CALIFORNIA
High-Speed Rail Authority

Request for Expressions of Interest for the Delivery of an Initial Operating Segment

RFEI HSR15-02

INABENSA

September, 2015

Index

1. Transmittal Letter

Dear Sirs,

Further to our earlier discussion on current project (RFEI 15-02), INABENSA is pleased to submit a proposal for your consideration.

From our enclosure, you will find INABENSA's impressive business strategies & project highlights, which have heaped outstanding feedback from our clients in past projects for the outstanding services rendered to INABENSA's esteemed clients.

We look forward to hearing positively from you for further collaboration, in the mean time please feel free to contact me with any further questions.

Yours Sincerely,

Abhishek Arora

2. Firm Experience and Team Structure

ABENGOA

Innovative technology solutions for sustainability

Abengoa

- Abengoa (ABG-B NDQ100; MCE: ABG) is an international company that applies innovative technology solutions for sustainability in the energy and environment sectors, generating energy from the sun, producing biofuels, desalinating sea water and recycling industrial waste

Abeinsa

- Abeinsa – the Abengoa (MCE: ABG) company that specializes in engineering and construction – operates in four sectors.
  - Infrastructures and servies
  - Transmission and distribution
  - Energy distribution
  - Water and environment

Inabensa

- Inabensa's activity is centered around four lines of business:
  - Transport and networks
  - Infraestructures and installations
  - Manufacture
  - Concessions and services
- Currently operating in more than 25 countries with more than 2,500 highly qualified staff, Inabensa is able to undertake projects across the world.

Railway division

- Inabensa is an international reference in railway sector, in works of overhead lines, substations, communications and ancillary installations.
- Highly qualified personnel with large experience in the railway sector
- Inabensa holds one of the most advanced pools of rail machinery in the sector, highly sophisticated with the utmost functionality and approved for use in the EU.

ABENGOA

Abengoa (NASDAQ: ABGB / MCE: ABG.B/P SM) applies innovative technology solutions for sustainability in the energy and environment sectors, generating electricity from renewable resources, converting biomass into biofuels and producing drinking water from sea water.

Abengoa's business is structured around three activities.

1 **Engineering and construction**

Engineering and construction includes our traditional engineering activities in the energy and water sectors, with more than 70 years of experience in the market. We specialize in carrying out complex turn-key projects for solar-thermal plants, solar-gas hybrid plants, conventional generation plants, biofuels plants and water infrastructures, as well as large-scale desalination plants and transmission lines, among others.

2 **Concession-type infrastructures**

We have an extensive portfolio of proprietary concession assets that generate revenues that are governed by long term sales agreements with formats such as take-or-pay contracts, tariff contracts or power purchase agreements (PPAs). This activity includes the operation of electric (solar, cogeneration or wind) energy generation plants and transmission lines. These assets generate no demand risk and we focus on operating them as efficiently as possible.

3 **Industrial production**

The latter covers involving our businesses with a high technological component, such as biofuels or the development of solar technology. The company holds an important leadership position in these activities in the geographical markets in which it operates.

Corporate Commitments

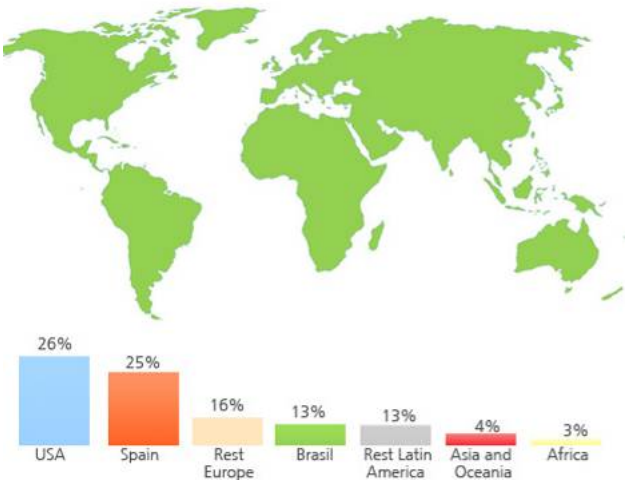
At Abengoa, we believe that the world needs solutions that will allow our development to be more sustainable. Scientists tell us that climate change is a reality, and at Abengoa we believe the time has come to pursue solutions and put them into practice.

