

SEPTEMBER 2025

The aPriori Advantage: 6 Years, 3 Startups, and the Road to Success

Rich Morabito

aPriori
Manufacturing
Insights **2025**

DETROIT / SEPTEMBER 23 - 24

The Voice of Experience

Implemented aPriori at Rivian, Nikola and now Slate



Rich Morabito

Head Of Cost Engineering-
Slate

Slate Auto

THE BLANK SLATE

It's a Slate. A radically simple electric pickup truck that can change into whatever you need it to be – even an SUV. Made in the USA at a price that's actually affordable (sub \$25,000).



Agenda

1

Lessons Learned from
the Automotive Front Line

2

aPriori Examples:
Large, Complex Parts

3

A Story from My Journey: Nikola

4

Generating Manufacturing Detail
Reports (Tooling & Side-by-Side
Reports)

Lessons from the Automotive Startup Frontline

1

Do not start your deployment by spending a huge amount of time and money configuring your Digital Factory – get started right away running simulations and using the insights to make important business decisions; digital factories can be tuned along the way

2

aPriori is so much more than just a “costing tool.”
Make sure you collaborate with everyone across your product team – designers, engineers, sourcing managers, etc. They can all benefit from the aPriori insights.

3

aPriori can be used for manufacturing simulation of extremely large, complex assemblies and electronics

LESSONS LEARNED

Process Group Requirements to Start Your aPriori Deployment

Sheetmetal Requirements

- Progressive Dies
- Transfer Dies
- Tandem Dies
- Hot Stampings
- Roll Forming
- Hydroforming
- Stretch Forming
- Bar and Tube
- Laser Cut Bend/ Break

Plastics / Casting Requirements

- Injection Molding
- Compression Molding
- Blow Molding
- RIM Molding
- Thermoforming
- Structural Foam Molding
- High Pressure Die cast
- Low pressure Die Cast
- Sand Castings

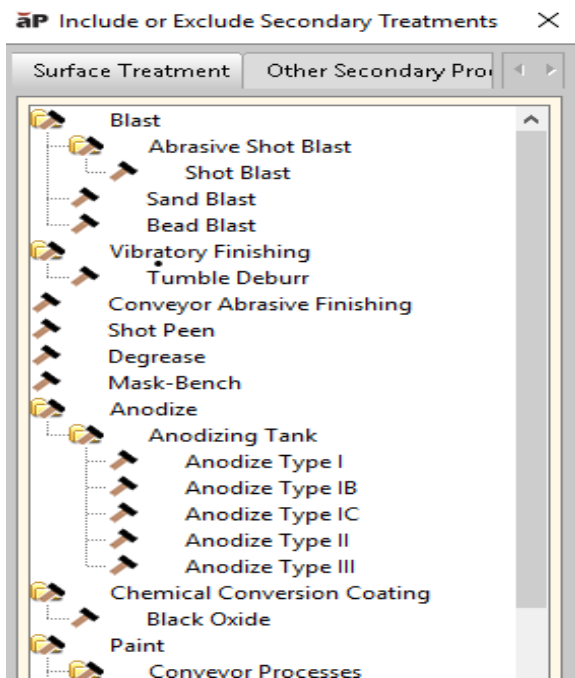
PCBA / Wiring Requirements

- Costing of 2000 + components
- Silicon Expert Interface or robust internal component library
- EBOM for Materials
- Circuit board files
- HV wires harness
- LV wires harness

