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蚌埠凯盛工程技术有限公司

BengBu Triumph Engineering&Technology Co.,ltd

Lean Manufacturing Solution for Glass Factories

Presenter：

Date: 2025-08-05

Contents

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Background and Introduction

1.1 Company Profile

BengBu Triumph Engineering & Technology Co.,ltd

- Founded in 2004, we are a world-leading manufacturer of float glass and photovoltaic rolled glass equipment.
- Covers an area of 255 mu (42 acres) with 97,300㎡ building area, including 8 modern workshops and an annual production capacity of 30 complete lines.
- We provide global clients with high-quality intelligent equipment and control systems for float glass, rolled glass, electronic glass, and glass deep-processing.

Asia's Largest Glass Equipment Manufacturing Integrator

*Bengbu Triumph Engineering & Technology Co., Ltd. is abbreviated as "BBKS".

1.1 Company Profile

BengBu Triumph Engineering & Technology Co.,ltd

- ◆Industry Leader in PV Solar Power Generation .
- ◆Recognized by MIIT as one of China's First-Batch Smart Manufacturing System Solution Providers (2019).
- ◆National Pilot Enterprise for Smart Manufacturing Standards Implementation.
- ◆MIIT-Designated Industrial Internet Pilot Demonstration Enterprise.

Anhui Provincial Key Laboratory for New Glass Materials

*MIIT - China's apex industry regulator overseeing Industrial Internet development

1.2 Industry Pain Points

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Critical challenges in today's glass manufacturing

- Lack of operational transparency
- Discontinuous processes
- Heavy reliance on manual experience
- Slow response to changes
- Data that is difficult to utilize
- Cost control difficulties
- Management measures that are hard to implement

1.2 Industry Pain Points

Key Challenges in Glass Manufacturing Management

■ **Workforce Challenges:**
- ✓ Varied skill levels;
- ✓ Unclear competency visibility;
- ✓ Delayed anomaly response;
- ✓ Broken knowledge continuity;
- ✓ Ineffective new hire training.

■ **Equipment maintenance challenges:**
- ✓ Poor implementation;
- ✓ Delayed response;
- ✓ Low efficiency improvement;
- ✓ Lost technical know-how;
- ✓ Data-deficient analysis;
- ✓ Unsupported decision-making.

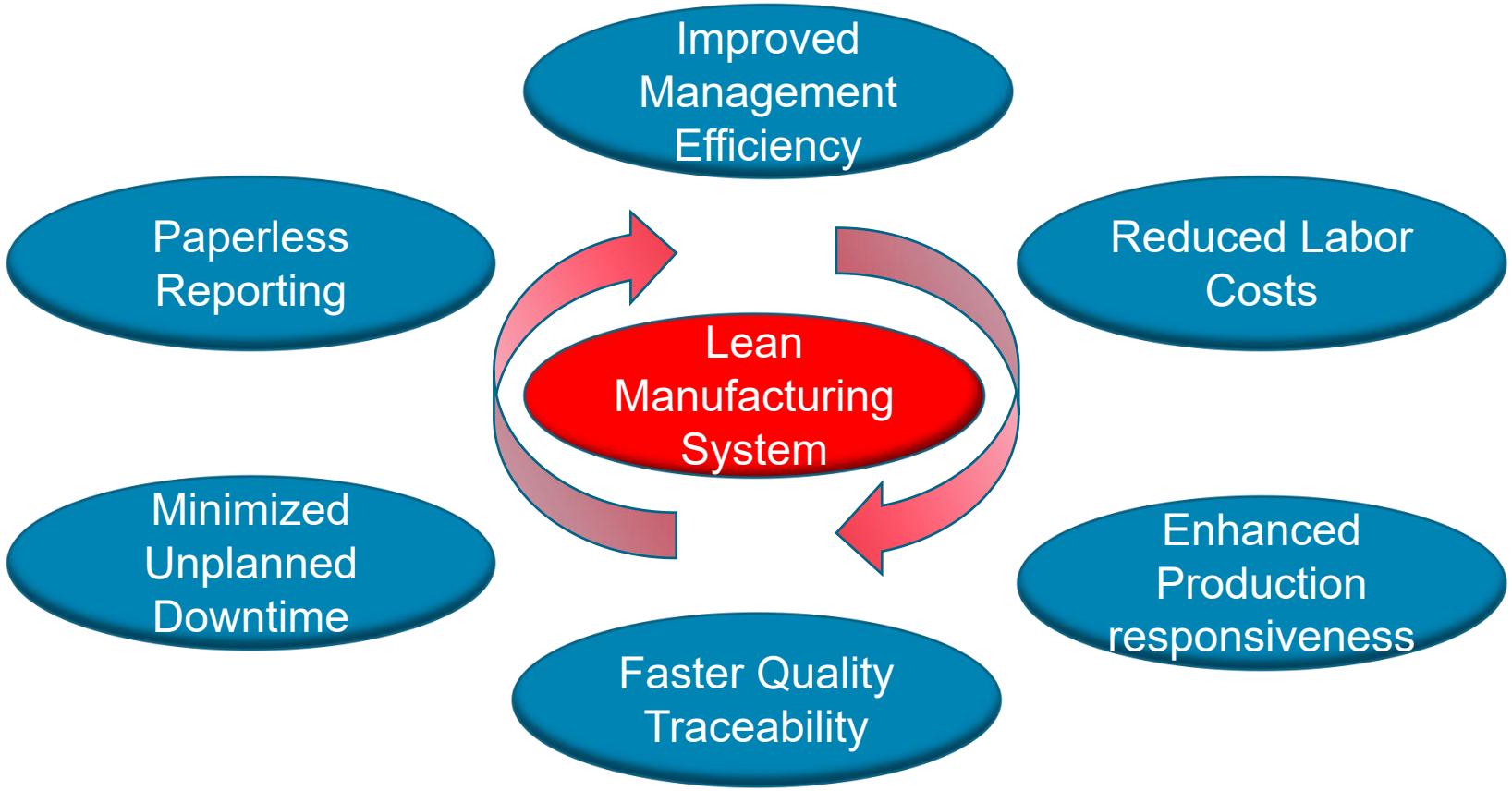
■ **Inefficient Production Management:**
- ✓ Opaque production processes;
- ✓ Error-prone paper-based records;
- ✓ Unclear scheduling & process discontinuities;
- ✓ Coarse cost/performance analytics;
- ✓ Poor product traceability.

■ **Warehouse Management Chaos:**
- ✓ Lagging & disordered inbound/outbound data;
- ✓ Chaotic storage locations with low space utilization;
- ✓ Inefficient & error-prone shipments;
- ✓ Low inventory counting efficiency.

1.2 Industry Pain Points

Lean Manufacturing System for Glass Factories

A holistic approach covering production execution, process tracking, equipment OEE, quality control, and KPI-cost analysis with continuous improvement frameworks.



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Main Components of the Lean Production Management System

2.1 6-Pillar Digital Lean System for Glass Manufacturing

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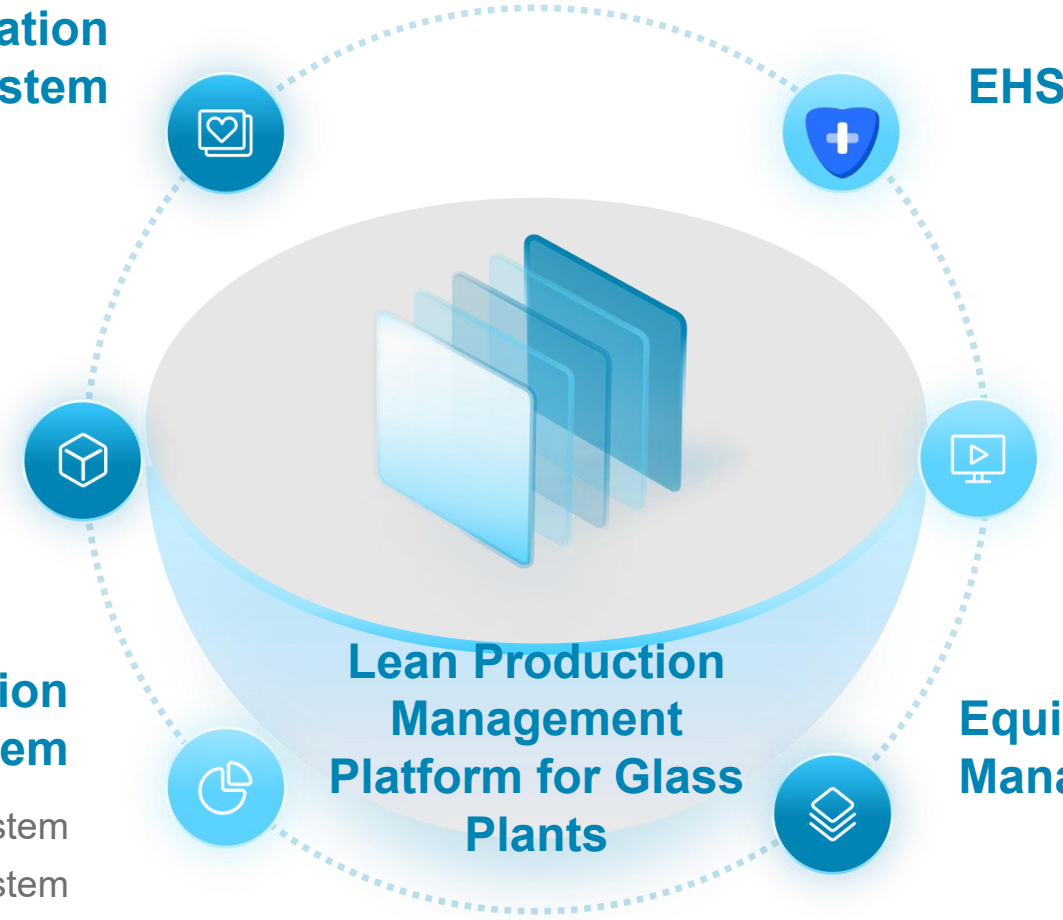
Data Acquisition & Visualization Dispatch System

EHS Management System

Warehouse Management System



Energy & Cost Management System

Production Management System

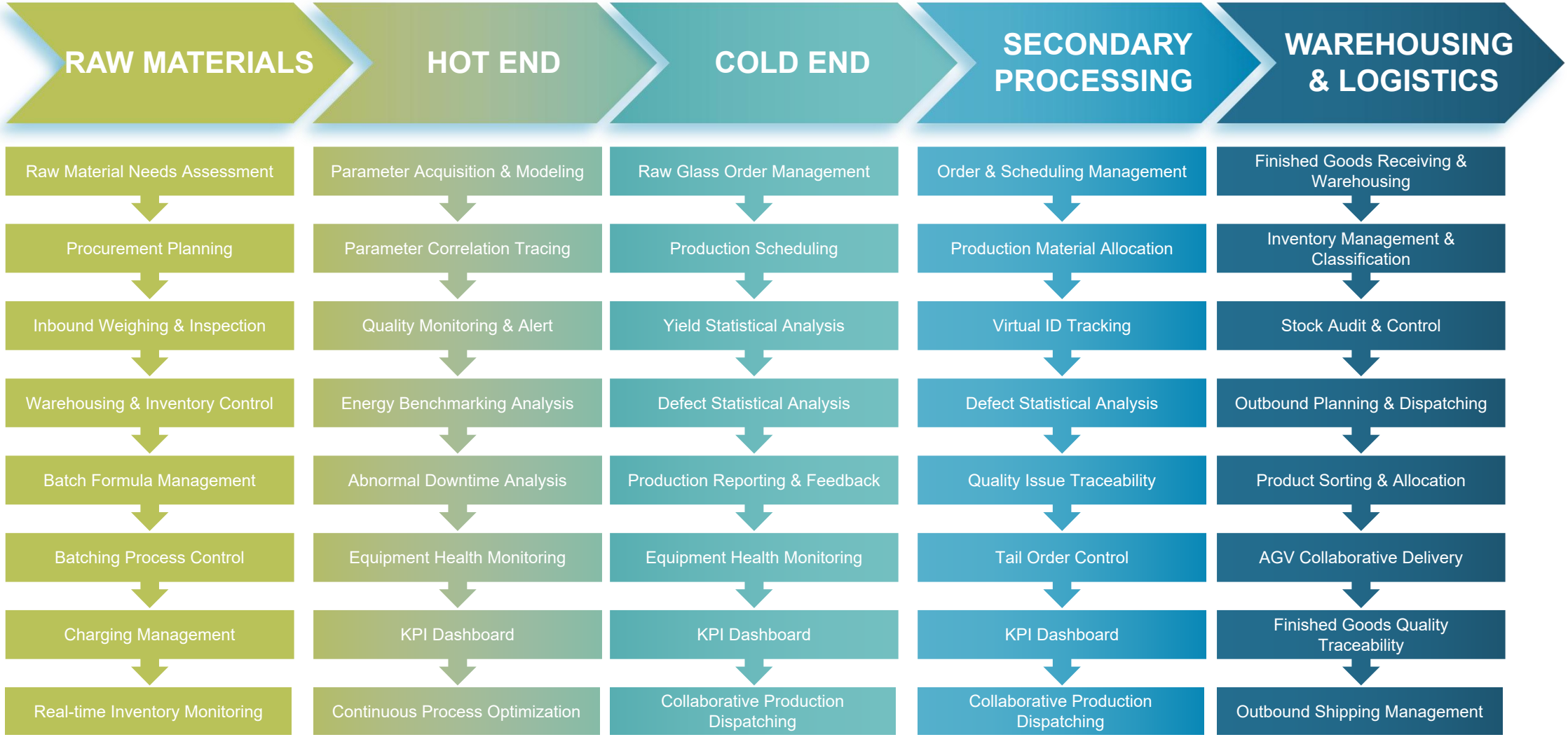
Raw Glass MES System

Processed Glass MES System

Equipment Lifecycle Management System

Proprietary and Secure Technology

2.2 Lean Solution: Mastering Process Value Chains



2.3 A Lean Approach to Cost Optimization & Performance Improvement

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95%

Optimized Resource Allocation

Scientific production scheduling ensures optimal configuration of production lines, equipment and workforce, achieving >95% resource utilization.