Abengoa focuses its growth on the creation of new technologies that contribute to sustainable development. And to achieve this: we invest in Research, Development and Innovation, R&D&I, globally expand the technologies with the greatest potential, and attract and develop the necessary talent. Moreover, through the Focus-Abengoa Foundation, we dedicate human and economic resources to promoting social action policies that contribute to social and human progress.

Mission

Abengoa is a technology company that applies innovative solutions for sustainability in the environmental and energy sectors, bringing long-term value to our shareholders through a management model characterized by encouragement of entrepreneurship, social responsibility, and transparent and effective management.

International Presence



Internationalization, the engine for growth and a source of diversification, is fundamental for Abengoa. With a presence on five continents, we have developed a global business with a local perspective.

Abengoa first ventured outside of Spain in 1963, establishing the company's first subsidiary in Argentina, before subsequently expanding into Brazil, Uruguay, Mexico, Peru and Chile. In the mid-1970s, Abengoa launched operations in Morocco and Algeria, and in the 1980s it entered the USA.

Thanks to its international vision, today Abengoa operates in more than 80 countries and has a presence through local offices in more than 35 of them. This helps it to deal with the challenges that arise from its presence in the international and global market for sustainable development.

Abengoa's international presence has grown significantly over the last decade, becoming a multinational with operations on every continent.

We decided, over ten years ago, to focus our growth on the creation of new technologies that contribute to sustainable development, investing in research, development and innovation (R&D+i). With an export plan aligned with our strategy, we are globally expanding the technologies with the greatest potential, and we attract and develop the necessary talent required to do this.

Our efforts to expand internationally reflect Abengoa's vision: to be a world leader in the development of innovative technology solutions for sustainable development.

Over the next few years, Abengoa intends to strengthen this leadership, consolidating and developing the position that it has achieved in the international markets in which it operates as well as expanding our presence in other potential markets.

Environment

Abengoa recycles and recovers industrial waste, preventing the need for extracting natural resources. We are also specialists in water management and treatment.

Water: We design, construct and operate facilities for treating water, making it potable or for water desalination, as well as other water infrastructures around the world.

The current global growth model is compromising the physical limits of our planet. Depletion of natural resources, the rise in the demand for energy and changes in the chemical composition of the atmosphere are causing major environmental instability and putting the development of future generations at risk.

Given this context, there is an apparent need to both introduce processes for lowering massive use of raw materials and non-renewable energy sources and develop new technologies to

promote efficient resource management and the use of clean energy sources and also lower CO_2 emissions into the atmosphere.

For Abengoa, sustainability is the cornerstone of company strategy. Abengoa businesses are geared towards achieving sustainable development and management thereof seeks to reduce the negative impact of operations on the environment.

Emissions labeling. «We inform the market on the carbon footprint of our products and services»

Abengoa engages in labeling the CO2 emissions linked to rendering its products and services.

The company's trajectory since 2008 in developing its own GHG Management System has enabled knowledge of the carbon footprint associated with these products and services, thereby strengthening Abengoa's commitment to the environment.

Emissions labeling provides disclosure to the market on the carbon footprint linked to the production of Abengoa products and services, which engages customers in the commitment the company upholds to reducing emissions and combating climate change. It also provides customers with information on the environmental impact of the emissions associated with their purchases.

Sustainable Mobility Office. «We promote sustainable travel among our employees»

Transportation of people and goods is associated with our business activity and this makes it necessary for us to take action and steps towards increasing sustainability in the mobility of our suppliers, employees, customers, and in transporting products and materials.

