REPLASTIX INNOVATIONS: TRANSFORMING PLASTIC WASTE INTO SUSTAINABLE SOLUTIONS

ABSTRACT

This project details the implementation of a customized Salesforce platform for RePlastix Innovations, a company dedicated to plastic waste recycling. The main goal of this initiative is to automate key business processes, improve operational efficiency, and establish a robust data management system. The solution includes a well-defined data security model with specific roles and profiles for different users, ensuring data integrity and controlling access based on user responsibilities.

The solution involves designing a robust data architecture featuring five key custom objects: Plastic Waste Collection, Recycling Center, Recycling Products, Order Processing, and Restock Requests. Business processes were automated using Formula Fields, Schedule-Triggered Flows, Apex Classes, and Apex triggers to handle product alerts, order confirmations, and proactive replenishment requests.

To ensure data integrity and operational efficiency, comprehensive validation rules were established, and a role-based security model was implemented for different operational teams including Recycling Manager, Warehouse Supervisor, and Sales Representative. The solution also includes automated batch processing using Apex to manage low stock scenarios and replenishment workflows.

These automations, combined with Salesforce's reporting and analytics capabilities, enable RePlastix Innovations to make data-driven decisions and continually optimize its operations.

OBJECTIVE

The main objective of this project is to develop and implement a customized Salesforce CRM solution for RePlastix Innovations to streamline core waste management operations, maintain data integrity, and enhance sustainability tracking.

By building a centralized system to manage plastic waste collection, recycling processes, inventory tracking, and order processing, the project aims to:

- Automate key processes such as low stock alerts, replenishment requests, and order confirmations to prevent stockouts.
- Ensure accurate and consistent data entry using comprehensive roles, profiles, and validation rules.
- Enable real-time visibility of products level and recycling metrics.
- Improve internal team coordination through role-based access control.
- Deliver sustainable solutions through automated workflows and reporting.
- Support compliance with environmental regulations and sustainability goals.

TECHNOLOGY DESCRIPTION

Salesforce: - Salesforce is a cloud-based Customer Relationship Management (CRM) platform that helps businesses manage customer data, automate processes, and improve service, marketing, and sales operations. It provides point-and-click tools as well as programmatic capabilities (like Apex and Flows) to build custom business solutions.

Custom Objects: - Objects in Salesforce function as database tables for storing specific data. For RePlastix Innovations, custom objects include Plastic Waste, Recycling Center, Recycled Product, order, and Restock Request.

Tabs: - Tabs are used to display object data in the Salesforce UI.

Custom App: - An App in Salesforce is a collection of tabs grouped together for a specific business purpose.

User: - A User refers to any individual who has a login to the platform, typically employees who need access to Salesforce records and features.

Profiles: - Profiles define what a user can see, do, and edit in Salesforce. It controls object permissions, field access, and more.

Roles: - Roles control the data visibility in Salesforce's role hierarchy. It's used for sharing settings and reporting.

Sharing Rules: - Sharing Rules automatically extend data access to users, roles, or public groups beyond what is defined by your organization-wide default settings.

Formula Fields: - Formula Fields are custom fields that display values derived from formulas, which can include calculations, text manipulation, or other logic based on existing fields and related records.

Validation Rules: - Validation Rules ensure data entered meets business criteria. Example:

- Stock cannot be negative
- Order quantity cannot be zero

Email Templates and Alerts: - Predefined email formats for automated communications including:

- Low stock alerts
- Order confirmations
- Restock request approval notifications

Flows: - Flows automate business logic without code. They can create, update, or send notifications.

Apex: - Apex is Salesforce's object-oriented programming language. It allows developers to write custom logic through:

- Classes for bulk operations
- Triggers for automated data processing

DETAILED EXECUTION OF PROJECT PHASES

1. Developer Org Setup

- A Salesforce Developer Org was created using https://developer.salesforce.com/signup.
- The account was verified and access was granted to the Salesforce Setup page.