10%

Production Cost Reduction

Optimized production sequencing, batch planning and shift scheduling minimize downtime, changeovers and waste, reducing total costs by 8%～10%.

18%

Lead Time Reduction

Precision production scheduling enables advanced planning, cutting order-to-delivery cycle by 15%～18% and shortening production-to-shipment duration.

98%

Enhanced Customer Satisfaction

Ensures on-time delivery through optimized order fulfillment and production planning, achieving >98% OTIF (On-Time In-Full) rate to boost client satisfaction.

8%

Labor Cost Savings

Automated scheduling, recording and reporting systems reduce manpower requirements by 5~8%.

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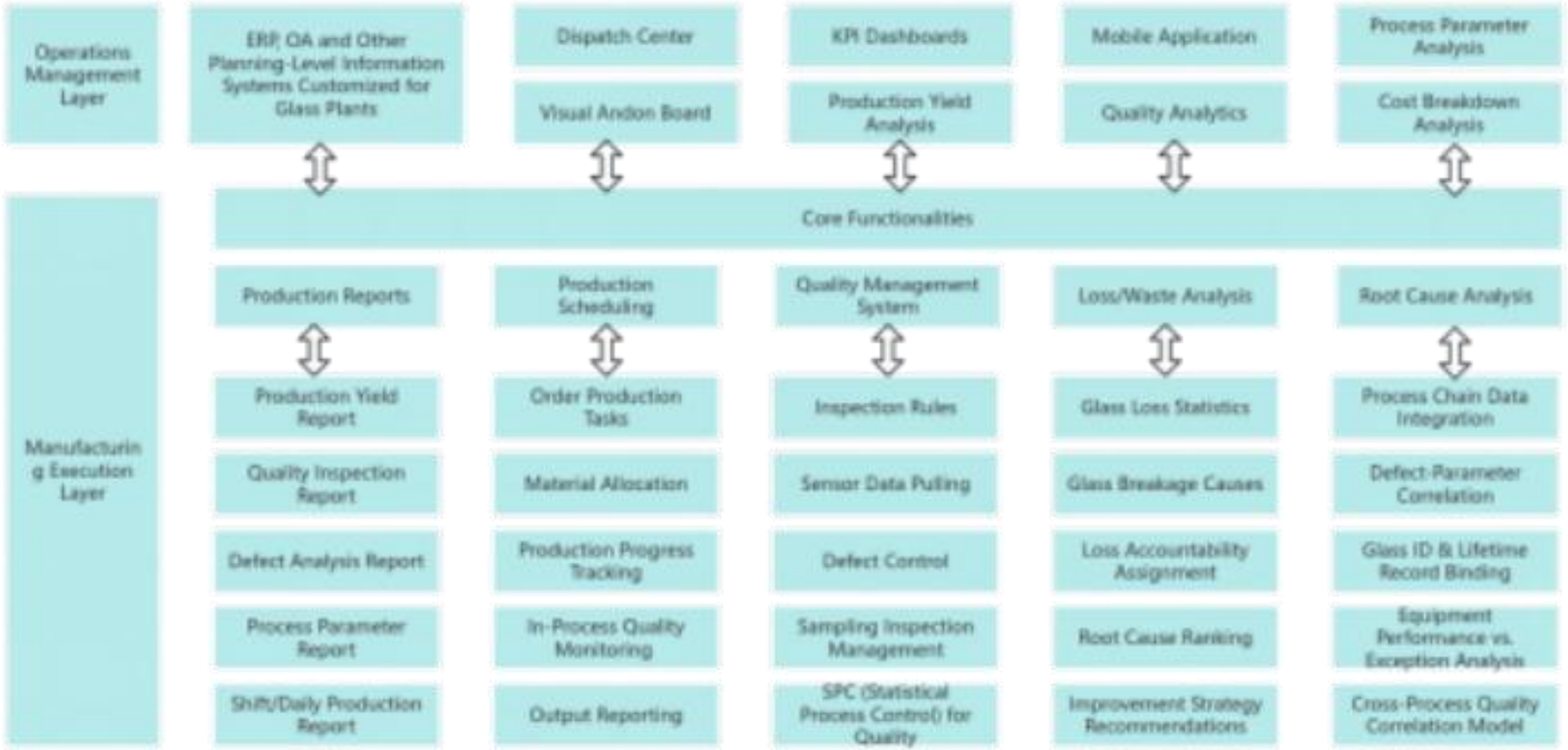
Manufacturing Execution System（MES)

3.1 Production Management System - Business Overview



- **Production Process Visualization**
- **Production Data Traceability**
- **Lean Production Management**
- **Full-Process Coverage**
- **Data-Driven Decision Making**

3.2 Auto-Report Generation System

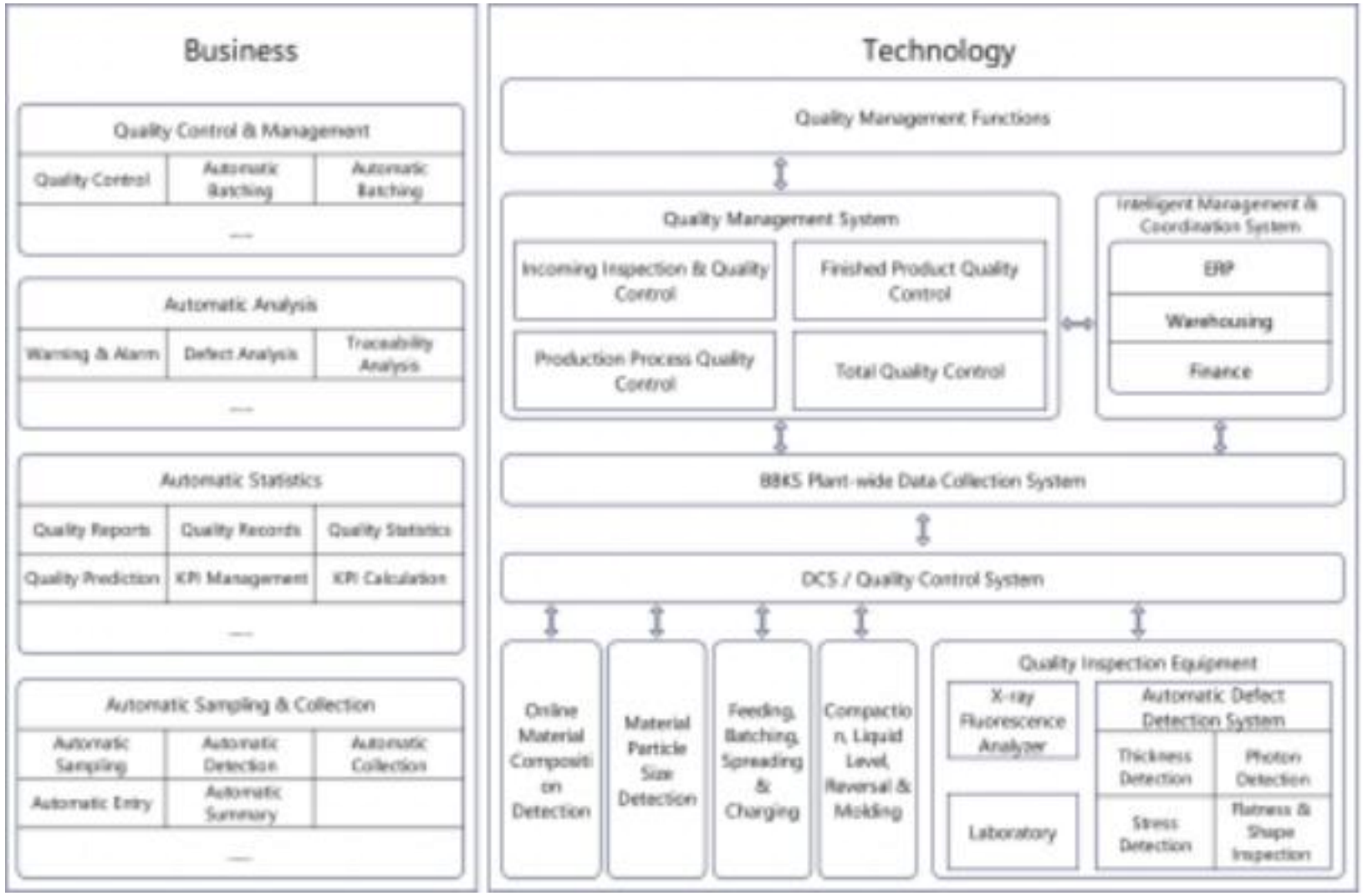
Figure1: Manually Filled Paper Reports

Figure2: System-Auto-Generated Reports

3.3 Management Model Transformation: Before vs. After Automated Report Deployment

Before Deployment (Manual Reports)		After Deployment (Auto-Generated Reports)
Paper/Manual Records	Data Collection Method	Auto Data Capture
30-60 Minutes per Report	Statistical Timeframe	Real-Time or Scheduled Generation
1-2 Dedicated Staff per Shift	Labor Cost	No Dedicated Staff Required
~85% Accuracy (Prone to Omissions/Errors)	Accuracy Rate	≥99.99% Accuracy with Auto-Validation
Single-Dimensional Data (Requires Manual Restructuring)	Analyzable Dimensions	Multi-Dimensional Cross-Analysis
T+1 Daily Reports	Response Time Efficiency	Real-Time Visualization with Minute-Level Updates

3.4 Quality Management Functions



"Enable end-to-end quality traceability, analysis, prediction and control for glass products through digital solutions, reducing production costs and defect rates while enhancing market responsiveness."

"Guide glass manufacturing process adjustments and production control improvements through integrated data analytics, elevating product/service quality while lowering operational costs."

"Enhance quality management capabilities and reduce QA workload through process automation and optimization."

"Foster organization-wide quality ownership by empowering employees at all levels with quality awareness and clearly defined responsibilities."

3.5 Quality Traceability

Assign a unique 'Digital ID' to each glass sheet on production lines — establishing virtual glass identifiers for rapid quality issue localization.

Figure3: Actual Glass on Conveyor Rollers

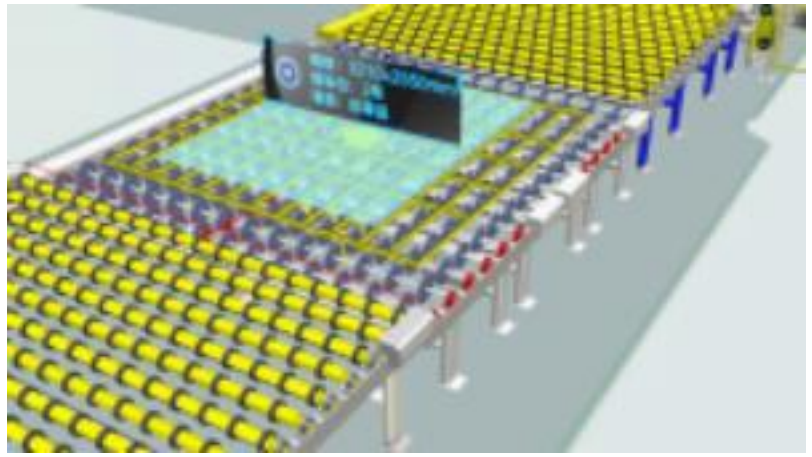
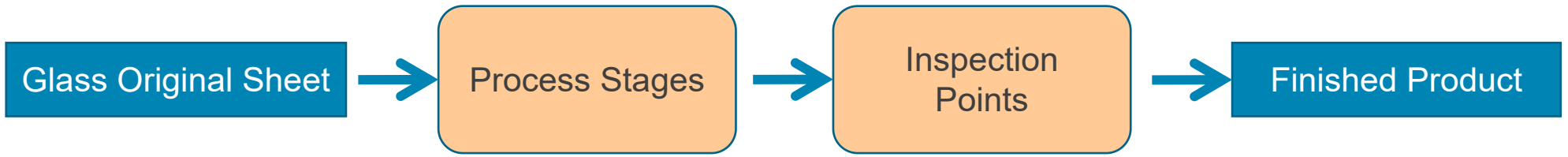


Figure4: Virtual Glass Data



Enable real-time updates of location, process parameters, quality data, and logistics status for each glass sheet across all production stages, achieving end-to-end dynamic quality monitoring.

3.6 Production Scheduling

Implement Production Scheduling to Maximize the Value of Order Production.

