI Ecosystem for e-Mobility and any market actor that wishes to be included in it (EU governance elements, PKI Systems, OEMs, CPOs, EMSPs, Certificate Pools, etc).

D4 - **Security policy** for the deployment and operation of the EU PKI Ecosystem for e-Mobility
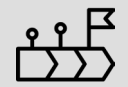
D5 - **Implementation plan for the preferred governance and architecture model** for the European PKI Ecosystem for e-Mobility starting from the current market situation (Implementation roadmap, identification of the next steps for the development)
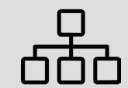
D6 - **Architecture, governance, and operating models** for European PKI Ecosystem for e-Mobility

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MAIN ACHIEVEMENTS

Definition of the **main features of the EU PKI for e-Mobility** in relation to ISO 15118

- Regulated (common definitions and minimum market requirements)
- Multi Root-CAs model
- Interoperable through the CTL
- Mixed approach to governance (i.e. public and private entities involved)

Definition of the **Governance and Architecture** of the potential future EU PKI for e-Mobility

Definition of a clear way forward to **fill the standardization gaps of an architecture based on the CTL, including: (1)** New COM standardisation request to ETSI to cover the EU PKI CTL requirements, (2) Agreement to work with EU industry through the **OPNC taskforce within CharIN (3)** Coordination with STF for further endorsement and submission of OPNC to international standardization organization (IEC or ISO)

Starting from ElaadNL market rules report, draft of full set of **market rules** for the EU PKI Ecosystem, its participants (PKI Systems, PKI operators, Root CAs, OEMs, CPOs, EMSPs, Certificate Pools and Services), and the EU Governance components (EPEGMB, CTL, TLM, ePOC, EPEOB)
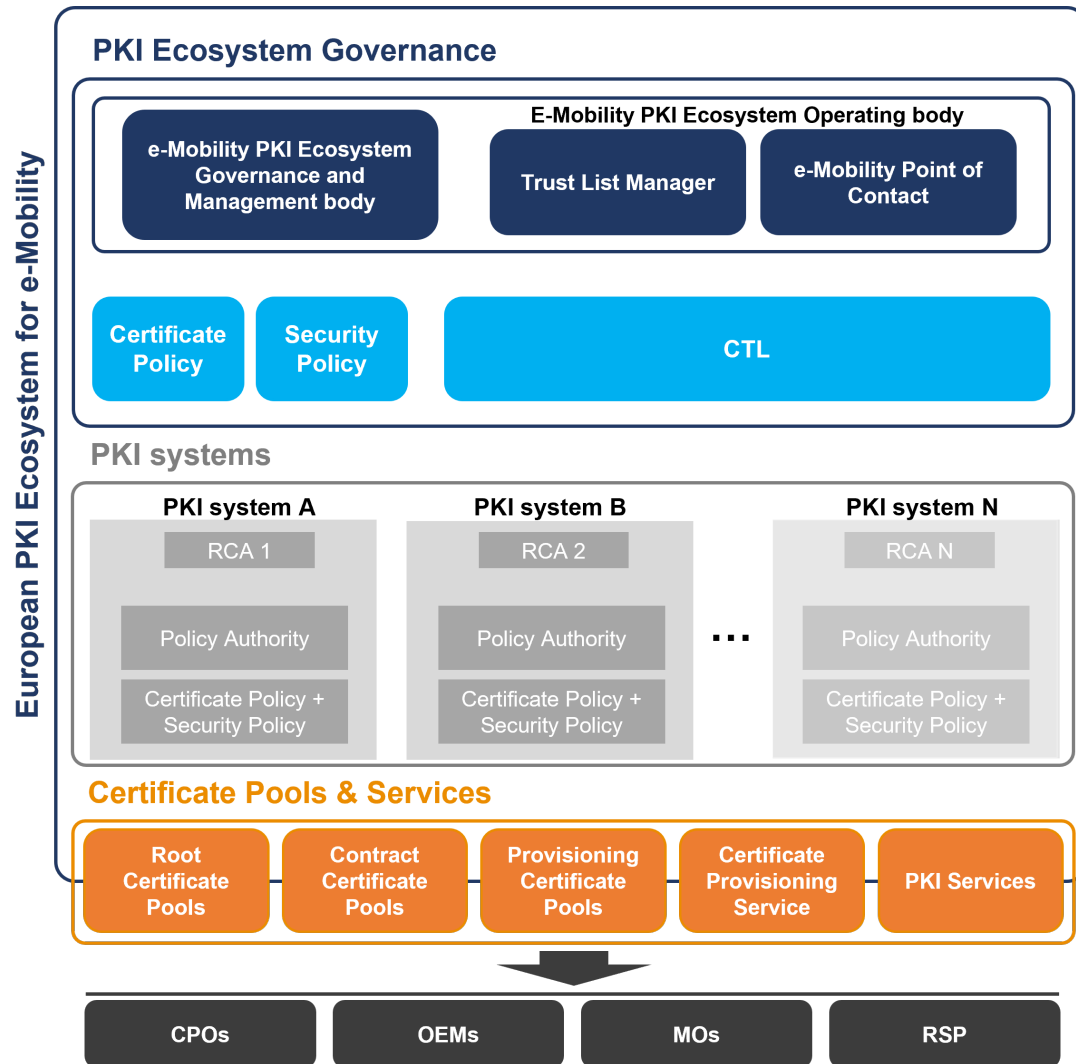
Definition of the **structure of the implementing act** under AFIR of the European PKI for e-Mobility and the draft contents of the related annexes

Development of work that could serve as a reference for other regions for the creation of open and freely competing markets based on common rules and definitions

MAIN ACHIEVEMENTS – EU PKI ECOSYSTEM ARCHITECTURE


Comments

1. The **EU PKI Ecosystem for e-Mobility** is constituted by the following components:
    1. PKI Ecosystem **governance elements under the EC responsibility**, including the **actors responsible of the governance** and the **interoperability** of the Ecosystem and the **technical element** to achieve it (CP, SP, CTL)
    2. The individual **PKI Systems** onboarded on the PKI ecosystem
    3. A **centralized layer of Certificate Pools** and services

2. Interoperability is ensured **through a CTL operated at EU level** that contains the certificates of the **trusted V2G, OEMs, CPOs and MOs Root CAs**.

3. All market actors willing to offer services in the EU will have to follow the **rules and requirements of the EU PKI ecosystem** as it will be lay down in the future **Commission Implementing Act** (Q4 2023 / Q1 2024).

4. The **EU PKI Ecosystem CTL** will be officially **set-up by** the Commission's **Joint Research Centre** as of **January 2025**.

CONCLUSIONS

The achievements of this project were thanks to the good **cooperation and contribution of the EU industry within this EU government-led initiative**
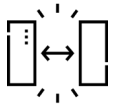
The expectation now is for **other governments to follow**

The **EC is willing to support** the US and other governments willing to engage in a similar initiatives

Questions and answers

Thank you

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