

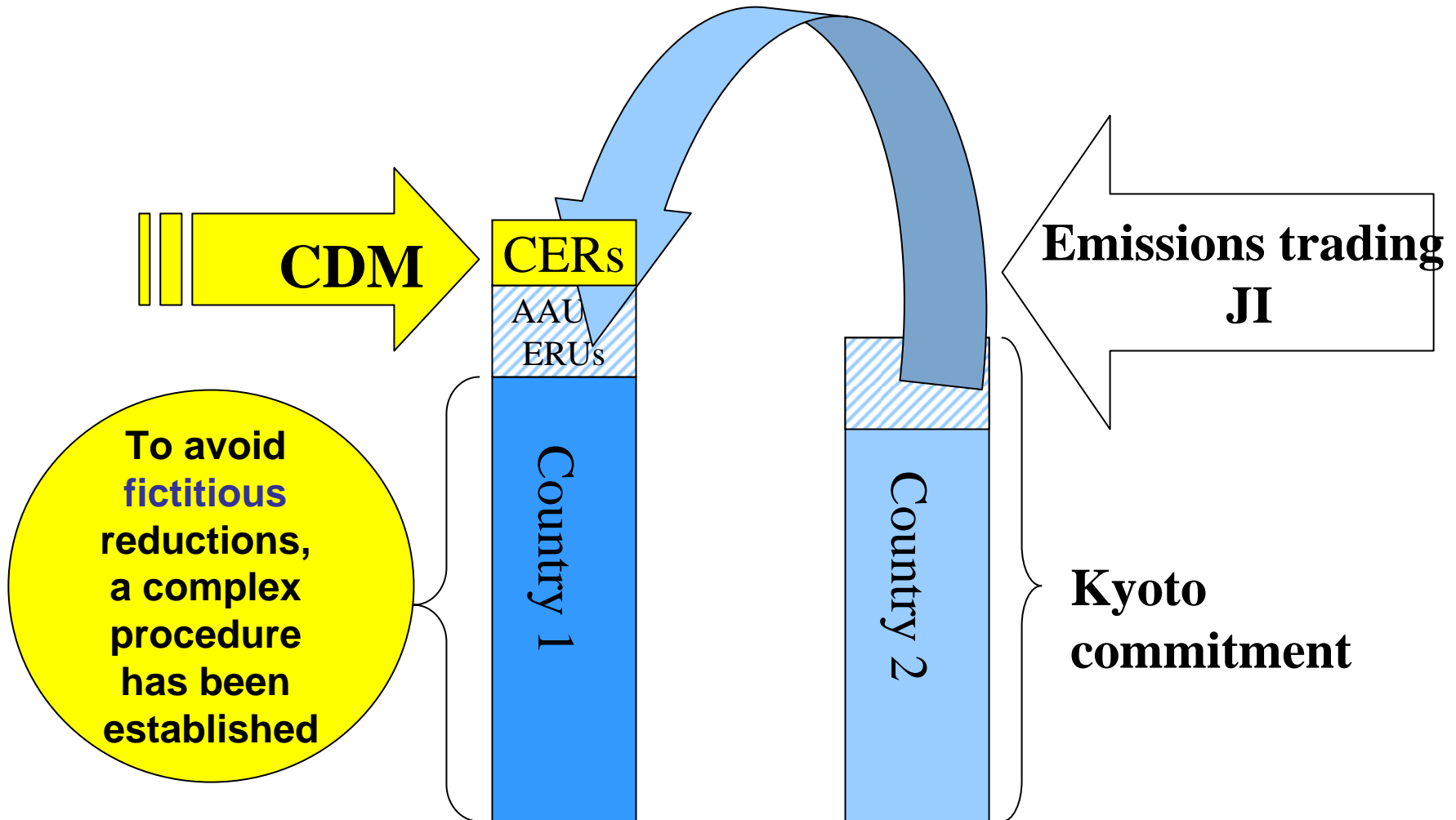
# **CDM in the railway sector**

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# The principle of the CDM



# Key CDM terms

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## ■ Baseline

- Emissions level that would have existed in the **business-as-usual situation** (in the absence of the CDM project)