Main Content:

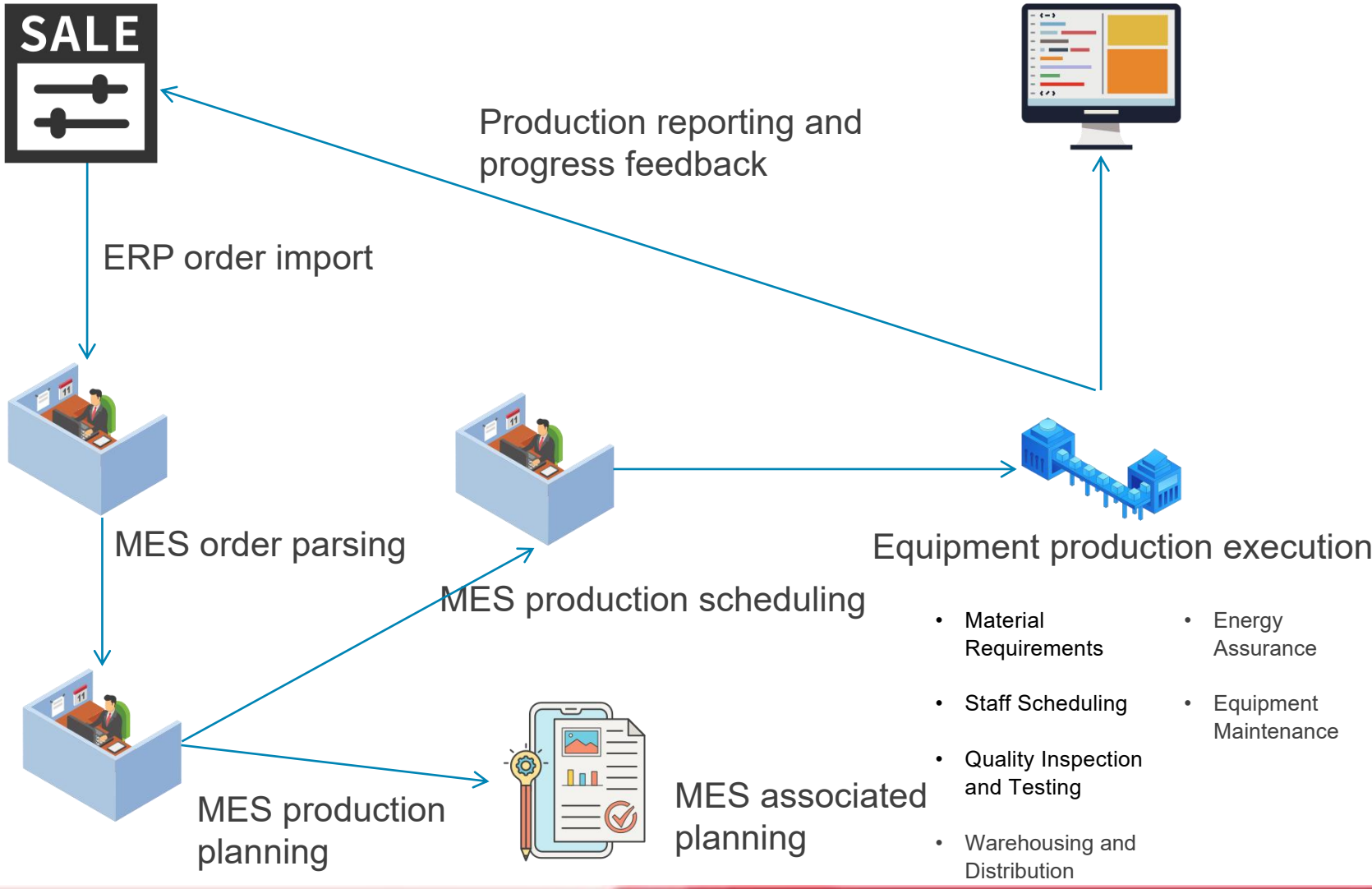
- Planned Receipts
- Plan Decomposition
- Task Assignment
- Work Order Execution
- Production Scheduling
- Progress Feedback
- Reporting Management

Value Points:

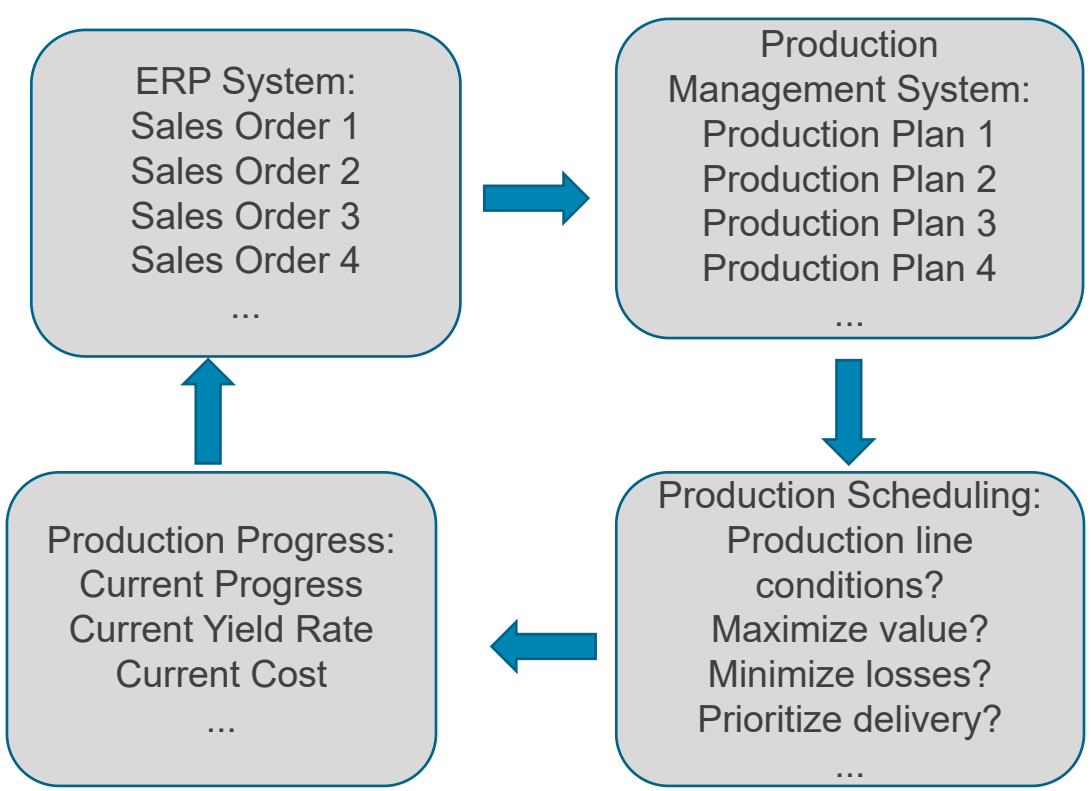
Automatically match orders with production capacity, reducing scheduling conflicts and waiting time;

Reduce the frequency of switches (e.g., switches in thickness, size, color), improving continuous production efficiency;

Support multi-order combination optimization to maximize the use of original sheet area and reduce losses.



3.6 Production Scheduling



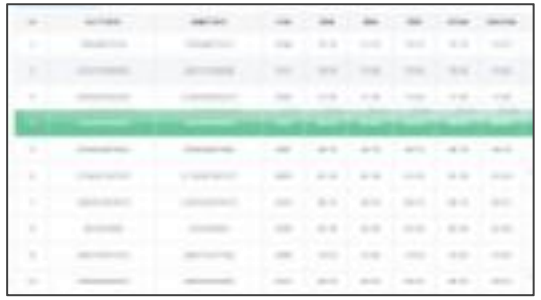


Figure5: Production Plan Pool

Figure6:Scheduling Results

Figure7:Scheduling Rules Ranking

- Unblock the data channel between sales and production, develop a production scheduling system, schedule production according to sales needs, and maximize production value; quickly respond to customer orders.
- Achieve continuity and efficiency in the production process through reasonable planning and scheduling. The make-to-order mode mainly carries out production and scheduling according to customer orders, with high flexibility.

3.7 Loss Analysis

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Dig deep into data, analyze the causes of production losses, and promote continuous improvement – "Zero Defects.

二、损失统计				
序号	损失分类	损失原因	重量	占比
1.0	QC取样统计	取样台取样		
		气垫桌取样	0.50	0.04%
2.0	折边损失统计	折边损失	405.05	30.22%
3.0	质量损失统计	整缝落板	561.94	41.89%
		手动落板	260.14	19.77%
		下游回暴		
		气垫桌	19.32	1.44%
		多缺角板		
		堆垛位弃板	0.81	0.06%
		单切机废板		
		小片落板		
		撞伤		
		其他		
合计：			1341.36	100.00%

- The production losses have been subdivided.
- The loss volume caused by each equipment failure maintenance is counted.
- The equipment maintenance time is linked with production losses to facilitate problem tracing.

缺陷不良				压延不良							裁切不良				其他不良		
缺陷不良率	气泡	结石	缺陷其他不良面积	压延不良率	凹凸	裂纹	碰伤	掉落物	厚薄超差	压延其他不良面积	裁切不良率	裂切	毛边率	裁切其他不良面积	其他不良面积	其他不良率	通过率
2.51%	28.48	6.1	0	0%	0	0	0	0		0	0%	0	6.28%	0	19.43	1.41%	0
2.32%	10.17	6.1	0	0%	0	0	0	0		0	0%	0	6.34%	0	27.99	3.99%	0
2.39%	13.44	2.69	0	0%	0	0	0	0		0	0%	0	6.32%	0	1.99	0.29%	0

3.8 Production Data Penetration Analysis

Explore production data correlations to promote production process improvement – "Zero Stagnation"

3.9 Changes in management mode before and after the deployment of the production management system

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Quality, Scheduling, Data Penetration Analysis.

Management Requirements	Before Deployment	After Deployment
Problem Tracing	Difficult to locate specific time/section/equipment/personnel.	Through virtual ID and defect labels, batches, sections and operators are automatically associated to achieve rapid positioning.
Response Speed	Quality abnormalities are detected belatedly, with responses generally made on T+1 day.	A real-time early warning mechanism enables minute-level problem detection and notification to relevant personnel.
Scheduling Method	Production supervisors manually formulate scheduling plans, driven by experience.	The system automatically calculates scheduling plans based on orders, equipment capacity, and material inventory.
Information Foundation	Orders, inventory, and equipment status are scattered across multiple spreadsheets/systems.	Information integration with a unified data source and real-time dynamic updates.
Scheduling Efficiency	A complete scheduling process takes 3-4 hours per day.	Automatic scheduling takes ≤10 minutes, supporting dynamic adjustments at the shift level and hourly level.
Emergency Adjustment	Recalculation is required, and efficiency is extremely low when changes are frequent.	Rapid rescheduling is possible based on material changes, delivery date changes, and equipment abnormalities.
Management Transparency	Segmented, information silos.	End-to-end, full-process penetrable.

3.9 Changes in management mode before and after the deployment of the production management system

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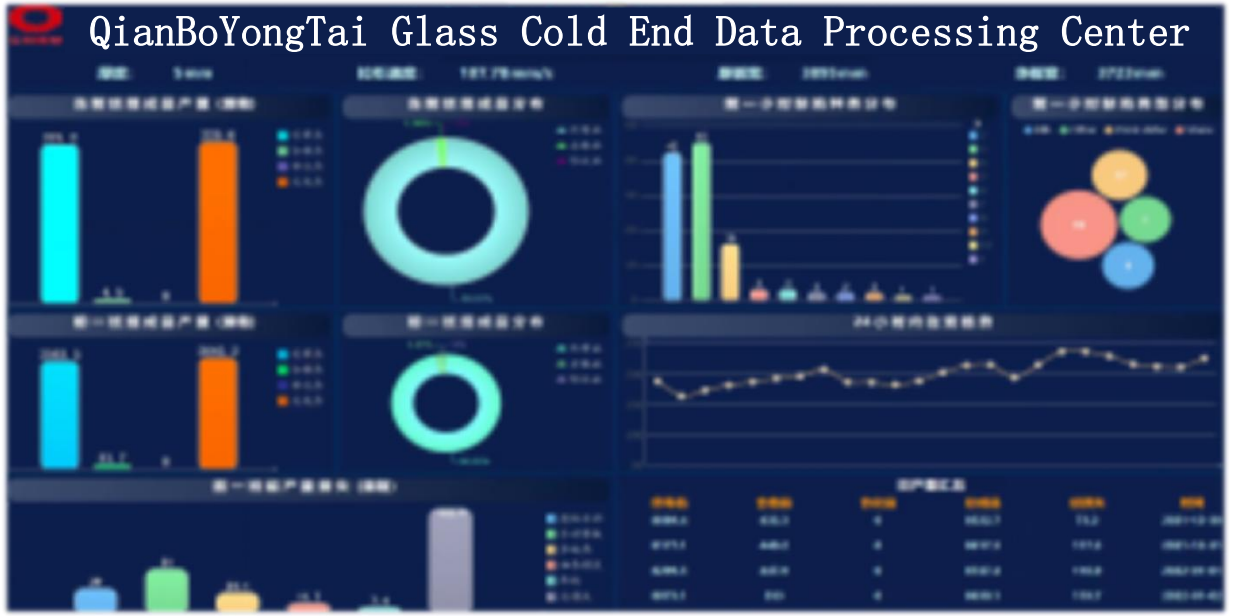
Benefit Indicators	Before Deployment	After Deployment	Improvement Rate
Production Plan Achievement Rate	Approximately 80%	≥95%	Increased by about 15%
Data Collection Accuracy	≤85%	≥99.99%	Increased by about 17%
Average Abnormality Response Time	≥10 minutes	≤2 minutes	Increased by about 80%
Daily Report Generation Time	≥2 hours (manual compilation)	Automatically generated in real-time	Time saved ≥90%
Quality Tracing Efficiency	Several hours to days	A few minutes	Speed increased by over 90%

3.10 Production Scheduling System

3.11 Production Scheduling System – On-site Kanban

Figure8: On-site Electronic Kanban.

