GUARDIAN™
MACHINE G PROTECTION

PowerTrack

Team 3
Darshan Patni
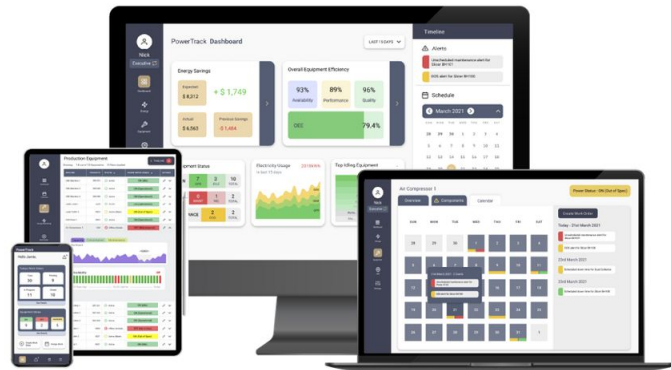Matthew Mills
Sowmya Chandra

GUARDIAN™
MACHINE G PROTECTION

PowerTrack

Here to help your company reach **Maximum Efficiency!**

Powered by IoT, our system allows you to monitor energy consumption for each asset, get actionable insights, and make your production economically and ecologically sustainable.

"The PowerTrack system has afforded us a brand new view into our machine health that increased uptime and savings!"

~ Dave Wilson, Mfg. Operations Manager, Total Manufacturing Co.

- Active Energy Monitoring
- Real-time Notifications
- Role Based Access
- Actionable Insights through Data.
- Downtime Reduction
- Machine Health Evaluation
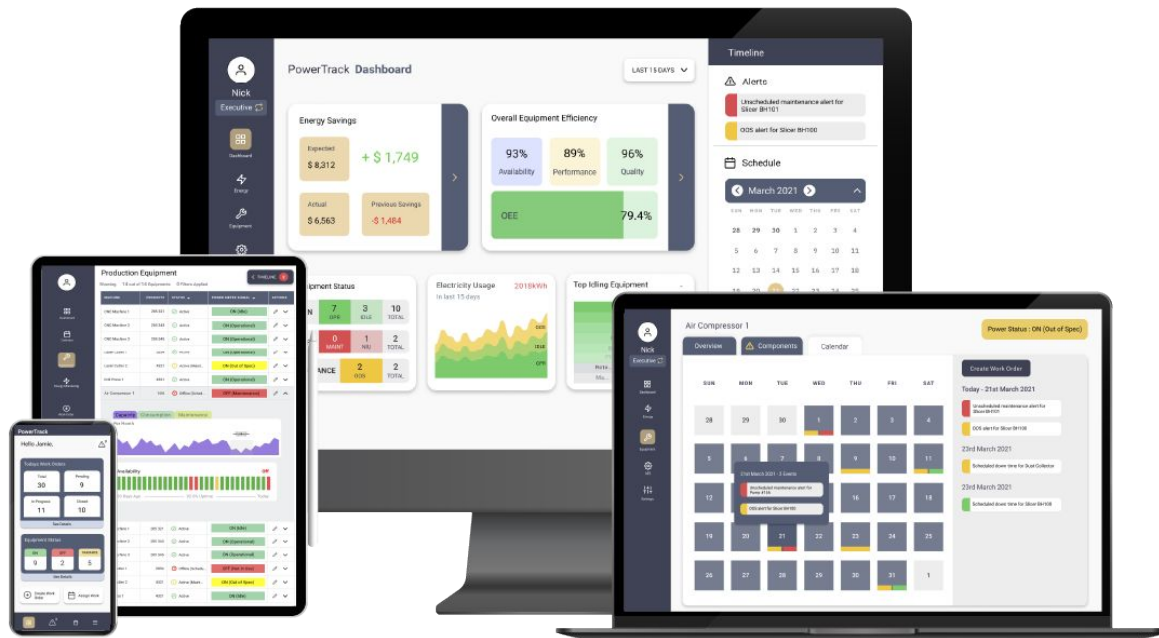- Work Order Creation and Scheduling
- Quantify Energy Savings