LESSONS LEARNED

Process Group Requirements to Start Your aPriori Deployment

Secondary Process



Stock Machining

- Metals
- Plastics
- Castings
- Many different machines in digital factories

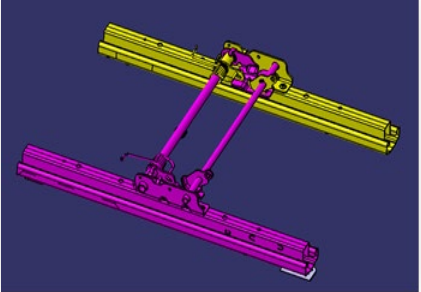
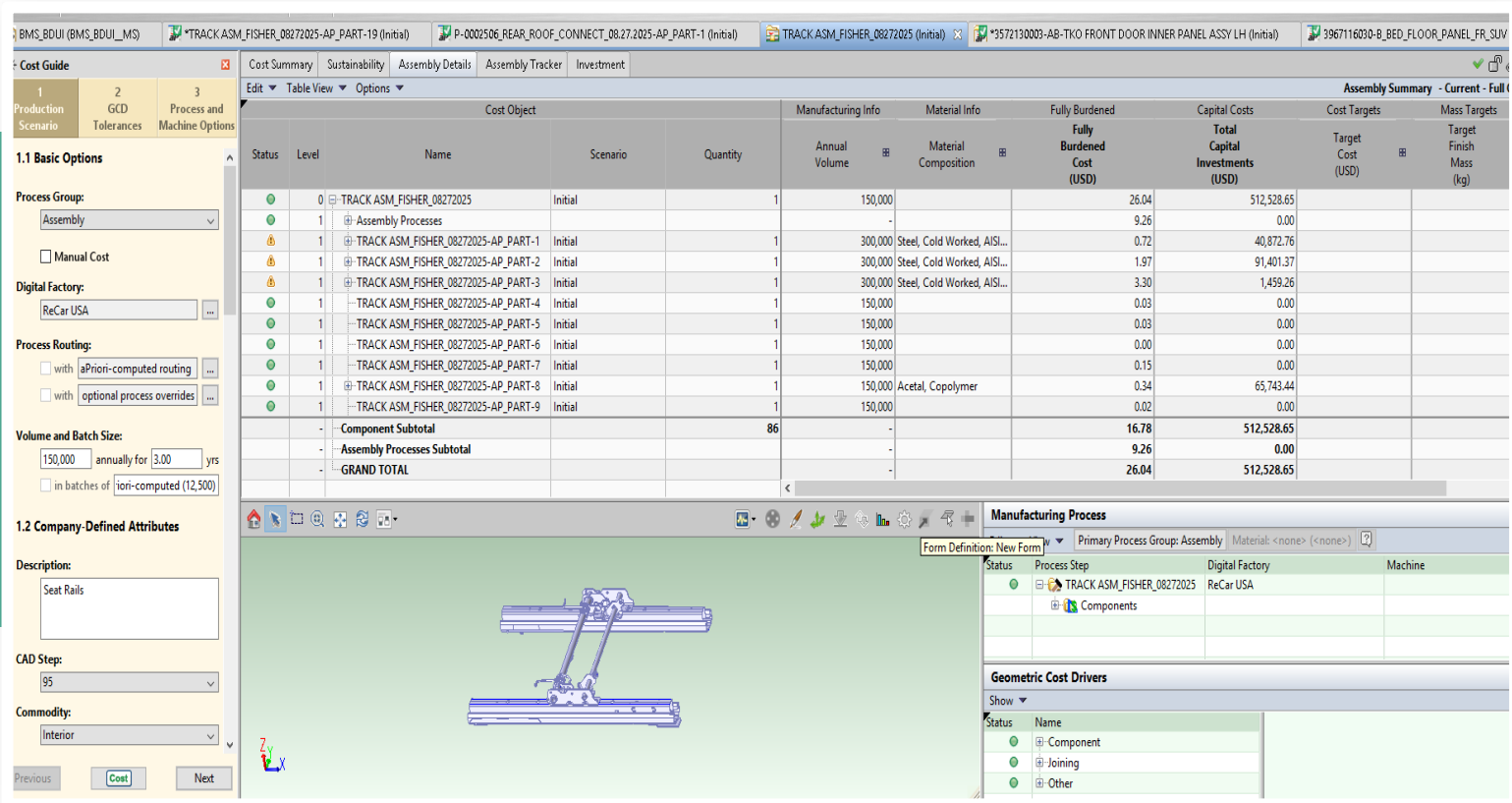
Forgings

