Innovation Fund (INNOVFUND)

H2GS Boden 101133206

2nd Progress report

M14-M21

Sensitive

31 December 2024

COVER PAGE

PROJECT	
Project number:	101133206
Project name:	H2GS Boden
Project acronym:	H2GS
Project starting date:	1.4.2023
Project duration:	105 months

TABLE OF CONTENTS

COVER PAGE 2

EXECUTIVE SUMMARY *4*

1. MILESTONES, DELIVERABLES AND CRITICAL RISKS *5*

2. OVERVIEW OF THE PROGRESS and ACTIVITIES IN WP2 ..... *6*

Task 2.1 Site work and mob 7

Task 2.2 Hydrogen manufacturing plant building 8

Task 2.3 DRI plant building 10

Task 2.4 Steel plant building, smp, cas, and csp 11

Task 2.5 Steel Plant building, finishing lines 13

Task 2.6 Balance of plant building 13

Task 2.7 Knowledge, hr tasks and communication 15

Task 2.8 Project coordination and reporting 16

3 Timetable *18*

ANNEXES *19*

EXECUTIVE SUMMARY

Executive summary M14-M21

In September 2024 H2 Green Steel changed its name to Stegra, a name that will better reflect a business that will be broadened in the future. In this and all future progress reports, the company will be referred to as Stegra.

The D7 Progress Report for the H2GS Boden project, now referred to as Stegra, covers the period from M14 to M21. The report highlights significant progress in various work packages, including site work, hydrogen manufacturing plant building, DRI plant building, steel plant building, and balance of plant building. The project has seen substantial advancements in construction activities, with key milestones achieved in groundworks, equipment installation, and civil works. Despite some delays due to design changes and safety stand-downs, the project remains on track with effective mitigation strategies in place. The report also emphasizes the importance of communication and knowledge sharing, with Stegra actively engaging stakeholders through various channels. Overall, the project is progressing well, with continuous efforts to optimize construction processes and manage risks effectively.

1. MILESTONES, DELIVERABLES AND CRITICAL RISKS

Deliverables and milestones (outputs/outcomes)

We confirm that we updated the following Continuous Reporting screens:

DELIVERABLES

Deliverable No.	Deliverable name	Dissemination level	Delivery month	Submitted YES/NO, Date
D36	Site preparation completion report for Hydrogen plant	SEN	14	YES, 29th August 2024
D37	Site preparation completion report for Finishing lines	SEN	14	YES, 29th August 2024
D38	Site preparation completion report for Direct Reduction Plant	SEN	14	YES, 29th August 2024
D39	Site preparation completion report for Balance of Plant	SEN	14	YES, 29th August 2024
D45	Site preparation completion report for Stel Plant	SEN	14	YES, 29th August 2024
D51	2nd Progress report	SEN	21	YES, 31st December 2024

MILESTONES

No milestones during this reporting time

Critical risks	YES/NO
We confirm that we updated the following Continuous Reporting screen: • Critical risks If there are risks – list them and describe mitigation actions.	

No critical risk materialised during this progress report period.

2. OVERVIEW OF THE PROGRESS AND ACTIVITIES IN WP2

WORK PACKAGE 2 Construction, 1st part
(WP2 covers M14-M33, this progress report regards M14-M21)

Objective and expectations of WP2:

- Preparing the site for building of plants
- Finalising the building of Hydrogen plant
- Building of DRI plant
- Building of Steel plant
- Constructing of Balance of plant (BoP)

Work package 2: Construction, 1st part	
Tasks:	
T2.1	Site work and Mob
T2.2	Hydrogen manufacturing Plant Building
T2.3	DRI Plant Building
T2.4	Steel Plant Building, SMP, CAS and CSP
T2.5	Steel Plant Building, finishing lines
T2.6	Balance of Plant Building
T2.7	Knowledge, HR tasks and communication
T2.8	Project Coordination and Reporting

TASK 2.1 SITE WORK AND MOB

Task description:
This task covers: ground works and piling, temporary facilities, and logistics and workers' camps.