2. Custom Object Creation: Five custom objects were created to support waste management operations:

- **Re Plastic Innovations Plastic Waste**
- **Re Plastic Innovations Recycling Center**
- **Re Plastic Innovations Recycled Product**
- **Re Plastic Innovations Order**
- **Re Plastic Innovations Restock Request**

Created custom Tabs for these Objects.

3. Lightning App

- A custom Lightning App, named Re Plastic Innovations, was created.
- Included tabs for all custom objects.
- Assigned to the System Administrator profile.

4. Role & Profile Setup

- Cloned the Standard User Profile to new profiles, Platform 1, Platform 2, and Platform 3, and added access to necessary custom objects.
- Created roles for different departments:
    - Recycling Manager, Sales Representative, Warehouse Supervisor

5. User Creation: Users were created in Salesforce and assigned appropriate roles and profiles to reflect their responsibilities:

- John Production Engineer Sandbox 1 – Recycling Manager [Platform 1]
- Quality Manager Mike – Sales Representative [Platform 2]
- Plant Manager Albert – Warehouse Supervisor [Platform 3]

These role-based assignments help enforce proper data access and process control within the system.

6. Formula Field & Validation Rule: To ensure accurate data entry and enforce business logic, the following formular field and validation rule were applied:

- Stock Low on Product [Formula] – Reminds replenishments if Stock_Level__c < Threshold__c.
- Order Object Validation – Prevents saving if Quantity__c <= 0.
    - Error: “Quantity must be greater than zero.”

7. Schedule-Triggered Flow: Stock Level is Low

- Runs daily in the morning.
- Creates Task to fill the Stock when the stock level drops below threshold.

8. Apex Classes

- InventoryManager – Updates stock after an order or creates restock request if there isn’t enough stock. Increases stock level based on the quantity requested in approved restock request.
- EmailNotificationHelper – Sends an email when a restock request is approved.
- InventoryManagerTest – Apex test class that verifies functionality of InventoryManger.

9. Apex Triggers

- UpdateStockAfterOrder – This trigger runs after new order is inserted, to manage the stock level of the associated product.
- UpdateStockAfterRestockApproval – This trigger activates after restock request is approved, to update the product's stock and send an email.

PROJECT EXPLAINATION WITH REAL-WORLD EXAMPLE

Let's walk through the RePlastix Innovations system with a real-world example to understand how it operates:

1. Plastic Waste Collection Registration

A community recycling center, "Green Valley Collection Hub," registers with the RePlastix system:

- In Salesforce: A new record is created in the **Plastic Waste Collection** object
- Collection details include location, capacity, waste types accepted, and collection schedules

2. Recycling Center Setup

RePlastix partners with "EcoRecycle Processing Plant" to handle waste transformation:

- A record is created in the **Recycling Center** object with processing capabilities
- Center details include processing capacity, technology types, and certification status
- The system tracks which types of plastic waste each center can handle effectively

3. Product Creation and Inventory Setup

The recycling center produces eco-friendly products from processed plastic waste:

- **Recycled Products** like park benches, storage containers, and building materials are added to the system
- Each product has stock levels, pricing, and sustainability metrics tracked
- Initial inventory shows: Park Bench (Stock: 25 units), Storage Container (Stock: 40 units)

4. Order Processing Workflow

A city municipality places an order for 30 park benches for a new public park:

- In Salesforce: A new **Order Processing** record is created
- **Apex Trigger** UpdateStockAfterOrder automatically processes the order

- The InventoryManager class reduces stock from 25 to 0 and creates a restock request for 5 additional units

5. Automated Restock Management

When stock levels fall below the threshold, the system automatically generates restock requests:

- **Restock Request** object tracks requests with status "Pending"
- The system calculates: Required quantity = Order quantity (30) - Available stock (25) = 5 units
- Approval workflow triggers when managers review and approve restock requests

6. Stock Replenishment Process

- Once the restock request is approved, the system updates inventory levels
- **Apex Trigger** UpdateStockAfterRestockApproval processes approved requests

7. Email Notifications and Alerts

- The system automatically sends notifications to relevant stakeholders
- **Schedule-Triggered Flow** sends low stock alerts to warehouse supervisors
- **Email Notification Helper** class sends restock approval confirmations

