

Team Arize  
CoalWorks

# CoalWorks

## Brochure

Enhancing Productivity  
and safety from ground up

# Empowering the Coal Industry with Innovative Solutions for Enhanced Productivity and Safety.

1.5 BILLION TON  
BY 2030



Our solutions aim to drive growth and innovation, helping businesses expand their reach and achieve their goals. By leveraging data-driven insights and actionable strategies, we ensure measurable impact and sustainable success.

# Mission and Vision

Empowering the coal mining industry through innovation, safety, and productivity, aligning with **CMPDI's vision** of sustainable development and advanced resource management for a secure energy future.

## Mission

To integrate cutting-edge technologies and safety measures, enhancing operational efficiency and sustainability in coal mining operations nationwide.



## Vision

To revolutionize coal mining with innovative solutions, ensuring safety, productivity, and sustainability, supporting India's energy goals.





# Problem

In the rapidly evolving landscape of coal mining in India, several critical challenges hinder operational efficiency and safety. As the industry strives to meet ambitious production targets while ensuring the well-being of its workforce.

3



**52 accidents**

caused **89 deaths, 76 injuries** in the past **5 years**

**267.96 mts**

coal **wasted** due to inefficient mining practices

**30%**

of mines rely on **outdated technology** and infrastructure

**125 mines**

lack **systemic compliance monitoring**

## EXISTING APPROACH AND DRAWBACKS

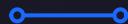
# Existing Approach

The existing methods to mine safety and operations relies heavily on manual processes, making it inefficient, prone to errors, and difficult to scale effectively.



### Manual shift handover

Currently, shift handovers are done using paper logs, with information manually recorded and transferred between shifts without real-time data access.



### Drawbacks

- Paper logs prone to errors
- Hard to track critical information
- Excessive handover time



### Manual SMP Formulation

The safety committee manually identifies hazards, assesses risks, and calculates a risk matrix to create proactive and reactive plans.



### Drawbacks

- Incomplete hazard identification
- Pure utilization of real time data factors
- Inaccurate due to human errors



### No Centralized System

Coal mining operations in India currently utilize unconnected systems to monitor safety and productivity, across various departments and shifts.



### Drawbacks

- Data spread across sources
- Hard to track history
- No real-time data access



# Solution & Outcomes



## Solution

CoalWorks is a transformative digital ecosystem for coal mining, integrating AI, IoT, mobile, and web solutions. It addresses challenges in manual processes, safety, and operational inefficiencies, providing a scalable, intelligent infrastructure to modernize mining practices.

## Outcomes

Streamlined operations save time and effort.

Proactive hazard detection prevents accidents.

Predictive analytics drive decisions for supervisors and admins.

Automated compliance ensures safety standard adherence.



### Fully Connected Ecosystem

Unifies IoT, AI, and human decision-making across all roles.



### Advanced AI Assistant

Boosts efficiency with real-time insights and automated compliance.



### Dynamic Digital SMP

The Safety Management Plan dynamically adapts with real-time data.



### Intuitive User Interfaces

Intuitive mobile and web apps with interactive visuals and filters.



### Scalable Infrastructure

Docker and Kafka for scalable, platform-independent data handling.

Our solution integrates with ERP systems using various migration and import options

- DATABASE MIGRATION

- CSV UPLOADS

- API INTEGRATIONS



### COMPONENT 1

# Unified Admin Dashboard



A centralized, intelligent platform designed to streamline coal mining operations by enabling real-time monitoring, resource management, and data-driven decision-making for enhanced productivity and safety.



# Impact Points

COMPONENT 1

The admin dashboard is the control center of the platform, enabling administrators to configure and manage the entire system.