Launched in 2009 as a product of this determination is the Sustainable Mobility Office, aimed at promoting, implementing, managing and coordinating initiatives geared towards achieving more sustainable mobility at Campus Palmas Altas (CPA), Abengoa's headquarters in Seville that accommodates close to 3,000 employees, and promoting this complex as a point of reference in this area. To this end, Abengoa has set a 50 % abatement target for the CO2 emissions generated by transportation to and from CPA by 2020, taking 2010 as the base year.

Noteworthy among the initiatives undertaken by the Sustainable Mobility Office are the following: implementation of a shuttle bus fleet to take employees from Seville to the different office locations; instruction on efficient driving techniques; encouraging alternative forms or means of transportation, including carpooling, bicycle use and the annual prize awarded to the most sustainable employee.

The entire range of initiatives, coupled with the effort and awareness of our employees in the struggle against climate change, has made CPA a more environmentally-friendly office complex.

Instalaciones Inabensa S.A.

Your partner in industrial engineering and construction

Within Abengoa strategy of specialization, in 1994 Instalaciones Inabensa SA was established as a society, concentrating on itself the experience of over 50 years in activities associated with industrial facilities and infrastructure.

The activity sectors of Inabensa are electrical assemblies, mechanical facilities and instrumentation, building of transmission lines, railway electrification, maintenance, thermal & acoustic protection, communications, concessions of services and manufacturing of capital goods.

Inanbensa´s activity is centered around four lines of business:

1. **Transport and Networks** — We construct large transmission lines as well as communication networks and railway infrastructures.
2. **Infrastructures and Installations** — We develop any type of electrical or mechanical installation for the all of industrial sectors.
3. **Manufacture** — From our workshops in Spain (Seville and Alcalá) and China (Tianjin), we manufacture innovative, high added value products.
4. **Concessions and Services** — We provide the promotion, construction, operation and maintenance of infrastructures and public services within the singular buildings, renewable energy and energy efficiency sectors.

International Presence

Currently operating in more than **25** countries with more than 2,500 highly qualified staff, Inabensa is able to undertake projects across the world.

We have an extensive network of subsidiaries and permanent establishments in:

Railway Division

In the railway sector, Inabensa is an international reference for overhead lines, traction substations and ancillary communications and installations (high voltage (HV), low voltage (LV), lighting and ventilation).

Inabensa undertakes turn-key projects, ranging from designing, supplying, prefabricating and installing to maintaining electrification fixtures for both conventional and high-speed (HS) railways, freight, subways, trams and monorails.

It also holds one of the most advanced pools of rail machinery in the sector, highly sophisticated with the utmost functionality and approved for use in the EU. Inabensa has its own catenary technology:

- CAVE overhead line: Designed for speeds of up to 350 km/h.
- TkMx overhead line: Designed for speeds of up to 160 km/h.

And it also has an R&D department focusing on:

- Energy storage systems
- Two-way substations
- Detection of broken rail
- Software development

Capabilities

Solutions tailored to each environment

Depending on the needs of each environment, Inabensa offers the best solution from design to implementation:

Overhead lines:

- Construction of HS overhead line equipment for 350 km/h of 25 kV of alternating current (AC).
- Construction of DC OHLE for speeds of 160 km/h and 220 km/h.
- Construction of AC OHLE for up to 160 km/h.
- Renovation of DC and AC OHLE and voltage adaptation. •Construction of subway and tram infrastructure: rigid metro OHLE and tram OHLE.

Communications:

- Providing and installing GSM-R infrastructure;
- Communications and control systems for subways, trams and commuter trains: CCTV, loudspeakers, interphone services, IP telephones, access control, tetra systems, train identification and passenger information systems, and LAN networks.

