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A River of Energy Solutions

Go Big with Renewables

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Sain Engineering Associates

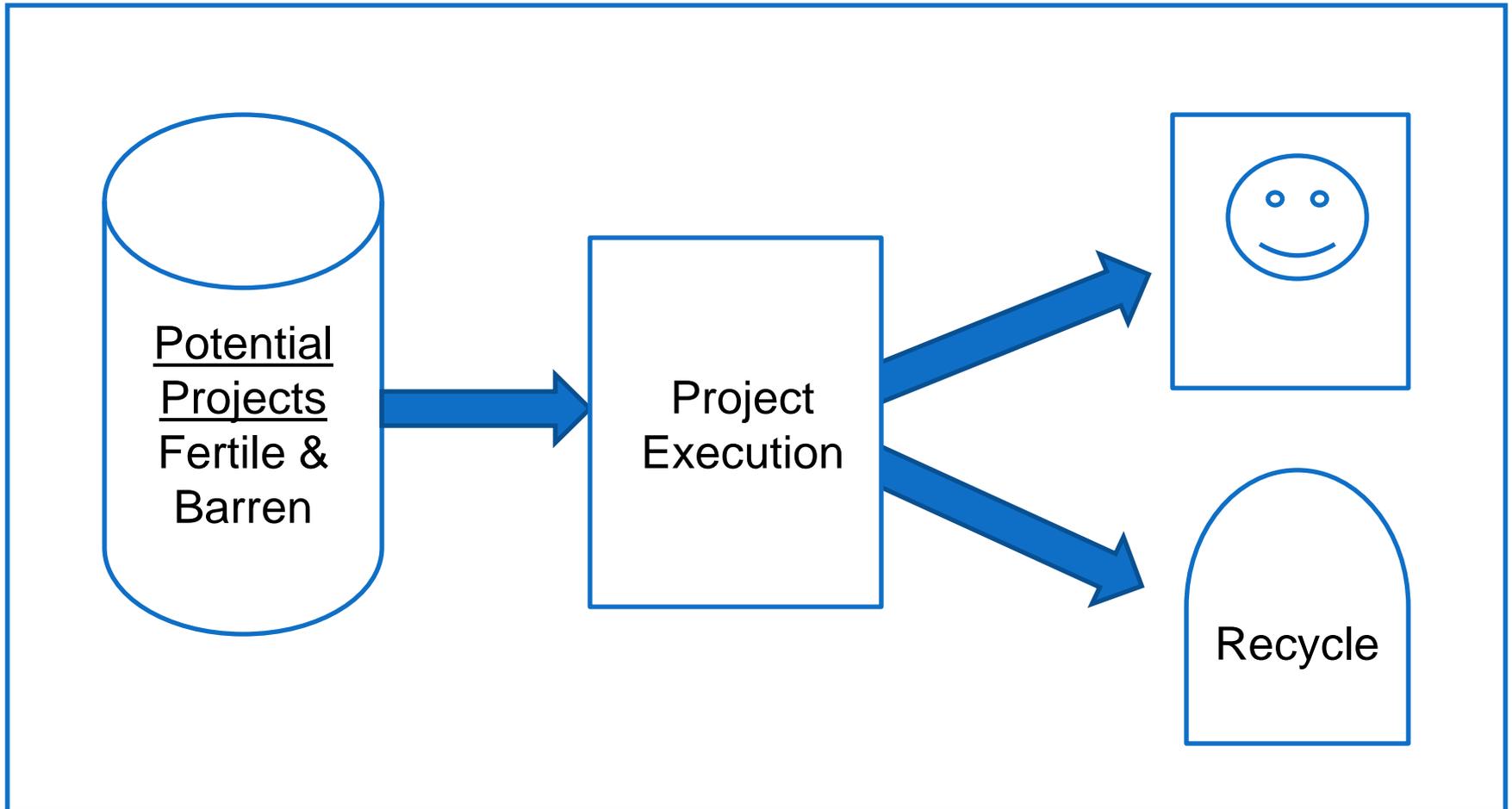
Overview

- **Introduction**
- **Project Foundation**
- **Project Structure**
- **Successful Project**
- **Recycle - Unsuccessful Projects**
- **Summary**

