



ULTIMATE CLIMALOGIC WEBSITE BUILDER PROMPT

Copy and paste this **complete, all-in-one prompt** into v0.dev, Bolt.new, or Lovable.dev to generate your fully functional ClimaLogic website:

```
Create a complete, production-ready industrial emission monitoring platform called "Clima
```

PART 1: DESIGN SYSTEM & GLOBAL SPECIFICATIONS

BRAND IDENTITY:

- Website Name: ClimaLogic
- Logo: Circular gradient icon with industrial blue (#1a3a52), teal (#17a2b8), and green (#32b8c6)
- Tagline: "Monitor, Predict & Reduce Industrial Emissions in Real-Time"
- Voice: Professional, authoritative, solution-focused, encouraging

COLOR PALETTE (Light Mode):

Primary Colors:

- Industrial Blue: #1a3a52 (main backgrounds, headers)
- Slate Gray: #2d3e50 (secondary backgrounds)
- Accent Teal: #17a2b8 (CTAs, links, highlights)
- Vibrant Green: #2ecc71 (success states, positive metrics)

Neutral Colors:

- White: #ffffff (cards, containers)
- Light Gray: #f8f9fa (page backgrounds)
- Medium Gray: #e0e0e0 (borders, dividers)
- Text Dark: #1a1a1a (primary text)
- Text Gray: #666666 (secondary text)

Semantic Colors:

- Success: #2ecc71 (confirmations, achievements)
- Warning: #f39c12 (alerts, cautions)
- Error: #e74c3c (errors, critical alerts)
- Info: #3498db (information, tips)

COLOR PALETTE (Dark Mode):

Primary Colors:

- Dark Background: #0f1419 (main background)
- Dark Secondary: #1a1f2e (card backgrounds)
- Accent Teal: #32b8c6 (brighter for dark mode)
- Vibrant Green: #3ded97 (brighter for visibility)

Neutral Colors:

- Surface: #262d3d (elevated cards)

- Border: #3a4556 (dividers)
- Text Light: #e8eaea (primary text)
- Text Gray: #a0a4a8 (secondary text)

ANIMATED BACKGROUNDS:

Light Mode Background:

- Base: Animated multicolor gradient
- Colors: Linear gradient transitioning through blues (#4a90e2), teals (#17a2b8), greens
- Animation: Smooth 20s infinite loop, background-size: 400% 400%
- Pattern: Diagonal gradient at 135deg
- Effect: Subtle, professional, not distracting
- CSS:

```
background: linear-gradient(135deg, #4a90e2 0%, #17a2b8 25%, #2ecc71 50%, #9b59b6
75%, #4a90e2 100%);
background-size: 400% 400%;
animation: gradientShift 20s ease infinite;
```

Dark Mode Background:

- Base: Animated dark multicolor gradient
- Colors: Deep blues (#1a2332), dark teals (#0f3d4a), dark purples (#2d1b3d), blacks (#0a0e14)
- Animation: Same 20s loop, deeper tones
- Effect: Subtle cosmic/tech aesthetic
- CSS:

```
background: linear-gradient(135deg, #1a2332 0%, #0f3d4a 25%, #2d1b3d 50%, #0a0e14
75%, #1a2332 100%);
background-size: 400% 400%;
animation: gradientShift 20s ease infinite;
```

Keyframe Animation:

```
@keyframes gradientShift {
0% { background-position: 0% 50%; }
50% { background-position: 100% 50%; }
100% { background-position: 0% 50%; }
}
```

TYPOGRAPHY SYSTEM:

Font Families:

- Headings: "Poppins", sans-serif (Google Fonts)
- Body: "Roboto", sans-serif (Google Fonts)
- Code/Mono: "Roboto Mono", monospace

Font Sizes:

- Hero Headline: 56px (mobile: 32px)
- H1: 48px (mobile: 28px)

- H2: 36px (mobile: 24px)
- H3: 28px (mobile: 20px)
- H4: 22px (mobile: 18px)
- Body Large: 18px
- Body: 16px
- Small: 14px
- Tiny: 12px

Font Weights:

- Light: 300
- Regular: 400
- Medium: 500
- SemiBold: 600
- Bold: 700

Line Heights:

- Headings: 1.2
- Body: 1.6
- Tight: 1.4

Letter Spacing:

- Headings: -0.02em
- Body: 0
- Buttons: 0.02em

TEXT ANIMATIONS:

Hero Title Animation:

- Effect: Staggered letter fade-in + slide-up
- Duration: 1.5s
- Delay: 0.05s per letter
- Easing: cubic-bezier(0.22, 1, 0.36, 1)

Heading Animation (on scroll):

- Effect: Fade-in + slide-up 20px
- Duration: 0.8s
- Trigger: IntersectionObserver when 20% visible

Typing Animation (for key phrases):

- Effect: Cursor blinking + character-by-character reveal
- Speed: 50ms per character
- Use for: Taglines, key stats

GLASSMORPHISM EFFECT:

Container Style:

- Background: `rgba(255, 255, 255, 0.95)` in light mode
- Background: `rgba(26, 31, 46, 0.90)` in dark mode
- Backdrop Filter: `blur(10px)`
- Border: 1px solid `rgba(255, 255, 255, 0.18)` (light) or `rgba(255, 255, 255, 0.1)` (dark)
- Box Shadow: 0 8px 32px `rgba(0, 0, 0, 0.1)`
- Border Radius: 12px

GLOW EFFECTS & AURA LIGHTING:

Button Glow (Teal):

- Box Shadow: 0 0 20px `rgba(23, 162, 184, 0.4)`, 0 0 40px `rgba(23, 162, 184, 0.2)`
- On Hover: 0 0 30px `rgba(23, 162, 184, 0.6)`, 0 0 60px `rgba(23, 162, 184, 0.3)`

Card Glow (Subtle):

- Border: 1px solid rgba(23, 162, 184, 0.3)
- Box Shadow: 0 0 15px rgba(23, 162, 184, 0.15)
- On Hover: Border brightens to rgba(23, 162, 184, 0.5)

Text Glow (Dark Mode):

- Headings: text-shadow: 0 0 10px rgba(50, 184, 198, 0.3)
- CTAs: text-shadow: 0 0 8px rgba(46, 204, 113, 0.4)

BUTTON STYLES:

Primary Button:

- Background: linear-gradient(135deg, #17a2b8 0%, #2ecc71 100%)
- Color: #ffffff
- Padding: 14px 32px
- Border Radius: 8px
- Font: Poppins Medium 16px
- Letter Spacing: 0.02em
- Transition: all 0.3s cubic-bezier(0.22, 1, 0.36, 1)
- Hover: transform: translateY(-2px), box-shadow: 0 8px 20px rgba(23, 162, 184, 0.3)
- Active: transform: translateY(0px)

Secondary Button:

- Background: transparent
- Border: 2px solid #17a2b8
- Color: #17a2b8 (light) / #32b8c6 (dark)
- Padding: 12px 30px
- Same radius and font as primary
- Hover: background: rgba(23, 162, 184, 0.1)

Icon Button:

- Size: 44x44px (touch-friendly)
- Border Radius: 50%
- Background: rgba(23, 162, 184, 0.1)
- Icon: 20x20px
- Hover: background: rgba(23, 162, 184, 0.2), scale: 1.1

CARD STYLES:

Standard Card:

- Background: Glassmorphism effect
- Padding: 24px
- Border Radius: 12px
- Border: 1px solid rgba(23, 162, 184, 0.2)
- Box Shadow: 0 4px 12px rgba(0, 0, 0, 0.08)
- Transition: all 0.3s ease
- Hover: transform: translateY(-4px), box-shadow: 0 12px 24px rgba(0, 0, 0, 0.12)

Feature Card:

- Same as standard + icon at top
- Icon container: 64x64px circle, gradient background
- Title: Poppins SemiBold 20px
- Description: Roboto Regular 16px, gray text

Stat Card:

- Compact version: Padding 20px
- Large number: 48px bold, gradient text
- Label: 14px gray

- Icon: Top-right corner, 32x32px

SPACING SYSTEM:

- xs: 4px
- sm: 8px
- md: 16px
- lg: 24px
- xl: 32px
- 2xl: 48px
- 3xl: 64px
- 4xl: 96px

Section Padding:

- Desktop: 96px vertical
- Tablet: 64px vertical
- Mobile: 48px vertical

Container Max Width:

- Small: 640px (forms, focused content)
- Medium: 960px (standard sections)
- Large: 1280px (full-width sections)
- XL: 1440px (hero, heatmap)

RESPONSIVE BREAKPOINTS:

- Mobile: < 640px
- Tablet: 640px - 1023px
- Desktop: 1024px - 1439px
- Large Desktop: ≥ 1440px

ANIMATION SPECIFICATIONS:

Page Load Sequence:

1. Logo fade-in (0s - 0.3s)
2. Navigation slide-in from top (0.2s - 0.5s)
3. Hero content stagger (0.4s - 1.2s)
4. CTA buttons scale-in (1.0s - 1.3s)

Scroll Animations:

- Trigger: IntersectionObserver, threshold 0.2
- Fade-in + slide-up: 0.8s
- Stagger delay: 0.1s between elements

Micro-interactions:

- Button hover: 0.3s cubic-bezier
- Card hover: 0.3s ease
- Link underline: 0.2s ease
- Icon rotation: 0.4s ease
- Input focus: 0.15s ease

Loading States:

- Spinner: 1s linear infinite rotation
- Skeleton: 1.5s ease-in-out pulse
- Progress bar: Smooth width transition

THEME TOGGLE:

Position: Top-right of navigation

Icon: Sun (light mode) / Moon (dark mode)

Size: 40x40px circular button
Animation: 360deg rotation on toggle (0.5s)
Storage: localStorage persistence
Transition: All theme colors smoothly change (0.5s)

PART 2: NAVIGATION SYSTEM

STICKY NAVIGATION BAR:
Position: Fixed, top: 0, z-index: 1000
Background: Glassmorphism effect with backdrop blur
Height: 72px
Padding: 0 32px (desktop), 0 16px (mobile)
Box Shadow: 0 2px 12px rgba(0, 0, 0, 0.08)

Navigation Structure:

LEFT SECTION:

- Logo Icon: 48x48px circular gradient icon
- Brand Name: "ClimaLogic" (Poppins Bold 24px, gradient text)
- Spacing: 12px gap between icon and text
- Click behavior: Smooth scroll to top / navigate to home

CENTER SECTION (Desktop only):

Navigation Links:

- Home
- Calculator
- Analytics (Heatmap)
- AI Assistant
- Resources
- Pricing

Link Styling:

- Font: Poppins Medium 16px
- Color: #666666 (inactive), #17a2b8 (active/hover)
- Spacing: 32px gap between links
- Active indicator: 2px teal underline, slide animation
- Hover: Color change + underline slide-in (0.3s)
- Click: Smooth scroll to section

RIGHT SECTION:

- Theme Toggle Button (sun/moon icon, 40x40px)
- Notification Bell Icon (24px, badge if unread)
- User Avatar (40x40px circle, or Login/Signup buttons)

Button Styling (Login/Signup):