Description of work completed:

Task 2.1 Site work and Mob

Activities

Figure 1: Groundworks (SIN) progress

Site mobilization is continuing with steel building being erected. Groundworks for casting foundation on PCM, HRC, HDRI tower & finishing mill have been completed. Piling is ongoing for secondary building and equipment foundation in STM. Detail cut and fill for several buildings in BOP, STM, and DRP area. Groundworks for roughing mill ongoing. Piling on WTP2, SMP04 and SMPB-Line as well as piling on Area 700, 600 and 500 are ongoing.

Site work execution was stopped from 21st of September 2024 to 30th of September 2024 due to safety stand down. The stand down has resulted in interview of all workers, workshop with all contractors and EPCMs, management walk down on all areas with an action plan already implemented. Before resuming any work, each person on site has been through a new site induction, new review of RAMS, closure of walk down at the area, SIA prepared for the activity and approval by BAS-U and Stegra Construction manager.

Temporary facilities in Nylandsbäcken were declared operational in August 2024 and Slipvägen 1 operational as of September 2024. BBP1 & BBP2 groundworks are ongoing and will be operational January and March 2025, respectively.

Figure 2: Groundworks progress

Status of T2.1

[redacted]

TASK 2.2 HYDROGEN MANUFACTURING PLANT BUILDING

Task description:
This task covers: main equipment design, facility design, procurement, equipment fabrication & delivery, construction, equipment instalment

Description of work completed:

Task 2.2 Hydrogen manufacturing Plant Building

[redacted]

Figure 3: HMP progress

Overall: Construction remains ahead of schedule for the overall progress with the completion of Cell Room 1, ramping up progress in the PDOP area and AWE buildings. Construction activities continue progressing according to the plan in civil works and preparations for the mobilization of the steel contractor. Preparations for underground works commenced in October, and steel

erection for Cell Room 1 early November. /G piping installation between AWE buildings and the commencement of steel fabrication at Kavamet facilities. Construction work is progressing ahead of schedule with rebar installation, formwork, and concrete ongoing in Cell Rooms 1, 2, and 3. Cell Room 1 slab on grade completed. Groundwork for Cell Room 4 is progressing, along with continued blasting in the PDOP area. Readiness preparation for commencing steel erection and civil package-2 undergoing. Groundworks continue progressing with blasting and crushing of rocks. Civil works frame agreement and capacity planning launched and in use with good results. A decision has been made to defer the hydrogen storage area, prompting necessary adjustment in both engineering and procurement to align with these changes.

Figure 4; AWE Cell Room 1-2-3-4 construction progress

HMP Cooling Towers was awarded to PaharpurEurope ([redacted]). The main contributor in procurement includes PO placement for P&F heat exchangers and TG4 approvals for the hydrogen storage vessels, hydrogen storage compressor, cooling water pumps, cooling towers, and pressure vessels have been secured. Selected contract awards: DRI Overhead Cranes to Konecranes ([redacted]) and HMP Integrated Control & Safety System to Siemens ([redacted]

Overall progress is slightly behind the initial plan due to the recent design changes in cooling water demand, EDI, Busbar and HVAC in engineering and in construction the underground installations. Stegra has implemented a recovery plan and will undertake an Engineering Review with TK NCA & McDermott. Additional resources have been deployed to support progress. TKNCA cooling water demand change has affected procurement progress for several procurement projects. Non-affected scopes progressing. Procurement and Engineering recovery plan are in place with weekly review of MDR and procurement package with stakeholders ensuring on time delivery.

Deviations:

- IFC drawings for GIS building has been issued enabling the work in PDOP area Stegra is currently preparing a change order to Primeeks to undertake this work.
- Reduction of concrete volume for buildings continue improving with 4,000 m^3 reduced from AWE building and equipment foundation.
- Engineering deviations from the OEM impacting progress and costs.
- Delays in engineering input from vendors [redacted].
- Civil execution for AWE building behind schedule due to less manpower from [redacted].
- Ongoing performance issues with [redacted] including underperformance, schedule deviations, and cost overruns.

Mitigations:

- An engineering recovery plan with [redacted], including workshops and weekly reviews, is ongoing to support decision-making.
- Additional engineering resources have been deployed to support progress.

- EPCM is expediting bidders to provide re-bids as soon as possible to address procurement delays.
- An acceleration plan for steel erection has been implemented, and the schedule is being rebaselined to align with OEM supplier schedules.
- Pile-driving preparation in the PDOP area is planned to start early, supported by an acceleration plan.
- Escalation meetings are being held to address performance issues with [redacted], aiming to establish accountability measures and bring the project back on track.