Substations:

- Traction substations and HS 25 kV AC auto-transformer sites;
- 3.3 kV DC traction substations;
- Traction substations for surface and underground subway (heavy subway and light subway);
- Traction substations for trams, trolley buses, etc.;

- Compact design traction substations for special installations;
- Automated People Mover (APM) system: system enabling trains to run without a driver.

Other activities:

- Ancillary manufacture
- Prefabricating and testing of switchgear arrangements for traction substations
- Installations for buildings
- Ancillary installations (HV, LV, lighting and ventilation).

Maintenance:

- HS and conventional OHLE
- Substations
- Subways

Design:

Inabensa has its own overhead line equipment (OLE) technology:

- CAVE OLE: Designed for speeds of up to 350 km/h.
- TkMx OLE: Designed for speeds of up to 160 km/h.

R&D&I

INABENSA – Railway Division has a R&D&I Department dedicated to research, development and innovation. Actually this Department is working on several projects:

- Development of OLE Calculation Hardware.
- Power Storage System.
- Research in Two-way Substations.
- Smart power network.
- Research in weather effects in railway through desert.
- Development of broken rail detection system.

Inabensa´s solutions

Some important references

Inabensa's Rail Division has a wide experience in railway electrification (High speed railway lines, conventional railway lines, underground and tramway.

In this way has recently been awarded with some international contracts (Middle East, UK, America, India, Turkey, etc.):

- Mecca - Medina → 900 single track km (STK), 2x25 kV AC, 60 Hz, 2 substations 400/2x25 kV for the Meca-Medina High Speed Railway (Saudi Arabia). Design, supply, erection, testing & commissioning of all the overhead system.

- Chile Underground → 74 STK, lines 3 and 6 Metro de Santiago. EPC and maintenance for 20 years of the substations and auto-transformer sites associated. (Chile). Under construction.

- 180 STK, 25 kV AC, 2 15 kV/25 kV substations in Izmir, Basmane-Menemen-Aliaga and Alsancak-Cumaovasi line (Turkey). Inabensa-Elecnor JV.

- Southern Elect → Removal of existing 3rd rail and installation of 250 STK of High Speed 25 kV OLE and associated substations on the routes Southampton-Basingstoke-Reading and Gospel Oak-Barking. Includes design, engineering, construction works and as built. Contract value: 180 Million Pounds.

- India→ 280 STK, 25 kV AC, Ghaziabad–Moradabad (Uttar Pradesh, India). Design, supply, erection, testing and commissioning of the electrification system.

- Mexico → 52 STK, 25 kV AC, 2 substations for the Mexican suburban railway, Buenavista – Cuatitlán line. (Mexico).

3. Project Approach

After a detailed analysis of the existing documentation on the project, Inabensa is interested in both scopes, IOS North and IOS South.

We are actually of the opinion that a combined delivery strategy for both sections will lead to optimize offers from contractors, some of the reasons being:

- As this solution implies only one tender process, it will improve the competitiveness which will result in a favourable price reduction for the Authorities.
- Section between Merced and Bakersfield is included in both packages, which will double the cost incurred by the Authority.
- This solution avoids the interfaces between both scopes and the risks that it involves.
- Unifying both scopes, the same technology will be installed along the whole railway line.
- The whole section being managed by the same Contractor will allow to allocate all resources where required in order to meet the schedule envisaged by the Authority.
- This will lead on optimised RAMS requirements, as the same staff would be able to assist anywhere along the line, also reducing the number of spares.

Based on our experience we would propose to the Authority a different delivery strategy, using separate contracts for every different scope of the project ie. Civil works, Track and Power Supply System, signalling and communication. This delivery strategy represents the following advantages:

- Increase the competitiveness, since more companies will be able to deliver a proposal.

- The awarded company will be specialist in the system, by:
  - Reducing the offer price.
  - Minimizing risks and ensure optimized results.
- Reduce subcontractor chain, which will lead to a reduction of target cost.
- Identification of responsibility matrix, that means a higher quality in contract delivery.
- Reduction of overheads and scale economy in common supplies what will optimize the project cost.