- Steel forgings
- Steel aluminum
- Copper magnesium
- Ex. Tailgate pins, suspension parts, etc.

aPriori Should Cost Example

Seat Manual
Track Assembly

86 parts in
this assembly



Manufacturing Simulation for:

- Metal Stamping
- Plastic Injection Molding
- Springs
- Rods
- Welding
- Final Assembly

Seat Track Costing Stampings



First run all the sheet metal parts,
4 tracks and 8 brackets total



2 hours to generate piece
part and tooling costs



Saved at least 1 day of engineer
time to manual cost in Excel

Variable Costs	Current (USD)	Previous (USD)	Last Saved (USD)
Material Cost	1.03	-	1.03
Labor	0.13	-	0.13
Direct Overhead	0.06	-	0.06
Amortized Batch Setup	<0.01	-	<0.01
Logistics	0.00	-	0.00
Other Direct Costs	0.35	-	0.35
Total Variable Costs	1.58	-	1.58
Period Costs			
Indirect Overhead	0.03	-	0.03
SG&A	0.13	-	0.13
Margin	0.14	-	0.14
Piece Part Cost	1.87	-	1.87
Fixed Costs			
Total Amortized Investments	0.10	-	0.10
Fully Burdened Cost	1.97	-	1.97
Capital Costs			

Variable Costs	Current (USD)	Previous (USD)	Last Saved (USD)
Material Cost	0.20	-	-
Labor	0.14	-	-
Direct Overhead	0.09	-	-
Amortized Batch Setup	<0.01	-	-
Logistics	0.00	-	-
Other Direct Costs	0.07	-	-
Total Variable Costs	0.50	-	-
Period Costs			
Indirect Overhead	0.09	-	-
SG&A	0.04	-	-
Margin	0.05	-	-
Piece Part Cost	0.68	-	-
Fixed Costs			
Total Amortized Investments	0.05	-	-
Fully Burdened Cost	0.72	-	-
Capital Costs			
Total Capital Investments	40,872.76	-	40,872.76

Step by Step aPriori – Plastic Injection Molding

Simple plastic part,
takes 10 mins to cost
in aPriori vs ~4 hours
manually in Excel

ap Pro

File Scenario Cost View Tools Reports Help

Session Timer: 01:03 Connected to: Production:Default Scenarios Connection: Fast Logged in as: rich.morabito

TRACK ASM_FISHER_08272025-AP_PART-17 (Initial) *TRACK ASM_FISHER_08272025-AP_PART-2 (Initial) *TRACK ASM_FISHER_08272025-AP_PART-20 (Initial) *TRACK ASM_FISHER_08272025-AP_PART-1 (Initial) TRACK ASM_FISHER_08272025 (Initial) *3572130003-AB-TKO FRONT DOOR INNER PANEL ASSY

Cost Guide

1 Production Scenario 2 GCD Tolerances 3 Process and Machine Options

Recently used settings

1.1 Basic Options

Process Group: Plastic Molding

☐ Manual Cost

Digital Factory: ReCar USA

Process Routing:

☐ with aPriori-computed routing

☐ with optional process overrides

Material: Acetal, Copolymer

Volume and Batch Size:

150,000 annually for 3.00 yrs

☐ in batches of iori-computed (12,500)

1.2 Company-Defined Attributes

Description:

Previous Cost Next

Validation Part Summary Design Guidance Sustainability Cost Summary Part Details Investment

	Current (USD)	Previous (USD)	Last Saved (USD)
Variable Costs			
Material Cost	0.03	-	0.03
Labor	0.07	-	0.07
Direct Overhead	0.08	-	0.08
Amortized Batch Setup	0.01	-	0.01
Logistics	0.00	-	0.00
Other Direct Costs	0.01	-	0.01
Total Variable Costs	0.20	-	0.20
Period Costs			
Indirect Overhead	0.06	-	0.06
SG&A	0.02	-	0.02
Margin	0.02	-	0.02
Piece Part Cost	0.30	-	0.30
Fixed Costs			
Total Amortized Investments	0.17	-	0.17
Fully Burdened Cost	0.47	-	0.47
Capital Costs			
Total Capital Investments	77,508.55	-	77,508.55