### AI Powered Round Planning and Scheduling

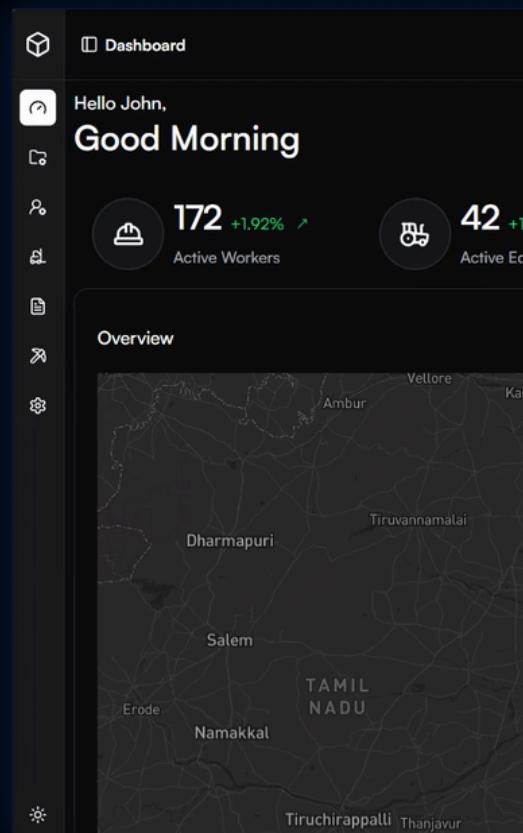
Schedules tasks considering worker experience, task priority, and time.

### Intelligent & Intuitive Heatmaps and Insights

Dynamically visualize operational data, worker locations, and high-risk zones.

### Hassle-free Compliance with Comprehensive Reporting

Generates key compliance, safety, and performance reports automatically.



**40%**

Improved  
operational visibility



**50%**

Reduced  
Planning Time



**60%**

Reduced  
Reporting Time

### COMPONENT 2

# AI Intelligence SMP



The AI Intelligence Safety Management Plan (SMP) automates risk calculation, detects hazards in real-time using IoT data, and proactively assigns tasks to mitigate risks, ensuring efficient safety management.



# Impact Points

COMPONENT 2

AI Safety System auto-calculates risks, identifies hazards, and generates intelligent mitigation plans.

### Dynamic Risk Matrix Creation

Automates the calculation of risk factors based on consequences, exposure, and probability scores.

		Coal	
		Negligible	Minor
Almost Certain	Negligible	Medium	High
	Medium	Low	Medium
Likely	Low	Medium	High
	Medium	Low	Medium
Possible	Low	Medium	High
	Medium	Low	Medium
Unlikely	Low	Low	Medium
	Medium	Low	Low
Rare	Low	Low	Low
	Medium	Low	Low

### Real-Time Hazard Detection using AI/IoT and Logs

Identify risks and generate actionable safety plans.

### Proactive Hazard Mitigation

Suggests preventative measures and auto-assigns tasks to mitigate potential risks.



