



# **STATION ARCHITECTURAL DESIGN: Economic Impact Assessment. The day after.**

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4-A Sustainable Stations

# What are we going to talk about?

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**The aim of this lecture is to present ADIF's STATION HANDBOOK and the reason why it was born:**

- To gather Adif's experience of the past years, in the design, construction, management & operation of High Speed and Conventional Spanish Stations.
- To ensure that values acquired from operation & maintenance during the life cycle of a station are considered as Station Design Principles.

# What does “*the day after*” mean?

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Project



Construction

## OPERATION

***The day after is the day when the lifecycle and the operation activities of a Station start.*** Therefore, Stations besides being beautiful, functional, and acting as city landmarks, must above all be **maintainable** and economic **sustainable** during their **whole life cycle**.

# Our role as architects experts in O&M

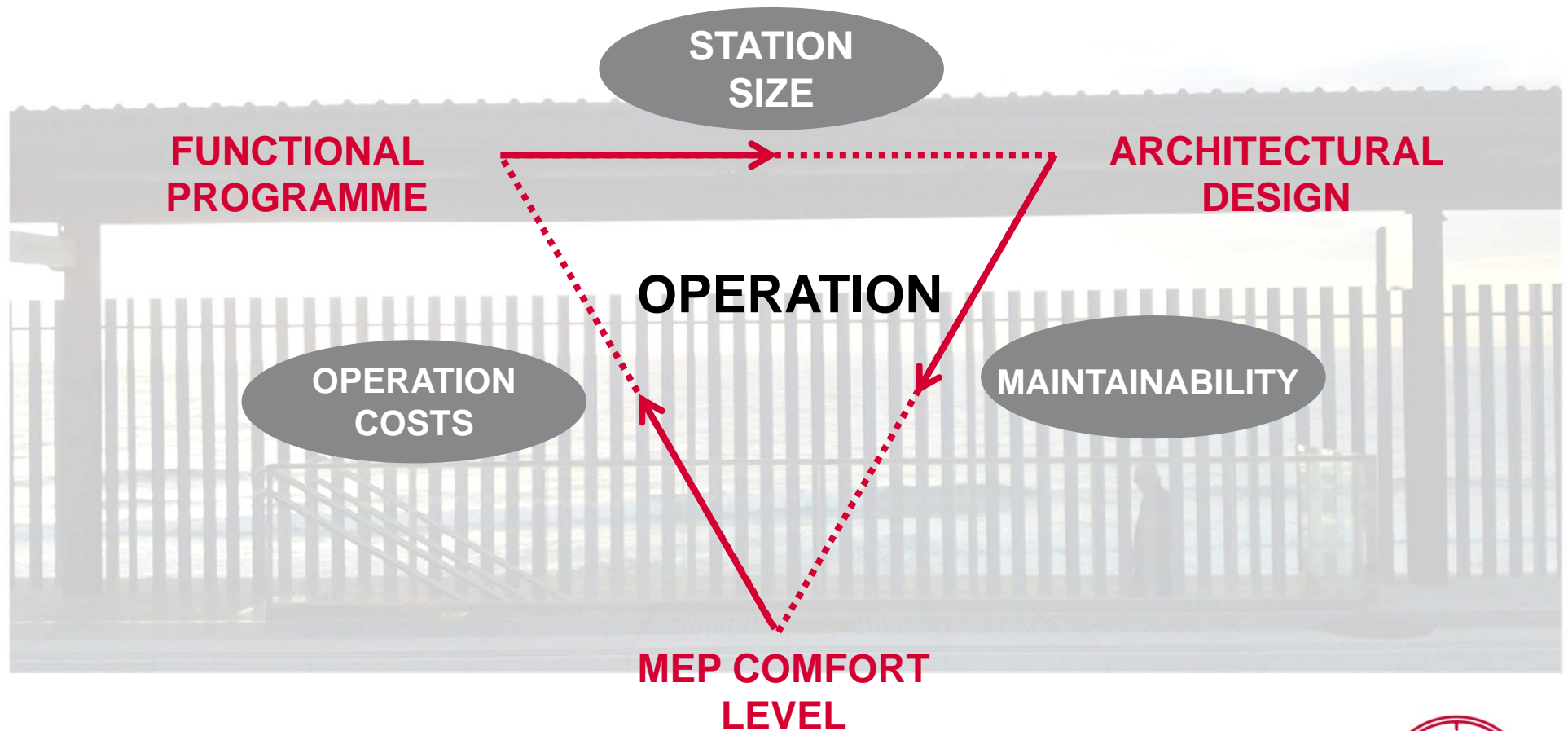
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To give technical support to needs arising from O&M activities. However, this task is not always easy to accomplish because **DECISIONS** made during **DESIGN STAGES** compromise around **80%** of stations **OPERATION** and Maintenance **COSTS**.