Prototype

Operations Manager: [Link](#)
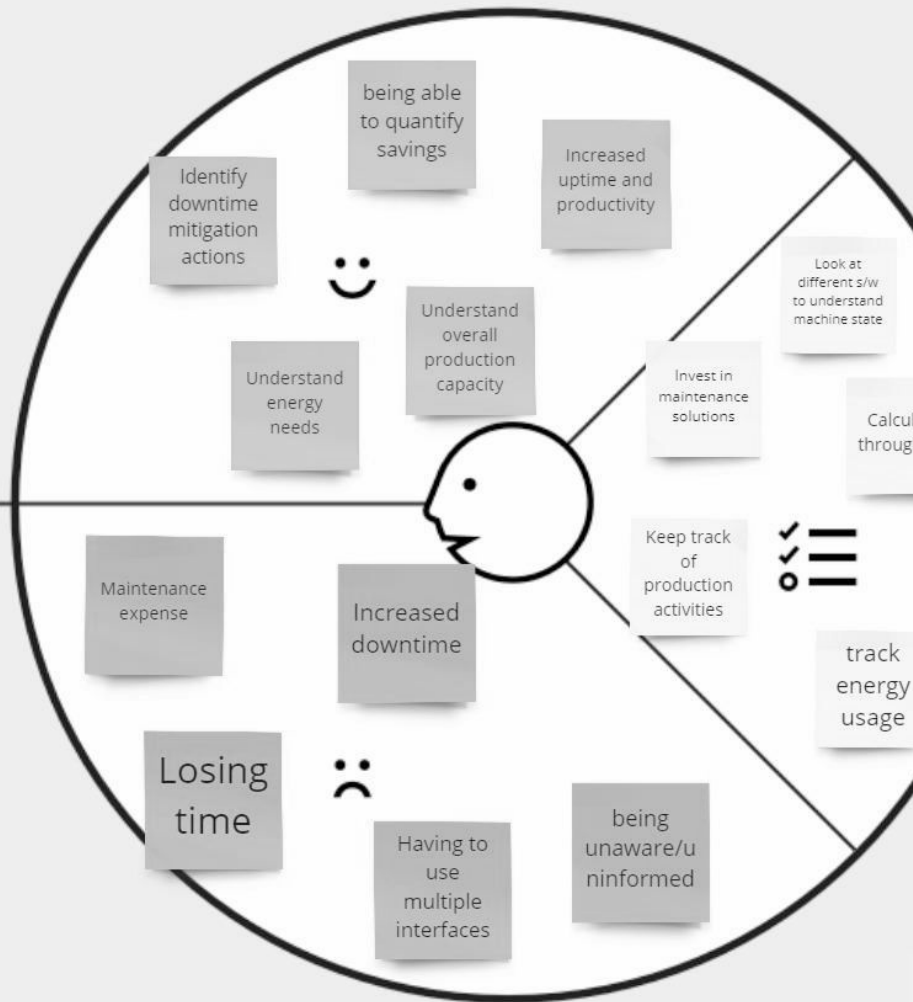
Plant Maintenance Tech: [Link](#)

CEO/COO: [Link](#)

Nick - CEO

Customer Profile

Invest, track and make informed decisions

Top Idling Equipment
- Machine 8
- Slicer BH100
- Packer5000
- Machine 2
- BOBST
- PH8
- Roto...
- Ma...
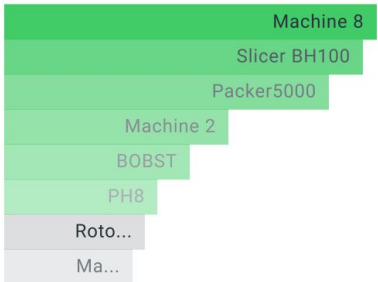
⚠ **Alerts**

