Sustainability, Resilience, and Energy Efficiency (SREE) Initiative Plan

Executive Summary

The City of North Miami Beach (NMB) faces pressing challenges from climate change, rising energy costs, aging infrastructure, and increasing demands for sustainability. The **Sustainability, Resilience, and Energy Efficiency (SREE) Initiative** proposes two pathways to address these issues:

- **Option 1**: Expand the duties of **NMB Water Department divisions** to integrate SREE initiatives, including building automation, smart utilities, and water conservation, into upcoming water, wastewater, and stormwater projects.

- **Option 2**: Establish a **Citywide SREE Committee**, uniting all municipal departments to implement a comprehensive strategy incorporating advanced public transportation, building envelope improvements, and more.

Both pathways leverage smart city technologies, innovative energy solutions, and community-driven green campaigns to enhance resilience, reduce costs, and position NMB as a leader in sustainable urban development.

SREE Initiative Objectives

- Optimize energy and water efficiency through smart utilities and automation.
- Strengthen climate resilience with adaptive infrastructure and green solutions.
- Secure diverse funding for sustainable projects, including solar and transportation.
- Foster community engagement through inclusive, gamified campaigns.
- Align with regional, state, and federal sustainability and smart city goals.

Committee Structure & Governance

Option 1: NMB Water Department-Led Implementation

- **Leadership**: NMB Water Director oversees SREE integration, with division heads (e.g., Water Treatment, Wastewater, Stormwater, Engineering) assigned specific SREE responsibilities.
- **Membership Composition** (all from NMB Water Department):
  - **Water Treatment Division**: Staff to implement smart metering and AI-optimized treatment.
  - **Wastewater Division**: Representatives to deploy greywater recycling and building automation for treatment facilities.

        - **Stormwater Division**: Engineers to integrate green infrastructure and resilient design.
        - **Engineering & Planning Division**: Project managers to embed SREE principles (e.g., solar, building envelope) in capital projects.
        - **Operations & Maintenance**: Staff to install IoT sensors and monitor smart utility systems.
        - **Sustainability Coordinator**: A designated NMB Water staff member to align initiatives with funding and smart city goals.
    - **Governance**: SREE initiatives are embedded into divisional workflows, with progress reports to the NMB Water Director and City Manager.

- **Option 2: Citywide SREE Committee**

    - **Chairperson**: Appointed by City Manager or City Commission.
    - **Vice Chairperson**: Sustainability or smart city technology expert.
    - **Membership Composition**:
        - NMB Water, Public Works, Capital Improvement Program (CIP), and Planning representatives.
        - Smart city, renewable energy, and transportation consultants.
        - Emergency Management and climate resilience specialists.
        - Community leaders, including youth and environmental justice advocates.
        - Regional partners (e.g., Miami-Dade County, Southeast Florida Climate Compact).
        - Grant specialists and public-private partnership (P3) coordinators.
    - **Governance**: Formal committee with a defined charter, meeting quarterly to coordinate citywide efforts.

Best Practice: For Option 1, provide cross-divisional training on building automation and smart utilities. For Option 2, ensure diverse representation to support equitable transportation and energy initiatives.

Strategic Focus Areas

1. **Energy Efficiency & Renewable Energy**
    - Conduct **smart energy audits** using IoT sensors and AI analytics for NMB Water facilities (Option 1) and all municipal buildings (Option 2).
    - Deploy **solar photovoltaic systems** with battery storage at water treatment plants (Option 1) and citywide facilities like community centers and transit hubs (Option 2).
    - Explore **natural gas applications**, such as combined heat and power (CHP) systems, for energy-efficient water treatment (Option 1) and municipal buildings (Option 2).
    - Implement **smart grids** and microgrids for decentralized energy resilience.
    - **Go-Green Campaign**: Launch "**NMB Solar Squad**," incentivizing solar adoption for utility facilities (Option 1) and residential/business sectors (Option 2) through group purchasing and financing education.

2. **Climate Resilience & Infrastructure Adaptation**
    - Use **AI-driven climate modeling** to assess flood, heat, and sea-level rise risks for utility infrastructure (Option 1) and citywide assets (Option 2).