Manufacturing Process

Edit View Primary Process Group: Plastic Molding Material: Acetal, Copolymer (ReCar USA) 12

Status	Process Step	Digital Factory	Machine
✓	TRACK ASM_FISHER_08272025-AP_PART-17	ReCar USA	
✓	Plastic Molding	ReCar USA	
✓	Injection Molding	ReCar USA	Injection Molder 2,000kN Clamp Force

Geometric Cost Drivers

Show

Status	Name
✓	Component
✓	Volume

Step by Step aPriori – Tubes, Springs, and Welds

Costed tubes, springs, and welding in 15 mins vs ~8 hours manually

Everything done separately in Excel can be handled at once in aPriori

Cost Guide

1 Production Scenario | 2 GCD Tolerances | 3 Process and Machine Options

1.1 Basic Options

Process Group: Assembly

☐ Manual Cost

Digital Factory: ReCar USA

Process Routing: ☐ with aPriori-computed routing ☐ with optional process overrides

Volume and Batch Size: 150,000 annually for 3.00 yrs ☐ in batches of 1000-computed (12,500)

1.2 Company-Defined Attributes

Description: Seat Rails

CAD Step: 95

Commodity: Interior

Previous Cost Next

Status	Level	Name	Scenario	Quantity	Annual Volume	Material Composition	Fully Burdened Cost (USD)	Total Capital Investments (USD)	Target Cost (USD)	Target Finish Mass (kg)
⊖	1	TRACK ASM_FISHER_08272025-AP_PART-52	Initial	1	-	-	-	-	-	-
⊖	1	TRACK ASM_FISHER_08272025-AP_PART-53	Initial	1	-	-	-	-	-	-
⊖	1	TRACK ASM_FISHER_08272025-AP_PART-54	Initial	1	-	-	-	-	-	-
⊖	1	TRACK ASM_FISHER_08272025-AP_PART-55	Initial	1	-	-	-	-	-	-
⊕	1	TRACK ASM_FISHER_08272025-AP_PART-56	Initial	1	300,000	Steel, Cold Worked, AISI...	1.82	76,877.54	-	-
⊖	1	TRACK ASM_FISHER_08272025-AP_PART-57	Initial	1	-	-	-	-	-	-
⊖	1	TRACK ASM_FISHER_08272025-AP_PART-58	Initial	1	-	-	-	-	-	-
⊖	1	TRACK ASM_FISHER_08272025-AP_PART-59	Initial	1	-	-	-	-	-	-
⊕	1	TRACK ASM_FISHER_08272025-AP_PART-60	Initial	1	150,000	Steel, Cold Worked, AISI...	0.23	37,561.70	-	-
⊕	1	TRACK ASM_FISHER_08272025-AP_PART-61	Initial	1	150,000	-	0.02	0.00	-	-
⊖	1	TRACK ASM_FISHER_08272025-AP_PART-62	Initial	1	-	-	-	-	-	-
-	-	Component Subtotal	-	86	-	-	16.80	512,528.65	-	-
-	-	Assembly Processes Subtotal	-	-	-	-	9.26	0.00	-	-
-	-	GRAND TOTAL	-	-	-	-	26.06	512,528.65	-	-