Unscheduled maintenance alert for Air Compressor 1

OOS alert for Slicer BH100

Overall Equipment Efficiency
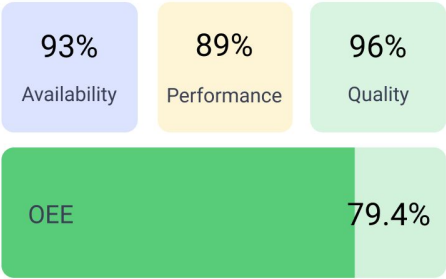
| 93% Availability | 89% Performance | 96% Quality |

OEE — 79.4%

Equipment Status

ON	7 OPR	3 IDLE	10 TOTAL
OFF	1 MAINT	1 NIU	2 TOTAL
VARIANCE	3 OOS		2 TOTAL

Nick - CEO

Customer Profile

Invest, track and make informed decisions

Be uninformed, lose time and spend money

Equipment Status

ON	**7** OPR	**3** IDLE	**10** TOTAL
OFF	**1** MAINT	**1** NIU	**2** TOTAL
VARIANCE	**3** OOS		**2** TOTAL

Electricity Usage
In last 15 days

OOS / IDLE / OPR

MACHINE	PRODUCT#	STATUS ▼	POWER METER SIGNAL ▼	ACTIONS
CNC Machine 1	285 321	✓ Active	ON (Idle)	✏ ⌄
CNC Machine 2	285 343	✓ Active	ON (Operational)	✏ ⌄
CNC Machine 3	285 545	✓ Active	ON (Operational)	✏ ⌄
Laser Cutter 1	2854	✓ Active	ON (Operational)	✏ ⌄
Laser Cutter 2	4321	⚠ Active (Maintenance Alerted)	ON (Out of Spec)	✏ ⌄
Drill Press 1	4321	✓ Active	ON (Operational)	✏ ⌄
Air Compressor 1	N/A	⚠ Active (Maintenance Alerted)	ON (Out of Spec)	✏ ⌄
CNC Machine 1	285 321	✓ Active	ON (Idle)	✏ ⌄
CNC Machine 2	285 343	✓ Active	ON (Operational)	✏ ⌄
CNC Machine 3	285 545	✓ Active	ON (Operational)	✏ ⌄
Laser Cutter 1	2854	⊘ Offline (Scheduled Maintenance)	OFF (Not In Use)	✏ ⌄
Laser Cutter 2	4321	⚠ Active (Maintenance Alerted)	ON (Out of Spec)	✏ ⌄
Drill Press 1	4321	✓ Active	ON (Idle)	✏ ⌄

Nick - CEO

Customer Profile

Invest, track and make informed decisions

Be uninformed, lose time and spend money

Understand, identify, quantify and increase capacity.

Energy Savings

Expected
$ 8,312

+ $ 1,749

Actual
$ 6,563
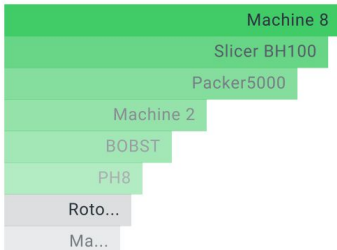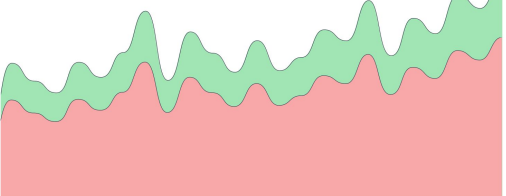
Previous Savings
-$ 1,484

Top Idling Equipment

Machine 8
Slicer BH100
Packer5000
Machine 2
BOBST
PH8
Roto...
Ma...

