Joint Deliverable D4.1, 4.2, 4.3 and 4.4

Busines Plan
public summary

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Project co-funded by the Fuel Cells and Hydrogen Joint Undertaking within the Seventh Framework Programme		
Dissemination Level		
PU	Public	**X**
PP	Restricted to other programme participants (including the FCH JU)	
RE	Restricted to a group specified by the consortium (including the FCH JU)	
CO	Confidential, only for members of the consortium (including the FCH JU)	
EU restricted	Classified with the mention of the classification level restricted "EU Restricted"	
EU confidential	Classified with the mention of the classification level confidential " EU Confidential"	
EU secret	Classified with the mention of the classification level secret "EU Secret "	

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1 Objective of this deliverable

This deliverable will summarize the results of work package 4 developing business plan for a potential European Fuel Cell stack integrator.

2 Organization

The proposed organization for the stack integrator suggests a lean organizational approach focusing on core competences. These core competences are representing all the functions needed to effectively execute product development and manufacturing of the fuel cell stack. They will be supplemented by support to core functions representing capabilities which are needed to effectively operate and manage the organization but are not essential part of product development or manufacturing. These functions are displayed in Table 1 below.

The organization is supposed to grow over time along with the requirements of different development phases and maturity levels. It will be subject to changes and adjustments as may be required to address the different needs of a growing organization. Due to the specific requirements of automotive industry, a strong context of automotive expertise will be required when filling key positions.

Based on these considerations, the following functions are considered necessary for the stack integrator:

Core competences	Support functions
Stack Development and Design (concept, interfaces, specification, IP)	Sales & Marketing
Component Specification and Validation (MEA, BPP, BoP)	Program- and Project Management
Stack Prototype Build, Testing and Validation	Infrastructure and IT
Supply Chain Management	Finance & Administration
Manufacturing/Assembly	
Quality System	

Table 1: Organizational functions of the stack integrator

The starting structure may consist of up to 25 staff and will include all functions needed for early development. The mature structure may grow to 45 staff depending from the final scope of activity and the associated resource needs. Preparation of mass production will post additional requirements for manufacturing, logistics, quality and support functions. This may require additional 10 – 15 people totaling staff to 65 (advanced structure, see Figure 1 below).