Introduction

- **Background – Air Force**
- **DoD is not a monolithic organization**

Introduction



Introduction

- **Federal Renewable Energy Mandates Goals**
- **EPAct 05 Renewable Goals - electricity**
 - **Section 203(a) “to the extent economically feasible . . . the following amounts shall be renewable energy:”**
 - 3% in FY07–09** **5% in FY10–12** **7.5% in FY13**
- **10 USC 2911: It shall be the goal of the DoD:**
 - **25 % of all facility energy from renewables in 2025**
- **Develop money saving renewable projects**

Pursue Economical Projects

Introduction

On-Site Project Benefits

- **EPAAct 05 Renewable Goals**
 - **100% Bonus: If generated and used on-base**
- **Executive Order 13423**
 - Encourages on-site projects for on-site use
- **Executive Order 13514**
 - On site projects reduce green house gas
- **On-Site Project Benefits**
 - EPAAct 100% Bonus
 - Energy security potential
 - Distributed generation benefits

Introduction

What is a Big Project?

- **Annual MWh generated**
 - **Larger than a small one**
 - 5 kW PV - 8,000 kWh/year
 - 5 MW PV - 8,000,000 kWh/year
 - **Higher production factor - land fill gas generation**
 - 5 MW PV - 8,000,000 kWh/year
 - 5 MW LFG - 40,000,000 kWh/year

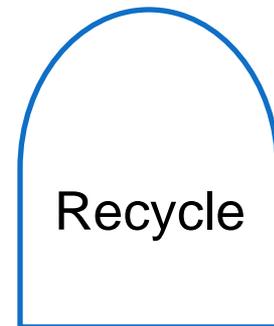
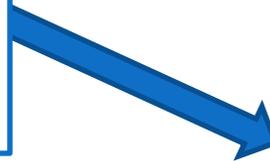
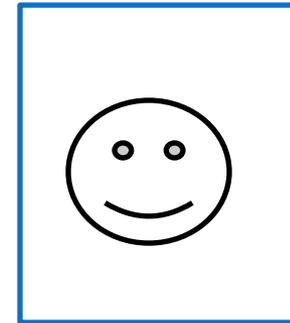
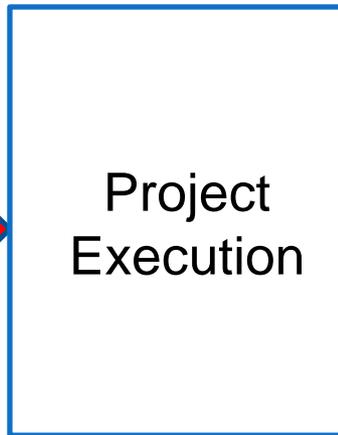
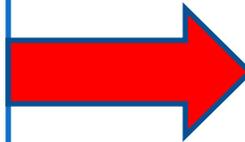
Introduction

Small Projects are Important

- **Average residential PV system is 5 kW**
- **2009: 34,000 PV systems installed**
 - Residential by number 92%
 - Residential by capacity 36%
- **Source: Interstate Renewable Energy Council**
www.irecusa.org