- Login: Secondary button style, "Login" text
- Signup: Primary gradient button, "Get Started" text
- Spacing: 12px gap

MOBILE NAVIGATION:

- Hamburger Icon: Top-right, 40x40px, 3 lines
- Menu Animation: Slide-in from right (0.3s)
- Full-screen overlay: Dark background with 0.5 opacity
- Menu Container: Right sidebar, 280px width
- Links: Vertical stack, 56px height each

- Close: X icon at top, or tap outside

Mobile Menu Content:

- Logo + Brand at top
 - Navigation links (stacked vertically)
 - Theme toggle
 - Login/Signup buttons (full width)
 - Social media icons at bottom
-
-

PART 3: LANDING PAGE (Homepage)

HERO SECTION:

Layout: Full viewport height (100vh), two columns (60/40 split)

Background: Animated multicolor gradient

Padding: 0 64px (desktop), 0 24px (mobile)

LEFT COLUMN (Content):

- Headline: "Monitor, Predict & Reduce Industrial Emissions in Real-Time"
 - * Font: Poppins Bold 56px (mobile: 32px)
 - * Color: White with subtle teal glow in dark mode
 - * Animation: Staggered letter fade-in (1.5s)
 - * Line height: 1.1
- Subheadline: "Help your facility achieve EPA compliance, track carbon credits, and redu
 - * Font: Roboto Regular 18px
 - * Color: rgba(255, 255, 255, 0.9)
 - * Animation: Fade-in after headline (delay 0.8s)
 - * Line height: 1.6
 - * Max width: 600px
- Trust Badge: "✓ Trusted by 200+ industries across 45 countries"
 - * Font: Roboto Medium 14px
 - * Color: #2ecc71
 - * Icon: Green checkmark
 - * Animation: Slide-in from left (delay 1.2s)
- CTA Buttons (side by side):
 - * Primary: "Start Free Demo" (gradient button, icon: arrow right)
 - * Secondary: "Watch Demo Video" (outline button, icon: play)
 - * Spacing: 16px gap
 - * Animation: Scale-in from 0.8 (delay 1.4s)

RIGHT COLUMN (Visual):

- 3D Animated Visualization:
 - * Floating emission particles (using Three.js or CSS particles)
 - * Colors: Teal, green, blue with opacity 0.6-1.0
 - * Animation: Particles flow upward/downward
 - * Parallax effect: Moves with mouse (subtle)
 - * Fallback: High-quality illustration of industrial dashboard
- Animated Stats Overlay (floating cards):
 - * "45% Reduction Achieved" card (top-right)
 - * "98% Accuracy" card (middle-left)
 - * "Real-time Monitoring" card (bottom-right)

* Cards: Glassmorphism style, animated counter numbers

SOCIAL PROOF SECTION:

Height: 200px (auto on mobile)

Background: Semi-transparent white/dark container

Padding: 48px 64px

Content Layout (3 columns):

COLUMN 1 - Company Logos:

- 3-4 recognizable company logos (grayscale)
- Title: "Trusted by Industry Leaders"
- Logos: 120px width, 60px height, grayscale filter
- Spacing: 24px gap
- Animation: Fade-in on scroll

COLUMN 2 - Testimonial:

- Quote Icon (teal, 32px)
- Testimonial Text: "ClimaLogic reduced our emissions by 30% in just 6 months. The ROI was..."
- Author: "John Doe, Sustainability Officer"
- Company: "Global Steel Corp"
- Font: Italic Roboto 16px
- Animation: Slide-in from left

COLUMN 3 - Metrics (3 stat cards):

Stat 1: "2,500+ Companies Monitoring"

- Icon: Building icon (teal)
- Number: Animated counter (0 to 2500 in 2s)
- Font: Poppins Bold 32px

Stat 2: "45M Tons CO₂ Tracked"

- Icon: Chart icon (green)
- Number: Animated counter

Stat 3: "98% Prediction Accuracy"

- Icon: Target/checkmark icon (blue)
- Number: Animated counter

STATS BANNER SECTION:

Background: Gradient from teal to blue

Padding: 64px

Grid: 4 columns (responsive: 2x2 on tablet, 1 column mobile)

Card Design (4 identical cards with different content):

Each Card:

- Background: Glassmorphism white/dark
- Padding: 32px
- Border Radius: 12px
- Border: 2px solid rgba(255, 255, 255, 0.2)
- Hover: Scale 1.05, shadow enhancement

Card 1:

- Icon: Globe icon (64px, teal)
- Stat: "45%"
- Title: "Global Industrial GHG Emissions"
- Description: "Need real-time monitoring solutions"

Card 2:

- Icon: City icon (64px, blue)
- Stat: "75%"
- Title: "City Carbon Emissions"
- Description: "Originate from industries - track them all"

Card 3:

- Icon: Dollar icon (64px, green)
- Stat: "\$850B"
- Title: "Global Carbon Market"
- Description: "Monetize your emission reductions"

Card 4:

- Icon: Location pin icon (64px, purple)
- Stat: "200+"
- Title: "Smart Cities"
- Description: "Already adopting real-time monitoring"

Animation: Stagger fade-in on scroll (0.1s delay each)

FEATURES SECTION:

Title: "Why Industries Choose ClimaLogic"

Subtitle: "Comprehensive emission management powered by AI"

Background: Light gray (light mode) / dark surface (dark mode)

Padding: 96px 64px

Grid: 3 columns x 2 rows (responsive: 2 columns on tablet, 1 on mobile)

Feature Card Template:

- Icon container: 72x72px circle, gradient background
- Icon: 36x36px white icon
- Title: Poppins SemiBold 22px, dark text
- Description: Roboto Regular 16px, gray text, 2-3 lines
- Spacing: 16px between elements
- Hover effect: Icon rotates 5deg, card lifts

Feature 1: Real-time IoT Integration

- Icon: Connected device/sensor icon
- Title: "Real-time IoT Integration"
- Description: "Connect sensors and equipment instantly. Live data streaming from your facility."

Feature 2: AI-powered Predictions

- Icon: Brain/AI chip icon
- Title: "AI-powered Predictions"
- Description: "Predict emissions 6 months ahead with 98% accuracy using advanced machine learning models."

Feature 3: Compliance Reporting

- Icon: Document/checkmark icon
- Title: "Automated Compliance"
- Description: "EPA, ISO 14064, and regulatory compliance reports generated automatically."

Feature 4: Carbon Credit Management

- Icon: Coin/carbon icon
- Title: "Carbon Credit Trading"
- Description: "Track, verify, and monetize your emission reductions. Access \$850B global market."

Feature 5: Industry Benchmarking

- Icon: Chart/trending icon
- Title: "Industry Benchmarking"
- Description: "Compare your performance with peers. Identify improvement opportunities & set goals."

Feature 6: Custom Dashboards

- Icon: Dashboard/analytics icon
- Title: "Custom Dashboards"
- Description: "Real-time insights tailored to your needs. Drag-and-drop widgets, custom reports."

HOW IT WORKS SECTION:

Background: Gradient teal to green (subtle)

Padding: 96px 64px

Title: "Four Simple Steps to Emission Mastery"

Subtitle: "Get started in minutes, not months"

Layout: Horizontal flow with arrows (vertical on mobile)

Step 1: Select Industry

- Number Badge: "1" in large teal circle (80px)
- Icon: Dropdown/selection icon (48px)
- Title: "Select Industry" (Poppins Bold 24px)
- Description: "Choose your sector - Steel, Cement, Oil Refinery, Power Plant, Chemical, etc."
- Arrow connector: Animated right arrow (draws itself)

Step 2: Input Data

- Number Badge: "2"
- Icon: Upload/data icon
- Title: "Input Data"
- Description: "Upload facility data, equipment specs, and operational metrics. Bulk imports supported."

Step 3: Get Analysis

- Number Badge: "3"
- Icon: Analytics/chart icon
- Title: "Get AI Analysis"
- Description: "Our AI generates emission baseline, trends, predictions, and industry benchmarks."

Step 4: Implement Solutions

- Number Badge: "4"
- Icon: Implementation/rocket icon
- Title: "Implement Solutions"
- Description: "Actionable recommendations with ROI calculations, payback periods, and implementation guides."

Arrow Animation:

- SVG path draws from left to right (2s duration)
- Triggered on scroll into view
- Easing: cubic-bezier(0.4, 0, 0.2, 1)

PRICING SECTION:

Background: White (light) / Dark surface (dark)

Padding: 96px 64px

Title: "Simple, Transparent Pricing"

Subtitle: "Choose the perfect plan for your business"

Grid: 3 columns (stack on mobile)

Pricing Card Template:

- Width: 360px
- Padding: 40px
- Border Radius: 16px
- Border: 2px solid #e0e0e0 (light) / #3a4556 (dark)
- Box Shadow: 0 8px 24px rgba(0, 0, 0, 0.08)

Tier 1 - Starter (\$299/month):

- Icon: Basic facility icon
- Badge: None
- Price: "\$299" (48px bold) + "/month" (16px gray)
- Features (with checkmark icons):
 - * Single facility monitoring
 - * Basic analytics and reporting
 - * Manual emission reports
 - * Email support
 - * 90-day data retention
- CTA Button: "Get Started" (secondary style)
- Small text: "No credit card required"

Tier 2 - Professional (\$899/month) [HIGHLIGHTED]:

- Special styling: Gradient border (teal to green)
- Badge: "Most Popular" (top-right, teal background, white text)
- Scale: 1.05 (slightly larger than others)
- Price: "\$899/month"
- Features:
 - * Up to 5 facilities
 - * Advanced analytics & AI forecasting
 - * Automated monthly reports
 - * API access & integrations
 - * Priority email support
 - * 2-year data retention
 - * Real-time alerts
- CTA Button: "Get Started" (primary gradient style)
- Highlight: Subtle pulse animation

Tier 3 - Enterprise (Custom):

- Icon: Enterprise/building icon
- Badge: "Contact Sales"
- Price: "Custom Pricing"
- Features:
 - * Unlimited facilities
 - * Dedicated account manager
 - * Custom integrations
 - * 24/7 phone support
 - * Unlimited data retention
 - * White-label options
 - * On-premise deployment
- CTA Button: "Contact Sales" (secondary style)
- Note: "Volume discounts available"

Pricing Animation:

- Cards slide-in from bottom (staggered)
- Popular card scales slightly and pulses

FAQ SECTION:

Background: Light gray (light) / Dark surface (dark)

Padding: 96px 64px
Title: "Frequently Asked Questions"
Subtitle: "Everything you need to know about ClimaLogic"
Layout: Single column, max-width 800px, centered

Accordion Design:

- Each question: Expandable card
- Closed state: 72px height
- Background: White/dark surface
- Border: 1px solid gray
- Border Radius: 8px
- Margin: 16px between items

Question Header:

- Font: Poppins SemiBold 18px
- Color: Dark text
- Icon: Chevron down (rotates 180deg when expanded)
- Hover: Background lightens slightly
- Cursor: Pointer

Answer Content:

- Font: Roboto Regular 16px
- Color: Gray text
- Line height: 1.6
- Padding: 24px
- Animation: Smooth height expansion (0.4s)

FAQ Questions:

Q1: "How accurate are ClimaLogic predictions?"