3.12 Production Management System – Project Cases



Display and analysis of cold-end data elements – Cold-end Data Processing Center, which realizes the transparency of the cold-end production process. It collects cold-end data such as output, quality, losses, orders, and performance, and displays them in the form of graphs and charts, helping production operators and managers intuitively understand the production status.

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Warehouse Management and AGV System

4.1 Warehouse Management System

Glass finished product warehousing system: achieving refined management of product inventory – "Zero Inventory" (inventory reduction).

Precise positioning of goods is realized through 5G + intelligent terminals.

Warehouse Visualization

Inventory management and goods inbound/outbound processes are completed via mobile PDA + barcode.

4.2 Based on the intelligent transformation and digital conversion of production line equipment and control systems

By defining unique barcode identifiers for each (batch of) products, pallets, and storage locations, precise positioning of products is achieved, and intelligent guidance for warehousing operations is provided to enable rapid product inbound and outbound.The overall process meets the warehousing needs of the entire plant, including raw material sections, spare parts, finished products, and packaging materials.

4.3 Warehouse Management System Storage Locations

Figure9: Original Sheet Warehouse

Figure10: Material Warehouse

Figure11: Spare Parts Warehouse

Figure12: Finished Product Warehouse

Figure13: Packaging Material Warehouse

Figure14: Raw Material Warehouse

4.4 AGV System

It can flexibly connect original sheets to deep processing, and from deep processing unloading to automatic packing machines to warehousing, realizing the full-process automated transfer from original sheets to deep processing warehousing, as well as the full-process intelligent order scheduling and warehouse management from original sheets to deep processing. This greatly improves the continuity and stability of production and scheduling.

4.5Achievements of Warehousing System Construction

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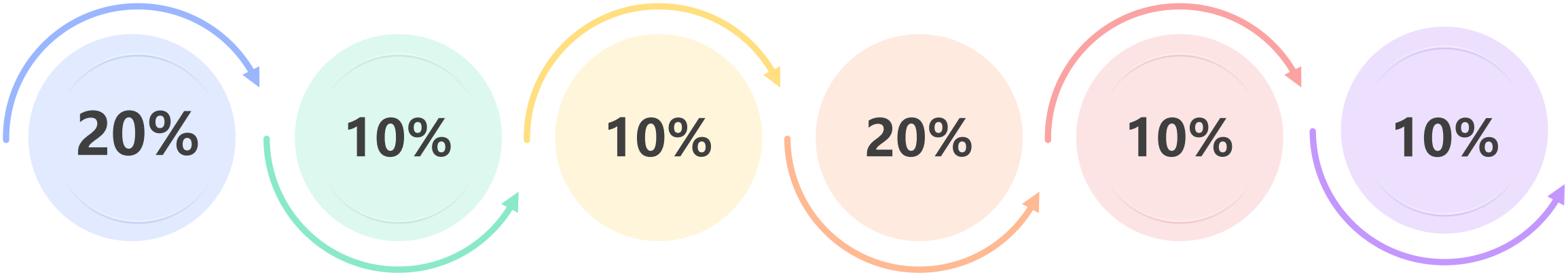
Management Indicators of Glass Finished Product Warehousing System:



Inventory accuracy increased by 20%

Inventory turnover rate increased by 10%

Order on-time delivery rate increased by 10%

Inventory stagnation rate decreased by 20%

Warehouse space utilization rate increased by 10%

Order response efficiency increased by 10%

Advantages: Optimized production decision support, reduced manual management costs, enhanced transparency of warehousing information.

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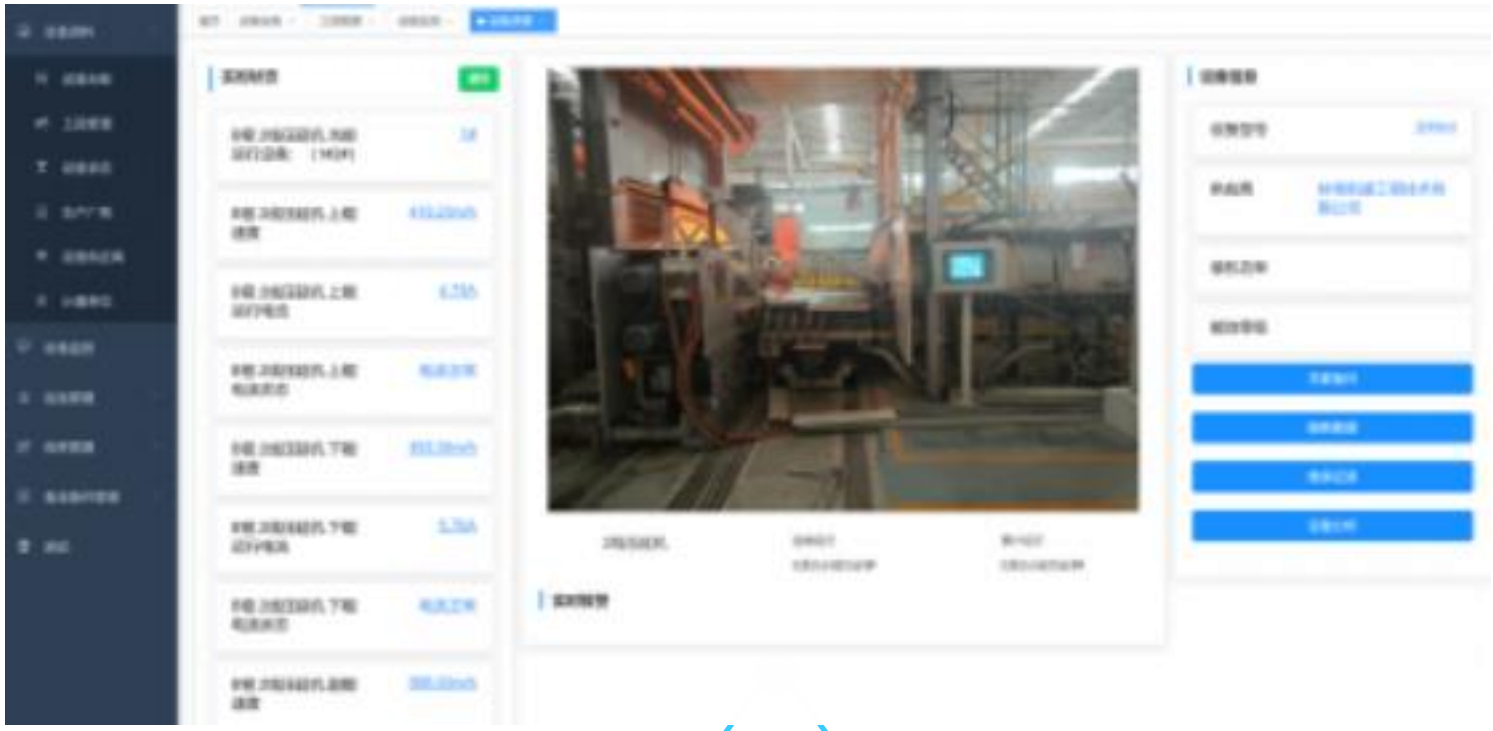
Equipment Full Lifecycle Management System

5.1 Equipment Lifecycle Management System Architecture

- Full Lifecycle Management
- Predictive Maintenance
- Intelligent Inspection
- Condition Monitoring
- Data Decision-Making

5.2 Software for Equipment Full Lifecycle Management System

Equipment Management Platform, enabling Total Productive Maintenance (TPM) – "Zero" Faults.



TPM Management: "Total Productive Maintenance".

Purpose: Zero defects of equipment, no unplanned downtime, minimizing losses and maximizing benefits.

和效益的最大化。

5.3 Equipment Full Lifecycle Management System APP

5.4 Management Modes Before and After Deployment of the Equipment Management System

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Management Requirements	Before Deployment (Traditional Management)	After Deployment (Systematic Intelligent Management)
Equipment File Management	Scattered in paper or Excel, with incomplete and inconsistent information	Establish electronic full-life-cycle equipment files with clear structure and unified standards
Maintenance Plan Formulation	Arranged based on manual experience, with rough periodic maintenance	Intelligently generate maintenance plans based on equipment status, operating hours, alarm frequency, etc.
Fault Handling Mechanism	Repair instead of maintenance, with emergency repairs after equipment failures	Predictive maintenance + early warning system, intervene in advance to reduce sudden failures
Maintenance Records	Paper-based registration, inconvenient query, and lack of historical traceability	The system automatically archives maintenance records, consumables replacement, maintenance personnel, downtime, etc.
Spare Parts Management	Purchased based on experience, prone to overstocking or out of stock	System-linked procurement and inventory management, with automatic early warning of spare parts demand
Equipment Performance Analysis	Lack of effective data support, unable to quantify equipment utilization	Provide indicators such as OEE, MTBF, MTTR, etc., to help analyze and optimize equipment efficiency

5.4 Management Modes Before and After Deployment of the Equipment Management System

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Benefit Indicators	部署前	部署后	改进幅度
Planned Maintenance Proportion	≤30%	≥70%	**Increased by more than 2 times**
Equipment Failure Downtime Rate	≥8%	≤3%	**Reduced by more than 60%**
Average Fault Response Time	≥4 hours	≤30 minutes	**Improved by 88%**
Equipment Availability	≤85%	≥95%	**Increased by more than 10%**
Workload of Operation and Maintenance Personnel	Highly dependent on manual recording and reporting	System automatic tracking and early warning	**Workload reduced by ≥50%**
Operation and Maintenance Cost	High hidden cost, difficult to count	Clear and controllable cost collection	**Significant cost reduction and efficiency improvement**

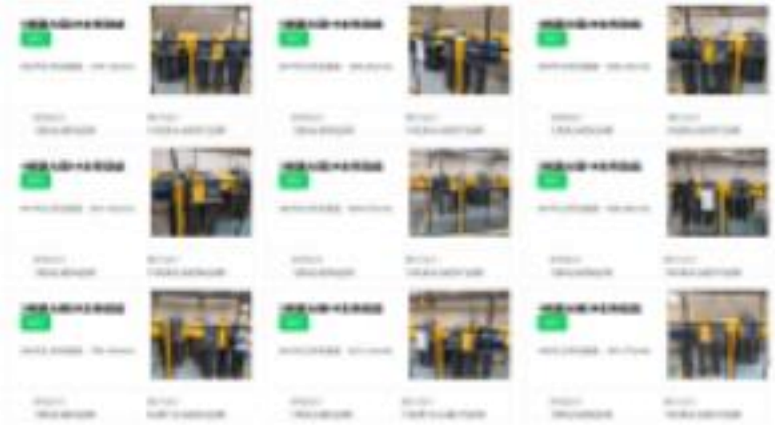
5.5 设备管理建设建设成效---项目案例

Before system construction:

- Daily inspection frequency:
  2 inspections per shift × 2 shifts = 4 times/day
- Time for a single inspection:
  Total time of 2.5 hours/shift ÷ 2 times = 1.25 hours/time
- Total daily inspection time:
  4 times × 1.25 hours = 5 hours/day
- Total weekly inspection time:
  5 hours/day × 7 days = 35 hours/week