Regarding maintenance period, Inabensa suggests a maximum of 25 years maintenance period. Due to the risk that implies to offer the cost of this works along the time, a longest period of maintenance will suppose an undue increase of the economical offer.

Above solutions are suggestions based on Inabensa experience in international tender processes.

However we let the Authority decide which delivery strategy is more suitable to meet its requirements in terms of budget and schedule envisaged.

If other feasible solutions are finally considered, Inabensa will maintain an interest in this project.

4. Responses to Questions

4.1 Commercial Questions

1. Is the delivery strategy (i.e., combining civil works, track, traction power, and infrastructure) likely to yield innovation that will minimize whole-life costs and accelerate schedule? If so, please describe how. If not, please recommend changes to the delivery strategy and describe how those changes will better maximize innovation and minimize whole-life costs and schedule.

As it was mentioned above in the Project Approach, Inabensa suggests, based on its wide experience in international projects, delivering every system (civil works, track, traction power, signalling…) under separate contract, launching four tender processes:

- Civil Works.
- Track.
- Traction Power Supply, which will include OHL and TSS.
- Signalling and Communication.

As an additional advantage, we would like to mention that it will open the tender process to more companies which will lead to cost savings, obtaining a bespoke solution for each of the different systems.

2. Does the delivery strategy adequately transfer the integration and interface risks associated with delivering and operating a high-speed rail system? What are the key risks that will be borne by the State if such risk transfer is not affected? What are the key risks that are most appropriate to transfer to the private sector?

With the current delivery structure, the DBFM Developer is assuming the delays produced in the other packages (CP1, CP2 and CP3) affecting the interfaces so that the full DBFM contract, and mainly the installation of tracks, communications, signaling and traction power systems could not start on time producing delays in the completion of the Project and in the operational date of the full railway system.

In addition, if the civil work infrastructure of CP1, CP2 and CP3 Contracts is solely accepted by the California High-Speed Rail Authority, the DBFM could be exposed to design and implementation errors of the CP contracts as well as latent defects of the civil works facilities, so it is proposed that the acceptance of the CP´s works shall be done in accordance with the California High-Speed Rail Authority and the DBFM, and the time for completing the DBFM scope of works shall be adjusted according to the liberation of the civil works of the CP contracts.

As per our experience, some of the key risks that will be borne by the State are:

- Delays in contracts CP1, CP2 and CP3. In this case, the COD of the DBFM shall be adjusted considering the completion period of these contracts in order to adjust the works to the current schedule.
- Delays in obtaining Right of Way.
- Environmental licenses and authorizations.
- Subsoil unforeseen conditions.

On the other hand, the key risks that should be transfer to the private sector are listed here below:

- Latent defects of each CP contract that shall be borne by the CP contractors.
- Design Errors.
- Execution Errors.
- Defects and damages related to the civil works done in contracts CP1, CP2 and CP3 shall be borne by the CP contractors.
- Maintenance failures.

3. Are there any other components of a high-speed rail system that should be included in the scope of work for each project (e.g., rolling stock, train operations, stations)? If so, how will this help meet the Authority's objectives as stated in this RFEI?

As per our experience in several international tenders, Traction Power and E&M installations in stations could be installed by the same company, being included in the same contract, as long as the stations and Traction Power projects are developed simultaneously.

It will reduce overheads and minimize the project cost as mentioned in previous questions.
In case the Authority will consider this suggestion, both tender processes should be launched at the same time and the schedules of both projects would have to match, in order to optimize the time of execution and meet the envisaged schedule.

If both projects are not simultaneous, both systems couldn´t be under the same scope as it would delay the testing and commissioning of the railway.

4. What is the appropriate contract term for the potential DBFM contract? Will extending or reducing the contract term allow for more appropriate sharing of risk with the private sector? If the Respondent recommends a different delivery model, what would be the appropriate term for that/those contract(s)?