Status of T2.2

[redacted]

TASK 2.3 DRI PLANT BUILDING

Task description:
This task covers: facility design, procurement, equipment fabrication & delivery, construction, and equipment instalment

Description of work completed:

Task 2.3 DRI Plant Building

Figure 5: DRI Plant progress

Structural Steel installation continues in furnace area, AKEAB continues to work on foundations of Gas Heater, Water system, Pipe rack, Mist Eliminators and Oxide Handling. Vapor removal area concrete pouring achieved in Sep'24. Critical path continues to be Furnace Tower structural steel installation. Site work execution was stopped due to safety stand down, from 21st Sep'24 and progressively started from 30th Sep'24. In October 2024, concrete pouring was successfully completed in the Gas Heater area. Regarding structural steel, 1,597 MT have been installed against a planned 1,603 MT, as per the agreed recovery plan. Additionally, 285 MT of structural steel was received from JSPL this month, contributing to a cumulative total of 3,301 MT, alongside 589 MT from CSCEC. HDRI feed bins installation is complete, and GRK has been awarded the clarifier tunnel execution works to respect SIMOPs in that area.

GEMKOM's structural installation continued, supported by supply of splice plates from local companies. Logistics port of shipment for JSPL being changed from Vizag to Chennai. Extended technical bid evaluation process on valves bids has delayed planned award.

Opportunities with bundled sourcing and award across areas for transformers has prolonged area specific award.

Deviations:

- Site work execution was affected by:
  - Safety stand-down in the first week of the reporting period.
  - Cranes engaged in HDRI bins installation for one week.
  - Reduced manpower from [redacted].
- Midrex reported delays in heater manufacturing due to design changes from medium voltage (MV) to low voltage (LV).
- Delays in structural steel deliveries from [redacted], mitigated by local supplies.
- Extended technical bid evaluation process on valve bids delayed planned awards.
- Bundled sourcing and award for transformers prolonged area-specific awards.
- [redacted] engineering is behind plan due to previous delays from [redacted] in providing inputs for procurement of bulk material.
- Delays in construction due to handover from piling/blasting activities and reduced manpower from [redacted].

Mitigations:

The project team is tracking heater supply delays and recommending construction sequences to recover from these delays. Steel supply on-site is recovering, with local suppliers compensating for missing [redacted] deliveries. [redacted] structural material is arriving at the site, and the project team is working to ensure the timely handover from piling/blasting activities. Additionally, [redacted] is working to recover previous delays, with their in-month performance being ahead of plan. A 90% design review meeting for the MPW scope was successfully held, and engineering progress during the reporting period was higher than planned.

Figure 6: Current status of DRI Plant

Status of Task 2.3

[redacted]

TASK 2.4 STEEL PLANT BUILDING, SMP, CAS, AND CSP

Task description:

This task covers: equipment design, facility design, procurement, equipment fabrication & delivery, construction, and equipment instalment

Description of work completed:

Task 2.4 Steel Plant Building, SMP, CAS, and CSP

Act

Figure 7: Steel plant building progress

Figure 8: Roughing Mill rebar assemble for base slab

Overall Progress: The steel plant construction, encompassing the SMP, CAS, and CSP areas, has seen significant developments. The major remaining civil works for the CSP Foundation were awarded to [redacted], with immediate mobilization to the site. The procurement team at Stegra has been strengthened by placing team members in the [redacted] office, which is anticipated to expedite the process. The critical path on the hot side is predominantly driven by SMS equipment deliveries, which remain on track or ahead. The utilities infrastructure has some float, awaiting equipment arrivals, aligning with the overall strategy to ensure readiness for installation. Nordec commenced work and made substantial progress in CSP-01, while SMS engineering and manufacturing activities were generally ahead of schedule, despite some delays in critical electrical deliveries. A unit rate framework contract for civil works has been established to provide flexibility and speed in procurement and mobilization for the remaining tasks. The pipe support engineering was expedited to be installed early, aiming to mitigate future SIMOPS (Simultaneous Operations).