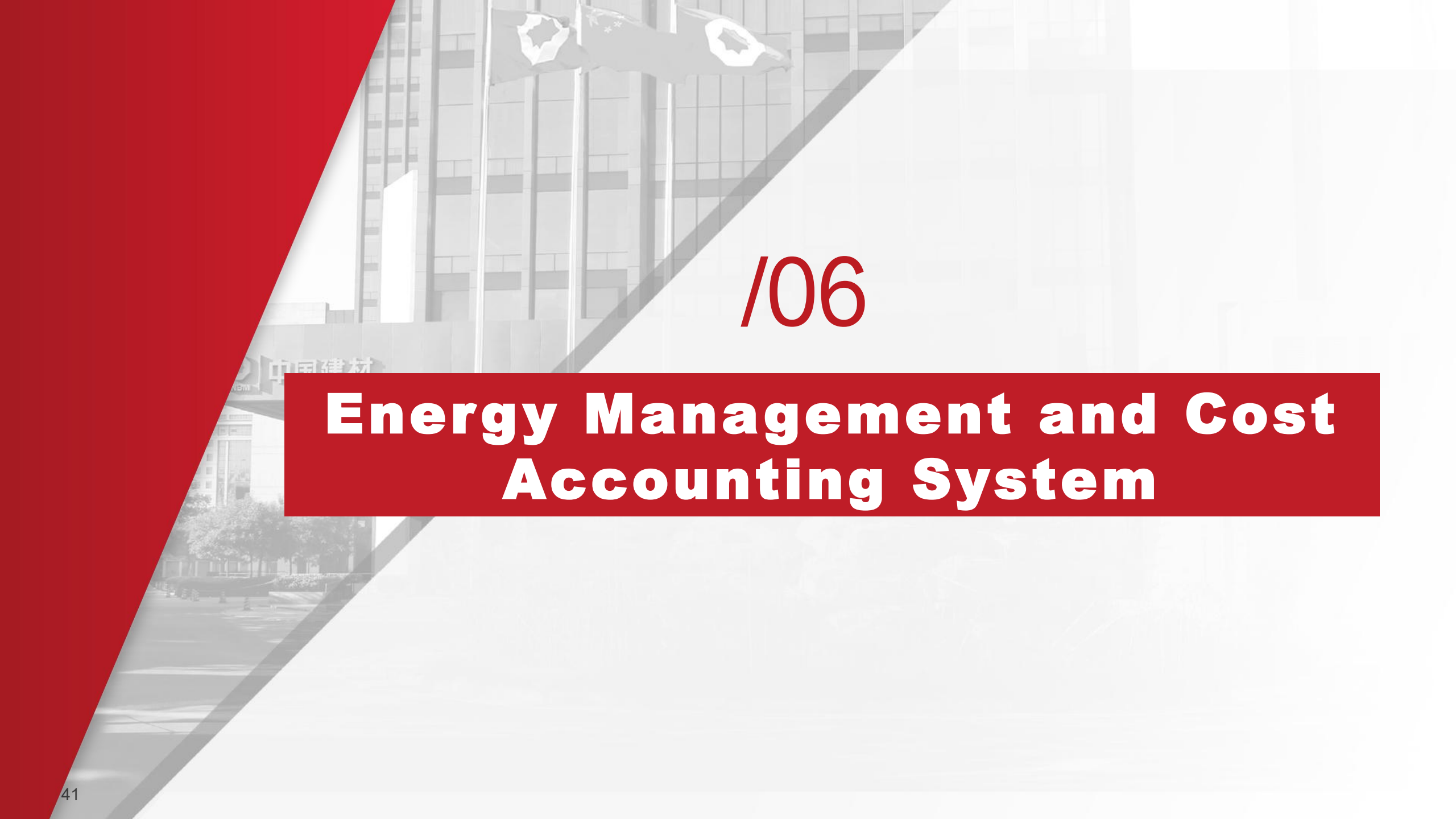
After system construction:

- Weekly inspection frequency:
  Take the median value of 2.5 times/week (2-3 times).
- Assumption of time for a single inspection:
  Due to the automatic monitoring data of the system, manual work only needs to spot-check key equipment. It is assumed that the time for a single inspection is reduced to 0.5 hours/time (40% of the original 1.25 hours, which can be adjusted according to specific situations).
- Total weekly inspection time:
  2.5 times × 0.5 hours = 1.25 hours/week



By deploying the data collection and centralized monitoring system:

- It can save about 33-34 hours of inspection time every week, with efficiency improved by more than 95%;
- Human resource release value: The saved time can be used for high-value tasks such as equipment maintenance optimization and process improvement;
- Hidden benefits: Reduce the risk of manual exposure in high-risk areas and lower the probability of safety accidents.



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Energy Management and Cost Accounting System

6.1 Energy Management System

The three-level energy metering system architecture of the energy management system in glass factories usually includes the following three levels:

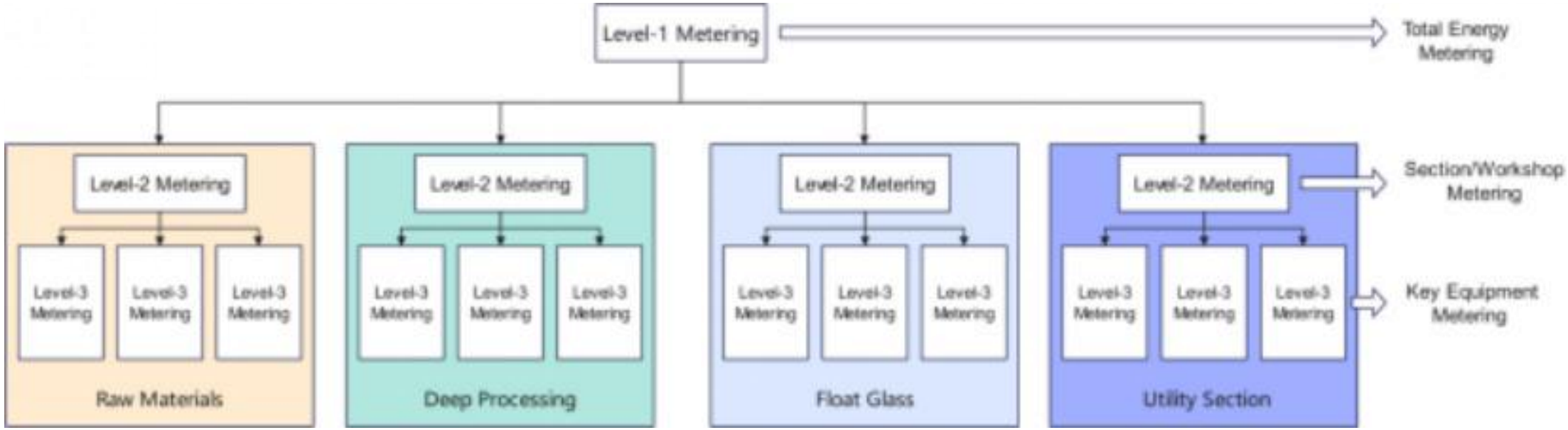
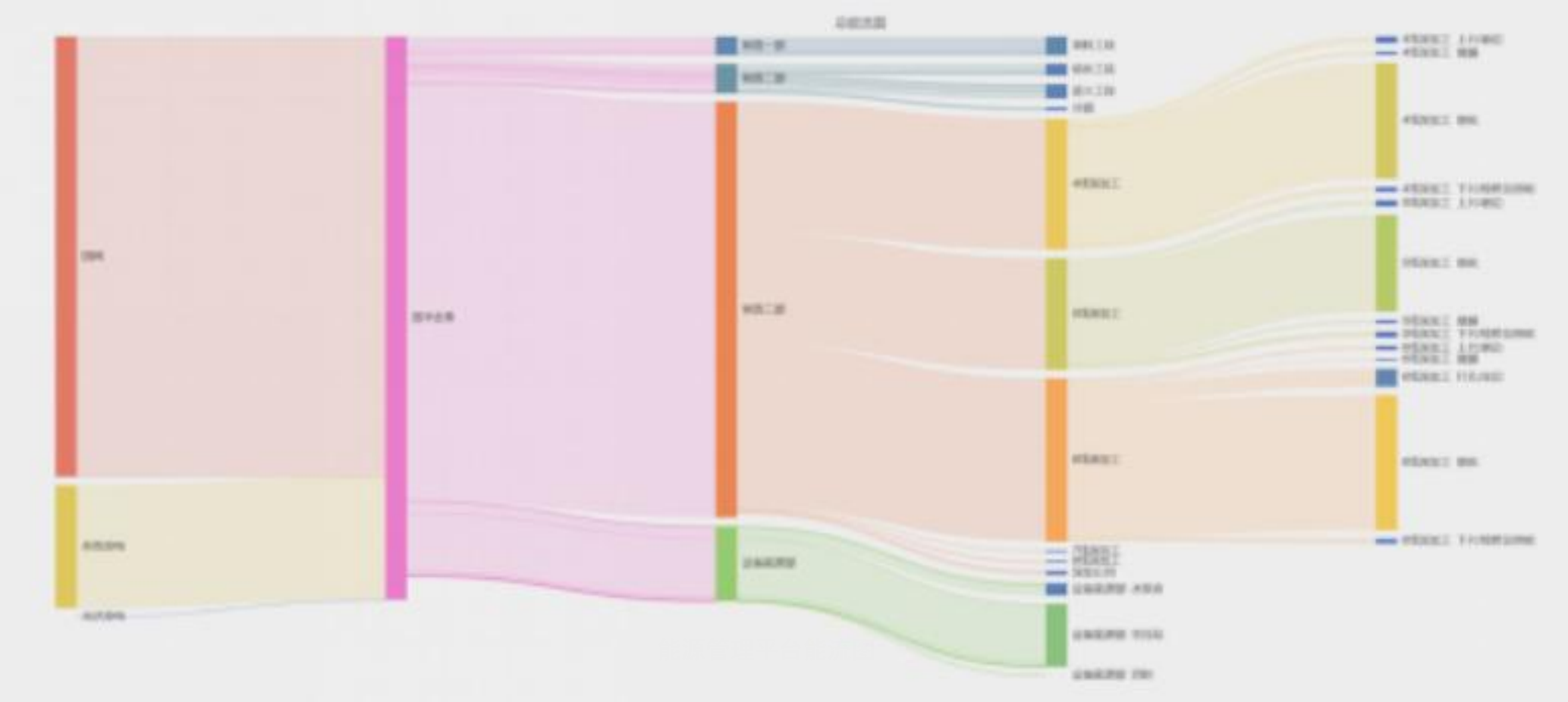


Figure15: Energy Management System — Three-Level Metering in Factory

6.2 Energy Management System

Energy Data Analysis and Visualization — Energy Flow Diagram Dashboard.



Energy Flow Diagram: On the left side, externally supplied energy (electricity, water, gas) is transmitted to various energy-consuming sections. The thickness of the energy flow arrows represents the energy consumption of the corresponding sections. It can intuitively show the energy flow in each area and provide detailed energy data basis for promoting lean production in the factory.

6.3 Energy Reports

Figure16: Electricity Summary Table

Figure17: Electricity Details Table

Automatic Energy reports: The system provides statistical tables of energy consumption such as electricity, water, and fuel, which are generated automatically without the need for meter reading and summary calculation.

6.4 Comparison of Management Modes Before and After Deployment of the Energy Management System

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Management Requirements	Before Construction (Traditional Management)	After Construction (Intelligent Energy Management)
Management Mode	Meter reading, manual entry, low frequency	Automatic collection, high frequency, real-time upload, system automatically generates reports
Anomaly Identification	Energy consumption fluctuations are difficult to detect in time	Real-time alarm, abnormal events can be traced
Energy Efficiency Optimization	Rely on the subjective experience of operators	Based on data model intelligent analysis, suggest optimization strategies
Anomaly Identification	Energy consumption fluctuations are difficult to detect in time	Real-time alarm, abnormal events can be traced
Energy Consumption Statistics Cycle	Week/Month	Real-time/Hourly
Anomaly Response Time	≥1 hour	≤1 minute

6.5 Cost Analysis

How to accurately calculate manufacturing costs?

6.6 Responsibilities and Cooperation of Various Business Systems In Performing Manufacturing Cost Accounting

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Business System	Data Provided	Purpose
MES (Production Management)	Production work orders, output, defective products, production time	Calculate the production cost per unit of glass
EAM (Equipment Management)	Equipment depreciation, maintenance costs	Calculate equipment usage and maintenance costs
WMS (Warehousing Management)	Raw material inventory, warehouse entry and exit records	Calculate material consumption and inventory costs
EMS (Energy Management)	Electricity, gas, oil energy consumption data	Calculate energy costs
ERP (Finance)	Purchase unit price, labor costs, management fees	Comprehensive calculation of complete manufacturing costs
HRM (Human Resources)	Worker wages, working hours records	Calculate labor costs
TMS (Logistics Management)	Transportation costs	Calculate transportation costs

The cost accounting system can serve as an independent system, integrating with MES, ERP, WMS, EAM, EMS and other systems to achieve accurate calculation and allocation of manufacturing costs, and share the costs of factory energy, materials, labor, equipment depreciation, etc.

6.7 Manufacturing Cost Accounting for Glass Factories — BBKS Solution

The cost accounting system currently being developed by BBKS aims to integrate data from the entire chain including production, equipment, energy, finance, warehousing, logistics, etc., to achieve accurate accounting, intelligent analysis, and real-time monitoring, and help glass factories reduce costs, increase profits, and optimize operations!

