

Fremtidens Tog

Summary of findings from the 2016-RFI process

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1. Background

DSB operates a 1668 km network of railways across Denmark. Some 640 km of the rail network is electrified, and programmes are on-going to significantly extend 25kV AC electrification across the Danish rail network. The remainder of the rail network is currently operated with diesel rolling stock much of which will soon be due for replacement.

To upgrade the Danish rail network, the Danish State has initiated two separate, but related programmes for the infrastructure: 1) to significantly extend 25kV AC electrification across the Danish rail network, and 2) implement ERTMS signalling throughout the rail network. In addition to these programmes a Rolling Stock programme, Future Trains, will procure new electric passenger rolling stock (hereafter referred to as the "Programme").

The Programme is comprised of the procurement and introduction of new electric rolling stock compatible with the Danish rail network. Furthermore, different options for sourcing maintenance support from suppliers are being explored by DSB. Among other the Programme entail the acquisition of new electric locomotives in a separate tender (hereafter referred to as "AL") and the acquisition of new electric trains (hereafter referred to as "NT").

In 2016 DSB carried out a comprehensive market investigation to assist in finalising plans for procuring new electric trains. The information gained from the market investigation contributed to the necessary foundation for the decision to procure new trains including decisions on train types, specifications and quantities to be procured along with the delivery plans and the contractual framework.

A key part of the market investigation was a Request for Information (RFI), providing DSB with a deeper understanding of the products and capabilities available in the rolling stock market, as well as the suppliers' views on the NT schedule, and the commercial structure as envisaged by DSB. Furthermore, as foreseeing and mitigating risk is a key issue for the Programme, DSB is keen to engage with suppliers in order for DSB to establish approaches which will allow effective risk management in the interest of both parties.

The RFI process was open to all interested rolling stock suppliers through an open invitation via the European public procurement journal, Tender Electronic Daily (TED). Thirteen companies (including some non-rolling stock suppliers) indicated their interest in the RFI, and Ten rolling stock suppliers actually participated in the RFI-process; Alstom, Bombardier Transportation, Construcciones y Auxiliar de Ferrocarriles (CAF), CRRC Corporation Limited, Hitachi Rail Europe, Petroleum Equipment & Services Association (Pesa), Siemens Mobility, Skoda Transportation, Stadler Rail and Talgo. The ten suppliers have an estimated marketshare of roughly 95% in the relevant European segment and, hence, are regarded representative for the relevant market.

The RFI consisted of two stages, 1) a RFI Questionnaire stage, and 2) a workshop stage. After completing the registration the suppliers received a questionnaire along with some background material about the required capacity and the Danish infrastructure and passenger operation. The suppliers handed in their responses to DSB and received an invitation to a workshop. Furthermore, DSB asked the participants a number of written additional question necessary to get the optimal output.

All information shared in the RFI process has been shared on a "without prejudice" basis. In the following, DSB has made a short summary of the topics and findings of the RFI. Since the information

shared during the RFI process has been subject to a confidentiality declaration, the summary has been made with respect of this confidentiality obligation.

2. Summary of Findings

Train Solution

Through the RFI, DSB obtained further knowledge on electric passenger train solutions to perform three operational service types: a Regional Train Service (RT), a Fast Train Service (FT) and a High Speed Train Service (HT). A summary of the key characteristics of the three operational service types can be found in Table 1.

Operational Service Types			Table 1
Operational service type	Distance between stops	Top speed (kph)	The table shows basic characteristics of the three operational service types
Regional Train Service (RT)	Approximately 7 km	At least 160	
Fast Train Service (FT)	Approximately 18 km	Approximately 200	
High Speed Train Service (HT)	Big distance	Up to 250	

Some suppliers have a distinct train solution for each operational service type, while others have train solutions that would cover more than one operational service type. In total 25 different product platforms were proposed. A summary of the 25 product platforms can be found in Table 2.