Electricity Usage
In last 15 days

Main Grid   Renewable/Backup

2018kWh

Electricity Usage
In last 15 days

OOS
IDLE
OPR

John the Ops Manager
Value Proposition Canvas

"People like this are usually confident and assertive. They are very sure of themselves and tend to speak their minds directly and honestly"

Machine availability awareness

Increased Production Efficiency

Increased awareness of machine availability

Time savings

Increased maintenance knowledge

Realtime Notifications

Onsite Maintenance Expertise

power meters

Visible Machine Status

Early detection

Reduced downtime

Reduced machine idle time

Wear part health visibility

Single Platform for all equipment status/info

Maintenance can be proactive

Increased Employee satisfaction

More informed employees

reduced wait time for wear parts

Process more information about production

improved scheduling capability

Singular source of machine information

Stay informed about machine health

to improve culture surrounding maintenance

visible machine hours

ensure production is running smoothly

Machine Downtime

Inefficient use of downtime

Maintenance is reactive

Maintain preventative maintenance on mfg machines

Overrunning hours on a machine or wear part

information about machines is fragemented

John - Ops Manager

Customer Profile

Track production machinery health, availability, and energy consumption

Run Time Hours
Alert: Machine 500 Over Hours

- CNC Machine 1 : 120 Hours
- CNC Machine 2: 150 Hours
- CNC Machine 3: 160 Hours
- Laser Cutter 1: 120 Hours
- Lazer Cutter 2: 220 Hours
- Compressor 1: 150 Hours
- Compressor 2: 160 Hours
- Drill Press 1: 120 Hours

Equipment Status

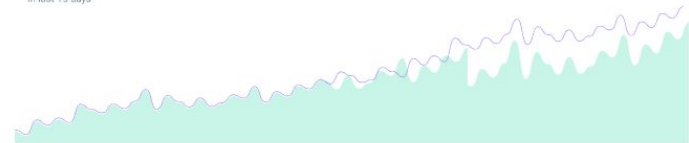|			
ON	7 Operational	3 Idle	10 Total
OFF	1 Maintenance	1 Not in use	2 Total
VARIANCE	3 Out of Spec		2 Total

MACHINE	CURRENT DRAW	MACHINE POWER CONSUMPTION (PER HOUR)	TOTAL POWER CONSUMPTION (BASED ON TIME SELECTION)	ACTIONS
CNC Machine 1	120 mA	4 kWh	68 kWh	
CNC Machine 2	124 mA	5 kWh	70 kWh	
CNC Machine 3	121 mA	4 kWh	65 kWh	
Laser Cutter 1	170 mA	9 kWh	71 kWh	
Laser Cutter 2	220 mA	16 kWh	90 kWh	
Drill Press 1	115 mA	2 kWh	45 kWh	
Air Compressor 1	N/A	0 kWh	47 kWH	

Air Compressor 1

Electricity Usage
In last 15 days

47 kWh

John - Ops Manager

Customer Profile

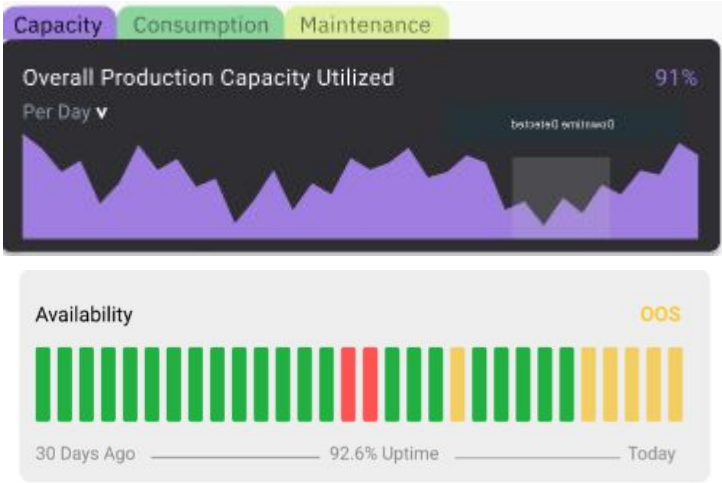|	MACHINE	PRODUCT#	STATUS ▾	POWER METER SIGNAL ▾	ACTIONS
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	Drill Press 1	4321	✓ Active	ON (Idle)	✏ ▾