Manufacturing Process

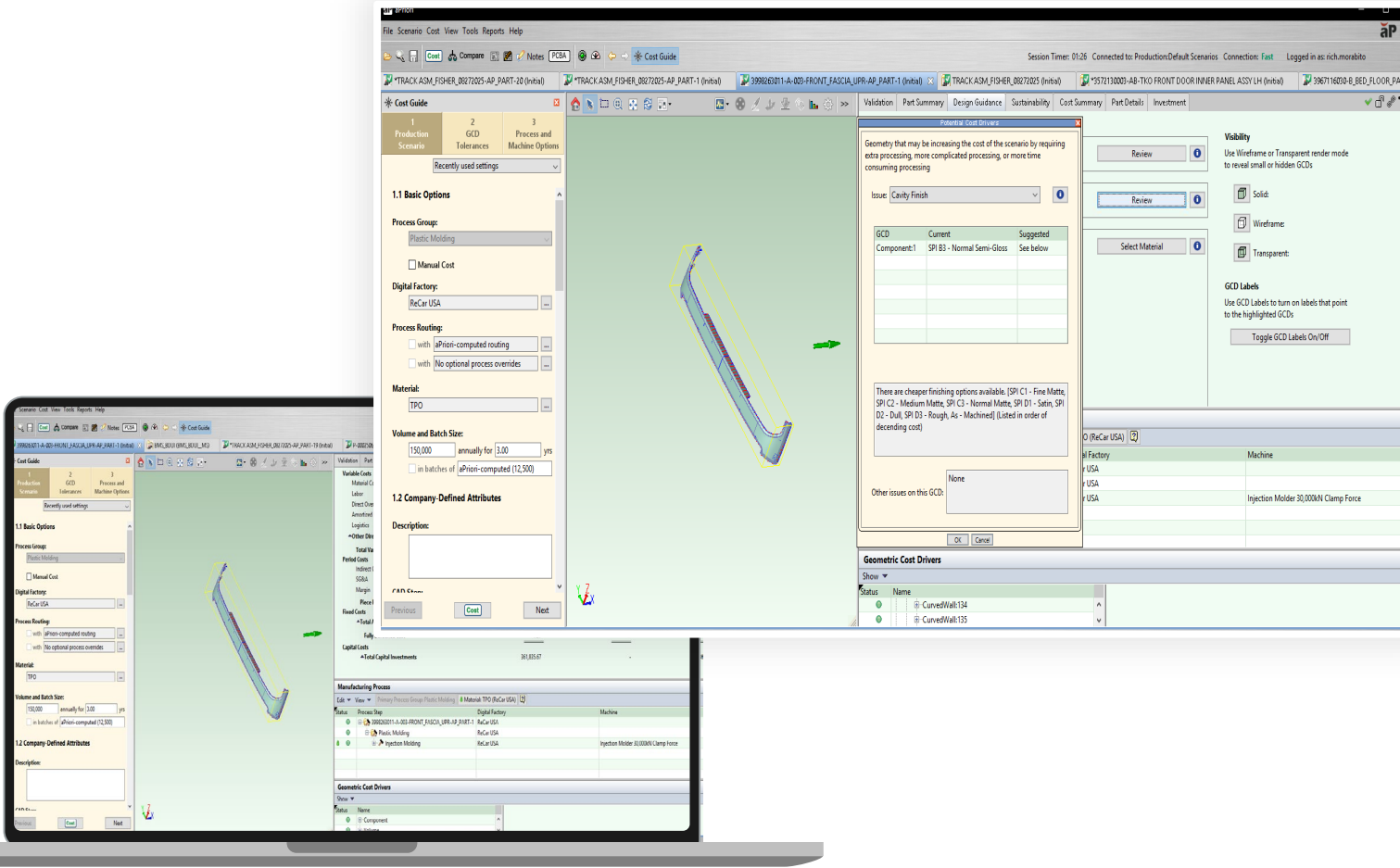
Primary Process Group: Assembly | Material: <none> | Machine: <none>

Status	Process Step	Digital Factory	Machine
⊕	TRACK ASM_FISHER_08272025	ReCar USA	Machine
⊕	Components		

Geometric Cost Drivers

Status	Name
⊕	TRACK ASM_FISHER_08272025-AP_PAF
⊕	TRACK ASM_FISHER_08272025-AP_PAF
⊕	TRACK ASM_FISHER_08272025-AP_PAF

Plastic Injection Mold Part



Bumper / Fascia –

Cost Summary Include – Materials, Labor, Direct and Indirect Overhead. SGA/Profit/Scrap, Regrind up 25%. Tooling Menu, Draft Angles, Mold Flow, Surface Finishes on core and cavities, Tool steel P20/ AL/ H13 over 20 items to set up each one will drive final cost models.