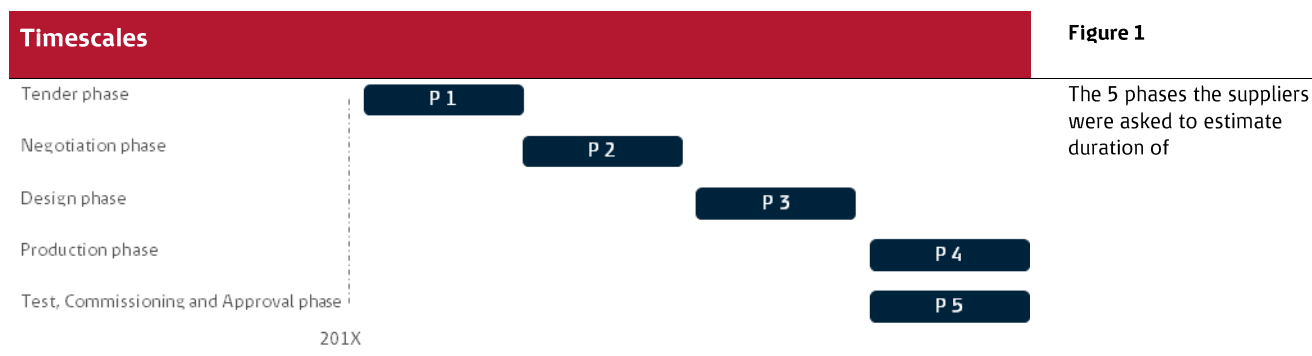
Proposed platforms per operational service type-combination						Table 2
Operational service type	Proposed platforms	Single deck	Double deck	Loco and coaches	Train sets	Summary of the proposed product platforms and the distribution between single and double deck as well as trainset and locomotive and coaches solutions.
All	5	3	2	1	4	
Regional	4	3	1	0	4*	
Regional and fast	8	6	2	0	8	
Fast	2	1	1	1	2	
Fast and High-speed	2	2	0	0	2	
High-speed	4	4	0	0	4	
Total	25	19	6	2	23	

* One of these can also operate as push-pull

7 out of the 10 suppliers indicated that the trains they proposed had well above 80% re-use of sub-systems etc. where the remaining 3 chose not to answer the question.

Timescales

DSB also discussed timescales and NT procurement duration with the suppliers. DSB has divided the NT procurement into five phases (see Figure 1 below). The suppliers were asked to provide input to the duration of each phase. DSB received very varied input, most likely due to different assumptions for each phase made by the suppliers as well as the different level of platform maturity.



All 10 suppliers provided duration estimates, some provided more than one to indicate the difference between their different product platforms. For the individual phases the following input was provided:

- P1: 2 to 14 months
- P2: 2 to 12 months
- P3: 6 to 21 months
- P4: 7 to 24 months (one supplier stated 54 month, which was related to production of an entire fleet)
- P5: 7 to 22 months

New Train Technical and Operational Requirements

DSB aims to procure new trains on the basis of functional and performance requirements in order not to unnecessarily constrain the products and solutions which suppliers may propose. The suppliers were asked to comment on DSB's high level requirements. The suppliers² all indicated that the requirements are standard in the industry and would not compromise their choice of solution. The high level requirements were focussed to the following:

- Network Compatibility, related to Danish rail infrastructure, signalling system as well as relevant laws and standards (i.e. TSI)
- Train Architecture, related to automatic coupling and splitting of trains
- Train Operation, related to climatic conditions, reliability & availability, performance in operation and dwell times
- Passenger Capacity, related to passenger facilities, journey times, accessibility (including PRM), classes of comfort and loading gauge
- Environmental Impact, related to build impact, disposal impact and operational impact

All 10 suppliers indicated a design-life of at least 30 years, even longer design-life can be expected with correct maintenance and timely overhauls.

Maintenance Solutions

DSB also discussed maintenance with the participating suppliers. All suppliers indicated a track record within maintenance. More specifically, DSB asked for the suppliers opinion on five different maintenance models:

- DSB maintains the new trains (including long lifecycle overhaul) with DSB sourcing all spare parts with specialist technical support from the supplier on an 'as-required' basis;
- A partially outsourced solution (Technical Support and Spares Supply Agreement), where DSB maintains new trains (including long lifecycle overhaul) with a long-term supply contract for the provision of technical support and spare parts;
- A partially outsourced solution (Technical Support and Spare Supply Agreement including heavy maintenance), where DSB maintains new trains with a long-term supply contract for

- the provision of technical support and spare parts and where the supplier is responsible for heavy maintenance;
- An outsourced solution (Full Service Solution), where the supplier takes full responsibility for all maintenance with DSB retaining depot works, ownership and management responsibility; and
- An outsourced solution (Full Service Solution including depots), where the supplier takes full responsibility for all maintenance, including depot works, ownership and management responsibility.