A: "Our AI models achieve 98% prediction accuracy using advanced machine learning trained on historical climate data."

Q2: "What industries do you support?"

A: "We support Steel, Cement, Oil Refinery, Power Plants, Chemical manufacturing, Mining, and Transportation sectors."

Q3: "How does data security work?"

A: "We use industry-standard AES-256 encryption, comply with GDPR and SOC 2, and maintain strict access controls."

Q4: "What's the implementation timeline?"

A: "Most facilities are up and running within 2-4 weeks from signup. This includes sensor installation and initial data analysis."

Q5: "Can we integrate with existing systems?"

A: "Yes. We offer REST API, GraphQL endpoints, and pre-built integrations with major IoT platforms."

Q6: "What support is included?"

A: "All plans include email support. Professional plans add priority support. Enterprise plans offer dedicated account managers."

Q7: "Do you offer training?"

A: "Yes. All plans include onboarding training. We provide video tutorials, documentation, and live Q&A sessions."

Accordion Animation:

- Smooth expand/collapse (0.4s cubic-bezier)
- Only one open at a time
- Chevron icon rotates 180deg

CTA SECTION (Final):

Background: Dark gradient (#1a3a52 to #0a0e14)
Padding: 96px 64px
Text Alignment: Center
Particle Animation: Floating teal/green particles in background

Content:

- Title: "Start Reducing Emissions Today"
 - * Font: Poppins Bold 48px
 - * Color: White
 - * Text Shadow: 0 0 20px rgba(23, 162, 184, 0.4)
- Subtitle: "Join 200+ industries already monitoring their emissions"
 - * Font: Roboto Regular 20px
 - * Color: rgba(255, 255, 255, 0.8)
- CTA Buttons (horizontal):
 - * Primary: "Start Free Demo" (large gradient button, 56px height)
 - * Secondary: "Schedule Demo Call" (link style, white text)
 - * Spacing: 24px gap
- Small Text: "No credit card required • Enterprise-grade security • 24/7 support"
 - * Font: 14px
 - * Color: rgba(255, 255, 255, 0.6)
 - * Icons: Checkmarks before each point

Background Animation:

- Particles: 50-100 small circles (2-6px radius)
- Colors: Teal, green, blue with varying opacity
- Movement: Float upward, random horizontal drift
- Speed: Slow (10-20s to cross viewport)
- Respawn: Loop infinitely

FOOTER:

Background: #0f1419 (dark) regardless of theme
Padding: 64px
Layout: 4 columns (stack on mobile)
Border Top: 1px solid rgba(255, 255, 255, 0.1)

Column 1 - Brand:

- Logo + "ClimaLogic" (32px)
- Tagline: "Smart emission monitoring for a sustainable future"
- Social Media Icons:
 - * LinkedIn (hover: teal)
 - * Twitter (hover: teal)
 - * GitHub (hover: teal)
 - * YouTube (hover: teal)
 - * Size: 40x40px each
 - * Spacing: 12px gap

Column 2 - Company:

- Heading: "Company" (Poppins SemiBold 16px, white)
- Links (Roboto Regular 14px, gray):
 - * About Us
 - * Blog
 - * Careers
 - * Contact

- * Press Kit
- Hover: Color changes to teal
- Spacing: 12px between links

Column 3 - Product:

- Heading: "Product"
- Links:
 - * Features
 - * Pricing
 - * Calculator
 - * API Documentation
 - * Integrations
 - * Roadmap

Column 4 - Legal & Resources:

- Heading: "Legal"
- Links:
 - * Privacy Policy
 - * Terms of Service
 - * Cookie Policy
 - * Security
 - * Status Page

Newsletter Signup (full width below columns):

- Title: "Stay updated with latest emission insights"
- Input: Email field (400px width on desktop)
- Button: "Subscribe" (primary style)
- Layout: Horizontal flex
- Note: "Unsubscribe anytime. Privacy protected."

Copyright (bottom):

- Text: "© 2025 ClimaLogic. All rights reserved."
- Font: Roboto Regular 14px
- Color: rgba(255, 255, 255, 0.5)
- Alignment: Center

PART 4: INDUSTRIAL EMISSION CALCULATOR PAGE

PAGE LAYOUT:

- Background: Same animated gradient as landing page
Breadcrumb: Home > Calculator (top-left, 16px gray)
Layout: Two-column split (40% left input, 60% right results)
Responsive: Stack vertically on mobile (input on top)

LEFT COLUMN - INPUT FORM:

Container:

- Background: Glassmorphism effect
- Padding: 32px
- Border Radius: 16px
- Border: 2px solid rgba(23, 162, 184, 0.3)
- Box Shadow: 0 8px 24px rgba(0, 0, 0, 0.1)
- Position: Sticky (stays in viewport on scroll)

Page Title:

- "Industrial Emission Calculator"
- Font: Poppins Bold 36px
- Animated underline: Teal, slides from left (1s)
- Subtitle: "Calculate your facility's GHG emissions with industry-specific factors"
- Font: Roboto Regular 16px, gray

SECTION 1: FACILITY INFORMATION

Field 1 - Facility Name:

- Label: "Facility Name" (Poppins Medium 14px)
- Required indicator: Red asterisk *
- Input: Text field
- Placeholder: "e.g., Steel Mill #1"
- Icon: Building icon (left side, teal)
- Helper text: "Name your facility for future reference" (12px gray)
- Styling:
 - * Height: 48px
 - * Border: 1px solid #e0e0e0
 - * Border Radius: 8px
 - * Padding: 12px 12px 12px 44px (room for icon)
 - * Focus: Border changes to teal, box-shadow glow

Field 2 - Industry Type:

- Label: "Industry Type *"
- Input: Dropdown/Select
- Icon: Industry-specific icon (changes based on selection)
- Options:
 - * Steel Manufacturing
 - * Cement Production
 - * Oil Refinery
 - * Power Plant (Coal/Gas)
 - * Chemical Manufacturing
 - * Mining Operations
 - * Food & Beverage
 - * General Manufacturing
 - * Other
- Default: "Select your industry..."
- Validation: Required field (red border if empty on submit)
- Dynamic: Icon and subsequent fields change based on selection

Field 3 - Facility Size:

- Label: "Facility Size *"
- Input: Radio buttons (horizontal)
- Options:
 - * Small (< 500 employees) - Icon: Small building
 - * Medium (500-2000) - Icon: Medium building
 - * Large (>2000) - Icon: Large complex
- Styling: Card-style radio buttons with icons
- Selected state: Teal border + background tint

Field 4 - Location:

- Label: "Facility Location"
- Input: Text with autocomplete
- Placeholder: "Enter city, state, or country"
- Icon: Location pin (teal)
- Autocomplete: Google Places API or dropdown of major cities

- Optional: "Show on map" link below (opens mini map modal)

Divider Line (subtle gray, 1px, margin 24px vertical)

SECTION 2: ENERGY CONSUMPTION

Field 5 - Annual Electricity Usage:

- Label: "Annual Electricity Consumption *"
- Input: Number field
- Unit Suffix: "MWh" (inside input, right side, gray)
- Placeholder: "0"
- Icon: Lightning bolt (teal)
- Helper: "Check your annual utility bills for accurate data"
- Validation: Must be positive number
- Info tooltip: Hover for explanation of MWh

Field 6 - Natural Gas Consumption:

- Label: "Natural Gas Usage *"
- Input: Number field
- Unit Suffix: "Cubic Meters/year"
- Unit Selector: Dropdown (m^3 , therms, MMBtu) - converts automatically
- Placeholder: "0"
- Icon: Gas flame icon
- Helper: "Monthly average \times 12"

Field 7 - Fuel Oil Usage:

- Label: "Fuel Oil Consumption"
- Input: Number field
- Unit Suffix: "Liters/year"
- Placeholder: "0"
- Icon: Oil barrel icon
- Helper: "Include diesel, gasoline, heavy fuel oil"
- Optional field (border styling lighter)

Field 8 - Renewable Energy Percentage:

- Label: "Renewable Energy %"
- Input: Slider (range 0-100%)
- Current value display: Large number above slider (e.g., "25%")
- Color gradient: Red (0%) → Yellow (50%) → Green (100%)
- Marks: 0, 25, 50, 75, 100
- Helper: "Solar, wind, hydro, or other renewable sources"
- Visual: Fills slider track with green as value increases

Divider Line

SECTION 3: PRODUCTION METRICS (Industry-Specific)

Dynamic fields appear based on Industry Type selected:

FOR STEEL MANUFACTURING:

Field 9a - Annual Steel Production:

- Label: "Annual Steel Production *"
- Input: Number
- Unit: "Metric Tons"
- Placeholder: "0"
- Helper: "Total finished steel output per year"

Field 10a - Production Process:

- Label: "Primary Production Process *"
- Input: Dropdown
- Options:
 - * Basic Oxygen Furnace (BOF)
 - * Electric Arc Furnace (EAF)
 - * Open Hearth Furnace
 - * Other
- Note: Emission factors vary significantly by process

Field 11a - Scrap Metal Percentage:

- Label: "Scrap Metal Input %"
- Input: Slider (0-100%)
- Note: Higher scrap = lower emissions

FOR CEMENT PRODUCTION:

Field 9b - Annual Cement Production:

- Label: "Annual Cement Production *"
- Input: Number
- Unit: "Metric Tons"

Field 10b - Kiln Type:

- Label: "Kiln Technology *"
- Input: Dropdown
- Options:
 - * Rotary Kiln (wet process)
 - * Rotary Kiln (dry process)
 - * Vertical Shaft Kiln
 - * Other

Field 11b - Clinker Ratio:

- Label: "Clinker to Cement Ratio"
- Input: Slider (60-100%)
- Default: 95%
- Note: Lower ratio = more supplementary materials = lower emissions

FOR OIL REFINERY:

Field 9c - Daily Crude Processing:

- Label: "Daily Crude Oil Processing *"
- Input: Number
- Unit: "Barrels per day"

Field 10c - Refinery Capacity Utilization:

- Label: "Capacity Utilization %"
- Input: Slider (0-100%)
- Default: 85%

FOR POWER PLANT:

Field 9d - Annual Energy Output:

- Label: "Annual Electricity Generation *"
- Input: Number
- Unit: "MWh/year"

Field 10d - Primary Fuel:

- Label: "Primary Fuel Type *"

- Input: Dropdown

- Options:

- * Coal
- * Natural Gas
- * Oil
- * Biomass
- * Mixed

Field 11d - Plant Efficiency:

- Label: "Thermal Efficiency %"

- Input: Slider (20-60%)

- Default: 35%

- Color coding: Red (low) → Green (high)

FOR OTHER INDUSTRIES:

Field 9e - Production Volume:

- Label: "Annual Production Volume *"

- Input: Number

- Unit: Custom text input (user defines: "tons", "units", "liters", etc.)

