

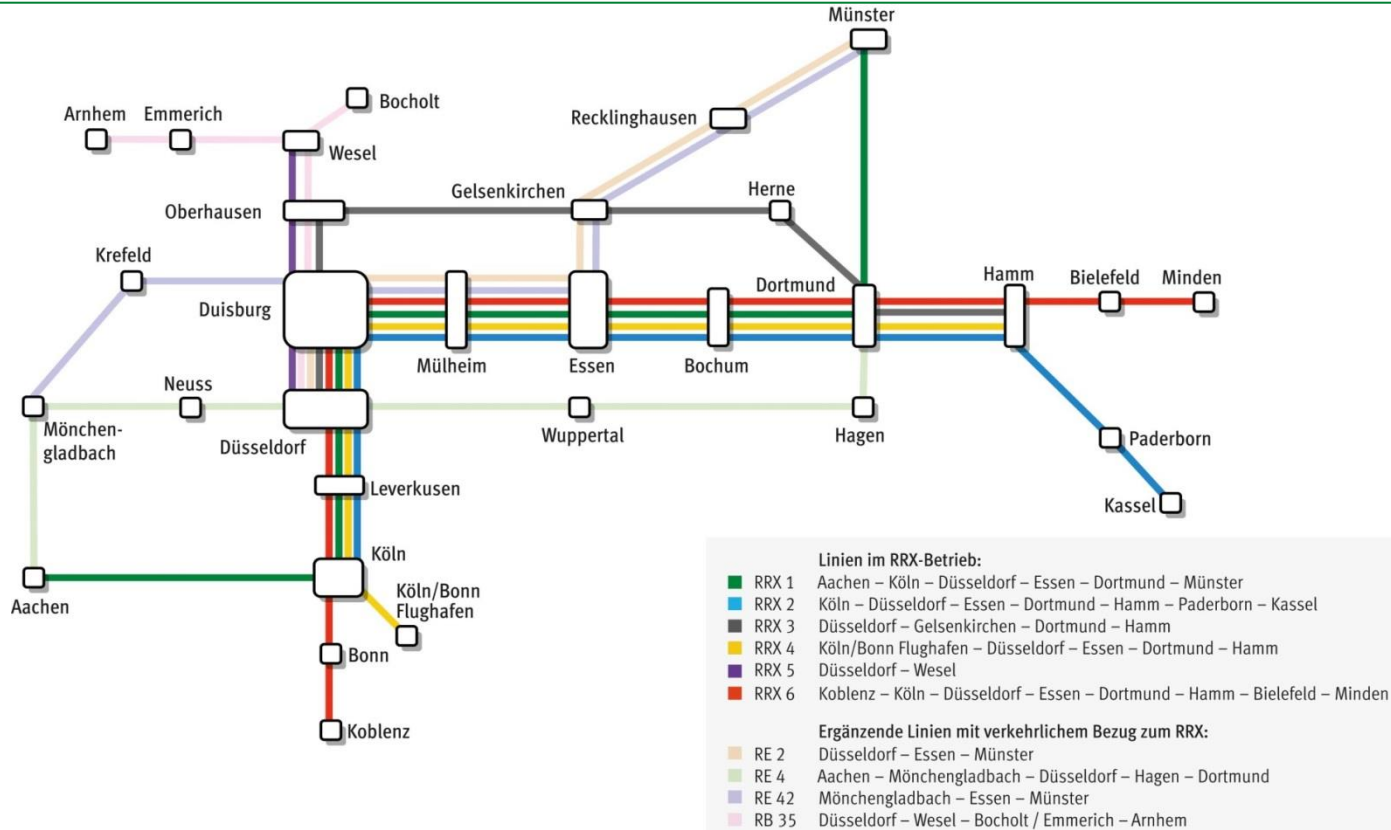
# Rhein-Ruhr-Express

More quality and technical advancement based on the availability approach

Verkehrsverbund Rhein-Ruhr AöR

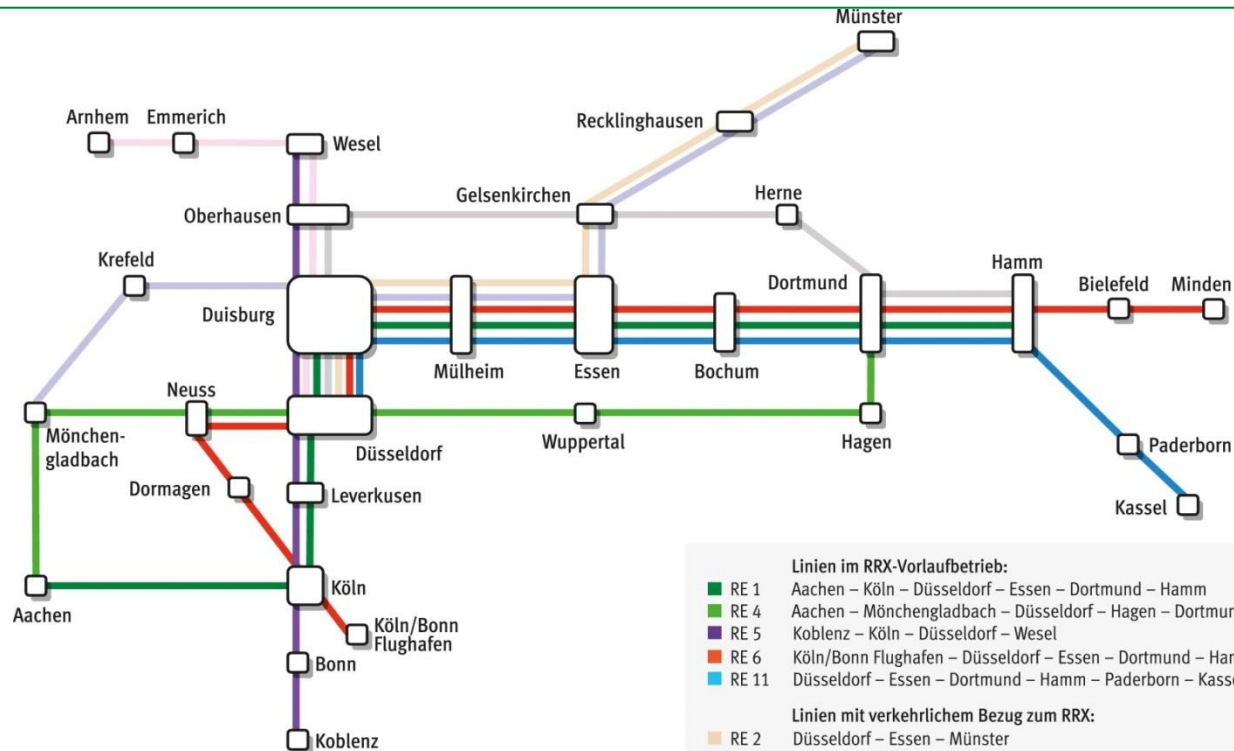
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# RRX target state (before expansion of infrastructure)



Nicht alle Halte dargestellt.

# Preliminary RRX operation



## Linien im RRX-Vorlaufbetrieb:

- RE 1 Aachen – Köln – Düsseldorf – Essen – Dortmund – Hamm
- RE 4 Aachen – Mönchengladbach – Düsseldorf – Hagen – Dortmund
- RE 5 Koblenz – Köln – Düsseldorf – Wesel
- RE 6 Köln/Bonn Flughafen – Düsseldorf – Essen – Dortmund – Hamm – Bielefeld – Minden
- RE 11 Düsseldorf – Essen – Dortmund – Hamm – Paderborn – Kassel

## Linien mit verkehrlichem Bezug zum RRX:

- RE 2 Düsseldorf – Essen – Münster
- RE 3 Düsseldorf – Gelsenkirchen – Dortmund – Hamm
- RE 42 Mönchengladbach – Essen – Münster
- RB 35 Düsseldorf – Wesel – Emmerich – Arnhem

Nicht alle Halte dargestellt.