Deviations:

- Construction deviations linked to CSP tunnels delayed CSP foundations and steel work.
- Low productivity from contractors [redacted] required re-prioritization of planned tunnel and foundation work to unblock CSP building foundations and steel.
- [redacted] faced supply and work front issues, with delays expected to persist due to SMP supply constraints and SIMOPS issues in the CSP.
- [redacted] experienced challenges related to manpower and efficiency, necessitating escalation to the executive level for resolution.

Mitigations: Recovery plans for [redacted] and [redacted] have been implemented, with some improvements already observed in [redacted] performance. A recovery plan for [redacted] is under review, with efforts to open up more work fronts. To address engineering delays, particularly in electrical and non-critical mechanical areas, Fluor plans to utilize external support to progress HVAC work and mitigate future delays. HVAC and fire protection recovery plans have been

launched with the respective teams. The ongoing re-prioritization of schedules aims to minimize SIMOPS and improve safety while focusing on first-coil critical scopes, including undergrounds.

Status of Task 2.4

[redacted]

TASK 2.5 STEEL PLANT BUILDING, FINISHING LINES

Task description:
This task covers: equipment design, facility design, procurement, equipment fabrication & delivery, construction, and equipment instalment

Description of work completed:

Task 2.5 Steel Plant Building, finishing lines

Activities

Overall Progress: The 60% model review was successfully hosted and completed in Boden, allowing for the release of IFC drawings. [redacted] are reported to be ahead of schedule overall, with non-critical equipment procurement expected to recover and remain on track. The utilities infrastructure maintains some float while awaiting equipment arrivals, ensuring readiness for installation.

Deviations:

- Two-week delay in the completion of the finishing mill base mat due to late handovers by [redacted].
- Construction progress slowed by a safety stop, extending into October, contributing to additional deviations.
- Delays in critical electrical engineering inputs from [redacted] and HVAC design inputs from [redacted], with ongoing challenges in [redacted]'s fire protection design.
  Delays compounded by material supply issues, particularly affecting [redacted]s initial work and [redacted]s shift arrangements.

Mitigations: A civil framework is in place to allow for call-offs, aiding recovery from previous deviations. Continued monitoring and adjustments are being made to ensure the timely delivery and completion of tasks, with additional recovery expected. Strategies such as additional shifts, 24x7 work, and holiday work are being discussed across all contractors to enhance the recovery potential. These efforts are anticipated to produce positive results in the coming months. SMS has communicated that despite some procurement delays, there is no risk to delivery or completion dates. The focus remains on expediting critical scopes while minimizing simultaneous operations to enhance safety.

Status of Task 2.5

[redacted]

TASK 2.6 BALANCE OF PLANT BUILDING

Task description:

This task covers the following activities: general design, procurement, general construction, power distribution construction, water and water treatment plant construction, air separation plant preparations design and construction, slag, LNG, and compressor station construction

Description of work completed:

Task 2.6 Balance of Plant Building

Activities

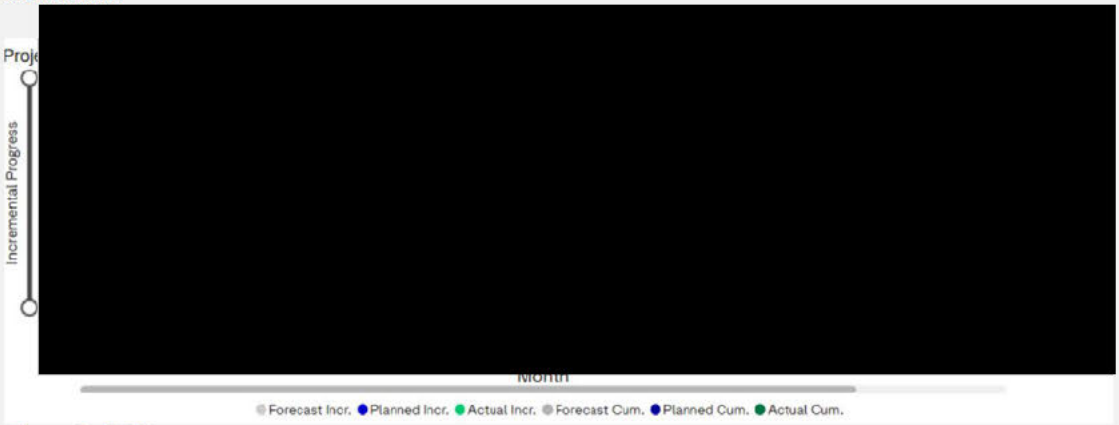

Figure 9: BOP progress

Good construction progress has been gained for rail, GIS building, NPB 202, pipe bridge foundations and underground pipe excavations. UG pipe installation is underway in Priority 0. NPB 202 foundation construction has been completed and the Hallix steel frame is 95% erected, work to be expedited to finish earlier. NPB 202 envelope (PVC cover) was installed ahead of the winter. PDOP GIS civil works complete, steel building is erected and cladding started. PDOP Control room building structural steel erected and transformer bay civil works underway. Pipe bridge P0 & P1 foundations are under construction and underground piping excavations have started with construction, both ramped up in October 2024. There has been good progress with rail construction, work on the rail was halted in October 2024 accommodate heavy hall trucks until big stockpile for hard rock has been built on the north of the site. Slight issues with [redacted] due to technical and commercial delays.

Figure 10: Envelope installation - NPB202 Building

Key procurement scopes have been progressing during Q4/2024 (civil, LNG terminal works, e-houses). A new EPCM procurement team was brought on board to develop the procurement program, and an Aquatech health check in September identified potential risks. Two new contractors mobilized: [redacted] in August and [redacted] in September 2024. Priority structural steel designs have been issued to [redacted] to start fabrication of steel elements. Civil handover on 16th of September with [redacted]. Chart has started the fabrication of the LNG tanks. BOP schedule review and procurement plan update has been completed, providing a clear outlook on the remaining program.

Figure 11: Foundations completed in PDOP Control Building

Milestones for water, drinking water, and sewage maintaining their forecasted completion without deviation, planned for September 2025. Sweco will handle the engineering tasks, while [redacted] executing the construction work. Negotiations with Solör ongoing, and detailed design and construction about to start under an interim agreement. Potable water and sewer systems actively being constructed by [redacted], while rebar and formwork operations continuing for WTÅ (A600), and piling for WTP 2 ongoing. Temporary connections are in place. Fire/Raw water layout design change delay is being mitigated through alternative procurement activities (breaking scope down to smaller packages) to expedite lead times. Temporary power through existing substation via Bodens Energi, new substation and 150kV lines constructed with SVK and Vattenfall Eldistribution AB.

Deviations:

- Pipe bridge design is lagging behind plan with only partial release on detail structural designs by [redacted] This has a negative impact on [redacted] due to delays on shop drawings – fabrication has started.
- Ongoing work with [redacted] to improve interface management between the parties, [redacted] now complete for all major work packs and being managed weekly/monthly.
- PDOP construction delay due to [redacted] not on site.
- Expedited procurement of delayed packages for Transformers, Raw Water Pumps, FF Package.

[redacted]

TASK 2.7 KNOWLEDGE, HR TASKS AND COMMUNICATION

Task description:

This task covers the following activities: executing HR plan, executing external communication plan, continue planned dialogue with local citizens, Boden municipality and the regional board, execute Knowledge sharing plan, Hydrogen Lab

Description of work completed:

Task 2.7 Knowledge, HR tasks and communication

Activities

In September 2024 Stegra changed its name to Stegra, a name that will better reflect a business that will be broadened in the future. This change will also allow the company to explore international trademark opportunities while expanding its projects beyond Sweden. From the beginning, STEGRA has had a web page for the project for transparently communicating the construction process for its stakeholders. Figure 8 shows an example of recent updates posted to the web page. In addition, safety and acting ethically are core principles of STEGRA. Therefore, the website has a whistleblowing channel for all employees and other stakeholder to report irregularities in a secure and anonymous way. There are also instructions on other ways to report misconducts.