50%

Reduced

Incident Rates

7<sup>+</sup> mins

Faster

Response Time

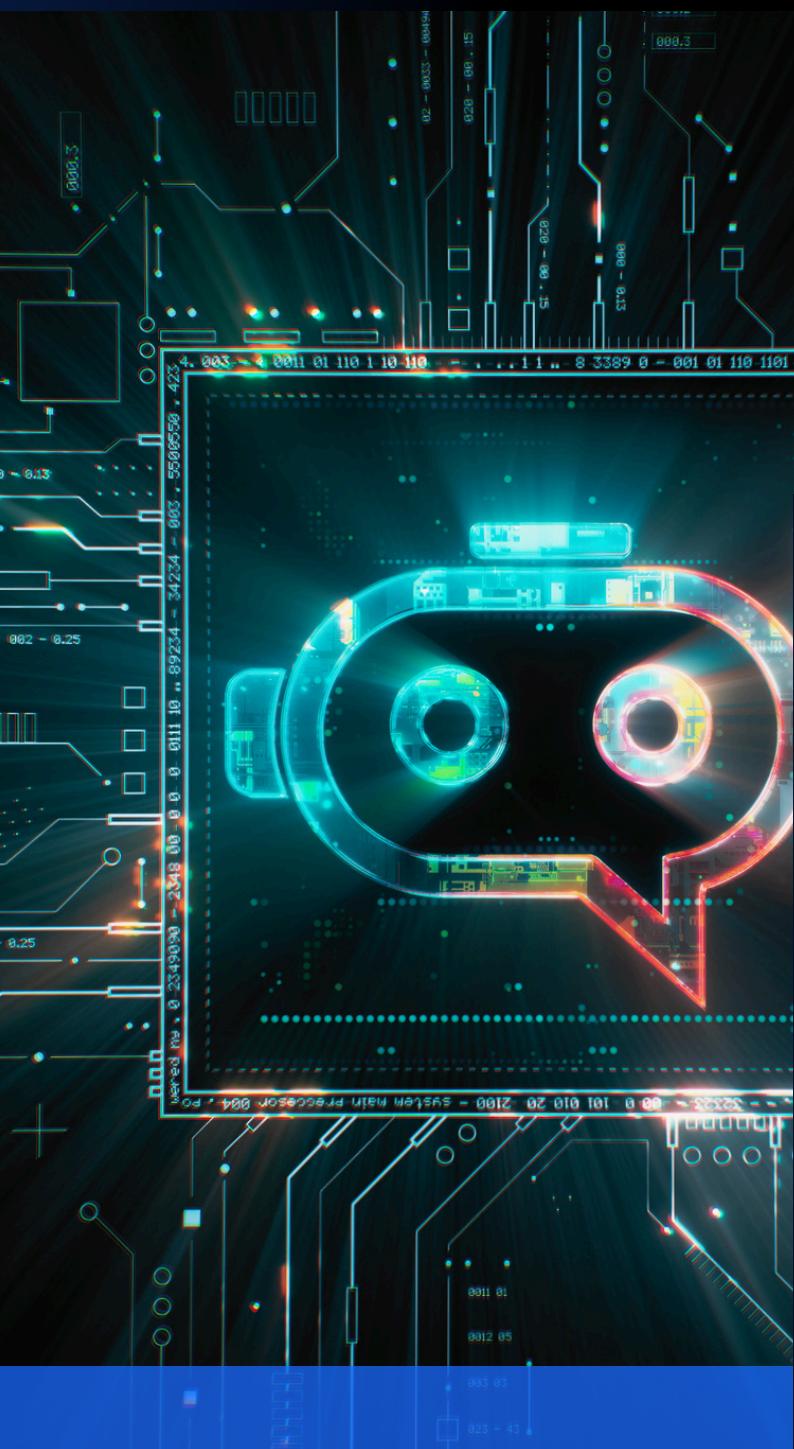
40%

Reduced

safety violations

### COMPONENT 3

# Anthra - The CoalWorks AI



Anthra, the AI Assistant, provides insights on mine operations, safety, and compliance with access. It automates tasks, reducing errors and saving time. With predictive capabilities, it forecasts risks and aids decision-making.



# Impact Points

COMPONENT 3

Anthra redefines operational efficiency by offering real-time insights, predictive analytics, and document automation.

### Query-Driven Insights

Provides tailored responses about mine operations, safety protocols, compliance, and performance.

### Document and Compliance Report Assistance

Fills compliance forms and generates reports automatically, saving time and reducing manual errors.

### Predictive Simulation

Simulates scenarios and forecasts risks to aid informed decision-making.

Chat Assistant

What is the total no of active shifts today?

No. of active shifts: 13

Type a message...

10<sup>+</sup> Hrs

Saved in a week  
for supervisors



90%<sup>+</sup>

Precision in  
predicting risks



2x

Faster  
Decision Making

### COMPONENT 4

# Operator-Friendly App



The Operator-Friendly Mobile App lets the operators log issues via voice commands, view schedules, log tasks offline, and geo-tag activities for real-time tracking and efficient daily operations.



# Impact Points

COMPONENT 4

The mobile application simplifies operators' logging tasks and enhances accessibility.



### Dynamic Logging with AI

Operators can log issues via voice commands, with multilingual support.



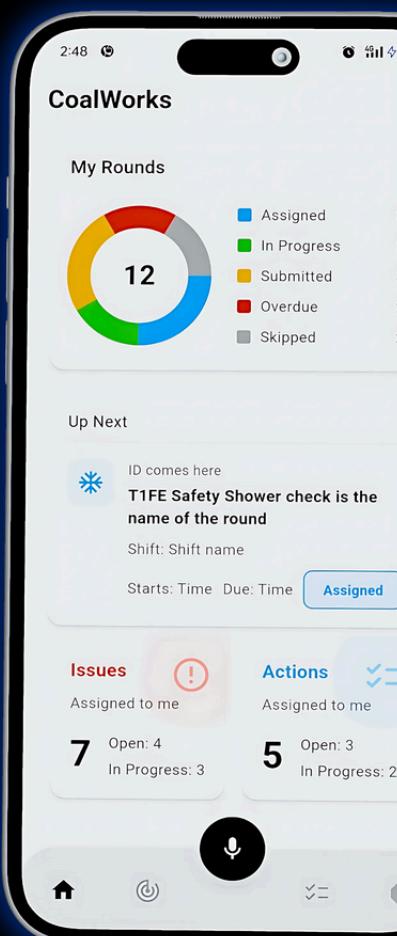
### Effective Round Execution with SMP Based Forms

Displays schedules and allows seamless logging of task completions, even offline.