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Safety and Environmental Management System

7 Safety and Environmental Management System

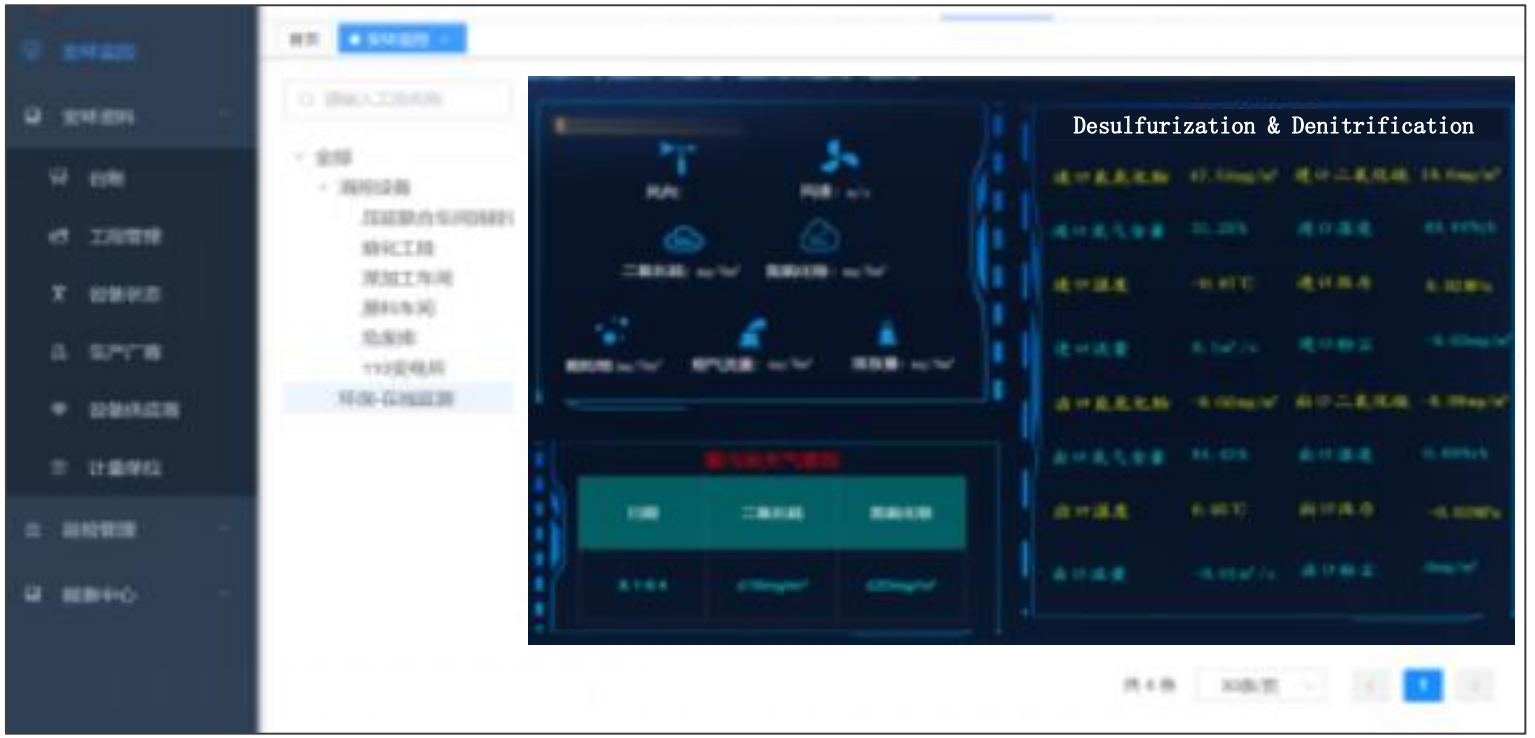


Figure: Visual Interface of Safety and Environmental Management Platform

The main function of the Safety and Environmental Management System is to ensure safe production and environmental protection. It prevents safety accidents and ensures the safety of employees and the stable operation of production equipment by real-time monitoring the factory's production environment, equipment operating status and safety indicators. The system can automatically detect and record potential safety hazards and environmental pollution, provide risk assessment and early warning functions, and enable timely response measures. At the same time, the Safety and Environmental Management System helps factories comply with national safety production and environmental protection regulations, reduces the risk of safety and environmental accidents, and improves the overall compliance and sustainable operation level of the factory.

/08

Data Acquisition and Visual Scheduling System

8.1 Glass Factory Whole-Plant Data Acquisition Platform

Figure:BBKS SCADA Data Acquisition Software

Figure: Deep Processing Line 5/6 Data Acquisition Station

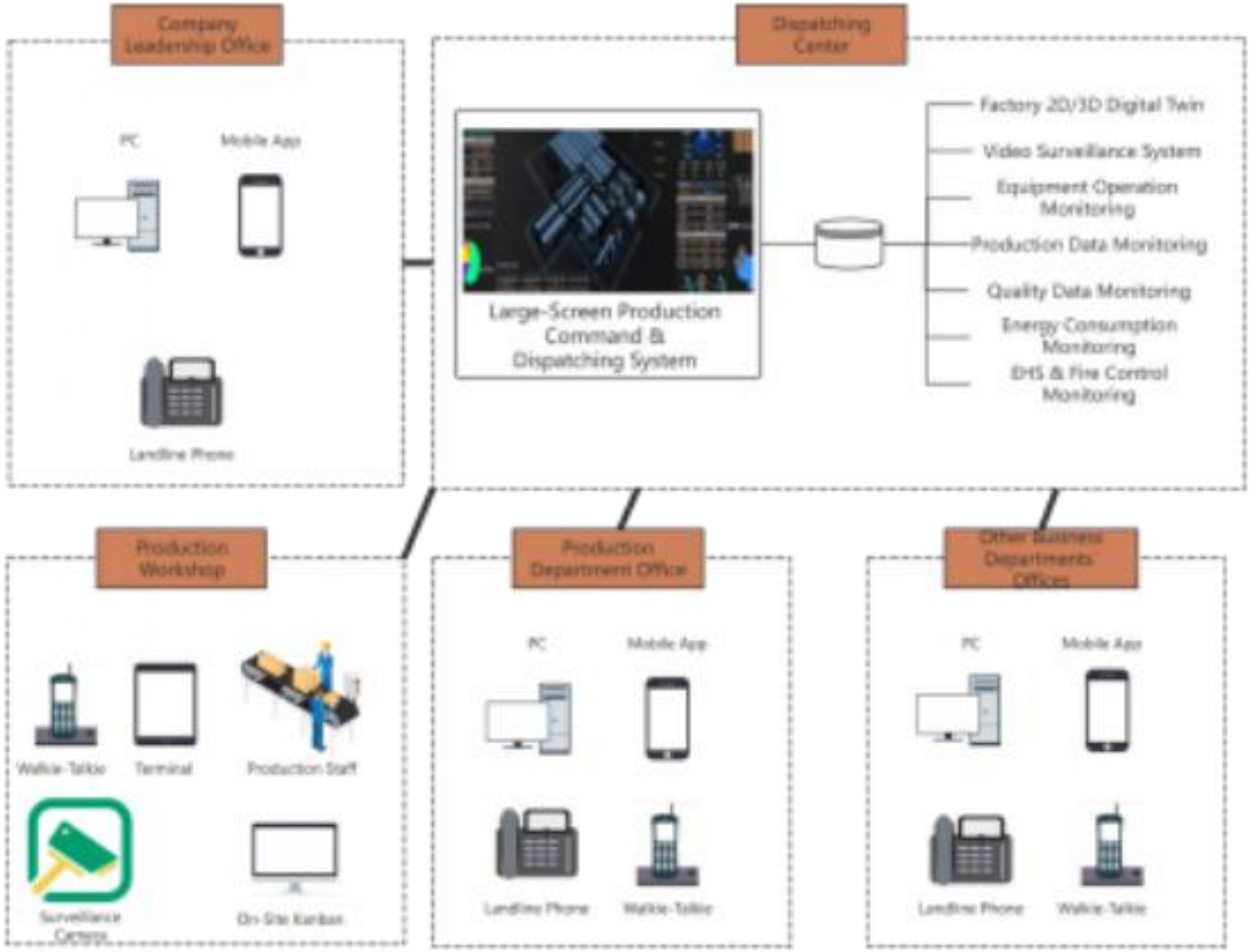
Figure: Raw Glass Sheet Data Acquisition Station

Figure:BBKS SCADA Visualization Software

Figure: Core Station, Server

Figure: Raw Material Data Acquisition Station

8.2 Large-Screen Visual Scheduling System



Integration of front-end and back-end businesses

Integration of online and offline businesses

Improvement of work quality and efficiency

Intelligent supervision and scheduling

8.3 Large-Screen Visual Scheduling System — Project Cases

Figure: Visual Scheduling Center of a Digital Factory Project in Shandong

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Industrial Internet Platform for New Glass Materials

9.1 Industrial Internet Platform for New Glass Materials

Construction of Industrial Internet Platform for New Glass Materials

- Equipment Early Warning
- Lifecycle Reminder for Key Components
- Production Emergency Response
- Remote System Upgrade

9.2 Industrial Internet Platform for New Glass Materials — Intelligent Production

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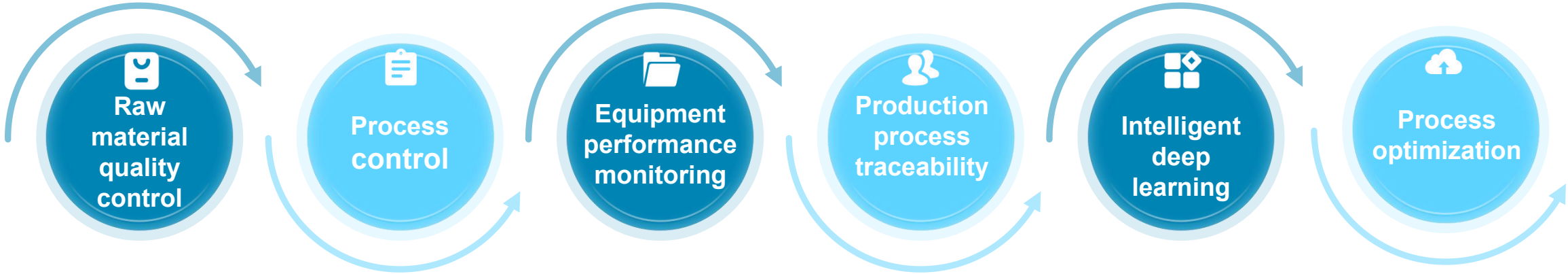
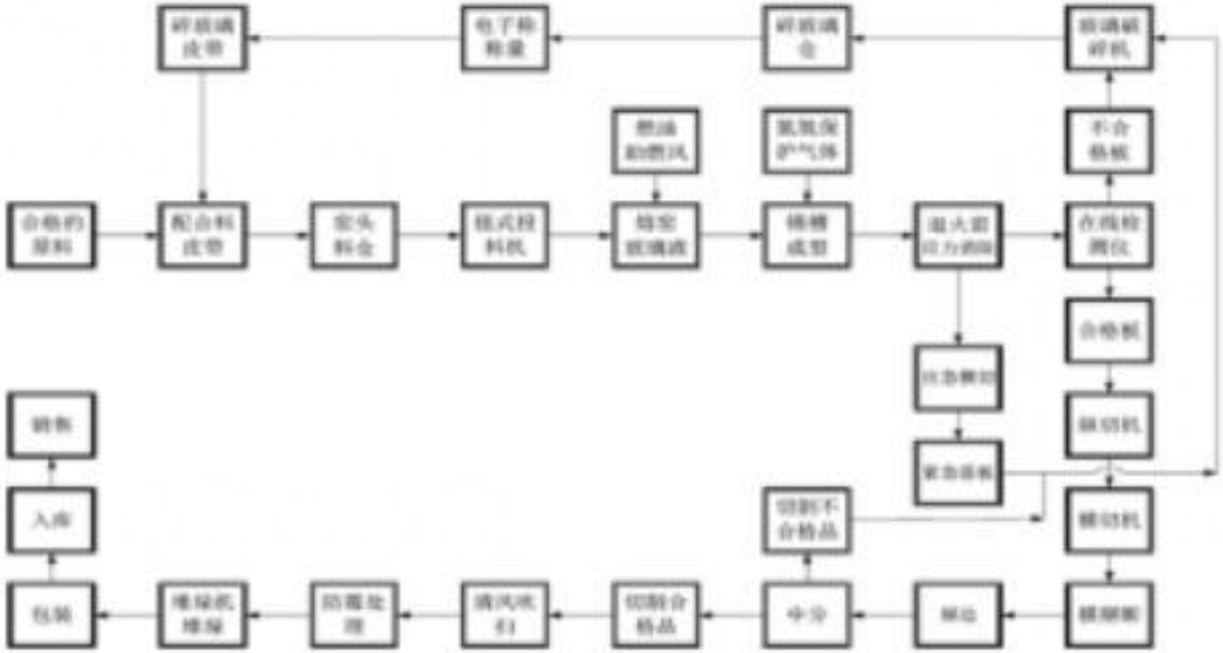
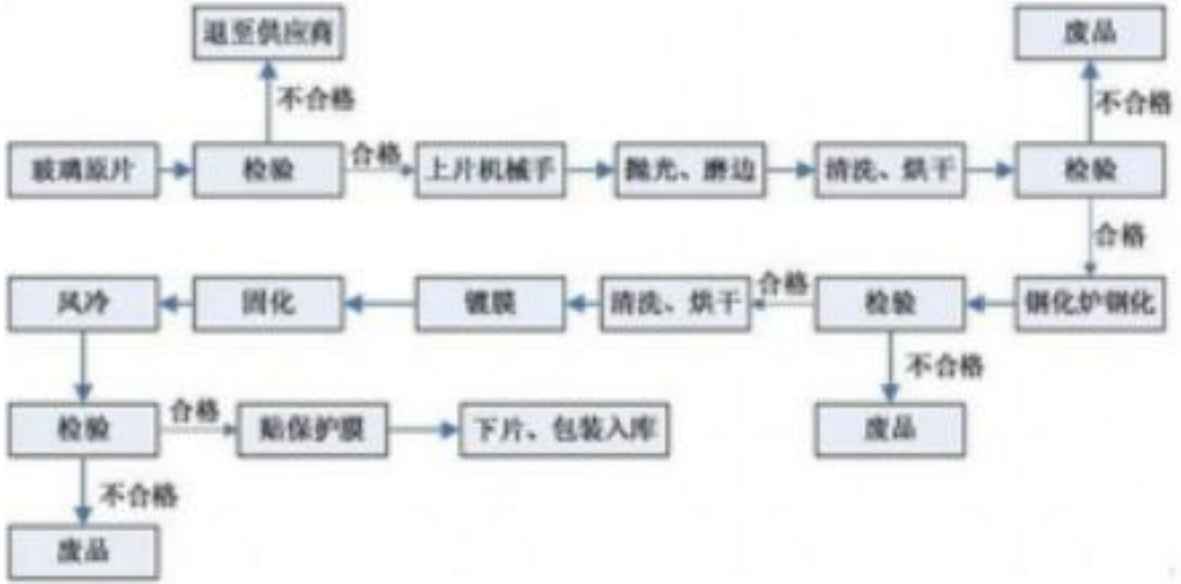