The appropriate contract term depends on several factors that must be defined (scope, technology, interfaces…). Inabensa, during the tender phase, will achieve a work plan in order to determine the optimal contract term. As a guideline, we include hereunder some examples of international similar projects where Inabensa is involved:

1. We are currently executing a similar High Speed Project which is the line between Makah and Madinah in Saudi Arabia. In this case the total length of the project is 450 km (280 miles) double line which includes 6 TSS 400/2x25 kV. The delivery model the client defined for this project as DBM project, divided in two separate contracts including:

- Civil Works including the platform
- Power Supply System including track, OHL, TSS, signaling and telecommunications.

In this case, terms of each contract are:

- Platform should be finished by year 4.
- Track should be finished by month 46.
- DB part for power supply 52 months.
- 12 years maintenance is included in the contract, starting after date of commissioning.

2. Denmark´s Electrification Programme:

- Civil works: not included, since this project is a renewal of the electrification system.

- Electrification: 14 years - 1330 stk (826,4 single track miles aprox.)
- Maintenance: The project consists on the electrification of 15 lines. The maintenance begins once a line is commissioned. Once the 15 lines were on operation, Danish Authorities must decide whether the Contractor continues with the maintenance or not.

The Spanish High Speed system is the longest HSR network in Europe with 3,100 km (1,900 mi) and the second in the world, after China's.

Running at speeds of up to 310 km/h (193 mph) this extensive network allows fast connections between cities in Spain.

The Madrid-Sevilla high speed line is a 472 kilometres (293 mi) double track Spanish railway line for high speed traffic between Madrid and Seville. The first Spanish high-speed rail connection has been in use since April 1992 at speeds up to 300 km/h (186 mph).

The execution time of this line was 6 years.

Another important milestone for Spanish High Speed was the line Madrid – Barcelona, that link the two more important Spanish cities, with a length of 650 double track kilometres (403,85 miles). This line was divided in several tranches built between 1996 and 2008.

As per our experience in other international projects, reducing the time of maintenance managed by the contractor will imply a budget reduction, as it will minimize the uncertainty around costing a service for a long period, which leads to incur in overcosts in order to mitigate the risks.

5. What is the appropriate contract size for this type of contract? What are the advantages and disadvantages of procuring a contract of this size and magnitude? Do you think that both project scopes should be combined into a single DBFM contract?

As it was mentioned in previous points, Inabensa suggests to combine both sections in a single contract, as it will reduce the project cost allowing to manage the resources easily throughout the whole line in order to meet the schedule envisaged by the Authority and it will also allow the optimization of the infrastructure envisaged for the project in the overlap section between Merced and Bakersfield as well as to minimize the OCC center to only one number instead of two different ones as proposed in the documentation available, as well as the number of TSS envisaged.

Moreover, delivering the whole project in a single contract will avoid any technical interface between both sections, mainly for the signalling scope.

6. Does the scope of work for each project expand or limit the teaming capabilities? Does it increase or reduce competition?

The fact of changing the delivery strategy of the tender process into four separate contracts brings more companies into the picture, Civil, Track, Power Supply and Signalling and Telecom. This implies making the process more competitive and leads to a reduction of the Budget for the Project. Apart from that, this strategy brings specialized contractor to lead every package of the project which implies a higher quality while delivering the project to the Authority.

However, this strategy might bring the Authority to manage the interfaces between the different contracts.

Therefore we let the Authority to weigh the advantages and disadvantages suggested and choose the delivery model that better suits its requirements in terms of schedule and budget.

4.2 Funding and Financing Questions

7. Given the delivery approach and available funding sources, do you foresee any issues with raising the necessary financing to fund the IOS-South project scope? IOS-North project scope? Both? What are the limiting factors to the amount of financing that could be raised?