### Real Time Location Updates

Geo-tags tasks and operator activity, enabling precise tracking.



**60%**

Faster Inputs via  
Voice controls



**30%**

Enhanced  
Operational Efficiency



**Offline Mode**

For Uninterrupted  
Operations

### COMPONENT 5

# IoT-Enabled Monitoring



The IoT-Enabled Monitoring system helps to track environmental conditions, worker health, and equipment performance in real time, ensuring proactive safety measures and operational efficiency.



# Impact Points

COMPONENT 5

Transforming coal mine safety with IoT-driven monitoring of environment, worker health, and equipment performance.

### Environmental Sensors

Track gas levels, vibrations, and temperature in real time to prevent accidents.



### Worker Wearables

Monitor worker vitals, fall detection, triggering alerts, and dynamic break scheduling.

### Equipment Health Monitoring

Tracks performance metrics and predicts downtime or wear-and-tear issues.

  
**60%**  
Reduced  
workplace injuries

  
**5<sup>+</sup> Hrs**  
Reduced  
equipment downtime

  
**847<sup>K</sup> INR**  
in monthly  
operational savings

# Market Viability

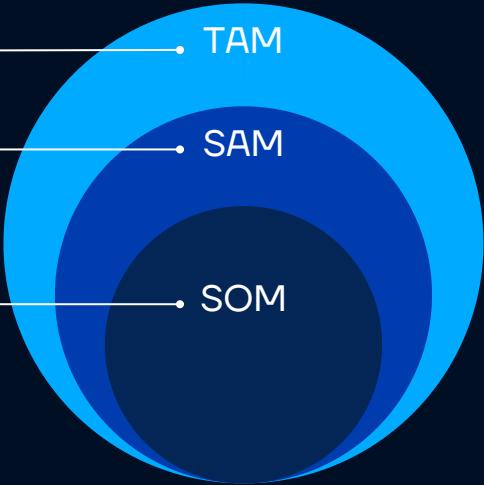
### PRODUCT TAM SAM SOM

India's coal production aims to reach 1.5 billion tons by 2030. With a \$930M TAM, a \$279M SAM, and a \$14M SOM, Coal Works can realistically capture 5% of the market within 3-5 years.

\$930 Million  
₹ 77,190 Crores

\$279 Million  
₹ 23,157 Crores

\$14 Million  
₹ 1,158 Crores



### PRODUCT MARKET DEMAND AND PROGRESSION

As the Indian government pushes towards digitalization and safety compliance (under DGMS), the adoption of smart mining technologies is expected to grow at 18.2% CAGR between 2024 and 2030.

## Implementation and Market Entry

### Phase 1 - Initial Market Entry Mines for CoalWorks

- Rajmahal Coal Mine: Boost production to 18.6 million tons annually.
- Sonepur Bazari Mine: Add 1.1 million tons, reduce regulatory violations significantly.
- Jagannath Mine: Improve equipment utilization to over 85% efficiency.

### Phase 2 - Expansion Across India (2026-2028)

- By 2028, aim for a presence in at least 10 major coal-producing states, including Chhattisgarh, West Bengal, and Madhya Pradesh, which collectively contribute significantly to India's coal output.

### Phase 3 - Global Expansion Of CoalWorks

- CoalWorks will expand globally by forging strategic partnerships in Africa, Australia, and South America.