# Our Experience: Factors that condition Operation

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# Functional Programme to define Size

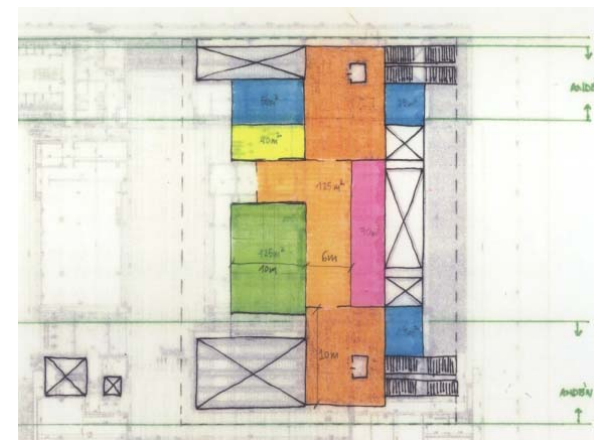
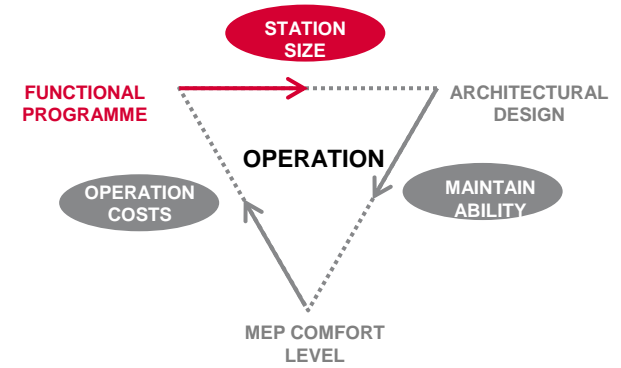
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- Match the **functional programme**, *railway, retail, front of the house and back of the house uses*, to the different type of stations.
- Adjust the **station's size** considering initial passenger forecast and plan station future extensions.



**ADJUSTED SIZE, MODULARITY & FLEXIBILITY**

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# Architectural Design to ensure Maintainability

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- **Budget Control** by using different type of materials and finishes depending on the station type:

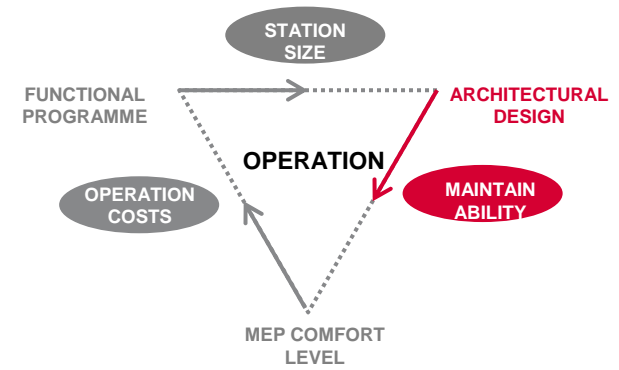
St. Building	Platform finishes	Canopies
2.000 – 3.200 €/sqm	20 – 100 €/sqm Concrete / granite	350 – 500 €/sqm

- **MEP & Back of the House Services** as an important part of the project:
  - Represent up to 20% of Station area.
  - Rooftops, service galleries and glazed walls must be accessible for maintenance operations.



