Fremitidens Tog

Summary of findings from the 2017-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 programs are on-going to significantly extend 25kV AC electrification across the Danish rail network. The remaining rail network is currently operated with diesel rolling stock, many of which will soon be replaced.

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

The Programme comprises 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.

In 2017, DSB carried out a comprehensive market investigation to assist the writing of the requirements for procuring new electric trains. The information gained from the market investigation contributed as the necessary foundation for several decisions to be made when procuring the new trains. Such decisions will then result in the final specifications included in the tender package.

A key part of the market investigation, a Request for Information (RFI), was organized, providing DSB with a deeper understanding of the products and capabilities available in the rolling stock market, as well as the suppliers’ views on a number of technical, commercial and organizational aspects.

The RFI 2017 built upon the RFI 2016 and included the same suppliers. The RFI 2016 was initiated via an open invitation to all interested suppliers send out via the European public procurement journal, Tender Electronic Daily (TED). The rolling stock suppliers that participated in the RFI-process were Alstom, Bombardier Transportation, Construcciones y Auxiliar de Ferrocarriles (CAF), CRRC Corporation Limited, Hitachi Rail Europe, Siemens Mobility, Skoda Transportation, Stadler Rail and Talgo. After an initial interest, Pesa decided not to participate to the RFI 2017. The nine participating suppliers have an estimated market share of more than 90% in the relevant European market and, hence, are regarded representative for the relevant market.

The RFI consisted of three main stages:
1) Written RFI Questionnaire stage
   The suppliers received a questionnaire along with background material about the Danish rail network and passenger operations. The suppliers handed in their responses to DSB and received an invitation to a workshop at DSB’s premises.
2) Individual Workshop
   The workshops with the suppliers (one day for each supplier) were divided into six focus areas where area experts from DSB New Trains participated and discussed with the suppliers their opinion on a number of matters.
3) Market Dialogue
   After the workshops, the suppliers were asked to respond to a few additional specific questions.

All RFI-related information 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 Technical Requirements

Through the RFI, DSB obtained further knowledge about which train type would be most suitable to procure, given the operational constraint anticipated for the fleet. Given the 70/30 split between fast and regional traffic of the Danish rail network, the suppliers were asked to recommend either a combined solution (only one train type) or a distinct solution (one train type for fast traffic and one train type for regional traffic). The large majority of the suppliers recommended a combined solution for the Danish network, since, in their experience, procuring and operating a homogenous fleet would reduce complexity and result in a number of significant benefits.

Suppliers were also asked to propose the type of product platform that they deem would work best for the network, i.e. EMU solution (Electric Multiple Unit) or a push-pull solution (loco-hauled). All suppliers proposed EMUs and none of the suppliers proposed loco-hauled solutions for FT operations (including a one-platform approach covering both RT and FT operations).

Given that the length of the majority of DSB platforms is 320 m, the suppliers were asked to provide their perspective on the preferred trainset length, i.e. either three 100/110 m coupled units or four 80/85 m coupled units to make a full platform. The large majority of the suppliers recommended the longer (100/110 m) solution, for both single-deck and double-deck product platforms.

Passenger exchange time was also discussed with the suppliers; specifically DSB aimed to investigate the most suitable method for validating it. Possible solutions that were mentioned by the suppliers included the use of a dedicated software to model passenger flow, validation through a simple formula with a limited number of variables and real-life validation with a mock-up.

Regarding pressure tightness and aural comfort, the large majority of the suppliers stated that they would be able to provide a pressure-tight or pressure-sealed train. It was however highlighted that such a train would be significantly more expensive both in terms of CapEx and OpEx. After having analyzed the infrastructural constraints of the network, the majority of suppliers claimed that their proposed train would offer sufficient aural comfort without needing to be fully pressurized. To further confirm this, DSB provided to the suppliers infrastructure data of the Great Belt Tunnel (the point in the network that would cause the largest aural discomfort to the passengers). The suppliers confirmed that by taking minor measures (if any needed at all), the trains will guarantee a sufficient aural comfort even in the Great Belt Tunnel. As a result, only a few of the suppliers recommended a pressurized-tight or pressure-sealed train for New Trains.

Track wear and track deterioration was another topic. The suppliers presented their product platform and highlighted the performance in regards to track wear. Furthermore, possible models to measure and evaluate track deterioration were also discussed and presented by the suppliers.