Track production machinery health, availability, and energy consumption

Lost production efficiency due to machine idles or downtime

Capacity | Consumption | Maintenance

Overall Production Capacity Utilized   91%

Per Day ▾

Downtime Detected

Availability   OOS

30 Days Ago ——— 92.6% Uptime ——— Today

John - Ops Manager

Customer Profile

Track production machinery health, availability, and energy consumption

Lost production efficiency due to machine idles or downtime

Improved production scheduling capabilities

"People like this are quiet, serious and conscientious. They are selective about their interests usually prefer to study things in depth or participate in physical/ hands-on activities."

Jamie the Maintenance Tech
Value Proposition Canvas
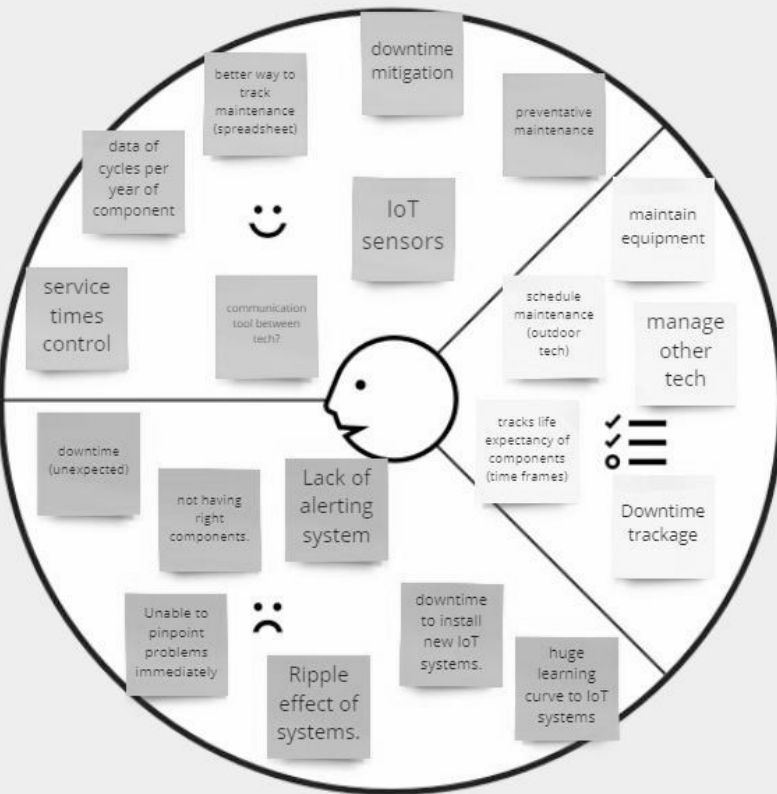
Jamie - Maintenance Tech

Customer Profile

Maintain and work with equipment, track work orders.

PowerTrack

← Work Orders

[⊕ Create WO] [📅 Assign WO]

Total 30   Filter ▽

#5543	Air Compressor 1	3/24/21
	Reason : Low Energy Draw Detected on Air Compressor # 1	
	Priority : High	
	Status : Pending	
	Not Assigned	

#5542	Machine 1	3/9/21
	Reason : Machine slowing down.	
	Priority : High	
	Status : In Progress	
	Assigned to : Dill Pickens	

#5541	Machine 5	3/9/21
	Reason : Machine consuming too much power.	
	Priority : Low	
	Status : Pending	
	Assigned to : Alex	

#5540	Machine 4	3/9/21
	Reason : Routine Maintenance	
	Priority : High	
	Status : Completed	
	Assigned to : Alex	

PowerTrack

Equipment List

[Search   🔍]