8. Role-Based Access Control

Different team members have specific access levels:

- **Recycling Manager**: Full access to recycling processes and product management
- **Warehouse Supervisor**: Inventory management and stock monitoring
- **Sales Representative**: Order processing and customer communication
- **System Administrator**: Complete system configuration and user management

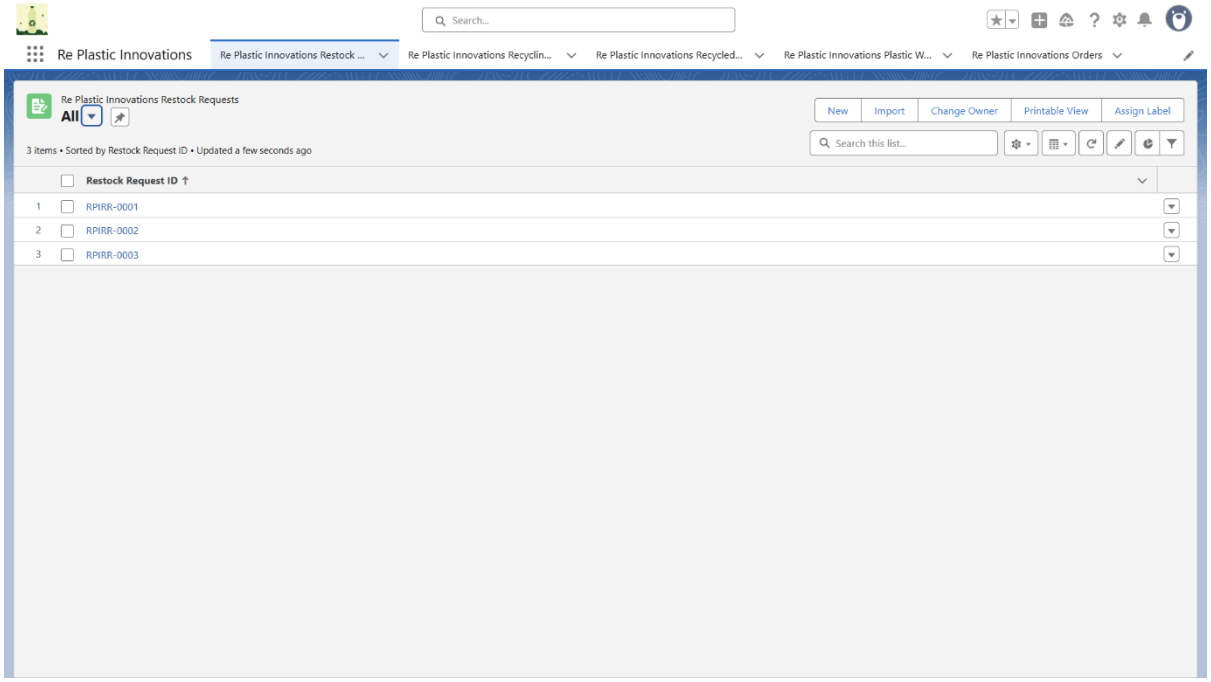