- Deploy **green infrastructure** (e.g., bioswales, permeable pavements, urban tree canopies) in stormwater projects (Option 1) and citywide developments (Option 2).
- Retrofit facilities with **resilient design standards** (e.g., ASCE 7-22) and **building envelope improvements** (e.g., high-performance insulation, cool roofs) for energy efficiency.
- **Go-Green Campaign**: Initiate "**Resilient NMB Neighborhoods**," engaging residents to co-design green infrastructure near utility projects (Option 1) or citywide (Option 2).

3. **Water Conservation & Sustainability**
   - Install **smart water meters** with real-time leak detection and consumer apps to promote conservation in utility operations (Option 1) and citywide (Option 2).
   - Expand **greywater recycling** and **rainwater harvesting** for water treatment facilities (Option 1) and municipal buildings/parks (Option 2).
   - Pilot **AI-optimized water treatment** to reduce energy use in purification processes.
   - **Go-Green Campaign**: Launch "**Drop by Drop**," a gamified water-saving challenge offering bill discounts for utility customers (Option 1) and all residents/businesses (Option 2).

4. **Building Automation & Smart Utilities**
   - Implement **building automation systems (BAS)** to optimize HVAC, lighting, and energy use in water treatment facilities (Option 1) and all municipal buildings (Option 2).
   - Deploy **smart utility systems** using IoT sensors for real-time monitoring of water and energy networks, with predictive maintenance for pumps and pipelines (Option 1) and citywide utilities (Option 2).
   - Integrate **digital twin models** to simulate and optimize utility operations (Option 1) and citywide infrastructure (Option 2).
   - **Go-Green Campaign**: Promote "**Smart NMB Utilities**," educating staff (Option 1) and residents (Option 2) on smart technology benefits.

5. **Advanced Public Transportation (Option 2 only, with utility integration for Option 1)**
   - Deploy **electric bus fleets** with solar-powered charging stations, integrated with NMB Water's renewable energy systems (Option 1) or as a citywide transit initiative (Option 2).
   - Implement **smart mobility solutions**, such as real-time transit apps and AI-optimized bus routing, to reduce emissions.
   - Develop **bike-sharing and micromobility hubs** near utility facilities (Option 1) or citywide (Option 2) to promote low-carbon transport.
   - **Go-Green Campaign**: Launch "**NMB Green Commute**," incentivizing eco-friendly transport with discounts for utility staff (Option 1) or residents (Option 2).

6. **Emergency Preparedness & Redundancy**
   - Deploy **IoT-enabled sensors** for real-time monitoring of critical utility systems (Option 1) and citywide infrastructure (Option 2).
   - Establish **resilience hubs** powered by solar and natural gas CHP systems at utility sites (Option 1) or community centers (Option 2).
   - Use **digital twins** to simulate emergency scenarios for water systems (Option 1) or citywide networks (Option 2).
   - **Go-Green Campaign**: Promote "**Ready Green NMB**," educating staff (Option 1) or residents (Option 2) on sustainable preparedness.

7. **Grants, Partnerships & Funding Strategy**
    - Pursue grants for water projects (EPA WIFIA, SWIFIA) and solar/building automation (DOE EECBG, FEMA BRIC) in Option 1, and add transportation and smart city grants (e.g., DOT SMART Grants) in Option 2.
    - Form **public-private partnerships** with tech firms (e.g., Siemens for BAS, Tesla for EV infrastructure) and green developers.
    - Launch a **Green Bond Program** to finance solar, smart utilities, and transportation projects.
    - **Best Practice**: Assign a dedicated grant coordinator within NMB Water (Option 1) or a citywide task force (Option 2).

8. **Community Engagement & Smart City Integration**
    - Develop a **smart city dashboard** for real-time water, energy, and transit metrics, accessible to utility staff (Option 1) or all residents (Option 2).
    - Launch **NMB Green Ambassadors**, training utility staff (Option 1) or community volunteers (Option 2) to promote sustainability.
    - Host **hackathons** to crowdsource smart utility solutions (Option 1) or citywide innovations (Option 2).
    - **Go-Green Campaign**: Introduce "**NMB Green Living Festival**," showcasing solar, smart utilities, and eco-friendly transport.

Best Practice: Align with **UN Sustainable Development Goals (SDGs)**, **C40 Cities**, and **ISO 37101** standards to enhance funding eligibility and regional collaboration.

