

## Del 2. Projektsammanfattning *(max 1 sida exklusive tabeller, publik)*

Projekttitel på svenska (max 80 tecken) <b>Högpresterande lätta stålsandwichmaterial</b>	
Projekttitel på engelska (max 80 tecken) <b>High-performance light steel sandwiches</b>	
Akronym (max 10 tecken) <b>LightFe</b>	
Projekttyp <input type="checkbox"/> Förprojekt <input checked="" type="checkbox"/> Utvecklingsprojekt	Projektet bygger vidare på resultat från ett tidigare projekt <input type="checkbox"/> ja, med stöd från VINNOVA (Projekts diarienummer: diarienummer) <input type="checkbox"/> ja, med stöd från finansiär (avser offentlig finansiering). <input checked="" type="checkbox"/> nej
Projektet är <input type="checkbox"/> i sin helhet samma projekt som har insänts till annan finansiär, nämligen: finansiär <input type="checkbox"/> i delar samma projekt som har insänts till annan finansiär, nämligen: finansiär	
Finns det uppgifter om affärs- och driftförhållanden som skulle kunna leda till skada om de offentliggörs? <input type="checkbox"/> ja <input checked="" type="checkbox"/> nej	
Sammanfattning (max 1500 tecken) <i>Denna ska skrivas så att en extern bedömare kan förstå syftet och innehållet i projektet.</i> För att möta de långsiktiga kraven på reducering av växthusgaser (GHG) för vägtransporter krävs nya konstruktionsmaterial för att reducera vikt. I LightFe kommer två stycken stålsandwichkoncept med en densitet 30% lägre än för ett solid stålmaterial att utvecklas. Sandwichlösningarna är processade till komponenter med hjälp av presshårdning. Sandwichmaterial ska även möta de höga kraven på styvhet, krockegenskaper och utmattningsfrån bil- och lastbilsindustrin. Sandwichkoncepten ska även undersökas för militärfordon för kommande utveckling lättviktsskydd mot spränglaster. Slutligen ska även sandwichmaterialen ha god formbarhet anpassad för presshårdningsprocessen. En kostnadseffektiv virtuell metod, i detta fall finita elementmetoden, metod för produktframställning ska tas fram. För att validera FE-metodiken och för att påvisa goda egenskaper rörande styvhet, krockegenskaper, utmattningsfrån och skydd mot spränglaster kommer demonstratorer att konstrueras. Den framtagna simuleringsmetodiken kommer att implementeras hos medverkande företagen vars konstruktörer kommer att utbildas i de nya teknologierna genom workshops.	
Sammanfattning på engelska (max 1500 tecken) In order to meet the long term goals regarding reduction of greenhouse gas emissions in road transport new material solutions are needed to reduce weight. In LightFe two steel sandwich concepts with densities 30% lower than the density for a solid steel will be developed. The multi grade material is processed to components by press hardening. The sandwich materials shall also fulfil the high demands from the truck and automotive industry regarding stiffness, crashworthiness and fatigue. The sandwich concepts will also be investigated for armoured vehicle for future development of lightweight blast mitigation protection systems. Finally, the sandwich should at the same time have a good formability customized for the press hardening process. Cost efficient virtual methods in shape of finite element method for development and design of sandwich solutions will be established. In order to validate the FE-methodology and to show good properties regarding stiffness, crashworthiness, fatigue or blast	

mitigation, demonstrators will be made. The developed simulation methodologies will be implemented at the companies and the design engineers will be trained in the new technologies through workshops.

Startdatum 2016-12-05	Slutdatum 2019-12-04
Totalt sökt stöd (SEK) 10.408.000	Total medfinansiering (SEK) 5.204.000

## 1. Projektets idé

In order to meet the long term goals regarding reduction of greenhouse gas emissions in road transport new material solutions are needed to reduce weight. In LightFe two steel sandwich concepts with densities 30% lower than the density for a solid steel will be developed. The multi grade material is processed to components by press hardening. The sandwich materials shall also fulfil the high demands from the truck and automotive industry regarding stiffness, crashworthiness and fatigue. The sandwich concepts will also be investigated for armoured vehicle for future development of lightweight blast mitigation protection systems. Finally, the sandwich should at the same time have a good formability customized for the press hardening process. Cost efficient virtual methods in shape of finite element method for development and design of sandwich solutions will be established. Demonstrators will be made in order to validate the FE-methodology and to show good properties regarding stiffness, crashworthiness, fatigue or blast mitigation. The developed simulation methodologies will be implemented at the companies and the design engineers will be trained in the new technologies through workshops.

## 2. Projektets bidrag till programmålen

Several long-term goal of the call are established. In the table below it is summarized how the objectives of LightFe is connected to the objectives in Lighter and the long-term goals.

Objectives of LightFe	Contributions to objectives of LIGHTer	Long-term objectives 2033
Two sandwich solutions with a with densities 30% lower than the density for a solid steel will be developed and realized	<ul style="list-style-type: none"> <li>75 % of the lightweight solutions developed within SIP will be industrialized</li> <li>TRL will be improved at least one level</li> </ul>	<p><b>Environment:</b> Swedish lightweight products reach end-users through implementation of lightweight technology</p> <p><b>Industrial growth:</b> Swedish lightweight solutions contribute to industrial growth</p>
Cost efficient virtual methods for product development will be established		
A demonstrator will be made with a weight reduction of at least 30 % compared to the material solution (mild steel) used today		
The developed simulation methods/methodologies will be implemented at the companies. The design engineers at BAE, Gestamp and Scania will be trained in the new technologies through workshops.	Results from the projects have been included in courses for industry and academia	More than 50 % of innovation within lightweight originate from multi-sectorial collaboration

## 3. Projektets aktörskonstellation

The partners in the consortium are: Swerea MEFOS, who will develop processes for continuous manufacturing of steel sandwich, Luleå University of Technology, who will establish virtual simulations strategies for development of steel sandwich, Gestamp HardTech, who will design a cold stamping die for manufacturing of the steel sandwich core, Scania, who will select, optimize the design and test a component, based on the possibilities offered from the development of a steel-sandwich material, BAE Systems Hägglunds, who will select and design a panel, given by the steel-sandwich technique, which finally will be tested against relevant impulsive loading (demonstrator) and SSAB, who will study joining methods for the sandwich based on their press-hardened boron steels.