Executive Summary: Louisiana – AISF (American Innovation & Sustainability Fund)

Overview

The **Louisiana initiative** under the **AISF Master Plan** transforms **red mud** (bauxite residue) and **industrial wastewater** from **petrochemical** and **oil & gas** operations into **valuable critical minerals** and **clean water solutions**. By deploying advanced **SHURE®** and **refining technologies**, this project will **reduce environmental risks**, **produce rare earth elements (REEs)** like **neodymium**, **yttrium**, and **scandium**, and create **local jobs** in one of America's most resource-rich yet vulnerable states. Over the next **15 years**, Louisiana stands to become a **national leader** in **sustainable mineral recovery** and **circular economy** practices.

Key Objectives

- **Red Mud Valorization**
  - Process **bauxite residue** (red mud) from alumina refining (30M+ tons stored at the **Noranda Alumina** site in Gramercy), recovering REEs, **scandium**, **iron alloys**, **titanium**, and other high-value materials.
  - Potentially tap into **$8.4B** worth of rare earths while mitigating **environmental hazards** associated with red mud storage.
- **Water Treatment Expansion**
  - Deploy **SHURE®** technology for **petrochemical** and **oil & gas** wastewater, removing **toxic heavy metals** and **contaminants**.
  - Explore using **treated red mud** as an **adsorption media**, creating **zero-waste** solutions that **recover valuable materials** from effluent streams.
- **Economic & Environmental Impact**
  - Reduce **industrial waste** and **chemical runoff** into Louisiana waterways, improving **ecosystem health**.
  - Catalyze **new job creation** and **local economic growth**, diversifying Louisiana's economy away from fossil fuels.
- **Job Creation & Local Development**
  - **500 direct jobs** in **red mud processing**, **advanced materials**, and **water treatment** by Year 5.
  - **1,500+ indirect jobs** in **logistics**, **research**, and **support services**, driving **regional revitalization**.

Phases & Long-Term Vision

Phase 1 (0–12 months)

- **Feasibility & Site Selection**
  - Assess **30M+ tons** of red mud at **Noranda Alumina** and other storage sites.
  - Partner with **ElementUS Minerals** and **Louisiana State University (LSU)** to optimize REE extraction processes.
- **Pilot Testing**
  - Launch a pilot facility to process **~500 tons** of red mud, aiming to extract **5–10 tons** of REEs for **market testing**.
  - Focus initially on **scandium** and **yttrium** recovery, establishing proof-of-concept.
- **Partnership Formalization**
  - Finalize agreements with **ElementUS**, **LSU**, and local R&D partners.
  - Secure **$5M** in federal/state funding for pilot projects and technology development.

Phase 2 (12–24 months)

- **Red Mud Processing Facility**
  - Construct a **modular plant** in **Gramercy** capable of processing **1,000 tons** of red mud/month.
  - Target **10–15 tons** of REEs annually, alongside **iron alloys**, **titanium**, and **scandium**.
- **Water Treatment Pilot**
  - Expand **SHURE®** technology to local petrochemical plants, treating **50,000–100,000 gallons** of wastewater/day.
  - Test **red mud residue** as adsorption media, creating a **zero-waste** water treatment loop.
- **Environmental Monitoring & Impact**
  - Begin a comprehensive **water quality** monitoring program, reducing contaminants by **30–40%** in treated wastewater.
  - Lay groundwork for a **30–50%** overall reduction in red mud hazards by Year 3.

Phase 3 (24–36+ months)

- **Full-Scale Red Mud Processing**
  - Scale up to **5,000 tons** of red mud/month, producing **50–75 tons** of REEs/year.
  - Supply **scandium**, **yttrium**, and **neodymium** for **EV batteries**, **wind turbine magnets**, and **aerospace** components.
- **Commercial Water Treatment Facility**

- Construct a **full-scale SHURE®** plant to process **200,000 gallons** of wastewater/day, recovering **lithium**, **boron**, **bromine**, and other metals for local industries.
- Establish long-term service agreements with **oil & gas** and **petrochemical** companies.

- **Revenue Generation**
  - **$40–50M** annual revenue by Year 5 from **REE sales**, **titanium**, **iron alloys**, and **water treatment** contracts.
  - Solidify partnerships with major **defense**, **clean energy**, and **battery** manufacturers.