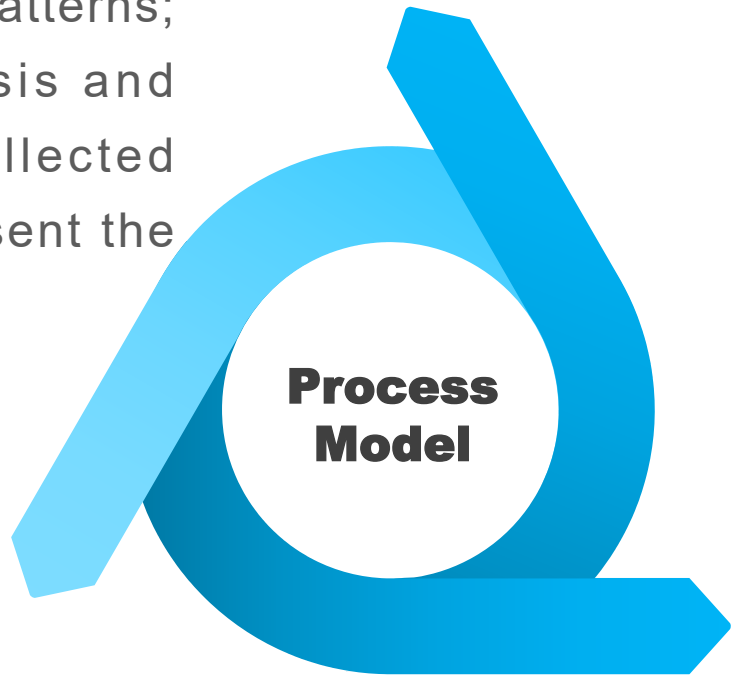




9.3 Industrial Internet Platform for New Glass Materials — Data Analysis Empowerment

Data Analysis

Trend analysis to derive patterns; conduct big data analysis and processing based on collected equipment data, and present the analysis results visually.



Equipment Monitoring

Monitoring, collection, display; directly observe the process results by monitoring the operation of equipment.

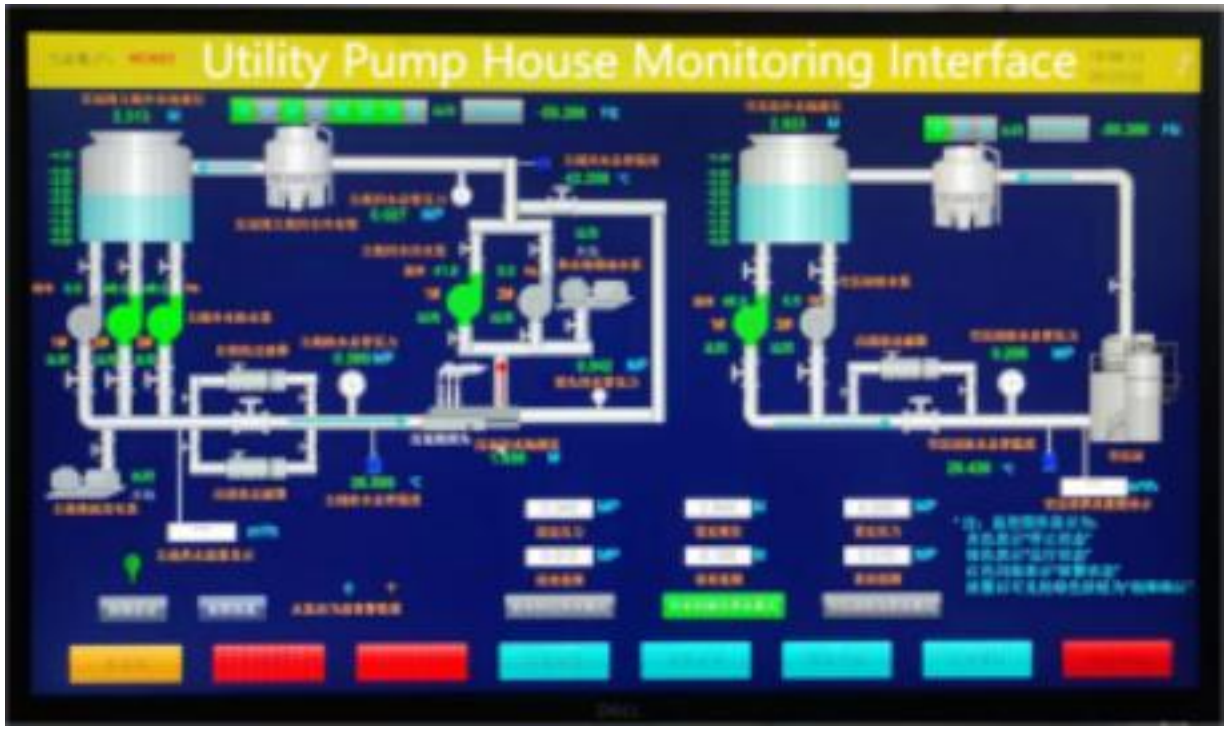
Process Improvement

Reverse impact; continuously improve the process based on the results of data analysis.

9.4 Industrial Internet Platform for New Glass Materials — Human-Machine Interaction Production Management Mode

中国建材

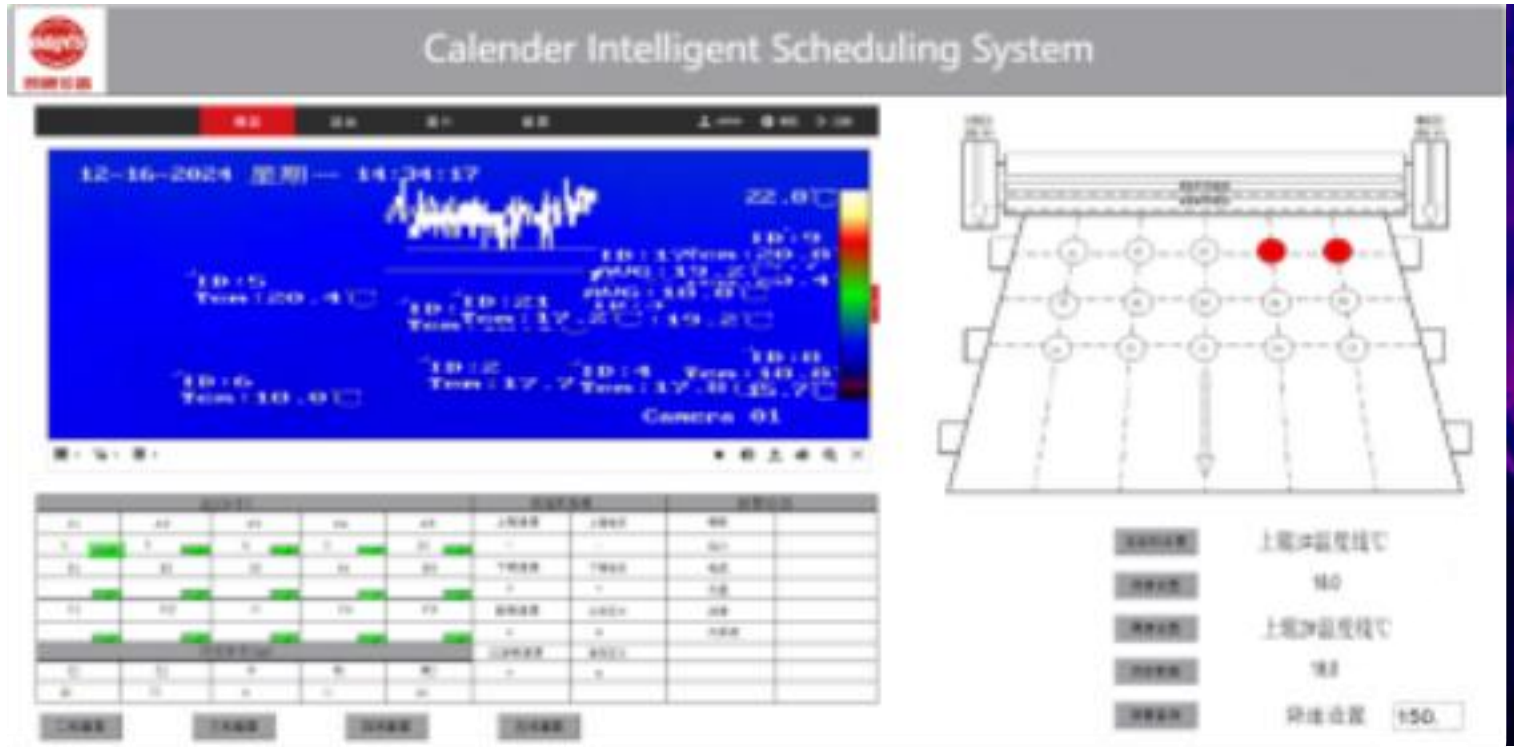
Application of equipment digitalization in lean production of utility workshops in glass factories.

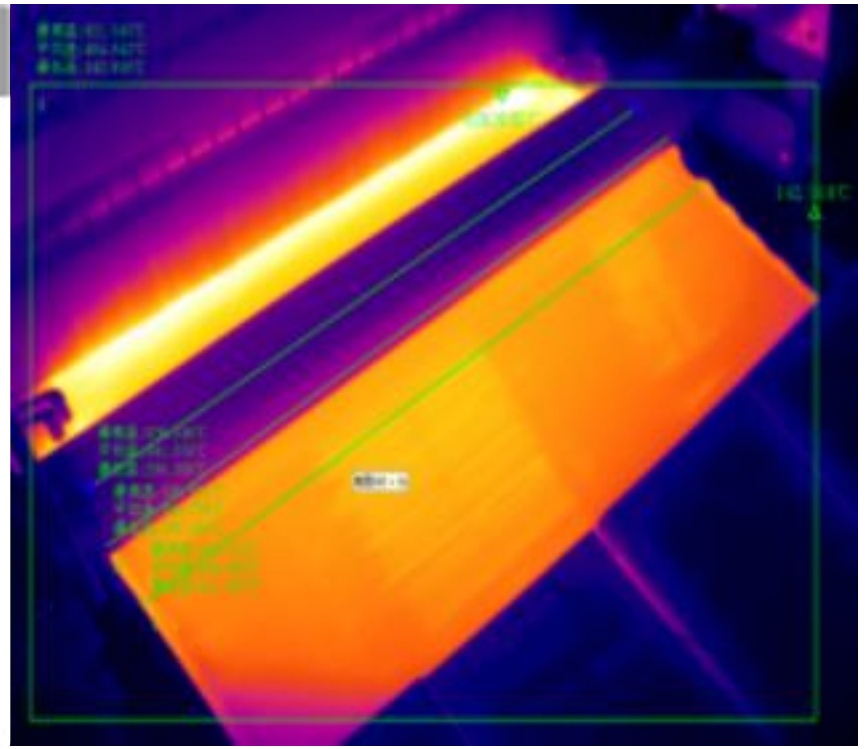


System prediction algorithm — "Zero" disasters: Predictive control algorithms ensure the safe and reliable supply of water, gas, and oil in utility engineering. Centralized monitoring reduces staff and improves efficiency, effectively saving enterprises approximately 1 million yuan in operating costs per year.

Load balancing management and control — "Zero" waste.

9.5 Industrial Internet Platform for New Glass Materials — Human-Machine Interaction Production Management Mode





1. Supports independent line drawing: two temperature lines (warning line and alarm line) can be drawn on the upper roller. When the temperature reaches the warning level, the system will alarm; when it reaches the alarm level, the system will reduce the roller speed and release the pressure of the pressing rod at the same time.

2. Multi-point temperature monitoring:The system can monitor 28 temperature points and display the two temperature lines of the upper roller. It supports selecting and viewing specific temperature point data. When the temperature exceeds the warning line, an acousto-optic alarm will be triggered, and the equipment will send a dry contact signal simultaneously.