## BUSINESS OF THE PRODUCT

# Initial Investment

Category	Cost (₹)	Details
Development Costs	1,08,000	6 developers x ₹15,000/month x 1.5 months (development phase only).
Cloud Infrastructure (EC2)	2,40,000	t3.medium instances (~₹20,000/month).
Storage (S3)	36,000	500 GB x ₹3/month x 12 months.
Data Transfer	18,000	1 TB/month free, additional transfer ~₹1.5/GB beyond free tier.
AI/ML Services (SageMaker)	1,20,000	₹10,000/month for training and inference workloads.
Monitoring Services (CloudWatch)	30,000	₹2,500/month for backend monitoring.
Hosting Costs (Nginx)	40,000	Server management/load balancing (~₹3,300/month).
Marketing and Sales	2,00,000	Digital marketing campaigns, ads, and outreach materials.
Legal and Compliance	50,000	Basic legal consultation and compliance filings.
Scaling and Growth	2,00,000	Infrastructure and team scaling as the user base grows.
Miscellaneous/Buffer	70,000	For unforeseen expenses.
<b>Total Initial Investment</b>	<b>₹14,12,000</b>	-

## Profit Analysis - Year 1 Financials

**Clients:** 6 small mines, 3 medium mines, 1 large mine

**Plans:**

- Basic: 5 clients
- Premium: 3 clients
- Pro: 2 clients

**Growth Rate:** 30% annually

**Variable Cost:** 15% of revenue

**Fixed Costs:** ₹3,00,000 annually + ₹14,12,000 initial investment

**Revenue:**

- **Basic Plan:** ₹13,90,000
- **Premium Plan:** ₹10,50,000
- **Pro Plan:** ₹10,60,000
- **Total Revenue:** ₹35,00,000

**Profit:**

- **Total Costs:** ₹22,37,000
- **Profit:** ₹12,63,000
- **Profit Margin:** 36.1%



## BUSINESS OF THE PRODUCT

# Pricing Plan

### BASIC PLAN

- ✓ Digital Shift Handover System
- ✓ Risk Matrix Calculation
- ✓ Data Visualization dashboard and GIS Integrated Map
- ✓ Basic compliance tools
- ✓ All Basic Config Functionalities

QUOTEATION BASED SOFTWARE PRODUCT PURCHASE IS ALSO AVAILABLE

Cloud Services Apply Additional Charges

<b>SMALL MINES</b> <b>&lt; 500 workers</b> <b>&lt; 1 M Ton coal</b>	<b>₹2.5 L</b>
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<b>MEDIUM MINES</b> <b>&lt; 1000 workers</b> <b>&lt; 5 M Ton coal</b>	<b>₹3.2 L</b>
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<b>LARGE MINES</b> <b>1000+ workers</b> <b>5 M + Ton coal</b>	<b>₹4.5 L</b>
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### PREMIUM PLAN

- ✓ Includes all Basic features
- ✓ IoT device support (as a service)
- ✓ AI assistant for limited compliance auditing
- ✓ Limited uses of Automatic scheduling

<b>SMALL MINES</b> <b>&lt; 500 workers</b> <b>&lt; 1 M Ton coal</b>	<b>₹3.1 L</b>
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<b>MEDIUM MINES</b> <b>&lt; 1000 workers</b> <b>&lt; 5 M Ton coal</b>	<b>₹4.3 L</b>
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<b>LARGE MINES</b> <b>1000+ workers</b> <b>5 M + Ton coal</b>	<b>₹5.5 L</b>
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### INDUSTRY PLAN

- ✓ Includes all Premium features
- ✓ Full AI integration for scheduling, compliance reports, and graph-based predictions
- ✓ Unlimited IoT device support
- ✓ Real-time SMP updates

<b>SMALL MINES</b> <b>&lt; 500 workers</b> <b>&lt; 1 M Ton coal</b>	<b>₹4.1 L</b>
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<b>MEDIUM MINES</b> <b>&lt; 1000 workers</b> <b>&lt; 5 M Ton coal</b>	<b>₹5.4 L</b>
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<b>LARGE MINES</b> <b>1000+ workers</b> <b>5 M + Ton coal</b>	<b>₹6.5 L</b>
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### STANDALONE IoT

Underground Mines  
₹700/node  
without GPS/LORA

Open Cast Mines  
₹1,300/node  
with GPS/LORA



# Stay in touch with us!

At CoalWorks, we believe that safety and productivity go hand-in-hand. By harnessing the power of technology, we're transforming the mining industry, one operation at a time. Our dedication to innovation ensures that every operator, supervisor, and manager can perform their tasks with confidence, efficiency, and safety. Together, we're building a future where challenges are met with solutions, and every mine operates at its full potential.

**"Join us in this journey of transformation. Let's make every shift smarter and every mine safer—starting today."**



**Catch us here** 

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