Total 15   Filter ▽

✓ CNC Machine 1	Available (Alert Sent)
Product #	285 521
Health Risk	Medium
Heirarchy	Level 1
Power Meter	ON (Idle)

✓ CNC Machine 2	Active
Product #	285 343
Health Risk	Medium
Heirarchy	Level 2
Power Meter	ON (Operational)

⚠ Lazer Cutter 1	Active (Maintenance Alerted)
Product #	2854
Health Risk	Low
Heirarchy	Level 1
Power Meter	ON (Out of Spec)

▦   ⚠³   📅   ☰

Jamie - Maintenance Tech

Customer Profile

Maintain and work with equipment, track work orders.

Unexpected downtime, and no real time alerts for machine breakdown.
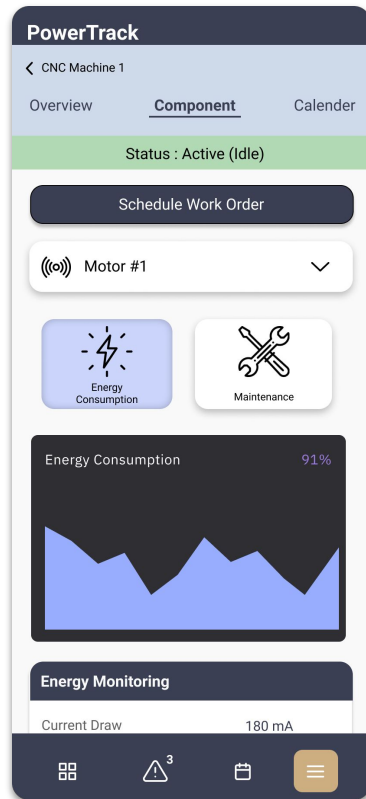
⚠ Alerts

John assigned a workorder - Air Compressor 1 has a low current draw

Sensor 53 in CNC Machine 1 is showing delay.

CNC Machine 3 is showing random energy spikes while in operation.

PowerTrack

‹ CNC Machine 1

Overview   **Component**   Calender

Status : Active (Idle)

Schedule Work Order

((•)) Motor #1   ⌄

Energy
Consumption   Maintenance

Energy Consumption   91%

Energy Monitoring

Current Draw   180 mA

⊞   ⚠³   📅   ☰

Jamie - Maintenance Tech
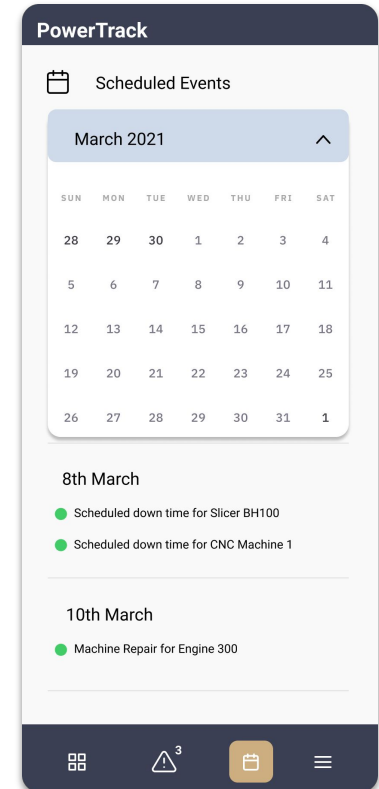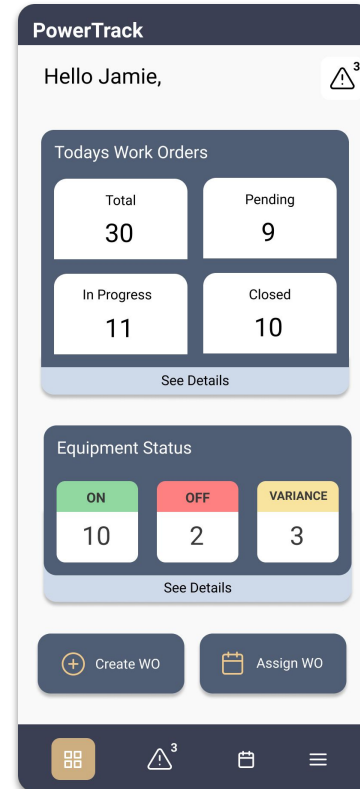
Customer Profile

Maintain and work with equipment, track work orders.