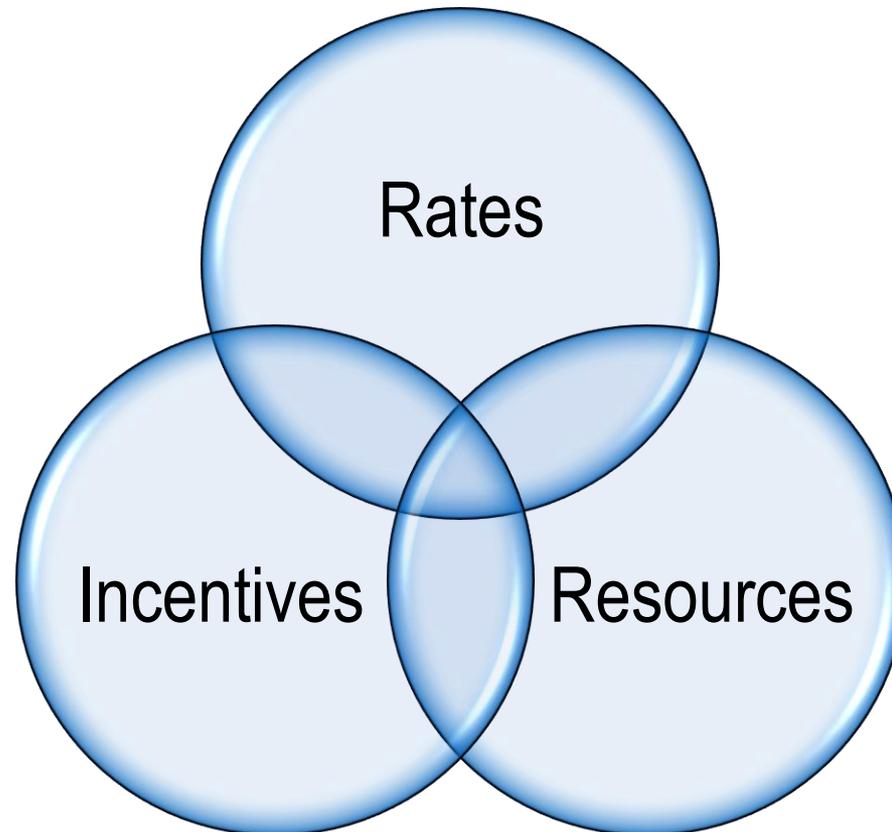
Project Foundation

Potential Projects



What Makes a Project Work

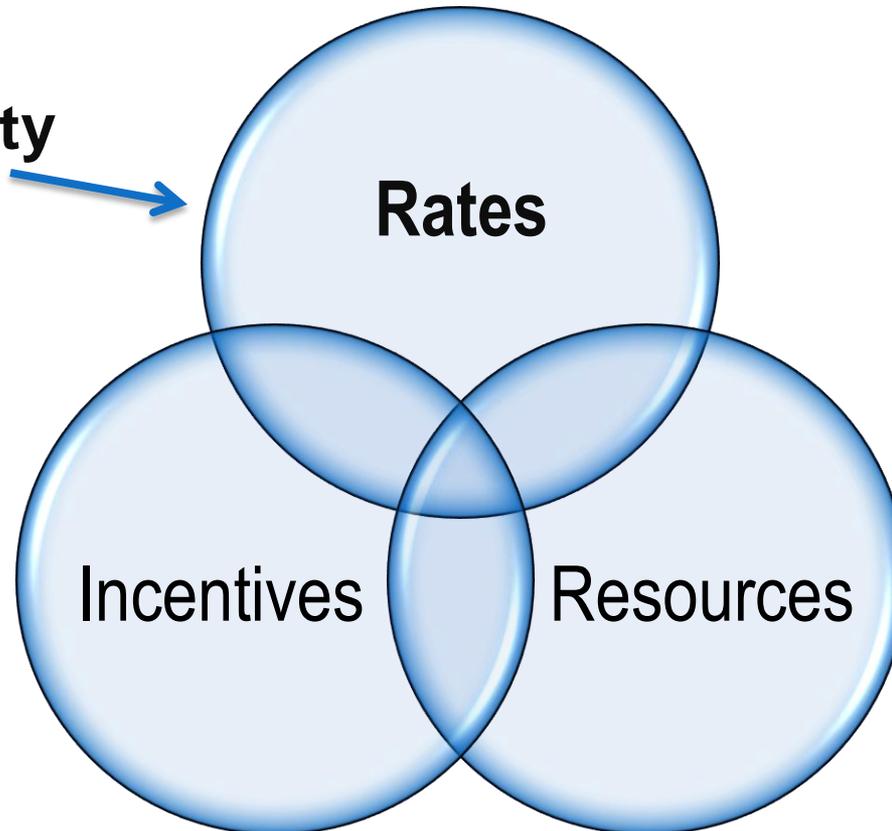