DFM Guidance tab provides total manufacturing checks (aP Design has lighter version of this for designers)

Nikola Side Story

- During the early interview process, Nikola intended to hire 10 cost engineers
 - Average cost engineer ranges from ~\$110,000-160,000/year
 - These engineers would be using MS Excel for cost modeling
- Average time to cost using MS Excel vs aPriori is 10 to 1 (generously) and requires 10x the resources
- Convinced leadership to hire only 2 engineers vs 10 and purchase aP software instead
 - Saved at least \$770,000 before the program even started
- With this team, after only 3 months, using aPriori we cost the whole truck at Nikola

Tooling Detail Report

FileScenarioCostViewToolsReportsHelp

CostCompareNotesPCBA

Cost Guide

P-0003008 (Initial)FLOOR COVERING ONLY - FLAT FOR CE (1) (Initial)

ValidationPart SummaryDesign GuidanceSust

1Production Scenario

2GCD Tolerances

3Process and Machine Options

Recently used settings

1.1 Basic Options

Process Group: Plastic Molding

☐ Manual Cost

Digital Factory: ReCar USA

Process Routing:
☒ with Injection Mold
☐ with No optional process overrides

Material: Polypropylene Ext. Fiber

Volume and Batch Size:
150,000 annually for 3.00 yrs
☐ in batches of aPriori-computed (12,500)

1.2 Company-Defined Attributes

Description:

CAD Status
PreviousCostNext

3D Model

3D Model

QUOTE NUMBER : 12010

CUSTOMER NAME : Slate

DESCRIPTION : Underhood HDLP Beauty Cover LH / RH

FILE NAME / LOCATION: P-0003008 (1)_a3d / P-0003009 1.a3d

CREATION DATE: 9/8/2025

BLOCK MATERIAL : STEEL

Block \$/lbs \$2.50

PRINTED 9/8/2025 1:46 PM

Prototype

Production X

Descrp	Rough Rate	Fin Rate	Description	Rough Machine	Finish Machine	Rough	Finish	Costs	Material Cost	h/d	w	L	Total			
MACHINE	\$26.95	\$34.20	Cavity Block	LRG 3AXIS	LRG 3AXIS	30	80	\$3,544.50	\$9,201.60	12	30	36	12960			
MACHINE	\$26.95	\$34.20	Ejector Block			40	80	\$3,814.00	\$9,201.60	12	30	36	12960			
LABOR	CNCE	\$44.14	Rough Labor Hours			35		\$1,544.90				M	210			
LABOR	CNCE	\$44.14	Finish Labor Hours				80	\$3,531.20				L	115			
MOLD SHOP																
MACHINE		\$17.97	Cavity Inserts	\$46.17	SML 3AXIS			\$0.00					0			
MACHINE		\$46.17	Core Inserts	\$46.17				\$0.00					0			
LABOR	CNCE	\$44.14	Machine Labor				0	\$0.00					0			
MACHINE		\$17.97	Slides	\$46.17	SML 3AXIS			\$0.00				M	0			
MACHINE		\$46.17	Lifters	\$46.17				\$0.00				L	0			
LABOR	CNCE	\$44.14	Machine Labor				0	\$0.00					0			
DESIGN																
LABOR	CAMP	\$56.57	Processing	20				\$1,131.40					35			
LABOR	CAMP	\$56.57	3D Design	150				\$8,485.50					150			
LABOR	CAMP	\$56.57	Trode Design	15				\$848.55					185			
MOLD SHOP																
LABOR	MDMK	\$46.17	Bench Cavity	50	\$2,308.50								0			
LABOR	MDMK	\$46.17	Bench Core	40	\$1,846.80		LRG 3AXIS						0			
LABOR	MDMK	\$46.17	Sprue Bushing		\$0.00			\$0.00					0			
LABOR	MDMK	\$46.17	Hot Manifold	20	\$923.40	Labor Hrs	Machine Hrs	Combined Cost	\$40,000.00	6	DROPS		0			
LABOR	MDMK	\$46.17	Ejector Plates	10	\$461.70	15	30	\$1,397.85	\$1,012.18				0			
LABOR	MDMK	\$46.17	Ejector Box	10	\$461.70	20	40	\$1,863.80	\$2,085.70				0			
MAT'L	COST		Sleeves & Pins	\$1,000.00				\$1,000.00					0			
LABOR	MDMK	\$46.17	Clamp Plate	10	\$461.70	5	10	\$465.95	\$2,683.80				0			
LABOR	TENG	\$78.08	Tool Engineer	15									0			
LABOR	MDMK	\$46.17	Pressure Sensors		\$0.00	0		\$0.00					0			
LABOR	MDMK	\$46.17	Core Pulls		\$0.00		TE	\$1,171.20					0			
LABOR	MDMK	\$46.17	Spot	40	\$1,846.80								0			
LABOR	MDMK	\$46.17	Core Pins	10	\$461.70				\$250.00				0			
LABOR	MDMK	\$46.17	Water	15	\$692.55				\$1,200.00				0			
LABOR	MDMK	\$46.17	Assembly	60	\$2,770.20								0			
LABOR	MDMK	\$46.17	Total Inserts/slides	0	\$0.00								0			
LABOR	MDMK	\$46.17	Material	5	\$230.85	290						M	80			
LABOR	MDMK	\$46.17	Machining	20	\$923.40	40	MOLD	\$13,389.30	\$1,500.00			L	345			
BORING MILL																
MACHINE	TOSHIBA	\$23.09	Boring Mill	40	CNC			\$923.60					0			
MACHINE	TOSHIBA	\$23.09	Pin & Bushings	15				\$346.35	\$750.00			M	55			
LABOR	CNCE	\$44.14	Machine Labor					\$2,427.70				L	55			
GUNDRILL																
MACHINE	TARUS	\$28.08	Drill Ejection	30				\$842.40					0			
MACHINE	TARUS	\$28.08	Drill Water Lines	60				\$1,684.80				M	90			
LABOR	CNCE	\$44.14	Machine Labor					\$3,972.60				L	90			
EDM																
MACHINE		\$17.97	Electrodes	25				\$449.25	\$1,000.00				0			
LABOR	CNCE	\$44.14	Machine Labor					\$1,103.50					0			
MACHINE		\$23.93	Sinker EDM	50	LARGE			\$1,196.50					0			
LABOR	CNCE	\$44.14	Machine Labor					\$1,103.50					0			
MACHINE		\$15.42	Wire EDM					\$0.00				M	75			
LABOR	CNCE	\$44.14	Machine Labor					\$0.00				L	50			
OUTSOURCE AND MISC																
LABOR	PROS	\$43.60	Heat Treat					\$654.00	\$1,500.00				0			
LABOR	MDMK	\$46.17	Tryout	15				\$0.00					0			
LABOR	MDMK	\$46.17	Texture				\$0.00	\$0.00					0			
MACHINE		\$12.03	CMM Machine				\$0.00	\$0.00					0			
LABOR	CAMP	\$56.57	CMM Labor	0				\$244.10	\$1,500.00				0			
LABOR	GENL	\$24.41	Shipping	10				\$0.00				M	0			
LABOR	WLDG	\$68.00	Welding					\$0.00				L	0			
LABOR	CAD		Mold Flow					\$882.80				L	45			
LABOR		\$44.14	tuning	20												
Total								\$57,019.25	\$72,884.87							
Delivery Weeks								Labor Hours	Machine Hours							
Estimated By: GB								18 weeks	885.0	530.0						
Comments:											Cost with Margin					
Grain Cost and Timing TBD - Tryout cost with trucking \$4,500.00 per tryout not included in cost											20%					
											\$162,380.15					
											\$129,904.12					
Approval of COST / Delivery as shown above, and Price for Quote:																
Director or Designee's Signature								Date		Price for Quote						