## MEP ACCESSIBILITY & STANDARDIZATION

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# MEP Comfort Level Operation Costs

□ **Vertical communication elements.**

Annual maintenance costs:

Elevator	Escalator	Mech. ramp	Fixed Ramp
2.000 €/year	2.500 €/year	4.000 €/year	0 €/year

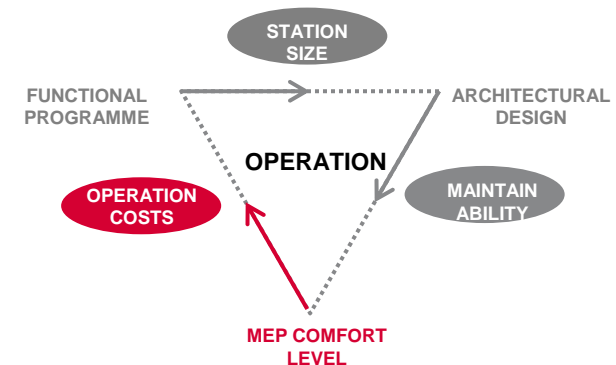
□ **Maintenance budget.**

- Electrical: 30 % medium-low voltage, lighting.
- HVAC: 40 % heating, ventilation and air conditioning.
- Others: 30% plumbing, sewage, fire protection.



**SECTORIZATION, REGULATION,  
SYSTEMS MANAGEMENT**

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# Our experience put down into words

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## Adif Stations Handbook (1300 pages)



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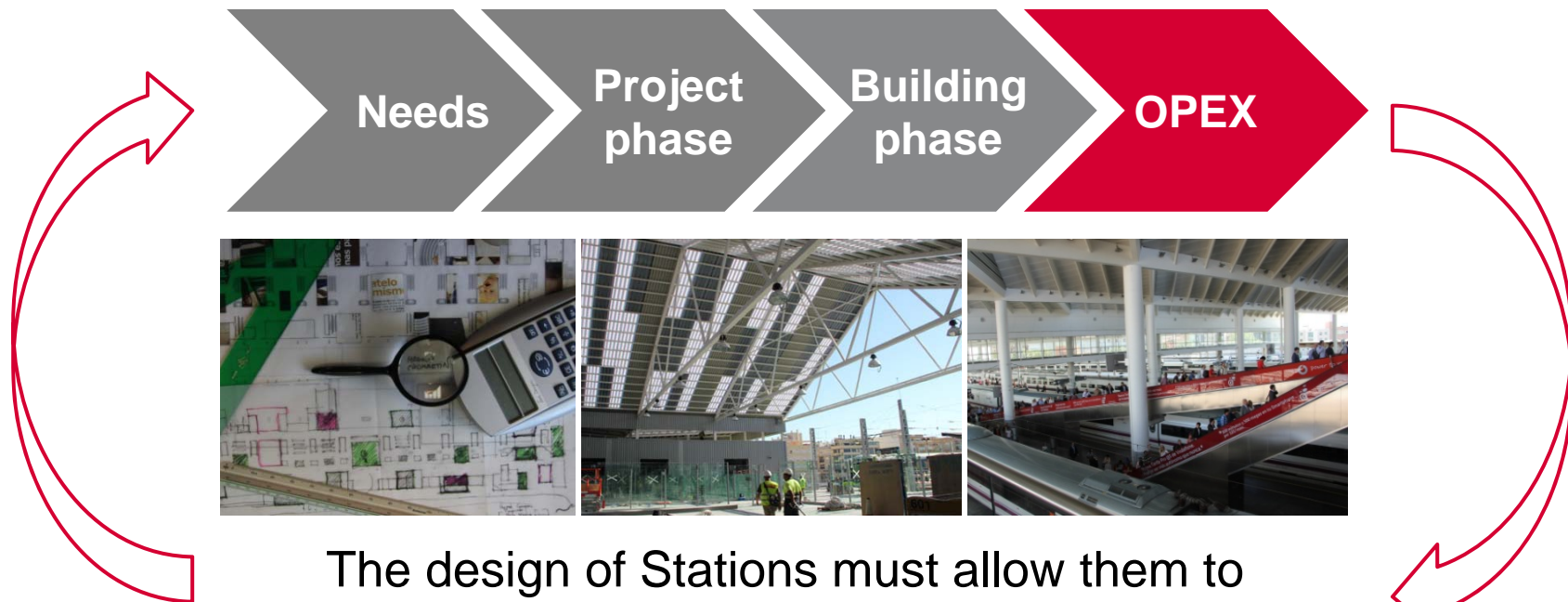
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# New approach: Station life cycle

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**Values** acquired from **operation & maintenance** must be considered as **Station Design Principles**.



The design of Stations must allow them to **ADAPT** and **EVOLVE** because they are living artefacts in **constant CHANGE**.

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...Thank you

for your kind attention

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