5-Year Outlook

- **Environmental & Economic Milestones**
  - **Process 100,000+ tons** of red mud annually, remediating a significant portion of Louisiana's stockpiles.
  - Treat **1 million gallons/day** of industrial wastewater, reducing pollutants and improving water quality.
  - Achieve **$40–50M** in annual revenue, with **500–600 direct jobs** in **materials manufacturing**, **research**, and **water treatment**.
- **Strategic Partnerships**
  - Collaborations with **major clean energy** and **EV** companies for REE supply, forging secure off-take agreements.
  - Potential expansions to address other **industrial byproducts** (e.g., **phosphogypsum**, **steel slag**) for high-value mineral recovery.

10-Year Outlook

- **Statewide Industrial Transformation**
  - **Multiple red mud** processing sites and **SHURE®** water treatment facilities in **Baton Rouge**, **Lake Charles**, and **New Orleans** corridors.
  - **2,000–3,000 direct jobs** supporting comprehensive **waste-to-resources** operations, contributing **hundreds of millions** in annual economic impact.
- **Advanced Material Manufacturing**
  - Integration of **RCP** (Recycled Composite Polymers) technology from AISF's **Texas** initiative for **lightweight, high-strength** products.
  - Attract **downstream manufacturers** in **aerospace**, **EVs**, and **defense** to local industrial parks, developing a **full supply chain** in Louisiana.

- **Environmental Leadership**
  - Large-scale **restoration** of former red mud ponds, potentially converting them into **industrial eco-parks** or **renewable energy sites**.
  - **90%+** reduction of hazardous red mud and **significant** water quality improvements in the **Mississippi River Basin**.

15-Year Outlook

- **Global Export & Downstream Integration**
  - Louisiana becomes a **major global supplier** of REEs, **scandium**-based alloys, and high-performance polymers.
  - **International trade** in rare earth products fuels ongoing capital investment and **R&D** expansions.
- **Fully Circular Industrial Ecosystem**
  - **Zero-waste solutions** from integrated **SHURE®** water treatment, red mud valorization, and **RCP** product lines.
  - **Thousands** of stable jobs, robust **tax base**, and **global recognition** as a **leader in resource recovery** and **clean manufacturing**.
- **Permanent Environmental & Community Benefits**
  - **Billions of dollars** in cumulative economic impact, **long-term** job security, and **restored** industrial lands.
  - Vibrant **research ecosystem** with **LSU**, **federal labs**, and **private R&D**, ensuring Louisiana remains at the **forefront** of **sustainable innovation**.

Impact

- **Environmental Impact**
  - **Red Mud Reduction**: Process **millions** of tons over 15 years, mitigating toxic storage sites and **restoring land** for future use.
  - **Water Quality Improvement**: **SHURE®** technology reduces **heavy metals**, **chemical runoff**, and other pollutants, safeguarding **ecosystems** and **public health**.
- **Economic Revitalization**
  - **500+ direct jobs** by Year 5, potentially **2,000+** by Year 10, supporting local manufacturing and R&D.
  - **$50M+** annual economic impact in Louisiana, with expansion leading to hundreds of millions by Year 10–15.

- **National Security & Supply Chain Resilience**
  - Domestic production of **REEs**, **titanium**, **iron alloys**, and **scandium** reduces reliance on foreign suppliers.
  - Aligns with **U.S. defense**, **clean energy**, and **EV** manufacturing goals, enhancing **energy independence** and **strategic material security**.

Financial Projections

- **Initial Capital Investment**:
  - **$30–40M** in Phase 1 & Phase 2 for pilot infrastructure, red mud processing, and water treatment systems.
- **Revenue Generation**:
  - **Phase 2**: **$5–10M** annually from REE sales and water treatment service contracts.
  - **Year 5**: **$40–50M** as the facility scales up production (50–75 tons of REEs/year) and water treatment capacity.
- **ROI**:
  - **15–20% IRR** over **5–7 years**, with **breakeven** by Year 3.
  - **3x return on investment** by Year 5, with potential for **continued growth** in years 10–15.

Conclusion

The **Louisiana initiative** under the **AISF Master Plan** positions the state as a **global leader** in **sustainable mineral recovery** and **circular economy practices**. By valorizing **red mud** and deploying **SHURE®** water treatment to **petrochemical** and **oil & gas** sectors, this project will **transform hazardous waste** into **critical resources**, enhance **national security** by producing **REEs** domestically, and foster **economic growth** through **job creation** and **long-term investments**. With a **5-, 10-, and 15-year vision**, Louisiana stands poised to become a **major force** in **clean energy**, **advanced materials**, and **environmental stewardship**.