Suppliers had varying opinions, preferences and experience with each of the five models. However, all showed interest in including maintenance, one way or the other, as part of the procurement.

Commercial Approach

DSB seeks to employ a commercial and contractual approach which delivers the best value for money, and risk minimization, whilst also allowing suppliers to provide their most competitive tenders.

Being subject to the Utility Directive, DSB will use an EU compliant public procurement to procure the new trains. DSB at this stage expects to use the “negotiated procedure with prior call for competition” which includes a prequalification phase and DSB expects at least two rounds of negotiations including a “best and final offer”. Suppliers indicated that two negotiation rounds are preferred.

DSB anticipates that the evaluation of tenders from suppliers will test the quality and the degree of compliance of the offered solution against the technical requirements. Further DSB anticipates that the financial evaluation will focus on the total cost of ownership associated with the proposed solution.

DSB anticipates that the contract for the supply of new trains will be based on an output-based specification to include clear functional and performance requirements. In addition, DSB anticipates that the rolling stock supplier will be responsible for the full design, production, testing, homologation, approval and commissioning of the new trains.

DSB expects suppliers to act independently in a wide degree, but will wish to audit the progress of the work, witness key tests, participate in structured design reviews and may undertake some inspections at the acceptance stage. However, at all times the responsibility for fulfilling the contractual requirements will remain with the supplier.

The suppliers indicated that if DSB needs two different train types, the suppliers prefer it to be two separate tenders. All suppliers are in favour of including maintenance in the contract structured as a separate agreement next to the supply agreement with the same supplier. Lastly, all suppliers prefer the functional specification strategy and all suppliers confirm that they are used to take responsibility for the homologation process.

Regarding general warranties suppliers state that it is usual to agree on general warranty periods between 12 and 36 months and that it is also common to agree on longer warranties on specific items, which may last for 5 years, 10 years, or longer. All warranties represent a cost to the supplier for the duration, and will be reflected in the price. Regarding general liability, which refers to the liability of the suppliers towards DSB, the supplier indicate an average of approximately 20% of the contract value for the cap.

The suppliers suggest that a performance bond should have a value between 5 and 15% of the contract price, and that 10% is the market norm.

Suppliers indicate that the maximum level of penalties (cap) on a maintenance contract would be in the region of 10 – 30% of the annual maintenance cost. Above this threshold, suppliers indicate they would consider not to bid.

The suppliers' responses on payment structure vary quite significantly, from acceptance of a negative cash flow, to indicating average advance payments of between 10 % and 25%.

Risk Management

As part of the RFI questionnaire and the workshops, suppliers have been asked to comment on their perceived risks, influencing timescales and reliability growth over time. All suppliers have more or less developed processes for working with risks. The below table sums up the risks most frequently given by the interviewed suppliers.

Risk table	
Risks related to Contract	Risks related to Production
<ul style="list-style-type: none"> Costs are exceeding original estimates. LCC targets required by DSB cannot be met Risk sharing is biased towards supplier, loading suppliers with risks that cannot be mitigated by him. Non-collaborative approach proposed by DSB leading to additional burden on supplier. 	<ul style="list-style-type: none"> Design modifications are more laborious than expected. Use of new technologies required by DSB exceed market standards. Homologation process requires more time. Certification process required more time. Manufacturing requires more time than estimated. Subsystems & Components do not work as expected. Testing & Approval processes take longer than expected.
Risks related to Operation	Risks related to Maintenance
<ul style="list-style-type: none"> Availability & Reliability requirements are not met (timely). Integration into existing infrastructure not according to plan due to state infrastructure). Delivery is not according to planning. Introduction into operation not according to planning. 	<ul style="list-style-type: none"> In-house maintenance by DSB does not meet the standards set by supplier, affecting availability and reliability. Components become obsolete.