9. Formula Fields and Automation

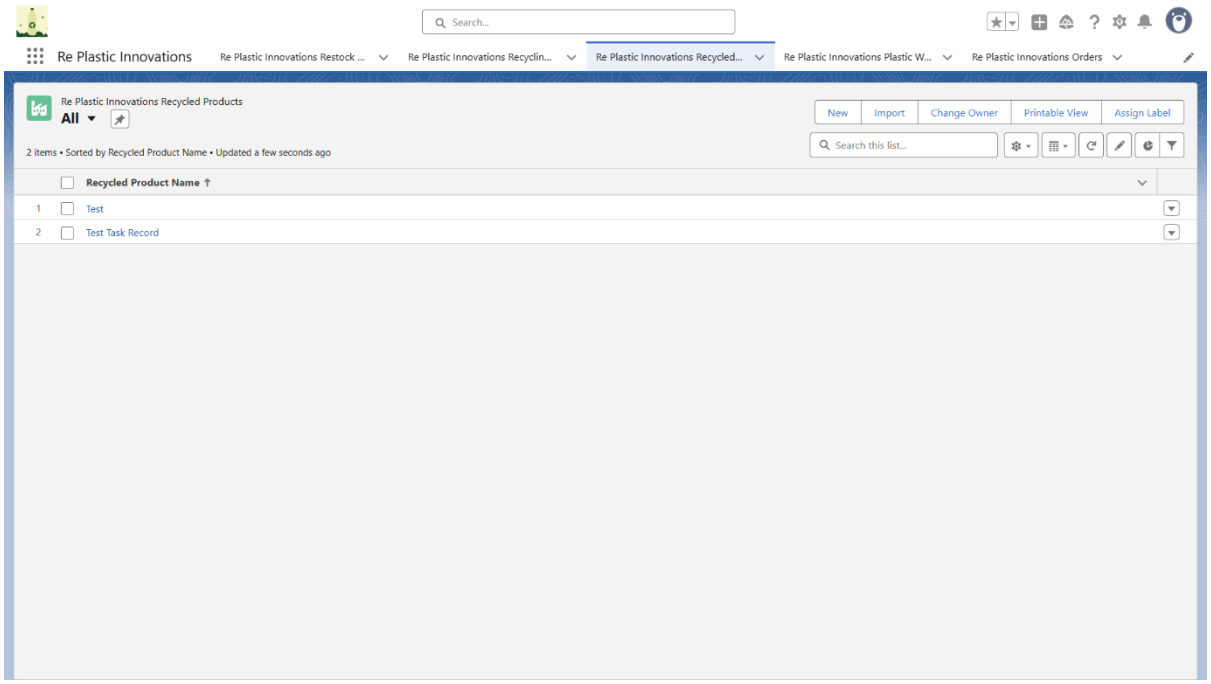
The system uses **Formula Fields** to automatically calculate:

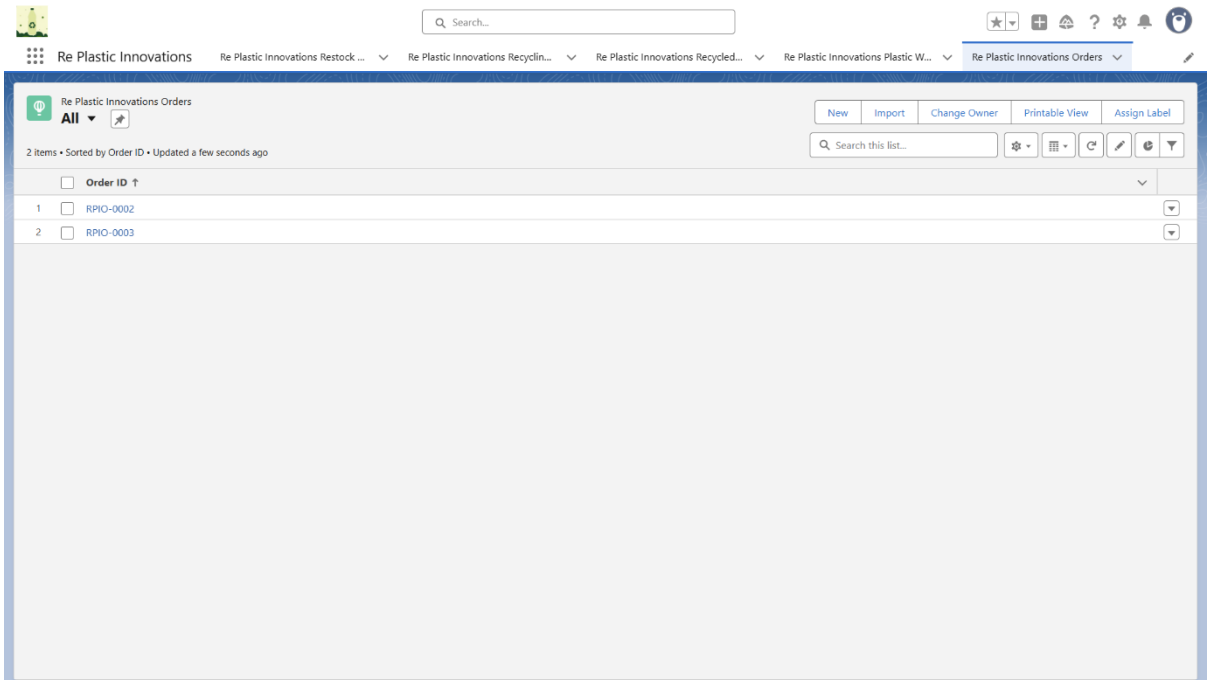
- Total recycling capacity utilization
- Environmental impact metrics (CO2 saved, plastic diverted from landfills)
- Cost savings compared to virgin plastic production
- Revenue generated from recycled products