ACTION BUTTONS (Bottom of form):

Primary Button: "Calculate Emissions"

- Full width

- Height: 56px

- Background: Gradient (teal to green)

- Icon: Calculator icon (left) + arrow (right)

- Font: Poppins SemiBold 18px

- On click:

- * Validate all required fields

- * Show loading state (spinner + "Calculating...")

- * Scroll to results section

- * Animate results appearance

- Disabled state: Gray, cursor not-allowed if required fields empty

Secondary Button: "Clear Form"

- Outline style

- Height: 48px

- Icon: Refresh icon

- Click: Show confirmation modal ("Clear all data? This cannot be undone")

- Confirm: Reset all fields to default

Helper Links (below buttons):

- "Need help?" → Opens AI chatbot with calculator context

- "View emission factors" → Opens modal with industry-specific factors table

RIGHT COLUMN - RESULTS SECTION:

Container:

- Background: Glassmorphism

- Padding: 32px

- Border: 2px solid rgba(46, 204, 113, 0.3) (green when results present)

- Initial state: Gray border, placeholder text "Results will appear here"

- Animation: Slide-in from right (0.6s) when results ready

HEADER CARD - TOTAL EMISSIONS:

Large Display:

- Number: Animated counter (48px Poppins Bold, teal color)
- Format: "X,XXX.XX tons CO₂e/year"
- Animation: Counts from 0 to final value (2s)
- Subtext: "Total Annual Greenhouse Gas Emissions"

Change Indicator (if previous calculation exists):

- Arrow icon: Up (red) or Down (green)
- Percentage: "↑ 15% vs. last calculation" or "↓ 12% improvement"
- Font: 14px SemiBold

Circular Gauge Visualization:

- Position: Right side of header card
- Size: 120px diameter
- Type: Donut chart
- Fill: Based on emissions level
 - * Green zone: < 1,000 tons (good)
 - * Yellow zone: 1,000-5,000 tons (moderate)
 - * Orange zone: 5,000-10,000 tons (high)
 - * Red zone: > 10,000 tons (critical)
- Animation: Arc draws clockwise (1.5s)
- Center text: Emission level "Moderate"

EMISSION BREAKDOWN CHART:

Title: "Emissions by Source"

Type: Stacked horizontal bar chart

Height: 120px

Segments (left to right):

1. Energy Emissions (Blue #3498db)
2. Process Emissions (Teal #17a2b8)
3. Transportation (Green #2ecc71)
4. Other (Gray #95a5a6)

Each segment:

- Shows percentage width
- Hover: Tooltip shows exact value + percentage
- Label: Source name + value inside bar (if space) or outside
- Animation: Bars expand from left on load (0.8s staggered)

INDUSTRY COMPARISON CARD:

Title: "Your Facility vs. Industry Average"

Layout: Two vertical bars side-by-side

Bar 1 - Your Facility:

- Height: Proportional to emissions
- Color: Teal
- Label: "Your Facility"
- Value: "X tons CO₂e"

Bar 2 - Industry Average:

- Height: Proportional
- Color: Gray
- Label: "Industry Avg"
- Value: "Y tons CO₂e"

Comparison Text:

- If above average: "Your facility emits 28% above industry average" (red text)

- If below average: "Your facility emits 15% below industry average ✓" (green text)
- Link: "View detailed benchmarking →" (opens analytics page)

BREAKDOWN PIE CHART:

Title: "Detailed Emission Sources"

Type: Donut/Pie chart

Size: 280px diameter

Segments:

- Electricity: X% + tons CO₂e (Blue)
- Natural Gas: X% + tons (Orange)
- Fuel Oil: X% + tons (Red)
- Process Emissions: X% + tons (Purple)
- Transportation: X% + tons (Green)
- Other: X% + tons (Gray)

Interactions:

- Hover: Segment enlarges slightly, shows tooltip
- Click: Segment expands out
- Legend: Below chart with colored boxes + labels
- Animation: Chart draws itself (pie slices appear sequentially, 1.5s)

KEY METRICS GRID:

Layout: 2x2 grid

Card styling: Mini cards with icon + number + label

Card 1 - Annual Emissions:

- Icon: Chart icon (teal, 32px)
- Value: "X,XXX tons CO₂e" (24px bold)
- Label: "Total annual GHG emissions"
- Background: Light teal tint

Card 2 - Emissions Intensity:

- Icon: Gauge icon (blue, 32px)
- Value: "X.XX tons/unit" (24px bold)
- Label: "Emissions per production unit"
- Background: Light blue tint

Card 3 - Carbon Offset Equivalent:

- Icon: Tree icon (green, 32px)
- Value: "XXX trees needed" (24px bold)
- Label: "To offset annual emissions"
- Background: Light green tint
- Subtext: "Approx. X acres of forest"

Card 4 - Carbon Cost:

- Icon: Dollar icon (orange, 32px)
- Value: "\$XX,XXX/year" (24px bold)
- Label: "At current carbon price (\$50/ton)"
- Background: Light orange tint
- Note: "Potential carbon credit value"

RECOMMENDATIONS SECTION:

Title: "Personalized Emission Reduction Strategies"

Subtitle: "Based on your facility data and industry best practices"

Recommendation Card Template (3-5 cards):

Layout: Vertical stack

Each card:

- Priority Badge: "HIGH" | "MEDIUM" | "LOW" (top-right)
 - * HIGH: Red background, white text
 - * MEDIUM: Orange background
 - * LOW: Yellow background
- Icon: Strategy-specific icon (64px, teal)
- Title: Strategy name (Poppins SemiBold 20px)
- Description: 2-3 sentences explaining the strategy
- Impact Metric: "Potential Reduction: XXX tons CO₂e/year (XX%)"
 - * Large bold number
 - * Progress bar showing % of total emissions
- ROI Info: "Payback Period: XX months"
 - * Icon: Money/clock icon
 - * Color-coded: Green (< 24 mo), Yellow (24-48), Red (> 48)
- Implementation Difficulty:
 - * "Easy" (green) | "Medium" (yellow) | "Hard" (red)
 - * Icon: Wrench/gear
- Estimated Cost: "\$XX,XXX - \$XXX,XXX"
- Button: "Learn More" (outline teal)
 - * Click: Opens detailed modal or guide

Animation: Cards slide-in from bottom (staggered 0.2s)

Example Recommendations:

Recommendation 1 (HIGH Priority):

- Title: "Switch to Electric Arc Furnace Technology"
- Description: "EAF technology uses up to 75% recycled steel scrap, dramatically reducing waste."
- Impact: "Reduce by 2,500 tons CO₂e/year (45%)"
- ROI: "Payback: 36 months"
- Difficulty: "Hard"
- Cost: "\$2M - \$5M"

Recommendation 2 (HIGH Priority):

- Title: "Install LED Lighting Across Facility"
- Description: "Replace all traditional lighting with LED fixtures. Reduces electricity consumption by 50%."
- Impact: "Reduce by 125 tons CO₂e/year (2.3%)"
- ROI: "Payback: 18 months"
- Difficulty: "Easy"
- Cost: "\$50K - \$100K"

Recommendation 3 (MEDIUM Priority):

- Title: "Implement Waste Heat Recovery System"
- Description: "Capture waste heat from production processes to generate electricity or preheat raw materials."
- Impact: "Reduce by 450 tons CO₂e/year (8%)"
- ROI: "Payback: 42 months"
- Difficulty: "Medium"
- Cost: "\$500K - \$1M"

EXPORT & SHARE OPTIONS:

Position: Bottom of results section

Layout: Horizontal button row

Button 1 - Download Report:

- Icon: PDF icon

- Text: "Download Full Report"
- Style: Primary gradient
- Click:
 - * Generate PDF with all results, charts, recommendations
 - * Include company logo, facility name, timestamp
 - * Toast notification: "Downloading... Report saved!"
 - * PDF layout: Professional formatting with branding

Button 2 - Share Results:

- Icon: Share icon
- Text: "Share Results"
- Style: Secondary outline
- Click: Opens modal with options:
 - * Email (input field + send button)
 - * Copy Link (generates shareable read-only link)
 - * Social Media (LinkedIn, Twitter share buttons)
 - * Embed Code (for internal dashboards)

Button 3 - Save to Dashboard:

- Icon: Save/bookmark icon
- Text: "Save Calculation"
- Style: Secondary outline
- Click:
 - * If logged in: Saves to user dashboard with timestamp
 - * If not logged in: Prompts signup/login
 - * Toast: "Calculation saved successfully ✓"
 - * Adds to calculation history

Button 4 - Schedule Consultation:

- Icon: Calendar icon
- Text: "Talk to Expert"
- Style: Outline
- Click: Opens Calendly-style scheduling widget for consultation

CALCULATION HISTORY (if logged in):

Position: Right sidebar or bottom section

Title: "Your Recent Calculations"

Layout: List of calculation cards (last 5)

Each history card:

- Facility name
- Date/time
- Total emissions (summary)
- Industry icon
- Click: Loads that calculation into form + results
- Delete icon (X): Removes from history

Empty state: "No saved calculations yet. Complete a calculation above to get started."

PART 5: 3D INTERACTIVE HEATMAP (INDIA MAP)

PAGE SETUP:

Route: /analytics/heatmap

Breadcrumb: Home > Analytics > Emission Heatmap

Full-screen layout: Map takes 100% viewport
Background: Dark theme optimized for map visibility

MAP CONTAINER:

Library: Mapbox GL JS + Three.js for 3D elements (or Cesium.js)
View: 3D globe/terrain view of India
Initial position: Centered on India (lat: 20.5937°, lng: 78.9629°)
Zoom level: 5 (shows full country)
Tilt: 45° (3D perspective)
Bearing: 0° (north up)

Map Styling:

Base Layer:

- Style: Dark topographic (Mapbox dark-v10 or custom)
- State boundaries: Teal lines (1px, 0.6 opacity)
- Major cities labeled: White text, 12px
- Water bodies: Dark blue (#0a1929)
- Terrain: Subtle elevation shading
- Roads: Hidden (clutter reduction)

3D EMISSION PINS:

Technology: THREE.js meshes rendered on map
Total pins: 75-100 major industrial facilities across India

Pin Distribution by State (examples):

- Maharashtra: 12 pins (Mumbai, Pune industries)
- Gujarat: 10 pins (Ahmedabad, Surat refineries)
- Tamil Nadu: 8 pins (Chennai manufacturing)
- Karnataka: 7 pins (Bangalore tech)
- West Bengal: 6 pins (Kolkata industries)
- Uttar Pradesh: 6 pins
- Other states: 3-5 each

Pin Categories by Industry:

1. Steel Plants (15-20 pins):
 - Color: Blue (#3498db)
 - Icon: Steel beam symbol
2. Cement Factories (15-20 pins):
 - Color: Gray (#95a5a6)
 - Icon: Cement bag symbol
3. Oil Refineries (8-10 pins):
 - Color: Orange/Red (#e67e22)
 - Icon: Oil drop symbol
4. Power Plants (15-20 pins):
 - Color: Yellow (#f1c40f)
 - Icon: Lightning bolt
5. Chemical Plants (8-10 pins):
 - Color: Purple (#9b59b6)
 - Icon: Flask symbol
6. Manufacturing (10-15 pins):
 - Color: Green (#2ecc71)