Side by Side Costing (Rivian/ Nikola / Slate)

Supplier				Currency	USD	Date	Feb 19, 2025
Program				Incoterm			
Part Number	3998263011-A	Rev		Named Place			
Part Description	Front Fascia Assembly			Supplier Annual / Weekly Capacity			
M. Country of Origin	United States			ReCar Production Volume		150000	
Contact Name	Rich Morabito			ReCar Purchasing Manager			

Sourcing Cost Breakdown	Should Cost	Quote	Delta	% Delta
1. Purchased Parts	\$ 0.88		\$ (0.88)	
2. Raw Materials	\$ 4.82		\$ (4.82)	
3. Manufacturing Process	\$ 4.14		\$ (4.14)	
4. Assembly	\$ 2.05		\$ (2.05)	
5. Other Costs				
5.1 Sales, General & Administration (SG&A)	\$ 0.75		\$ (0.75)	
5.2 Profit (% Process & Material)	\$ 0.93		\$ (0.93)	
5.3 Purchased Parts & Raw Material Markup	\$ 0.18		\$ (0.18)	
5.4 Assembly Scrap				

Part Cost Subtotal	\$ 13.74	\$ -	\$ (13.74)	
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6. Logistics	\$ -	\$ -	\$ -	
6.1 Packaging	\$ -		\$ -	
6.2 Freight	\$ -		\$ -	
6.3 Duty	\$ -		\$ -	

Total Selling Price	\$ 13.74	\$ -	\$ (13.74)	
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Tooling Cost Breakdown	Should Cost	Quote	Delta	% Delta
Injection Mold	\$ 574,196.60		\$ (574,196.60)	
Compression Mold	\$ -		\$ -	
Stamping Die	\$ -		\$ -	
Progressive Die	\$ -		\$ -	
Extrusion Die	\$ -		\$ -	
Assembly Mold	\$ -		\$ -	
Check Fixtures	\$ -		\$ -	
Assembly Fixtures	\$ 49,593.73		\$ (49,593.73)	
EOL Testing	\$ -		\$ -	
Capital Equipment	\$ -		\$ -	
Other	\$ -		\$ -	
Tooling Total	\$ 623,790.33	\$ -	\$ (623,790.33)	

< > Side-by-Side Summary Part (Initial A) Tooling Breakdown Thumbnails +

Cost Model Summary

Should cost versus Suppliers Quote

Largest Deltas work to close the gap

Next steps to get to cost targets

Target

Under
\$14

First quotes
from suppliers

Over
\$30

Final
Sourced Cost

\$13.87

5 Keys to Saving Cost FAST in aPriori

1. Change material on part: are we using the most cost-effective material for max savings
2. Labor rate and cycle times: are they verified with cost model and at supplier level at plant .
3. Part thickness and final weight (I see this in our cost models every day)
4. Part tolerances and finishes
5. Direct buy materials from supplier (most common and highest usage - steel and plastics, castings , wiring , HV (aPriori now shows this savings in software)

Summary of my Journey with aPriori



Speed and accuracy of the tool help you get results immediately out of the box with limited to no configurations



Data can be leveraged in negotiations with suppliers directly

- Ex. Piece price, cycle times, markups, labor costs (indirect and direct), tooling breakdown
- Opens discussions with suppliers who are previously closed off



Rivian tooling savings over \$5 million in 2 years

- ~25% taken out of the piece part cost
- Over \$2 million (~10%) tooling savings negotiated at Nikola



Maintained BOM cost at Slate (\$25K), used aP to set targets

Thank You!

aPriori
Manufacturing
Insights **2025**

DETROIT / SEPTEMBER 23 - 24