SCREENSHOTS

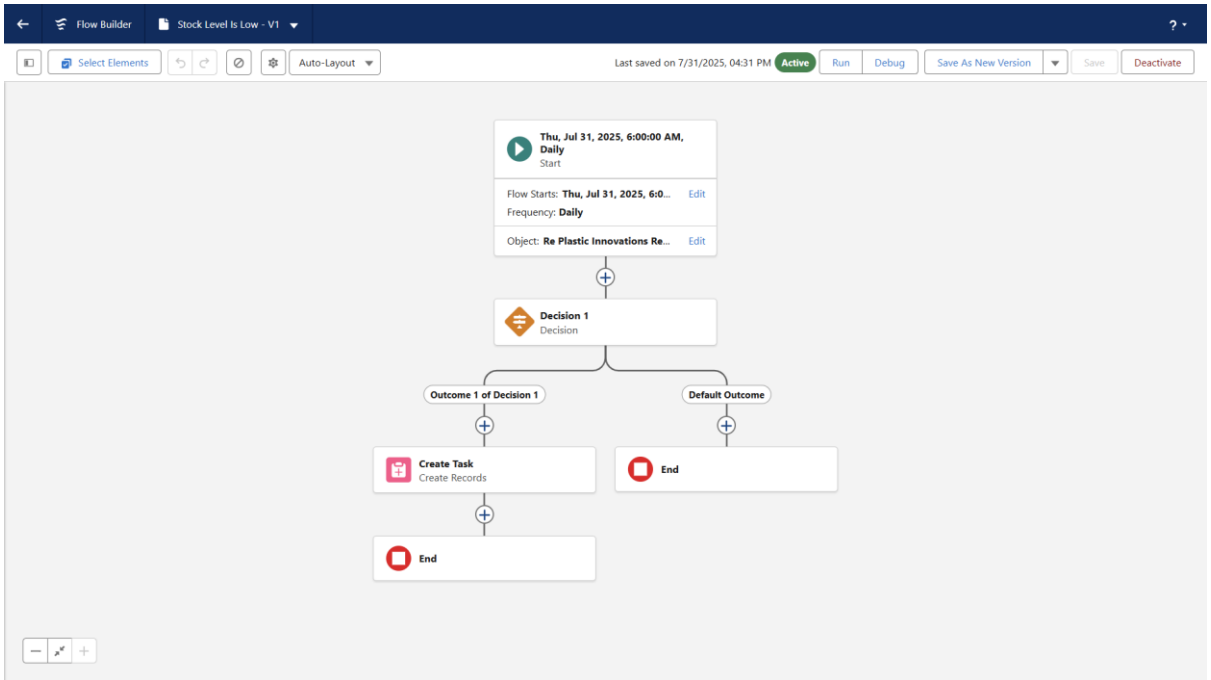
Re Plastic Innovations App







Stock Level is Low



CONCLUSION

The RePlastix Innovations CRM system, built on Salesforce, successfully addresses the critical challenge of plastic waste management while creating sustainable business opportunities. The system streamlines key business processes like managing plastic waste collection, recycling operations, order processing, and inventory tracking by leveraging Salesforce tools such as Apex, Flows, Validation Rules, and Email Alerts. This ensures accurate data entry, real-time updates, and an enhanced user experience.