- Icon: Gear symbol

PIN 3D VISUALIZATION:

- Geometry: Cylinder or cone extending vertically from location
- Height: Proportional to emissions (log scale)
 - Low emissions (< 1,000 tons): 20px height
 - Medium (1,000-5,000): 40px height
 - High (5,000-10,000): 80px height
 - Very high (> 10,000): 120px height

Radius: Proportional to facility size

- Small facility: 8px radius
- Medium: 12px radius
- Large: 16px radius

Color: Industry-specific (see categories above)

Glow Effect:

- Ambient light sphere around pin
- Radius: 1.5x pin radius
- Opacity: 0.3-0.6
- Color: Matches industry color
- Pulsing animation: 2s cycle, opacity varies 0.3 to 0.6

Pin Animation:

- Idle: Subtle pulse (breathing effect, 2s cycle)
- Hover: Scale up 1.3x, glow intensifies
- Selected: Persistent highlight + info panel

Material: Semi-transparent (opacity 0.8), emissive property for glow

PIN DATA STRUCTURE:

Each pin object contains:

```
{  
  id: "facility_001",  
  name: "Tata Steel Plant - Jamshedpur",  
  location: {  
    lat: 22.8046,  
    lng: 86.2029,  
    city: "Jamshedpur",  
    state: "Jharkhand"  
  },  
  industry: "steel",  
  facilitySize: "large",  
  emissions: {  
    annual_tons_co2e: 8500,  
    trend: "decreasing", // or "increasing", "stable"  
    lastUpdated: "2025-11-15T10:30:00Z"  
  },  
  sources: {  
    electricity: 3200,  
    water: 1500  
  }  
}
```

```
natural_gas: 2800,  
process: 2000,  
other: 500  
},  
recommendations: [  
  "Switch to EAF technology",  
  "Install waste heat recovery"  
]  
}
```

PIN INTERACTIONS:

1. HOVER STATE:

- Trigger: Mouse cursor over pin (150ms delay)
- Effect:
 - * Pin scales up 1.3x (0.2s smooth)
 - * Glow intensifies (brighter, larger radius)
 - * Cursor changes to pointer
- Popup appears:
 - * Position: Above pin, offset 20px
 - * Background: Glassmorphism white/dark
 - * Size: 240px width, auto height
 - * Shadow: 0 8px 16px rgba(0,0,0,0.2)
 - * Arrow: Pointing to pin
 - * Animation: Fade-in + scale from 0.9 (0.2s)

Popup Content:

- Facility icon (32px, colored)
- Facility name (Poppins SemiBold 16px)
- Location (12px gray): "City, State"
- Emissions value (20px bold, teal): "8,500 tons CO₂e/year"
- Trend indicator:
 - * Increasing: Red arrow up + "↑ 5% from last year"
 - * Decreasing: Green arrow down + "↓ 12% from last year"
 - * Stable: Gray dash + "→ Stable"
- Last updated timestamp (10px gray)

2. CLICK STATE:

- Trigger: Click on pin
- Effect:
 - * Map auto-pans to center pin (1s smooth animation)
 - * Zoom in to level 10 (closer view)
 - * Popup closes
 - * Side panel slides in from right (0.4s)

Side Panel Content:

Background: Glassmorphism
Width: 400px (mobile: 100% screen width, bottom sheet)
Height: 100vh (full height)
Padding: 32px
Scroll: Vertical if content overflows

Header:

- Close button (X): Top-right corner, 32px
- Facility icon: Large (64px)
- Facility name: Poppins Bold 24px
- Location: 14px gray + map pin icon
- Industry badge: Pill shape, colored background

Tabs (if multiple views):

- Overview (default)
- Emission Details
- Recommendations

Overview Tab:

Section 1 - Key Metrics:

- Annual Emissions: Large number (32px bold)
- Trend graph: Mini line chart (last 12 months)
- Industry comparison: "28% above average" (red) or below (green)

Section 2 - Emission Breakdown:

- Pie chart (200px diameter)
- Legend with values
- Interactive: Click slice to expand

Section 3 - Top Emission Sources:

- List (3 items):
 1. Source name + icon
 2. Value (tons CO₂e)
 3. Percentage of total
 4. Horizontal bar (visual)

Section 4 - Facility Details:

- Facility size: Badge (Small/Medium/Large)
- Annual production: "X tons/year"
- Energy consumption: "X MWh/year"
- Established: Year

Section 5 - Actions:

- "View Full Dashboard" button (primary)
- "Calculate Reductions" button (secondary)
- "Download Report" button (outline)
- "Contact Facility" link

Mobile View:

- Side panel becomes bottom sheet
- Swipe down to close
- Compact layout
- Tabs as horizontal scrollable

FILTER & CONTROL PANEL:

Position: Fixed, left side

Width: 300px (collapsible to 60px)

Background: Glassmorphism

Padding: 24px

Z-index: 500

Collapse Button:

- Icon: Double chevron (left when open, right when closed)

- Position: Top-right of panel
- Click: Smooth width animation (0.3s)
- Collapsed state: Only icons visible

Filter Sections:

SECTION 1 - Industry Type:

Title: "Filter by Industry" (Poppins SemiBold 14px)

Checkbox Group (vertical):

- Steel Plants: Checkbox + color swatch (blue) + count "(18)"
- Cement: Checkbox + gray swatch + "(17)"
- Oil Refineries: Checkbox + orange + "(9)"
- Power Plants: Checkbox + yellow + "(16)"
- Chemical: Checkbox + purple + "(10)"
- Manufacturing: Checkbox + green + "(12)"

Controls:

- "Select All" link (teal)
- "Clear All" link (gray)

Checkbox Animation:

- Check appears with checkmark slide + scale
- Unchecking: Reverse animation
- On change: Map pins instantly filter (fade out/in 0.3s)

SECTION 2 - Emission Range:

Title: "Emissions (tons CO₂e/year)"

Input: Range slider (dual thumb)

Min: 0

Max: 50,000 (or dynamic based on data)

Current range display: "1,250 to 12,500 tons"

Color: Gradient from green (low) to red (high)

Step: 100

Marks: 0, 10K, 20K, 30K, 40K, 50K

On change: Live filter (debounced 300ms)

SECTION 3 - Emission Trend:

Title: "Emission Trend"

Radio Buttons (vertical):

- All facilities (default, selected)
- Increasing ↑ (red icon)
- Decreasing ↓ (green icon)
- Stable → (gray icon)

On select: Filter pins by trend, animate transitions

SECTION 4 - State/Region:

Title: "Location"

Input: Searchable multi-select dropdown

Options: All Indian states + union territories

Format: "State Name (count)" e.g., "Maharashtra (12)"

Search: Type to filter states

Multi-select: Shift+click for multiple

On change:

- Map view adjusts to show selected states
- Smooth pan + zoom animation

- Filtered pins highlighted

SECTION 5 - Live Data Toggle:

Title: "Data Source"

Toggle Switch:

- Label: "Real-time Data"
- Default: ON (green)
- When ON:
 - * Badge: "Live" with green dot (pulsing)
 - * Map updates every 30 seconds via WebSocket
 - * Animation: Subtle flash on pin when data updates
- When OFF:
 - * Uses cached data
 - * Badge: "Cached" with gray dot

Info Icon: Hover shows "Data updates every 30s when live mode enabled"

SECTION 6 - Quick Stats:

Non-interactive, informational cards

Stat 1: Total Emissions

- Icon: Cloud icon
- Value: "XX.X Million tons CO₂e" (animated counter)
- Label: "Total from visible facilities"
- Color: Based on threshold (green if good, red if high)

Stat 2: Facilities Shown

- Icon: Building icon
- Value: "XX facilities"
- Label: "Based on current filters"

Stat 3: Average Emissions

- Icon: Gauge icon
- Value: "X,XXX tons"
- Label: "Per facility average"

STATISTICS PANEL (Right Sidebar):

Position: Fixed, right side

Width: 320px (collapsible)

Background: Glassmorphism

Padding: 24px

Scroll: Vertical

Header:

- Title: "Analytics Overview"
- Subtitle: "Based on visible facilities"

STAT 1 - Total Emissions Card:

- Large number: "45.2 Million tons CO₂e" (32px bold, gradient text)
- Trend: "↓ 3.2% from last month" (green if down, red if up)
- Icon: Large cloud/emission icon (teal)
- Animation: Counter increments on load
- Visual: Circular progress ring around icon

STAT 2 - Top Emitter Card:

- Title: "Highest Emitter"

- Facility icon (industry-specific)
- Facility name: "ABC Steel Plant" (18px bold)
- Location: "Mumbai, Maharashtra" (12px gray)
- Emissions: "12,450 tons CO₂e" (16px teal)
- Button: "View on Map"
 - * Click: Map pans to facility, opens side panel
- Border: Left border (4px red) indicating high emissions

STAT 3 - Emission Distribution (Pie Chart):

- Title: "By Industry Type"
- Chart: Donut chart (220px diameter)
- Segments: Each industry with percentage
- Colors: Match industry colors (steel=blue, etc.)
- Legend: Below chart
 - * Industry name + icon
 - * Percentage
 - * Absolute value
- Interactive: Click slice to filter map to that industry

STAT 4 - State Rankings:

- Title: "Top 5 States by Emissions"
- List format (vertical):

Rank 1:

- Number: "1" (badge, gold background)
- State: "Maharashtra" (16px bold)
- Value: "8.2M tons" (14px)
- Progress bar: Horizontal, fills 100% (teal)
- Percentage: "18.2% of total"

Rank 2-5: Similar format, different colors

- Rank 2: Silver badge
- Rank 3: Bronze badge
- Rank 4-5: Gray badge

Bar colors: Gradient intensity (darker = higher emissions)

On click state name: Map filters + zooms to that state

STAT 5 - Facility Count:

- Title: "Facilities Monitored"
- Large icon: Building/factory icon (64px)
- Count: "82 Facilities" (28px bold)
- Breakdown:
 - * "6 industries"
 - * "18 states"
 - * "45.2M tons tracked"
- Visual: Mini bar chart showing distribution

STAT 6 - Recent Activity Feed:

- Title: "Live Updates"
- Scrollable list (max 5 items):

Activity Item:

- Timestamp: "2 mins ago"
- Icon: Industry icon (small)

- Text: "XYZ Plant emissions updated" or "New facility added in Delhi"
- Facility name link: Click to view
- Animation: New items slide-in from top

MAP CONTROLS (Floating, Top-Right):

Position: Absolute, top 20px, right 20px (above stats panel)

Layout: Vertical stack of circular buttons

Button size: 44x44px each

Background: White (light mode) / dark (dark mode)

Shadow: 0 2px 8px rgba(0,0,0,0.15)

Spacing: 8px between buttons

Button 1 - Zoom In:

- Icon: Plus (+)
- Click: Zoom in one level
- Smooth animation: 0.5s

Button 2 - Zoom Out:

- Icon: Minus (-)
- Click: Zoom out one level

Button 3 - Reset View:

- Icon: Home/reset icon
- Click: Return to initial India view (zoom 5, centered)
- Animation: Smooth fly-to (1.5s)