We foresee that if HSRA provides a framework that guarantees certain returns on investment, the project could be financeable. A project of these characteristics could normally raise up to 75% of total investment needs in debt. It would be required though that the project achieves investment grade rating.

In this case, as per the Business Plan 2014 approximately 35% of the project cost is available for the Authority, so 65% of the funds needs to be raised, which seems feasible as per above statement.

However, we suggest joining both sections in one single project but separating every scope of works in a different contract as stated in previous questions, as it will make easier to bring different players into the project in term of funding and therefore tap on different sources of financing and bring multiple funds.

8. What changes, if any, would you recommend be made to the existing funding sources? What impact would these changes have on raising financing?

A project of this investment requires fully support from the sponsor and should be backed with strong guarantees. Governmental support both at State and Federal would be required. In case the strategy chosen is to pay this 65% of is the sale of tickets, then the financing party will be carrying the demand risk and the project will be subject to market conditions and fluctuations, making financing much more difficult. To get good financing, the project would need to get investment grade rating (BBB or better).

9. Given the delivery approach and available funding sources, is an availability payment mechanism appropriate? Could financing be raised based on future revenue and ridership (i.e., a revenue concession)? Would a revenue concession delivery strategy better achieve the Authority's objectives?

We believe that an availability payment would be acceptable. Financing based on future revenue and ridership will prevent a significant number of players to participate in competitive processes. A revenue concession and fixed annual payments, independent of market risks, would be the most appropriated financing mechanism.

4.3 Technical Questions

10. Based on the Authority's capital, operating, and lifecycle costs from its 2014 Business Plan, describe how the preferred delivery model could reduce costs, schedule, or both. Please provide examples, where possible, of analogous projects and their cost and/or schedule savings from such delivery models.

If the contract is a DBFM for the whole systems there is an inherent risk of a main company which will subcontract all the main activities while increasing their budget with a management fee; leaving the cost savings to the subcontractors while risking the best for the project definition of materials and construction.

By dividing the contract into different systems, the Authority will reduce that risk and leave the synergies to the contractors.

We will also propose a pain-gain model in which if the contractor leads to efficient cost savings and/or reducing the schedule, these cost savings will be divided 50-50% between the contractor and the Authority.

Practical examples that support our suggestion are any bidding process in Spain. The Spanish Railway Authority, with the aim of achieving better value for money and bespoke solutions, divides the contract for building a railway line in the following:

- Civil Works
- Track
- Electrification
- Signaling and Communication
- Maintenance of the different systems.

The countries with more kilometres of railway line follow this delivery model. In particular, Inabensa has been involved in processes with this delivery model in countries like Denmark, Saudi Arabia, United Kingdom, and India.

11. How does this compare to separately procuring each high-speed rail component (i.e., separate contracts for civil works, rail, systems, power separately)? Please discuss design/construction costs, operating/maintenance/lifecycle costs, and schedule implications.

When comparing both delivery strategies, we come to the conclusion that delivering the project in separate contracts for civil works, track, electrification and signaling and telecom will reduce the project cost and increase the quality of the technical solutions implemented.

On the other hand, if both sections North and South are included in one single contract for each package mentioned above, it will lead to an optimization of the schedule, as the every contractor will manage its own resources through the complete line according to their needs in order to meet the milestones.

12. For each project, are there any technical changes to the respective scope of work that would yield cost savings and/or schedule acceleration while still achieving the Authority's objectives? If so, please describe.

As per our understanding in this kind of projects, the total number of centres envisaged on each section seems a little over estimated. There are 61 centers in each section, which means one center every 8 km (5 miles) roughly. Normally we are used to install one center every 15 km (9 miles), which will mean approximately 50 centers.

However the number of centers is directly proportional to the operating mesh envisaged, therefore we suggest the Authority to include a simulation study as a requirement during the tender process in order to optimize the necessary number of centers leading to a reduction of the project cost.