IT & Wayside Architecture

Concerning IT Architecture, DSB presented a suggested network structure, consisting of safety-related systems (e.g. TCMS), non-safety-related (but operationally important) systems and public (non-safety-related and non-operational-related) systems. All suppliers presented their own suggested network structure, which was, in most cases, comparable to the one planned by DSB. IT-systems in relation to coupling and de-coupling in operations was also discussed. Other topics like IT safety, system flexibility and train-wayside interface which were discussed. All suppliers agreed on the overall principles, although the solutions for implementation of the systems differed among the suppliers.
**Maintenance and Workshops**

DSB was interested in obtaining the suppliers’ perspective on the TSSSA (Technical Support and Spares Supply Agreement) maintenance model. All suppliers claimed to be familiar with this type of maintenance setup and willing to partner with DSB in a TSSSA maintenance agreement. However, the level of experience in working with the framework varied widely among the suppliers. The suppliers agreed upon the fact that the TSSSA maintenance model should be approached as an overall method, claiming that each agreement has its own peculiarities and that, therefore, it cannot be 100% standardized.

Since DSB is planning to build a couple of purpose-build maintenance depots to execute maintenance for the entire New Train fleet, DSB was keen to receive feedback from the suppliers on the aspects that they deemed important when building such facilities. For instance, DSB investigated whether the assumption of having a total of 25 tracks in the depots was a reasonable estimate. This was confirmed by the large majority of the suppliers. A couple of suppliers stated that 25 tracks would be too many, suggesting that a lower number of tracks would be sufficient.

Other topics addressed were availability, maintenance reserves as well as the typical curve and period to reach the reliability target. Suppliers suggested that the typical timeframe to increase the MDBF (Mean Distance Between Failures) from the Entry Level to the Target is around 20-24 months.

**Pricing and Operating Expenditures**

DSB was interested in receiving high-level estimates on pricing and operating expenditures for the New Trains. All received information is kept confidential and will not be disclosed.

A topic discussed with all suppliers was the typical TCO (Total Cost of Ownership) split for an Electric Multiple Unit. The majority of the suppliers provided their own high-level estimates. Although estimates varied among suppliers, the average result confirmed the DSB finding that CapEx = Maintenance Cost = Energy Cost ≈ 1/3 TCO; in other words that the TCO is approximately equally split in CapEx, Maintenance cost and Energy cost.

**Contractual Aspects and Timeline**

A number of contractual and financial aspects have been discussed with the suppliers.

One of the discussed aspects regards the payment plan. DSB investigated what structure of payment plan would be preferred by the suppliers. A payment plan creating a neutral cash flow for the suppliers would be the preferred solution according to the majority of suppliers. Most of the suppliers expressed a clear preference in receiving a significant advanced payment, of about 10% to 20%.

Indexation was also discussed. The majority of the suppliers recommended to divide indexation in two parts, depending on the nature of the utilized resources. Specifically, industrial indices based on material should be used for CapEx and consumer price indices for personnel-intense activities such as maintenance.

The typical contractual pain points that the supplier experience in a supply agreement and in a maintenance agreement were discussed. Regarding the Supply Agreement, the contractual pain points that were mentioned more often concern tendering process, acceptance, protection of IP rights, warranties and change orders (among others). As for the Maintenance Agreement, the definition of the scope of work, change order procedure, assistance obligations and force majeure were mentioned as pain points.
Other contractual topics that were discussed were change in delivery time and return of trainsets in case of termination.

Concerning the typical timeline for delivery, the majority of the suppliers estimated that the time for delivery of the first trainset after contract signature to be approx. 36 months – depending on the technical requirements in the tender material.

**Seat and Mock-up**

DSB considered including a mock-up as part of the bid evaluation process. The majority of the suppliers did not recommend a physical mock-up during the tender phase. Conversely, many suppliers recommended a combination of design booklet, virtual mock-up and some physical parts. All suppliers claimed to be able to supply a physical mock-up for the design phase. On the other hand, most of the suppliers suggested to make large use of digital visualization, to save time and resources, recommending solutions such as Virtual Reality for the design phase.

Possible modifications during the design phase were also discussed. The suppliers confirmed that internal layout (sitting area, seat pitch, location of luggage racks etc.) as well as lighting and display position (if not affecting the overall structure), color schemes and textures can be modified during design phase.

Another discussed topic regards the seat selection process. Many suppliers suggested a process similar to the following: DSB specifies the wished seats with a functional requirement, the train suppliers propose 2 or 3 types of seats (from different seat suppliers) and, in the end, DSB selects the final seat type among the proposed.

**Passenger Coaches**

In addition passenger coaches for international service was discussed. DSB wanted to investigate the suppliers’ capability to provide and deliver these coaches. The level of maturity in the proposed solutions showed quite widespread, however almost all the suppliers showed interest in participating in a potential tender on passenger coaches. Key aspects such as timeline for delivery and interface with locomotive were discussed.