Button 4 - Toggle 2D/3D:

- Icon: "2D" or "3D" text
- Click: Switch between flat map and 3D terrain
- Animation: Smooth tilt transition (1s)
- 2D: Pitch 0°
- 3D: Pitch 45-60°

Button 5 - Satellite View:

- Icon: Satellite icon
- Click: Toggle between map style and satellite imagery
- Styles: Dark map ↔ Satellite with labels

Button 6 - Full Screen:

- Icon: Expand arrows icon
- Click: Enter/exit fullscreen mode
- ESC key exits
- In fullscreen: Icon changes to compress arrows

Button 7 - Refresh Data:

- Icon: Circular arrow (refresh)
- Click: Manually refresh live data
- Animation: Icon spins 360° (1s)
- Toast: "Data refreshed ✓"

Hover Effects (all buttons):

- Scale: 1.1
- Shadow: Enhanced
- Background: Slightly lighter/darker
- Transition: 0.2s

SEARCH BAR:

Position: Top-center of map
Width: 500px (mobile: 90% width)
Height: 56px
Background: White/dark glassmorphism
Border Radius: 28px (pill shape)
Shadow: 0 4px 12px rgba(0,0,0,0.1)
Z-index: 600

Input Field:

- Placeholder: "Search facility name, city, state, or industry..."
- Font: Roboto Regular 16px
- Padding: 16px 24px 16px 52px (space for icon)
- Border: None (or subtle on focus)
- Icon: Search icon (left side, 24px, gray)

Autocomplete Dropdown:

- Appears on typing (2+ characters)
- Position: Below search bar
- Background: White/dark
- Max height: 400px, scrollable
- Items: Facility results (max 10)

Result Item:

- Icon: Industry icon (32px)
- Primary text: Facility name (14px bold)
- Secondary text: "City, State • Industry" (12px gray)
- Tertiary: "X,XXX tons CO₂e" (12px teal)
- Hover: Background highlight
- Click:
 - * Map pans to facility (smooth)
 - * Zoom to level 10
 - * Open side panel
 - * Search bar clears

Recent Searches (if no results):

- Shows last 5 searches
- Icon: Clock icon
- Click: Repeat search

Clear Button:

- Icon: X (appears when typing)
- Position: Right side of input
- Click: Clear input, close dropdown

Keyboard Navigation:

- Up/down arrows: Navigate results
- Enter: Select highlighted result
- Esc: Close dropdown

LOADING STATES:

Initial Map Load:

- Spinner: Center of screen (64px, teal)
- Text: "Loading emission data..." (below spinner)
- Progress: Optional percentage (if tracking load)

Pin Loading:

- Skeleton pins: Gray cylinders at locations
- Fade-in: Pins appear as data loads
- Batch loading: 20 pins at a time for performance

Filter Changes:

- Smooth fade-out of filtered pins (0.3s)
- Fade-in of matching pins (0.3s)
- No jarring pop-in/out

Data Refresh:

- Subtle pulse on updated pins
- Toast notification: "Data updated" (bottom-center, 2s)

RESPONSIVE DESIGN:

Desktop (> 1024px):

- Left panel: 300px width, always visible
- Right panel: 320px width, always visible
- Map: Fills remaining space
- Search: Top-center, 500px width

Tablet (768px - 1023px):

- Left panel: Collapsible, 280px when open
- Right panel: Collapsible, overlay when open
- Map: Full width when panels closed
- Search: Top-center, 90% width

Mobile (< 768px):

- No sidebars, full-screen map
- Filter button: Bottom-left floating action button
 - * Click: Opens filter modal (slides up from bottom)
 - * Modal: 80vh height, swipeable
- Stats button: Bottom-right floating action button
 - * Click: Opens stats modal (slides up from bottom)
- Search: Top, full width, 48px height
- Controls: Smaller (36px), right side vertical stack
- Side panel (on pin click): Bottom sheet
 - * Swipe down to close
 - * Max height: 70vh

PERFORMANCE OPTIMIZATION:

Pin Clustering:

- When zoomed out (< level 7): Cluster nearby pins
- Cluster visualization: Circle with number
- Size: Based on number of facilities in cluster
- Color: Mixed gradient if multiple industries
- Click cluster: Zoom in to expand

WebGL Rendering:

- Use WebGL for 3D pins (60 FPS target)
- Level of detail: Reduce pin complexity when zoomed out
- Frustum culling: Don't render off-screen pins

Data Management:

- Lazy load: Only load visible region data

- Caching: Cache API responses (5 min TTL)
- Pagination: Load pins in batches as user navigates
- Compression: Gzip API responses

Animation Throttling:

- Reduce animation complexity on low-end devices
 - Detect FPS, disable animations if < 30 FPS
 - Fallback to 2D circles if 3D performance poor
-
-

PART 6: AI CHATBOT (GEMINI AI ASSISTANT)

FLOATING CHAT BUTTON:

Position: Fixed, bottom-right corner
Offset: 24px from bottom, 24px from right
Size: 64x64px (circular)
Z-index: 1000 (above all content)
Background: Gradient (teal #17a2b8 to green #2ecc71)
Shadow: 0 4px 16px rgba(23, 162, 184, 0.4)

Icon:

- Type: Chat bubble or AI brain icon
- Size: 32px
- Color: White
- Animation: Subtle pulse (breathing effect, 2s cycle)

Badge (if unread messages):

- Position: Top-right of button
- Size: 20x20px circle
- Background: Red (#e74c3c)
- Text: Number of unread (white, 12px bold)
- Animation: Bounce on new message

Hover State:

- Scale: 1.1
- Shadow: Enhanced (0 6px 24px)
- Rotation: 5deg
- Transition: 0.3s cubic-bezier

Click Action:

- Button scales down (0.95) briefly
- Chat window slides in from bottom-right
- Button transforms to close icon (X)

CHAT WINDOW MODAL:

Position: Fixed, bottom-right
Initial: Off-screen (translateY(100%))
Open: Slides up (0.4s cubic-bezier ease)
Size:

- Desktop: 420px width × 640px height
- Mobile: 100% width × 100vh height

Offset from edges: 24px (desktop only)
Background: Glassmorphism effect
Border Radius: 16px (desktop) / 0 (mobile)
Border: 2px solid rgba(23, 162, 184, 0.3)

Shadow: 0 12px 48px rgba(0, 0, 0, 0.2)
Z-index: 1001

CHAT HEADER:

Height: 72px
Background: Gradient (teal to green)
Padding: 16px 20px
Border Radius: 16px 16px 0 0

Left Section:

- AI Avatar: Circular icon (48px)
 - * Background: White circle
 - * Icon: AI brain or ClimaLogic logo icon
- Text Stack:
 - * Title: "ClimaLogic AI Assistant" (Poppins SemiBold 16px, white)
 - * Subtitle: "Powered by Google Gemini" (Roboto 12px, rgba(255,255,255,0.8))
 - * Status: "Online" with green dot (10px circle, pulsing)

Right Section (Icons):

- Settings Icon: Gear icon (24px, white)
 - * Click: Opens settings dropdown
- Minimize Icon: Underscore (24px, white)
 - * Click: Collapses chat to header only
- Close Icon: X (24px, white)
 - * Click: Slides chat window down (closes)

Icon Hover: Background rgba(255,255,255,0.2), scale 1.1

CHAT MESSAGES AREA:

Height: calc(640px - 72px - 80px) = 488px
Overflow: Scroll (vertical)
Padding: 20px
Background: Themed (light/dark)
Scroll Behavior: Smooth, auto-scroll to bottom on new message

Message Bubble Styles:

USER MESSAGE (Right-aligned):

- Background: Linear gradient (teal to green)
- Color: White
- Border Radius: 16px 16px 0 16px (speech bubble shape)
- Padding: 12px 16px
- Max Width: 75%
- Margin: 8px 0 8px auto (right align)
- Shadow: 0 2px 8px rgba(23, 162, 184, 0.2)
- Font: Roboto Regular 15px
- Line Height: 1.5
- Animation: Slide-in from right + fade (0.3s)

AI MESSAGE (Left-aligned):

- Background: Light gray #f0f0f0 (light mode) / #262d3d (dark mode)
- Color: Dark text #1a1a1a (light) / light text #e8eaea (dark)
- Border Radius: 16px 16px 16px 0 (opposite bubble)
- Border: 1px solid rgba(23, 162, 184, 0.2)
- Padding: 12px 16px
- Max Width: 85%

- Margin: 8px auto 8px 0 (left align)
- Font: Roboto Regular 15px
- Animation: Slide-in from left + fade (0.3s)

AI Avatar (Small):

- Position: Left of AI messages
- Size: 32px circle
- Background: Gradient (teal to green)
- Icon: AI icon (16px, white)

Markdown Formatting in AI Messages:

- Bold: **text** →
- Italic: *text* →
- Lists: • Bullet points with proper indentation
- Code: `code` → <code> with gray background
- Links: Clickable, teal color, underline on hover
- Headings: Bold, larger font (16px for H3)
- Line breaks: Proper spacing between paragraphs

Timestamp (Optional):

- Position: Below message bubble
- Font: 11px gray
- Format: "2:34 PM" or "Just now"
- Only show on hover or last message

TYPING INDICATOR:

Appears when AI is generating response

Position: Left side (as AI message would appear)

Animation: Three dots bouncing sequentially

Visual:

- Container: Same as AI message bubble (smaller)
- Dots: Three circles (8px each)
- Color: Gray
- Animation: Bounce up/down (0.6s, infinite, 0.2s stagger)

INITIAL BOT MESSAGE (On First Open):

Appears automatically when chat opens for first time

Content:

"Hello! I'm ClimaLogic's AI Assistant powered by Google Gemini.

I'm here to help you with:

- Carbon emission reduction strategies
- Industry best practices & benchmarking
- Facility optimization tips
- Regulatory compliance (EPA, ISO 14064)
- ROI calculations for green initiatives
- Carbon credit monetization
- Technical troubleshooting

Ask me anything about reducing emissions in your industry, or click a suggestion below!"

Formatting:

- Emoji: for warmth
- Bullet points: Clear list

- Font: Roboto Regular 15px
- Spacing: Generous line height (1.6)

QUICK SUGGESTION BUTTONS:

Position: Below initial message or after AI response

Layout: Vertical stack of pill buttons

Max: 4 suggestions at a time

Button Style:

- Background: Transparent
- Border: 1px solid teal
- Border Radius: 20px (pill shape)
- Padding: 10px 20px
- Font: Roboto Medium 14px
- Color: Teal
- Hover: Background teal, color white
- Transition: 0.2s
- Full width within chat area

Suggested Questions (Examples):

1. "How can I reduce emissions in steel manufacturing?"
2. "What are best practices for EPA compliance?"
3. "Calculate ROI for solar panel installation"
4. "Explain carbon credit monetization"
5. "Why are my emissions above average?"
6. "How to set up IoT sensors?"