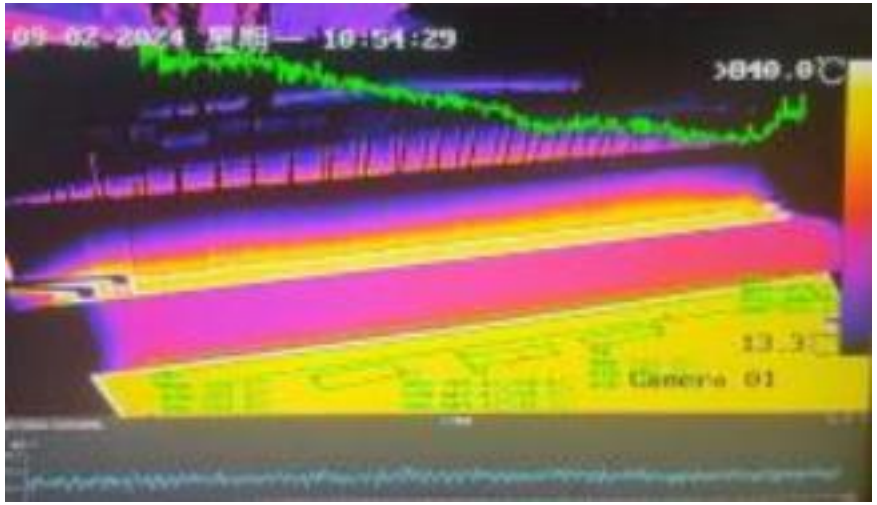
9.5 Industrial Internet Platform for New Glass Materials — Human-Machine Interaction Production Management Mode

Historical query

- Special temperature points can record changes
- The recording duration varies with the size of the equipped storage unit
- Alarm screens are stored separately

Overall demonstration

- Frame a specific area for independent display
- Linear temperature display
- Flexible adjustment of coiled plate alarm lines and warning lines
- Can be linked with calenders



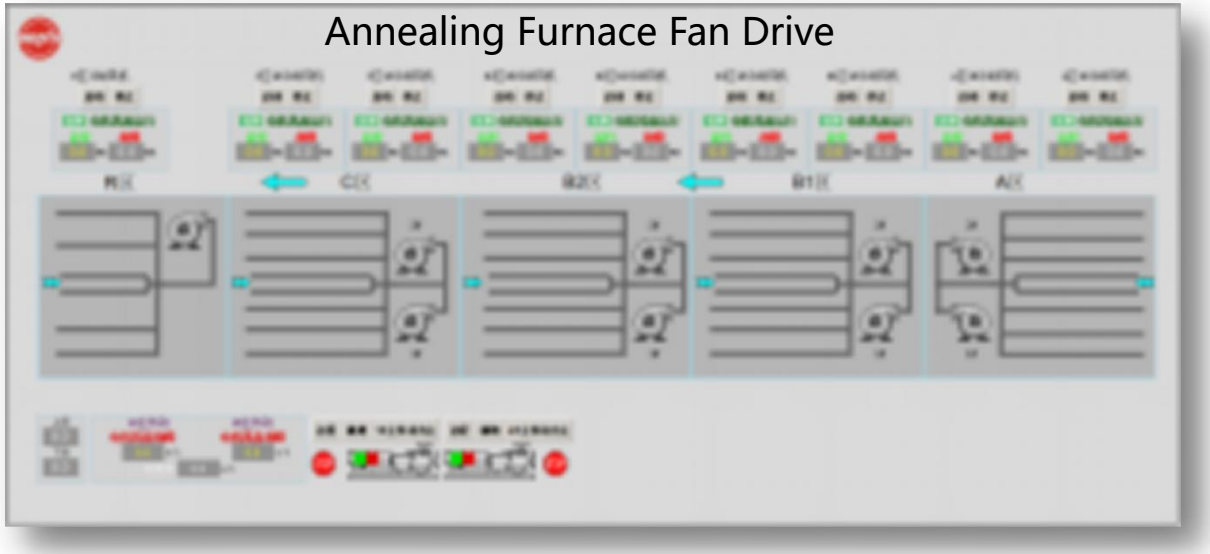
Equipment Installation

- Self-developed water-cooled jacket ensures stable operation under high temperature
- Installation position and form can be customized and adjusted according to on-site conditions
- Quick replacement of front heat-insulating glass

9.6 Industrial Internet Platform for New Glass Materials — Human-Machine Interaction Production Management Mode

The combination of equipment control and process algorithms promotes lean production in factories.

1.Optimized combustion control — "Zero" waste.

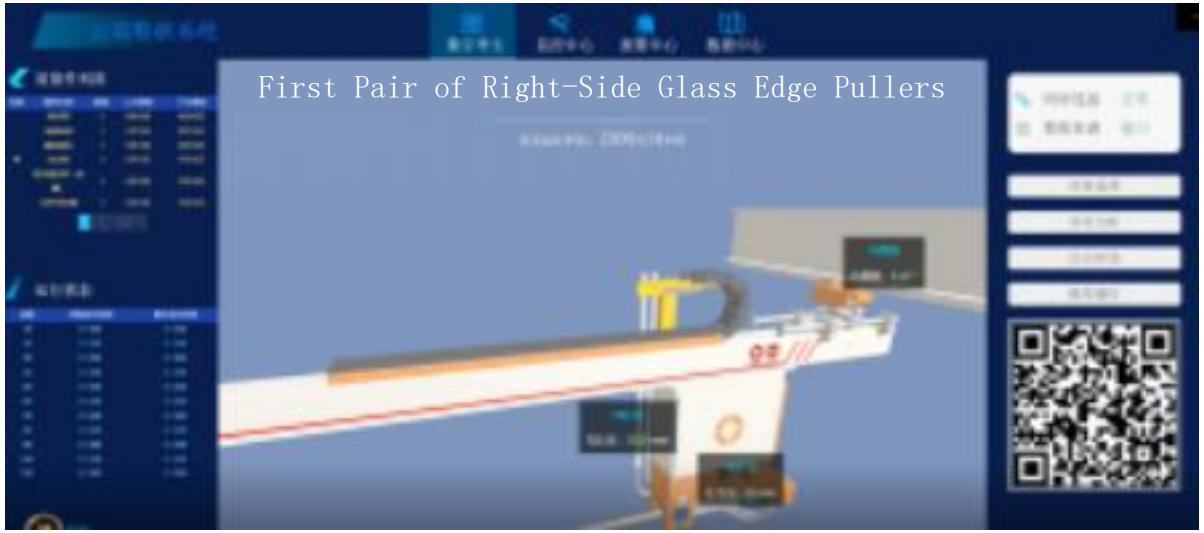


2.Automated management — "Zero" disasters.

9.7 Industrial Internet Platform for New Glass Materials — Human-Machine Interaction Production Management Mode

Application of Equipment Digitalization in Lean Production of Float Glass Forming Section:

- Reduced manual intervention — "Zero" stagnation.
- Intelligent algorithm adjustment — "Zero" waste of production conversion working hours.

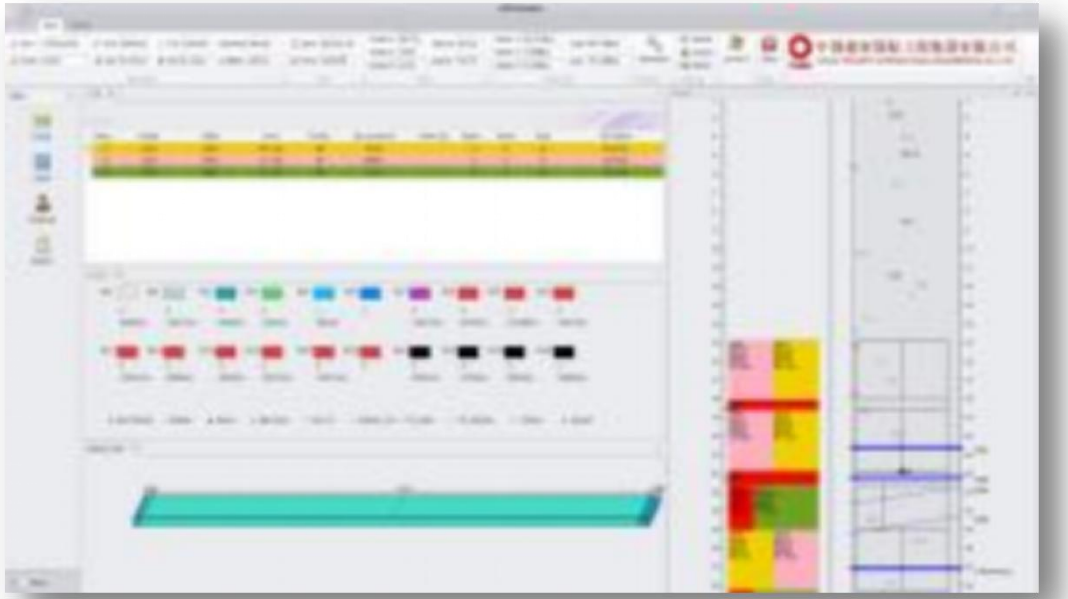


9.8 Industrial Internet Platform for New Glass Materials — Human-Machine Interaction Production Management Mode

Optimize cutting technology to significantly improve production line yield — "Zero" waste of production conversion working hours:

Independently develop optimization algorithms to help customers increase yield by approximately 4%.

Breakthrough in core cutting control technology, with cutting accuracy within ±0.3mm, reaching world-class level.



Optimized Cutting System

High-precision Cutting Machine

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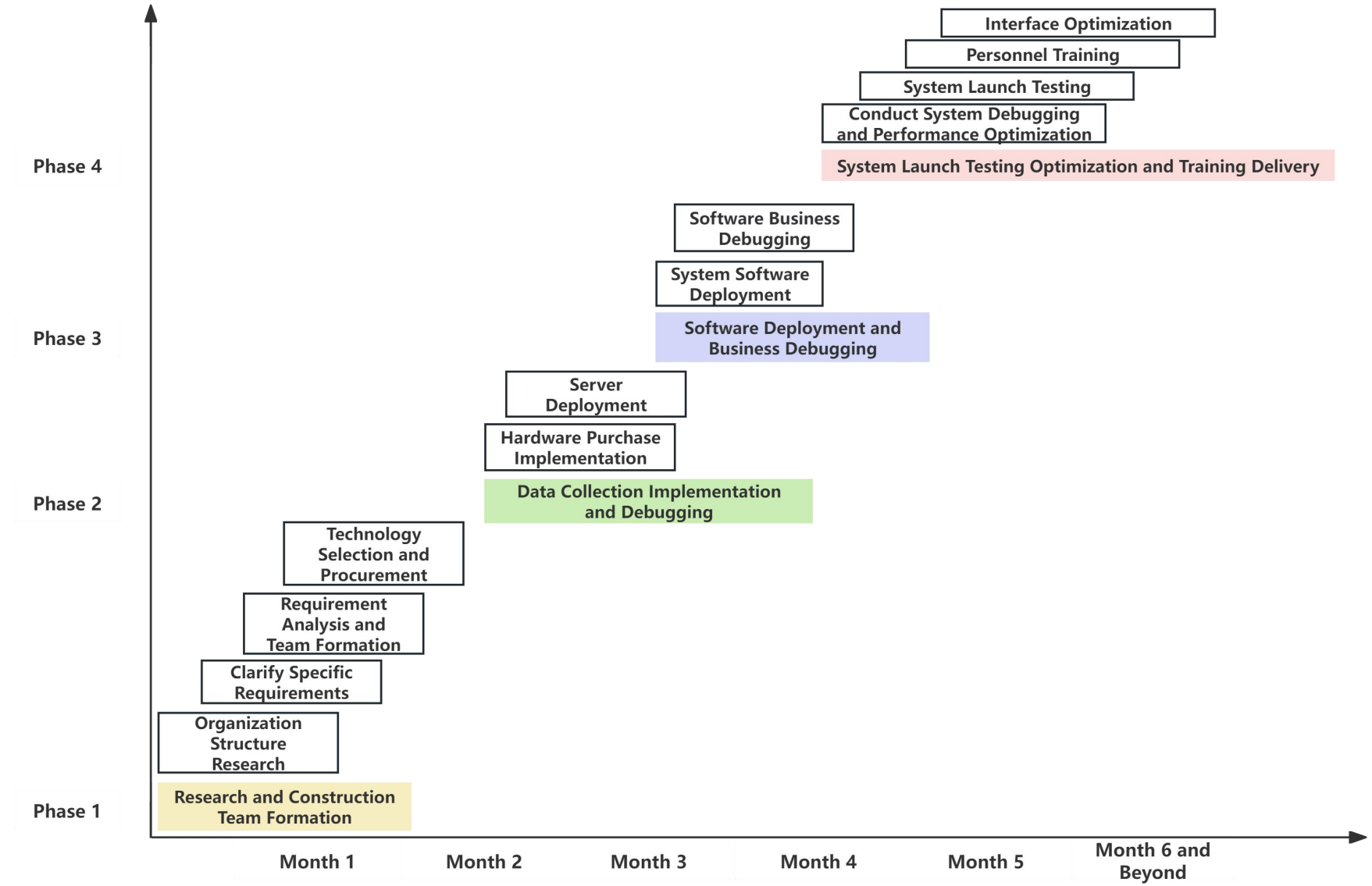
Project Construction Period

10.1 Construction Mode

Subsystem Name	Can it be Deployed Separately	Must be Paired with when Deployed Separately
Data Collection and Visualization Scheduling System	Yes	
Manufacturing Execution System (MES)	Yes	Data Collection System
Equipment Full-Life-Cycle Management System	Yes	Data Collection System
Energy and Cost Management System	Yes	Data Collection System
Safety and Environmental Management System	Yes	Data Collection System
Warehouse Management System	Yes	Data Collection System
Mobile APP	No	

10.2 Construction Period of the Full-function System



Thanks for watching!