## ■ Certified Emission Reductions (CERs)

- **Certificates** issued for the emissions reductions achieved by the CDM projects. They can be **sold** to companies and governments in industrialized countries

## ■ Additionality

- A CDM project should be **motivated by the revenue** coming from the CER sales. If it is already an **attractive business without the CER benefit**, it is not additional

# Key CDM terms II

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- **Crediting period**
  - **Duration** for which a CDM project can generate CERs. Either **10 years** or **three times 7 years**
- **Small-scale projects**
  - **Projects of less than**
    - **15 MW** for renewable energy
    - **60 GWh** annual savings for energy efficiency
    - **60,000 t** annual CO<sub>2</sub> reductions for other types
  - **They benefit from**
    - **simplified rules**, especially pre-defined baseline methodologies
    - **lower fees**

# Options for emission reductions

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- **Mass reduction of trains**
  - Lighter materials for components
    - Aluminium car bodies
    - Light materials for interior (sandwich structures)
  - Redesign of system (bogies)
- **Improved train aerodynamics**
  - Covering freight cars
- **Increasing seat-mass ratio**
  - Double-decked cars, wide body cars
  - Replacement of locomotives by multiple traction

# Options for emission reductions II

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- **Diesel motor improvement**
  - Direct injection engine
  - R&M
- **Energy recovery from braking**
  - Hybrid locomotives for diesel trains
- **Reducing idling**
- **Fuel switch**
  - Diesel-gas
- **Efficient AC**
  - Waste heat-cold conversion

# CDM project types for railways

- **Energy efficiency improvement of trains**
  - III.C: Emission reductions by low-greenhouse gas emitting vehicles
    - Any improvement of rolling stock
  - II.C: Demand-side energy efficiency programmes for specific technologies
    - Improvement of operation of secondary equipment in repair shops and onboard rolling stock
- **Improvement of operation of trains**
  - No methodology exists
- **Fuel switch**
  - III.B Switching fossil fuels

# Potential revenues

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- 1 CER = ~650 Rs
- **Energy efficiency improvement of trains and related equipment**
  - 0.75 – 1.05 CERs/MWh saved : ~600 Rs/MWh
  - ~2.6 CERs/t diesel saved : ~1700 Rs/t diesel
- **Fuel switch**
  - Biofuel use currently not accepted under the CDM
  - Diesel – gas: not relevant under Indian conditions

# Next steps

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- Identification of project types relevant in the context of Indian Railways
- Estimate of CER potential
- Assessment which CDM methodologies are applicable
- Assessment of barriers to the implementation of projects
- Prioritization of project types according to
  - Cost-CER ratio
  - Lead times
  - Replicability / possibility of bundling

# Timeline

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<b>Action</b>	<b>Who?</b>	<b>When?</b>
<b>Collection of project ideas according to PIN template</b>	<b>Indian Railways management</b>	<b>June 30</b>
<b>Pre-evaluation of project ideas according due to due diligence criteria</b>	<b>Perspectives</b>	<b>July 31</b>
<b>Comments on pre-evaluation</b>	<b>Indian Railways management</b>	<b>August 30</b>

# Timeline II

<b>Action</b>	<b>Who?</b>	<b>When?</b>
<b>Draft report on CDM potential in Indian Railways</b>	<b>Perspectives</b>	<b>September 15</b>
<b>Comments on draft</b>	<b>Indian Railways management</b>	<b>October 15</b>
<b>Final report</b>	<b>Perspectives</b>	<b>October 30</b>
<b>Workshop for presentation of results</b>	<b>CDM IGEN</b>	<b>November 5</b>

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**Thank you!**

**Further information:**

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