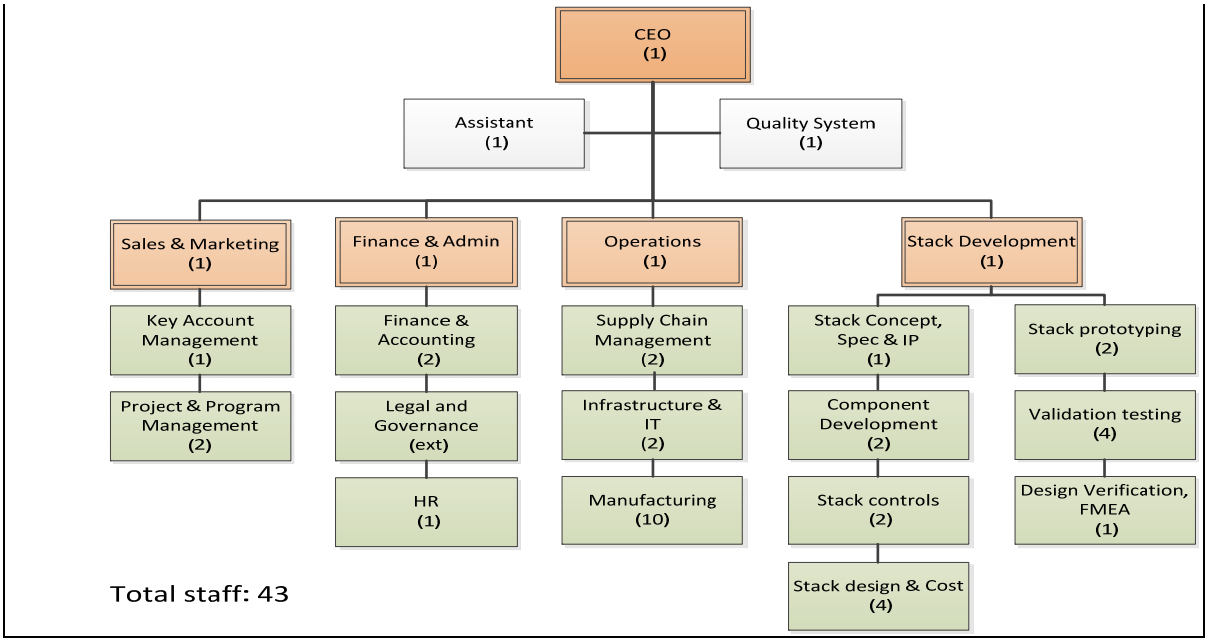
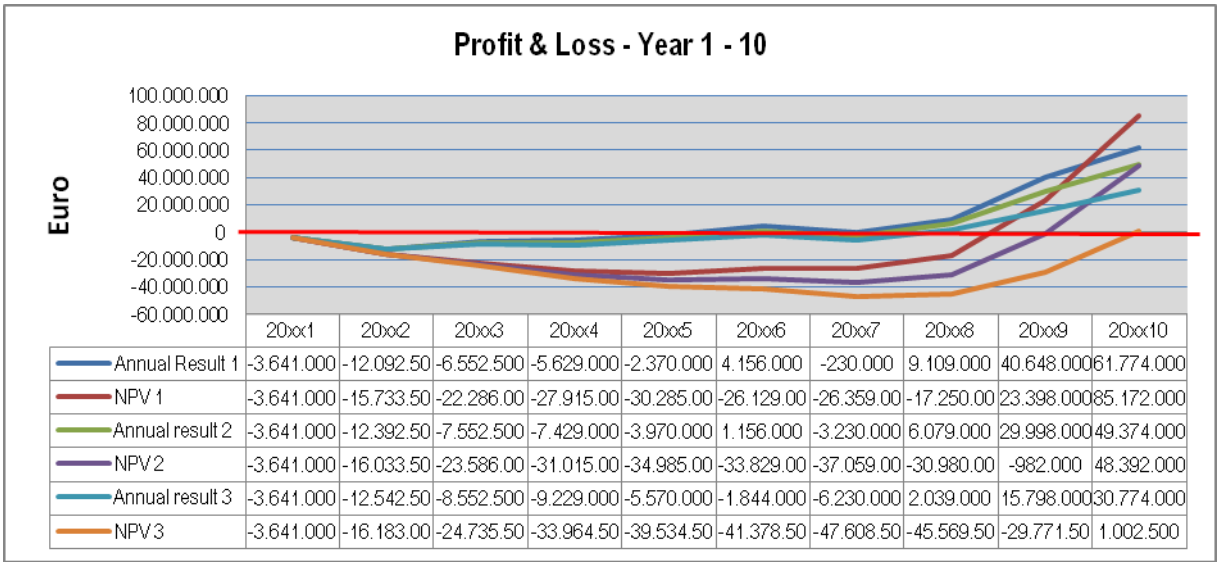


Figure 1: Proposed mature structure of the organization

3 Financial Plan – Profit & Loss

The financial planning for the business concept was established using the assumptions explained in the previous chapters and specific deliverables of the project. This does explicitly refer to the proposed organization and staff, assumed product cost and learning curves, investment needs and operational cost, sales revenues and profitability scenarios.

The assumed sales revenues are reflecting the product development cycle considering volume effects from other applications, i.e. with limited volumes for generation 1 (max 4000) and extended mass production volumes for generation 2. Starting from year 4 until year 9, sales to other markets may be as high as 50% of total sales. Hence, synergies with other applications will significantly facilitate the business case in early years. The share of these sales will however shrink and are assumed to level out to 5 – 10% when full automotive volumes will be achieved. The results of the detailed financial analysis are displayed in Figure 2 – below.



	20xx1	20xx2	20xx3	20xx4	20xx5	20xx6	20xx7	20xx8	20xx9	20xx10
Annual Result 1	-3.641.000	-12.092.50	-6.552.500	-5.629.000	-2.370.000	4.156.000	-230.000	9.109.000	40.648.000	61.774.000
NPV 1	-3.641.000	-15.733.50	-22.286.00	-27.915.00	-30.285.00	-26.129.00	-26.359.00	-17.250.00	23.398.000	85.172.000
Annual result 2	-3.641.000	-12.392.50	-7.552.500	-7.429.000	-3.970.000	1.156.000	-3.230.000	6.079.000	29.998.000	49.374.000
NPV 2	-3.641.000	-16.033.50	-23.586.00	-31.015.00	-34.985.00	-33.829.00	-37.059.00	-30.980.00	-982.000	48.392.000
Annual result 3	-3.641.000	-12.542.50	-8.552.500	-9.229.000	-5.570.000	-1.844.000	-6.230.000	2.039.000	15.798.000	30.774.000
NPV 3	-3.641.000	-16.183.00	-24.735.50	-33.964.50	-39.534.50	-41.378.50	-47.608.50	-45.569.50	-29.771.50	1.002.500