# Provision of uniform vehicles



## 77

Operating requirements  
+ operating reserves  
as from 2018  
for regional train lines

## 77

Operating  
requirements +  
operating reserves for  
RRX target state

Furthermore there will be maintenance reserves



Pool of uniform vehicles and exchangeability for operating changes have been ensured

# NRW's RRX model

**Separation:**

## Provision of vehicles

Transport organisation  
authority invites tenders for a  
contract on the vehicles

from

## Awarding of transport services

Transport organisation authority  
invites tenders for transport services

**As a result:**

**two separate tendering procedures  
overlapping in time**

## Manufacturer

– provides vehicles for the transport authority

### Ensures

- permanent availability for the  
daily operation of the railway company  
for 30 years with a prolongation option

- Servicing
- Maintenance
- Repair
- External cleaning

– Transport authority provides the funds

## Railway company

– leases the vehicles from the transport authority  
with various operating times (e.g. 12 + 13, maybe + X  
or 10 + 15 years + X)

– renders transport services

– Transport organisation authority specifies usage of  
vehicles in transport contract with the railway  
company

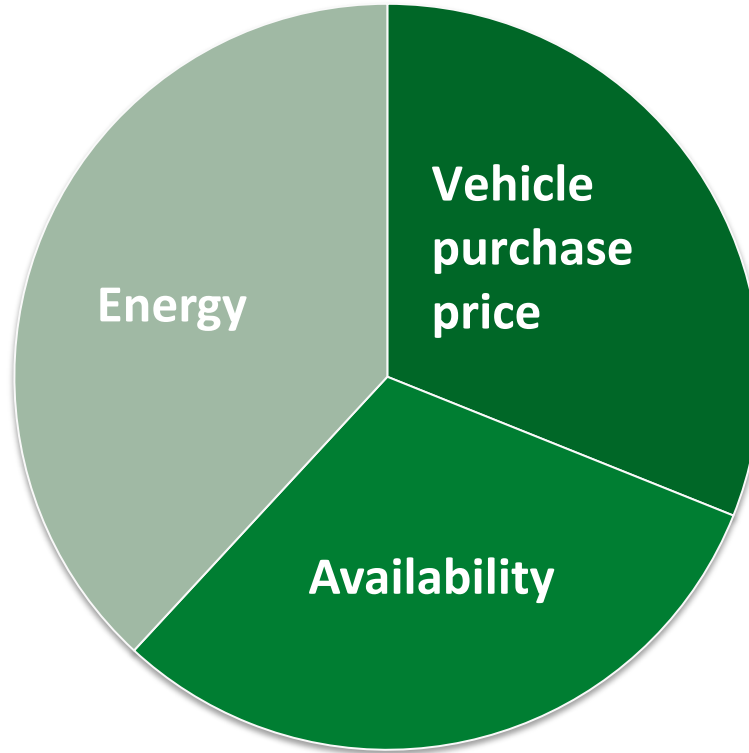
# Why manufacturer tendering + availability and operator tendering?

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- Uniform vehicles for all lines
- Optimisation of total costs for production and maintenance and repair of vehicles (life-cycle costs) and vehicle quality
- Low-maintenance vehicles based on the commitment for maintenance services
- High number of vehicles allows new development and construction
- Manufacturer competition through large contract volume and combination Availability contract for 30 years
- Assured competition during operation because of enormous investment costs
- Opening of competition for railway companies that normally get less favourable financing conditions

# Life cycle approach - cost structure

- Optimised development, quality and energy efficiency for vehicles



# Better quality by combined invitation to tender for delivery and maintenance

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- Development of new vehicles, etc.
  - Electrical double-deck traction units
  - Minimum 800 seats per train and 400 seats per vehicle
  - Entries on the same level at a platform height of 760 mm above top of rail
- Lower weight of 10 – 20 t compared to the existing concepts
- Energy-efficient vehicles
- Advanced driver assistance system
- Sophisticated diagnosis system for high availability





# Intensive cooperation between manufacturers and railway companies during operation using digital technology

Joint planning, coordination and discussions between railway companies and manufacturers in the control station of the maintenance centre incl. EDP-based exchange of information regarding operational and maintenance planning for a smooth operation



Fast communication of possible faults during operation and at the vehicles by the railway companies (train attendants) using mobile input devices at the line and diagnosis systems in the vehicles, so communicating to the control station



# Comparison of quality requirements

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## Classical transport contract with railway company

- General criteria for evaluating the state of vehicles from the customer's point of view
- Evaluated by expert testers through samples
- Contractual penalty not before deduction of a certain tolerance value
- Annual approach

## RRX manufacturer contract

- Detailed catalogue of defects and failures (A,B,C,D defects)
- Every failure is recorded and viewed
- Short periods for correcting a defect, otherwise immediate penalisation