Implementation Pathways

<u>Option 1: NMB Water Department-Led SREE Integration</u>

Phase 1: Divisional Implementation (0–24 months)

- Expand NMB Water divisions' duties to integrate **building automation**, **smart utilities**, **solar**, and **water conservation** into projects like treatment plant upgrades and stormwater retrofits.
- Pilot **smart metering**, **solar-powered pumps**, **AI-driven leak detection**, and **BAS** for utility facilities.
- Secure water-specific grants (e.g., EPA WIFIA, SWIFIA) and energy grants for solar/CHP.
- Launch "**Drop by Drop**" and "**Smart NMB Utilities**" campaigns for utility customers and staff.

Phase 2: Citywide Expansion (2+ years)

- Scale successful initiatives (e.g., BAS, smart utilities) to Public Works, Parks, and Planning.
- Integrate SREE principles, including transportation initiatives, into all CIP projects.
- Transition to a citywide committee model, leveraging utility data.

Pros: Leverages existing staff, minimizes complexity, achieves quick wins.

Ideal for: Focused, utility-driven innovation.

Option 2: Citywide SREE Committee

Phase 1: Cross-Department Strategy Launch (0–12 months)

- Conduct citywide **climate vulnerability assessments** using GIS and AI tools.
- Develop a **Smart City Master Plan** integrating **building automation**, **smart utilities**, **solar**, **natural gas CHP**, and **advanced public transportation**.
- Launch pilots (e.g., electric buses, BAS in municipal buildings, green roofs).
- Kick off "**NMB Green Living Festival**" and "**NMB Green Commute**" to build momentum.

Phase 2: Full-Scale Implementation (1–5 years)

- Roll out citywide projects (e.g., smart grids, urban forestry, EV transit networks).
- Align with Miami-Dade County's **Resilient305** strategy and state climate goals.
- Institutionalize sustainability metrics in budgeting and planning.

Pros: Comprehensive, maximizes funding, fosters collaboration.

Ideal for: Bold leadership, interdepartmental synergy.

Timeline Overview

Phase	Option 1 (NMB Water-Led)	Option 2 (Citywide)
Structure Formation	0–3 months (assign duties)	0–3 months (form committee)
Strategic Planning	3–6 months	3–6 months
Pilot Program Launch	6–12 months	6–12 months
Full Implementation	12–24 months (NMB Water)	1–3 years (all departments)
Citywide Expansion	2+ years	N/A (already integrated)

Expected Benefits

- **Resilient Infrastructure**: Reduced vulnerability with smart utilities and resilient designs.
- **Cost Savings**: Lower costs via BAS, solar, and water conservation.
- **Economic Growth**: Attract green tech and transit firms, creating jobs.
- **Community Trust**: Enhanced engagement through transparent campaigns.
- **Funding Success**: Increased access to federal, state, and private funding.

Recommendations

- **Choose Option 1** for a streamlined approach leveraging NMB Water's structure, ideal for rapid integration of smart utilities and solar.

- **Choose Option 2** for a transformative strategy incorporating advanced transportation and citywide automation.
- **Hybrid Approach**: Start with Option 1 and transition to Option 2 after 2 years, using utility data to inform citywide scaling.

Best Practice: Partner with universities (e.g., FIU) for research on BAS, smart utilities, and transit solutions.

Next Steps

1. **Leadership Approval**
    - Present options to City Manager and Commission for decision.
2. **Structure Formation**
    - For Option 1, assign SREE duties to NMB Water divisions within 90 days.
    - For Option 2, form citywide committee and finalize charter.
3. **Initial Assessments**
    - Conduct AI-driven audits for energy, water, and climate risks.
4. **Grant Readiness**
    - Designate a grant coordinator (Option 1) or task force (Option 2).
5. **Public Engagement**
    - Launch "**NMB Green Ambassadors**" and a smart city dashboard.

Technology & Best Practice Highlights

- **Smart City Tech**: IoT, AI, digital twins, BAS, and smart grids for real-time optimization.
- **Green Campaigns**: Gamify conservation and transit (e.g., "Drop by Drop," "NMB Green Commute").
- **Best Practices**:
    - Follow **LEED**, **Envision**, and **BREEAM** for building and infrastructure standards.
    - Adopt **ISO 37101** for smart city frameworks.
    - Ensure equitable access to transportation and utility benefits.