Unit sales / 100 kW	0	10	200	400	2.000	4.000	4.000	10.000	50.000	100.000

Figure 2: 10-year financial plan - profit and loss

4 Conclusions

In essence, the following conclusions can be drawn from the financial assessments:

- The venture will need 7 – 8 years until reaching breakeven. This is more or less independent from the assumed profitability but mainly determined by reaching a production volume of at least 10 000 units/year.
- There is a significant contribution of sales to other applications for achieving breakeven and profitability of the venture.
- The total cash flow requirement will range from € 30.3 million (scenario 1) to € 47.6 million (scenario 3) strongly depending on profitability rather than volume.
- Return of investment will require 9 to 10 years as result of profitability combined with volume growth.
- The level of investment requires strategic, long-term oriented industrial investment with OEM support and strong commitment to the technology.

The assessment deals with stack development only and does not consider other elements such as system development and vehicle integration. These elements will easily increase the total investment needs to the 4-5-fold from the OEM perspective.

It is very obvious that these financial challenges can only be managed in the context of a strong business case. It is also critical to understand that these challenges are not only established by the direct investment needs of stack development but also by the sales subsidies required by OEMs prior to reaching optimum production rates and thus competitive stack cost. Isolated action will fail to utilize the technical and commercial benefits which can be delivered by a collaborative approach.

A simplified model delivered in Figure 3 illustrates the economic effects on product cost (sales subsidies) that can be saved by utilizing the proposed collaborative approach by Auto-Stack. The potential savings range from a few million Euro at low volumes to near to 200 million Euros at high but not yet optimum automotive production rates.

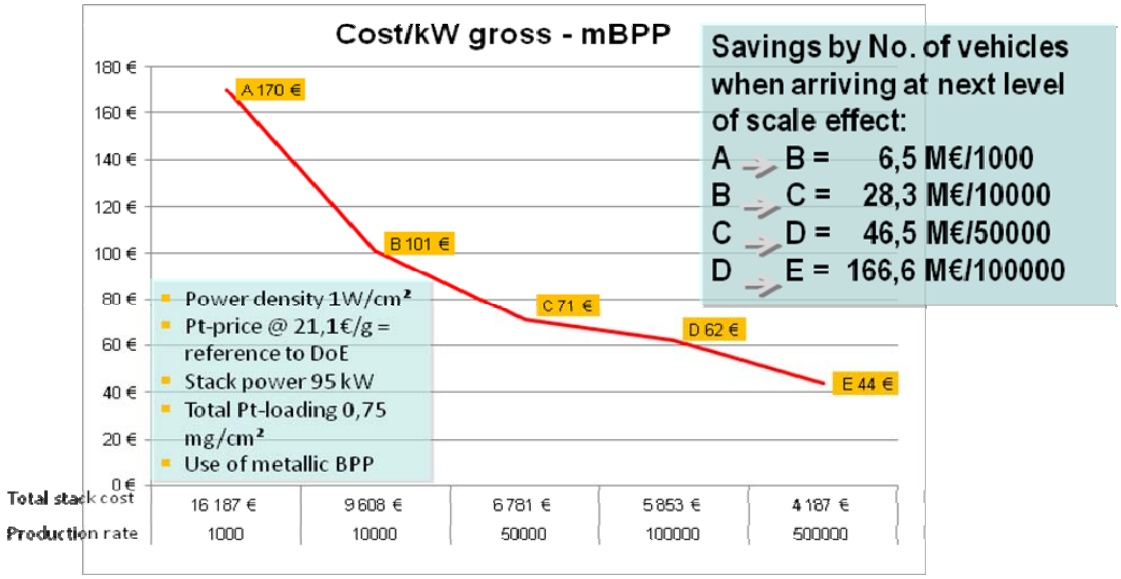


Figure 3: Economic effects of accumulated volumes on OEM subsidies