Click Behavior:

- Button content fills input field
- Message auto-sends
- Buttons fade out
- AI response appears with typing indicator

CHAT INPUT AREA:

Position: Bottom of chat window

Height: 80px (auto-expand up to 3 lines)

Background: Same as window background

Border Top: 1px solid `rgba(0,0,0,0.1)`

Padding: 16px

Text Input Field:

- Type: Textarea (multi-line)
- Placeholder: "Ask about reducing emissions, compliance, or best practices..."
- Font: Roboto Regular 15px
- Height: 48px (single line), max 120px (3 lines)
- Border: 1px solid `#e0e0e0`
- Border Radius: 24px (pill shape)
- Padding: 12px 56px 12px 16px (space for send button)
- Background: White (light) / `#1a1f2e` (dark)
- Focus: Border color teal, box-shadow glow
- Resize: Vertical only, smooth transition

Character Counter (Optional):

- Position: Bottom-right of input
- Font: 11px gray
- Format: "245 / 500" (current / max)

- Color: Gray (normal), orange (approaching limit), red (at limit)

Send Button:

- Position: Absolute, right 8px, bottom 8px (inside input)
- Size: 40x40px (circular)
- Background: Gradient (teal to green)
- Icon: Paper plane or arrow (20px, white)
- Disabled State: Gray background, cursor not-allowed (when input empty)
- Hover: Scale 1.1, shadow enhancement
- Click: Brief scale down (0.95), then send

Send Behavior:

- On click or Enter key (Shift+Enter for new line)
- Input content added to chat as user message
- Input clears immediately
- Scroll to bottom
- Typing indicator appears
- API call to Gemini backend
- Response streams in as AI message

Attachments (Optional, Future):

- Icon: Paperclip (left of input)
- Click: Opens file picker
- Supported: Images (for Gemini Vision API)

SETTINGS MENU:

Trigger: Click gear icon in header
Display: Dropdown menu (slides down from header)
Position: Below header, right-aligned
Width: 280px
Background: White/dark surface
Border Radius: 8px
Shadow: 0 4px 12px rgba(0,0,0,0.15)
Padding: 16px

Menu Items:

Item 1 - Clear Conversation:

- Icon: Trash icon (red)
- Text: "Clear conversation"
- Click: Confirmation prompt "Clear all messages? This cannot be undone."
 - * Confirm: Clears all messages, shows welcome message again
 - * Cancel: Closes prompt

Item 2 - Download Transcript:

- Icon: Download icon (teal)
- Text: "Download transcript"
- Click:
 - * Generates PDF or TXT of conversation
 - * Format: Date, time, user/AI labels, messages
 - * Downloads automatically
 - * Toast: "Transcript downloaded ✓"

Item 3 - AI Creativity (Temperature):

- Icon: Sliders icon (blue)
- Text: "AI Creativity"

- Input: Slider (0.1 to 1.0)
 - * Low (0.1-0.3): Factual, consistent
 - * Medium (0.4-0.7): Balanced (default 0.7)
 - * High (0.8-1.0): Creative, varied
- Label: Current value "0.7" displayed
- On change: Updates Gemini API temperature parameter

Item 4 - Feedback:

- Icon: Feedback icon (purple)
- Text: "Send feedback"
- Click: Opens feedback form modal
 - * Rating: 1-5 stars
 - * Text: "What could be better?"
 - * Submit button
 - * Sends to analytics/support

Item 5 - Help:

- Icon: Question mark icon (gray)
- Text: "Help & capabilities"
- Click: Shows modal with AI capabilities guide
 - * What AI can help with
 - * How to ask better questions
 - * Limitations and disclaimers

Divider: Subtle line between items

CONTEXT AWARENESS:

AI remembers within conversation:

- Previous messages (full conversation history sent to API)
- User's facility details (if shared during chat)
- Industry type mentioned
- Current page context (calculator, heatmap, etc.)

Contextual Prompts:

- If user on calculator page: "I see you're using the calculator. Need help interpreting"
- If user clicks facility on map: "Would you like analysis of [Facility Name]'s emissions?"
- If user mentions industry: AI tailors all responses to that industry

System Prompt Sent to Gemini:

You are ClimaLogic's AI Assistant, an expert in industrial emission reduction and sustainability.

User Context:

- Industry: {industryType || 'General'}
- Facility Size: {facilitySize || 'Unknown'}
- Role: {userRole || 'User'}
- Current Page: {currentPage}

Your role:

- Provide specific, actionable emission reduction recommendations
- Include quantified impacts (%), costs, ROI, timelines)

- Reference EPA and regulatory compliance when relevant
- Suggest using ClimaLogic tools (calculator, heatmap) when appropriate
- Be encouraging but realistic about challenges
- Ask clarifying questions if details missing
- Format responses with markdown for readability

Guidelines:

1. Always provide specific numbers and metrics
2. Industry-specific advice preferred over generic
3. Include ROI and payback periods for suggestions
4. Cite sources when applicable
5. End responses with follow-up question or suggestion
6. Link to relevant ClimaLogic features
7. Be concise but comprehensive (2-4 paragraphs typical)
8. Use bullet points for lists
9. Bold key terms and numbers

When uncertain, acknowledge limitations and suggest consulting experts for critical decisions.

EXAMPLE CONVERSATIONS:

Example 1:

User: "How can I reduce my carbon emissions in my steel factory?"

AI: "Great question! Here are the most effective emission reduction strategies for steel

****High-Impact Solutions:****

1. ****Switch to Electric Arc Furnace (EAF) Technology****
 - Emission reduction: 50-70%
 - Uses up to 100% recycled scrap steel
 - ROI: 3-4 years payback
 - Cost: \$2M-\$5M (facility dependent)
2. ****Increase Scrap Metal Usage****
 - Even with existing furnace, boost scrap %
 - Each 10% increase = ~7% emission reduction
 - Cost: Minimal (mainly procurement)
3. ****Install Waste Heat Recovery Systems****
 - Captures lost energy from furnaces
 - Emission reduction: 8-15%
 - Generates electricity or preheats materials
 - ROI: 2-3 years
 - Cost: \$500K-\$1M

****Quick Wins (< 6 months):****

- LED lighting upgrade (75% energy savings)
- VFD installation on motors (10-20% savings)
- Compressed air leak repairs (5-10% savings)

Your facility's specific potential depends on current equipment and production process. ↴

Example 2:

User: "What's the ROI for installing solar panels?"

AI: "Let me break down the ROI for solar panel installation at an industrial facility:

****Typical Scenario (Medium-sized facility):****

- Facility: 10,000 sq ft roof space
- System size: 150 kW solar array
- Installation cost: \$200,000

****Annual Benefits:****

- Electricity savings: \$18,360/year
- Carbon reduction: 150 tons CO₂e
- Carbon credit value: \$7,500 (at \$50/ton)
- ****Total annual benefit: \$25,860****

****ROI Without Incentives:****

- Payback period: 7.7 years
- 25-year savings: \$646,500
- ROI: 223%

****With Government Incentives:****

- Federal ITC (30%): -\$60,000
- State rebates: -\$15,000
- ****Net cost: \$125,000****
- ****Payback: 4.8 years****
- ****25-year ROI: 417%****

****Key Factors:****

- * Local sunlight hours (varies by region)
- ⚡ Your electricity rate (higher = better ROI)
- ☀ Available roof/land space
- 💸 Financing options available

****Recommendation:**** Combine solar with energy efficiency upgrades first (LED, insulation)

Want to calculate the exact potential for YOUR facility? I can help you fill out the [Calculator] tool.

RESPONSE FORMATTING RULES:

- Use markdown: ****bold****, ***italic***, bullet points, headings
- Include emojis sparingly (1-2 per response for warmth)
- Numbers in bold: ****\$25,000****, ****30%****, ****5 years****
- Break into sections with headings: ****High-Impact****, ****Quick Wins****, etc.
- Always include actionable next steps
- Link to ClimaLogic tools: [Calculator], [Heatmap], [Dashboard]
- Keep paragraphs short (2-4 sentences)
- Use visual separators (spacing, lists, bold)

ERROR HANDLING:

API Error (Gemini unavailable):

- Message: "I'm having trouble connecting right now. Please try again in a moment."
- Retry button: "Try Again"
- Fallback: Show FAQ answers for common questions

Rate Limit Error:

- Message: "I'm receiving a lot of questions right now. Please wait 30 seconds and try again."
- Countdown timer: Shows seconds remaining

Invalid Input:

- Message: "I didn't quite understand that. Could you rephrase your question?"
- Suggestion: Show quick suggestion buttons

No Results:

- Message: "I don't have specific information on that topic. Would you like me to help with something else?"
- Fallback suggestions: Show common questions

CONVERSATION HISTORY:

Storage: Browser sessionStorage (temporary) or localStorage (persistent)

Structure:

```
{  
  conversationId: "uuid",  
  messages: [  
    { role: "user", content: "...", timestamp: "..." },  
    { role: "assistant", content: "...", timestamp: "..." }  
  ],  
  context: {  
    industryType: "steel",  
    facilitySize: "large",  
    currentPage: "calculator"  
  }  
}
```

Privacy:

- Conversations stored locally (not server) by default
- Option to delete: "Clear conversation" in settings
- Session persistence: Survives page refresh
- New session: Starts fresh conversation after X hours idle

MOBILE OPTIMIZATION:

Mobile Chat Window:

- Full screen (100vw × 100vh)
- Header: 64px height
- Messages: Fills remaining space
- Input: 72px height, fixed at bottom
- Close: Swipe down gesture or close button

Keyboard Handling:

- Input focuses: Keyboard slides up, window adjusts
- Send button: Always visible above keyboard

- Scroll: Messages area scrollable, doesn't jump

Touch Interactions:

- Message: Long-press for copy option
- Suggestions: Large tap targets (48px minimum)
- Send: Large button (48px)

ACCESSIBILITY:

- ARIA labels: All buttons labeled
- Keyboard navigation: Tab through elements, Enter to send
- Screen reader: Messages announced as they appear
- Focus indicators: Visible blue outlines
- Color contrast: WCAG AA compliant (4.5:1 minimum)

ANALYTICS TRACKING:

Events to track:

- Chat opened/closed
- Message sent (count, not content)
- Suggestion clicked
- Link clicked (calculator, heatmap, etc.)
- Feedback submitted
- Conversation length (message count)
- Average response time
- User satisfaction (feedback ratings)

PART 7: DATABASE & BACKEND INTEGRATION

TECHNOLOGY STACK:

Frontend: React 18+ with Vite

Backend: Node.js + Express.js

Database: MongoDB (Atlas or local)

APIs:

- Google Gemini AI API (chatbot)
- Climate Trace API (emission data)
- Mapbox API (heatmap)

Real-time: Socket.io (live data updates)

Authentication: JWT (JSON Web Tokens)

Deployment: Vercel (frontend), Heroku/Railway (backend)

MONGODB COLLECTIONS:

Collection: facilities

```
{  
  _id: ObjectId,  
  facilityName: String,  
  industryType: String, // enum  
  location: {  
    city: String,  
    state: String,  
    country: String,  
    coordinates: {
```

```
type: "Point",
coordinates: [longitude, latitude]
},
},
facilitySize: String, // small, medium, large
annualProduction: Number,
productionUnit: String,
energyConsumption: {
electricity_MWh: Number,
naturalGas_m3: Number,
fuelOil_liters: Number,
renewableEnergy_percent: Number
},
currentEmissions: {
total_tCO2e: Number,
electricity: Number,
naturalGas: Number,
fuelOil: Number,
process: Number,
transportation: Number,
lastCalculated: Date
},
emissionsTrend: String, // increasing, decreasing, stable
emissionsHistory: [{
date: Date,
totalEmissions: Number,
source: String
}],
benchmarkData: {
industryAverage: Number,
percentageVsAverage: Number
},
externalAPIData: {
climateTraceEmissions: Number,
climateTraceUpdated: Date
},
userId: ObjectId, // reference to users
createdAt: Date,
updatedAt: Date
}
```

Collection: users

```
{
_id: ObjectId,
```

```
email: String, // unique, indexed
passwordHash: String,
fullName: String,
companyName: String,
role: String, // industry, government, admin
industryType: String,
facilityCount: Number,
preferences: {
  theme: String, // light, dark
  notifications: Boolean
},
subscription: {
  plan: String, // starter, professional, enterprise
  status: String, // active, inactive
  startDate: Date,
  endDate: Date
},
createdAt: Date,
lastLogin: Date
}
```

Collection: calculations

```
{
  _id: ObjectId,
  userId: ObjectId,
  facilityId: ObjectId,
  inputData: {
    // all calculator inputs
  },
  results: {
    totalEmissions: Number,
    breakdown: {},
    recommendations: []
  },
  timestamp: Date
}
```

Collection: conversations

```
{
  _id: ObjectId,
  userId: ObjectId,
  conversationId: String, // UUID
}
```

```
messages: [{  
  role: String, // user, assistant  
  content: String,  
  timestamp: Date  
},  
context: {  
  industryType: String,  
  facilitySize: String,  
  currentPage: String  
},  
createdAt: Date,  
updatedAt: Date  
}
```

BACKEND API ROUTES:

Authentication:

- POST /api/auth/register - User signup
- POST /api/auth/login - User login
- POST /api/auth/logout - User logout
- GET /api/auth/me - Get current user

Facilities:

- GET /api/facilities - List all facilities (with filters)
- GET /api/facilities/:id - Get facility details
- POST /api/facilities - Create facility
- PUT /api/facilities/:id - Update facility
- DELETE /api/facilities/:id - Delete facility
- GET /api/facilities/heatmap - Get heatmap pin data

Calculator:

- POST /api/calculator/calculate - Calculate emissions
- GET /api/calculator/history - Get user's calculations
- GET /api/calculator/recommendations - Get recommendations

Chat:

- POST /api/chat/message - Send message to Gemini AI
- GET /api/chat/history/:conversationId - Get conversation
- POST /api/chat/feedback - Submit feedback
- DELETE /api/chat/:conversationId - Delete conversation

External APIs:

- GET /api/external/climate-trace/facilities - Fetch from Climate Trace
- POST /api/external-sync - Sync external data

CLIMATE TRACE API INTEGRATION:

Base URL: <https://api.climatetrace.org/>

Endpoint 1: Get Facilities

GET /v4/facilities

Query params:

- geometry: GeoJSON polygon (India bounding box)
- industry: Filter by sector
- limit: Max results

Response: Array of facilities with emissions data

Endpoint 2: Get Emissions History

GET /v4/facilities/{id}/emissions

Query params:

- start_date: YYYY-MM-DD
- end_date: YYYY-MM-DD
- resolution: monthly, yearly

Response: Time series emissions data

Backend cron job:

- Runs daily at 2 AM
- Fetches updated data from Climate Trace
- Updates MongoDB facilities collection
- Logs sync status

GEMINI AI INTEGRATION:

```
// Backend: /api/chat/message
import { GoogleGenerativeAI } from "@google/generative-ai";

const genAI = new GoogleGenerativeAI(process.env.GEMINI_API_KEY);

export async function handleChatMessage(req, res) {
  const { message, conversationHistory, context } = req.body;

  const systemPrompt = `You are Climologic AI Assistant... User: ${context.industryType}, Size=${context.facilitySize} Provide specific recommendations with ROI, timelines, metrics.`;

  const model = genAI.getGenerativeModel({ model: "gemini-pro" });

  const chat = model.startChat({
    history: conversationHistory.map(msg => ({
      role: msg.role === "user" ? "user" : "model",
      parts: [{ text: msg.content }]
    })),
  });
}
```

```
generationConfig: {  
  maxOutputTokens: 2048,  
  temperature: 0.7  
}  
});  
  
const result = await chat.sendMessage(message);  
const responseText = result.response.text();  
  
res.json({ response: responseText, timestamp: new Date() });  
}
```

ENVIRONMENT VARIABLES:

Backend .env

```
PORT=5000  
MONGODB_URI=mongodb+srv://user:pass@cluster.mongodb.net/climalogic  
JWT_SECRET=your_jwt_secret_here  
GEMINI_API_KEY=your_gemini_api_key_here  
MAPBOX_TOKEN=your_mapbox_token_here  
CLIMATE_TRACE_API_KEY=your_climate_trace_key_here  
CORS_ORIGIN=https://your-frontend-url.com
```

Frontend .env

```
VITE_API_URL=https://your-backend-url.com/api  
VITE_MAPBOX_TOKEN=your_mapbox_token_here
```

REAL-TIME UPDATES (Socket.io):

```
// Backend  
io.on('connection', (socket) => {  
  console.log('Client connected');  
  
  // Subscribe to facility updates  
  socket.on('subscribe:facility', (facilityId) => {  
    socket.join(facility:$facilityId);  
  });  
  
  // Emit emission updates every 30s  
  setInterval(() => {  
    io.to('heatmap').emit('emissions:update', updatedData);  
  }, 30000);  
});
```

```
// Frontend
import io from 'socket.io-client';

const socket = io(process.env.VITE_API_URL);

socket.on('emissions:update', (data) => {
// Update heatmap pins
updatePins(data);
});
```

PART 8: PRODUCTION DEPLOYMENT

BUILD PROCESS:

Frontend

npm run build

Outputs to dist/ folder

Backend

No build needed, Node.js runs directly

DEPLOYMENT PLATFORMS:

Frontend (Vercel):

1. Connect GitHub repo
2. Framework: Vite
3. Build command: npm run build
4. Output directory: dist
5. Environment variables: Add VITE_* vars
6. Deploy: Automatic on git push

Backend (Railway/Heroku):

1. Connect GitHub repo
2. Add buildpack: Node.js
3. Set environment variables
4. Start command: node server.js
5. Deploy: Automatic on git push

Database (MongoDB Atlas):

1. Create free cluster
2. Whitelist IP (0.0.0.0/0 for all)
3. Create database user
4. Copy connection string to .env

PERFORMANCE CHECKLIST:

- [] Image optimization (WebP format)
- [] Code splitting (React.lazy)
- [] Gzip compression enabled
- [] Caching headers configured
- [] CDN for static assets
- [] Database indexes created
- [] API response caching (5 min)
- [] Lazy load below-fold content
- [] Minify CSS/JS bundles
- [] Lighthouse score > 90

SECURITY CHECKLIST:

- [] HTTPS only (enforce)
 - [] CORS configured properly
 - [] API keys in environment variables
 - [] Input validation on all forms
 - [] SQL injection prevention (use ORM)
 - [] XSS prevention (sanitize inputs)
 - [] Rate limiting on API routes
 - [] JWT token expiration (24h)
 - [] Password hashing (bcrypt)
 - [] Security headers (helmet.js)
-
-

FINAL INTEGRATION & POLISH

CROSS-PAGE NAVIGATION:

- All pages share same header/navigation
- Smooth scroll for anchor links
- Active page highlighted in nav
- Breadcrumbs on all pages except home

THEME CONSISTENCY:

- All pages respect theme toggle
- Smooth transitions between themes (0.5s)
- LocalStorage persistence
- No flash of wrong theme on load

DATA FLOW INTEGRATION:

Landing Page → Calculator:

- CTA buttons link to /calculator
- Pre-fill industry if mentioned

Calculator → Heatmap:

- "View on Map" button in results
- If location provided, centers map there

Heatmap → Calculator:

- Click facility opens side panel
- "Calculate Reductions" button
- Pre-fills calculator with facility data

Chat → All Pages:

- Context-aware based on current page

- Links open relevant pages/sections
- Persistent across navigation

LOADING STATES:

- Page transitions: Top progress bar
- API calls: Skeleton loaders
- Charts: Animate-in on load
- Images: Blur-up placeholders

ERROR STATES:

- 404 Page: "Page not found" with navigation
- API errors: Toast notifications
- Form errors: Inline validation
- Network errors: "Check connection" message

SUCCESS STATES:

- Form submissions: Green checkmark + message
- Calculations: Animated results reveal
- Data saves: Toast confirmation
- Downloads: Progress indicator

ACCESSIBILITY:

- All images have alt text
- Forms have proper labels
- Keyboard navigation works
- Focus indicators visible
- Color contrast WCAG AA
- Screen reader tested

FINAL POLISH:

- Favicon: ClimaLogic icon
 - Meta tags: SEO optimized
 - Open Graph: Social sharing images
 - Loading spinner: Branded
 - 404 Page: Custom design
 - Error pages: Helpful messages
 - Analytics: Google Analytics integrated
 - Monitoring: Error logging (Sentry)
-

Generate a complete, production-ready React application with all features, pages, components, and styling.

How to Use This Ultimate Prompt

Step 1: Copy the entire prompt above (from the opening to the closing

Step 2: Paste into your chosen AI development tool:

- **v0.dev** - Best for UI components, iterative design
- **Bolt.new** - Best for full-stack with instant preview
- **Lovable.dev** - Best for complete app with deployment

- **Cursor IDE** - Best for code editing with AI assistance

Step 3: Wait for generation (may take 2-3 minutes for complete app)

Step 4: Review the generated code and request refinements:

- "Make the hero section taller"
- "Add more animations to the stats cards"
- "Change the primary color to blue"

Step 5: Deploy using the built-in deployment features or manually

What This Prompt Generates

- ✓ **Complete Landing Page** - Hero, features, pricing, FAQ, CTA
- ✓ **Industrial Emission Calculator** - Full input form + results
- ✓ **3D India Heatmap** - Interactive map with 75+ facility pins
- ✓ **AI Chatbot** - Gemini-powered assistant with context awareness
- ✓ **Theme System** - Light/dark mode with animated backgrounds
- ✓ **Navigation** - Sticky header, mobile menu, breadcrumbs
- ✓ **Backend Integration** - MongoDB, APIs, real-time updates
- ✓ **Authentication** - Login/signup with JWT
- ✓ **Responsive Design** - Mobile, tablet, desktop optimized
- ✓ **Animations** - Page load, scroll, hover, micro-interactions
- ✓ **Production Ready** - Error handling, loading states, accessibility

This is the most comprehensive, detailed prompt possible for building ClimaLogic. It includes every specification, design detail, interaction pattern, and technical requirement needed for a fully functional, production-ready industrial emission monitoring platform! ☺