The platform minimizes manual errors, speeds up operations, and provides better insights into sales and stock through automation and well-structured user roles. The five custom objects—Plastic Waste Collection, Recycling Center, Recycling Products, Order Processing, and Restock Requests—provide a robust foundation that can accommodate business growth and expansion into new markets. Future enhancements include a Customer Portal, a mobile app using the Salesforce Mobile SDK, reports and dashboards, AI-powered recommendations, and WhatsApp/SMS integration for notifications.

Future Scope: -

1. IoT Integration and Smart Monitoring

Smart Waste Collection Bins: Integrate IoT sensors in collection bins to automatically track fill levels, waste types, and optimal collection routes. This would trigger automated collection schedules and improve operational efficiency.

Real-time Processing Monitoring: Implement sensors in recycling centers to monitor processing efficiency, energy consumption, and quality metrics in real-time, feeding data directly into the Salesforce system.

2. AI-Powered Analytics and Predictions

Demand Forecasting with Einstein: Leverage Salesforce Einstein AI to predict product demand based on seasonal trends, market conditions, and historical data. This would optimize production planning and inventory management.

Quality Assessment AI: Implement computer vision and machine learning to automatically assess plastic waste quality and sort materials, improving recycling efficiency and product quality.

3. Blockchain Integration for Transparency

Supply Chain Traceability: Implement blockchain technology to create an immutable record of plastic waste journey from collection to final product, ensuring complete transparency and sustainability verification.

Carbon Credit Tracking: Automatically calculate and track carbon credits generated through plastic waste recycling, creating additional revenue streams and environmental accountability.

4. Mobile Applications and Field Service

Field Collection App: Develop a mobile application using Salesforce Mobile SDK for collection teams to:

- Update collection status in real-time
- Capture waste quality photos and data
- Navigate optimal collection routes
- Generate digital receipts for waste providers

Customer Self-Service Portal: Create a Customer Community Portal where businesses and municipalities can:

- Track their waste contribution and environmental impact
- Place orders for recycled products
- Monitor order status and delivery schedules
- Access sustainability reports and certifications

5. Advanced Reporting and Dashboards

Executive Sustainability Dashboard: Create comprehensive dashboards showing:

- Environmental impact metrics (CO2 reduction, waste diverted)
- Revenue and cost analytics
- Collection and processing efficiency KPIs
- Regional performance comparisons

Predictive Maintenance Reports: Implement predictive analytics for recycling equipment maintenance, reducing downtime and operational costs.

6. Integration with External Systems

Government Compliance Integration: Connect with regulatory systems to automatically report waste processing volumes, environmental compliance metrics, and sustainability achievements.

ERP System Integration: Integrate with enterprise resource planning systems for comprehensive financial management, procurement, and supply chain optimization.

7. Marketplace and E-commerce Platform

B2B Marketplace: Develop an integrated marketplace where recycled products can be showcased and sold directly to businesses, municipalities, and consumers.

Subscription-Based Services: Implement recurring order management for regular customers, with automated billing and delivery scheduling.

8. Advanced Communication Channels

Multi-Channel Notifications: Expand beyond email to include:

- WhatsApp Business API for instant updates
- SMS notifications for critical alerts
- Slack integration for internal team communications
- Microsoft Teams integration for collaborative workflows

9. Sustainability Certification and Compliance

Automated Certification Tracking: Implement automated tracking and renewal of environmental certifications, sustainability standards, and regulatory compliance requirements.

ESG Reporting: Generate comprehensive Environmental, Social, and Governance (ESG) reports for stakeholders and investors.

10. Global Expansion Capabilities

Multi-Currency and Multi-Language Support: Prepare the system for international expansion with localization features, currency conversion, and region-specific compliance requirements.

Franchise Management: Develop capabilities to manage franchise operations, including territory management, performance tracking, and standardized processes across multiple locations.

The RePlastix Innovations platform represents a significant step toward sustainable waste management and circular economy principles. Through continuous innovation and strategic expansion of capabilities, the system can become a comprehensive solution for global plastic waste transformation while creating substantial environmental and economic value.