Unexpected downtime, and no real time alerts for machine breakdown.

Track maintenance and work orders in an efficient way.

PowerTrack

Hello Jamie,

Todays Work Orders

Total	Pending
30	9

In Progress	Closed
11	10

See Details

Equipment Status

ON	OFF	VARIANCE
10	2	3

See Details

Create WO   Assign WO

PowerTrack

Scheduled Events

| March 2021 | ∧ |

SUN	MON	TUE	WED	THU	FRI	SAT
28	29	30	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1

8th March
- Scheduled down time for Slicer BH100
- Scheduled down time for CNC Machine 1

10th March
- Machine Repair for Engine 300

The BMC Walk

The Backend

Key partners

Field Installers (can pitch and upsell GMP products)	Sales Team/ IT Team
Governmental / non governmental organizations (ex. connexus)	Software Platform Development Team
Sensor Supplier	Wabash Heartland Innovation Network
Cloud supplier	Communication Network supplier

Key activities

Development of Ops Manager PowerTrack desktop platform	Development of CEO PowerTrack desktop platform	Development of CEO PowerTrack mobile platform	Acquire Sensors	Sensor Installation	Customer sensor needs assessment
Development of Ops Manager PowerTrack mobile platform	Development of Maintenance Tech PowerTrack mobile platform	Development of Ops Manager PowerTrack tablet platform	Establish Connection between sensors and gateway	Establish Connection between gateway and cloud	Acquire Cloud platform

Key resources

Software Dev Team	Technical Support team (could be part of IT Team)	Initial Capital Investment
Field Installers	Sales Team	IT Team

The Frontend

Customer Relationships

Installation	Monthly Updates	Network maintenance and support
Long term Self Service Relationship	Request based Data Access - GMP	GMP Consultation Services

Customer Segments

700, IEDC Zone Manufacturers

Channels

Biz Devs Salesforce Networking	WHIN	IoT conferences
Field Touchpoints	Customer Service	GMP Consultation

The Financial Side

Revenue Models

Generous

Monthly/Yearly SaaS

Minimum 1 year subscription

Free sensors and installation

Shared data ownership

1 year of free support

Optional remote and on-site services

Balance

Monthly/Yearly SaaS

Minimum 3 year subscription

Desktop softwares - 3 years

Mobile apps - 1 year

Premium features - 6 months

Complete/Shared data ownership

3 years of free support

Optional remote and on-site services

Ambitious

One time lump sum payment

1 year of free support

Support pay as you go/subscription

Paid software updates

Complete data ownership

Optional remote and on-site services

Cost Structure

| IoT power clamps | Cloud infrastructure | Software Development | Installation Costs | After sales service and support | Advertisement and marketing | Maintenance Experts |

Revenue Streams

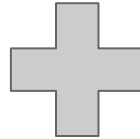| Desktop app subscription | Mobile app subscription | Data analytics subscription | Support subscription after 3 years | Data sales | Remote Expert Service | On-site service |

SWOT

Strengths

Internal

Layered subscription model

Innovative

Weaknesses

Multiple partnership costs

High Capital Investment
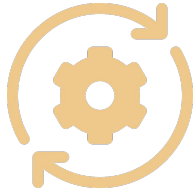
Opportunities

External

Role-based interface

Multi Segment targeting

Threats

Competitive market

Client Developing own system

Other Market players (Fluke, S.E., Rockwell)

Helpful

Harmful

Future Considerations

Integration with GMP
CMMS

Business expansion
leveraging remote services

Thank you!