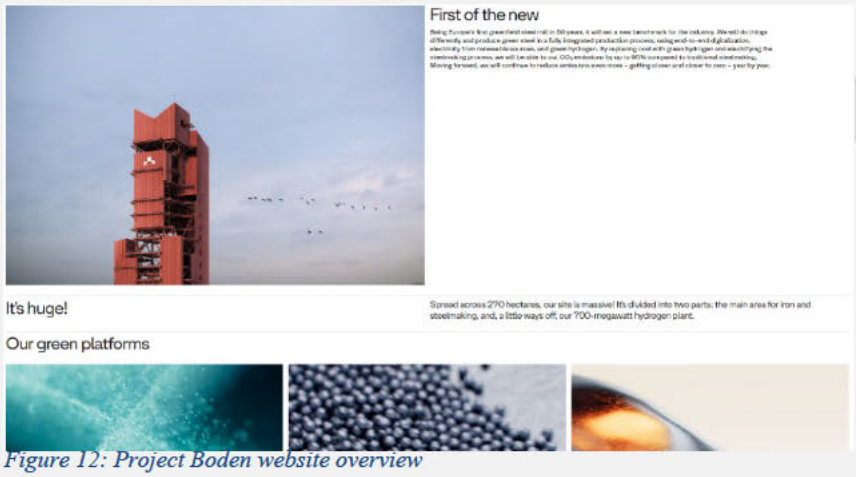

Figure 12: Project Boden website overview

The project also utilizes social media in its communication and knowledge sharing activities. As shown in Figure 9, the project's Instagram channel has over 2200 followers and over 200 posts. Frequent updates on the progress of the project are shared through posts and short videos, with most videos gaining over 8000 views. STEGRA's other communication channels include X (ex-Twitter) as well as LinkedIn for reaching other different stakeholders.

Figure 13: Instagram page

[redacted]

TASK 2.8 PROJECT COORDINATION AND REPORTING

Task description:
This task covers the following activities: project coordination, project control, risk management and financial administration, steering group meeting, and reporting to CINEA.

Description of work completed:

Task 2.8 Project Coordination and Reporting

Activities

Forecasting activities are ongoing with EPCMs. Stegra and EPCM are working together to identify gap in Forecasting due to different risks inclusion. Over the past few months, the risk register has been updated following numerous sessions aimed at enhancing the organization's risk management practices. Stegra has successfully achieved full adoption of the risk management process with risk dashboard to be updated in monthly project reports. The external infrastructure continues to pose the highest risk profile, primarily due to its impact on the project from recent delays in power, water, road, and rail services. The ongoing identification of short-term vulnerabilities and risks as well as Quantitative Risk Assessment is still ongoing. A cost and schedule risk analysis has been developed for all area and is updated in the monthly progress reports. Stegra management are also working with the list of initiatives and input from the Safety stand down. Some of these initiatives include the launch of site wide EHS (Environment, health, safety & security) meetings with all contractors, lessons learned shared on QR codes and TVs to spread EHS information.

October's forecast was up by [redacted] MEUR (major variance on IND, related to additional warehousing requirements on site). New budget scope defined in May was approved: LNG, Slag handling and on site rail in the Budget and Forecast ([redacted] MEUR).

Contracts have been signed for approximately 80% of the project budget.

The project coordination is based on STEGRA's own project management practices for managing projects of this size. The company has a project charter that will be actively updated during the project implementation. The charter includes a detailed schedule, a risk assessment, as well as budget considerations. In addition, as part of the Innovation Fund project, a Project Management Plan (D1.1) has been prepared based on the project charter as well as the project implementation plan provided as part of the proposal. The project management will work as a guideline for all employees when participating in a project receiving funding from the EU.

Figure 14: Boden Project Team

Each part of the construction (hydrogen manufacturing plant, direct reduction plant, steel plant and balance of plant) has its own team for Project Management Office (PMO), project controls, construction and site, engineering, operations, procurement, and technology. Vacancies and man hours are actively followed.

The project charter sets the main reporting requirements for the project, followed by those set by the Innovation Fund Grant Agreement. The project is followed at weekly basis in steering group updates. There are also monthly project cost and schedule performance reviews, as well as yearly reviews. Project risks are updated quarterly. In terms of actual report, the project will produce a

monthly project report and a quarterly Environmental and Social report. Investor updates are to be updated based on their requirements. For the coming Financial Close and reporting period, Stegra sees a continued effort to set routines and processes for facilitating conformity to the GA. Overall objective is to streamline work with GA progress reporting with other reporting streams within Stegra.
Status of Task 2.8 [redacted]

3 TIMETABLE

Timetable
There are no changes made to the Timetable/Gantt chart from Annex 1 of the Grant Agreement. There are no deviations to the workplan.

ANNEXES

LIST OF ANNEXES

Gantt chart