Project Foundation



Practical Economical Compatible

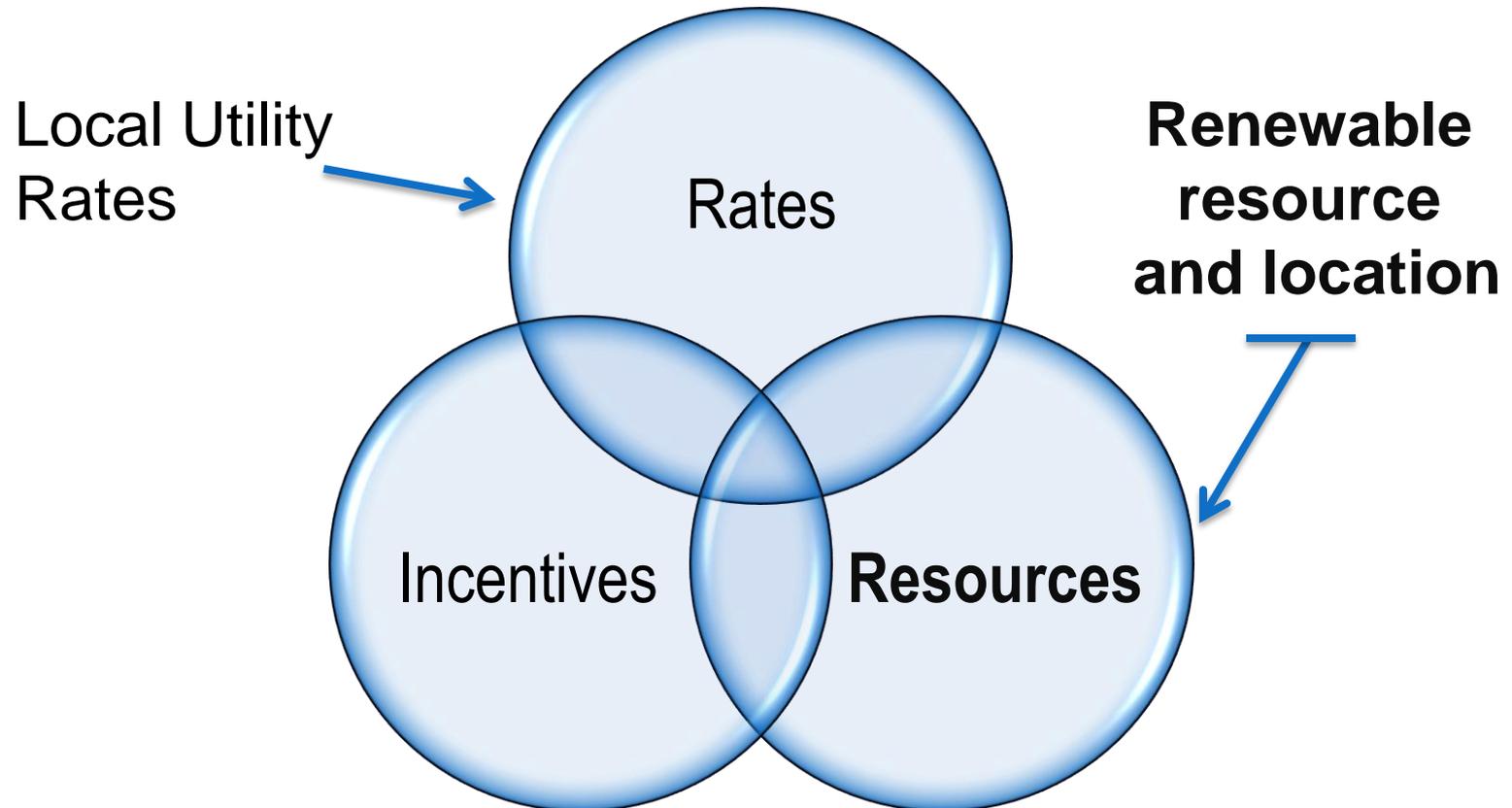
Project Foundation

Local Utility
Rates



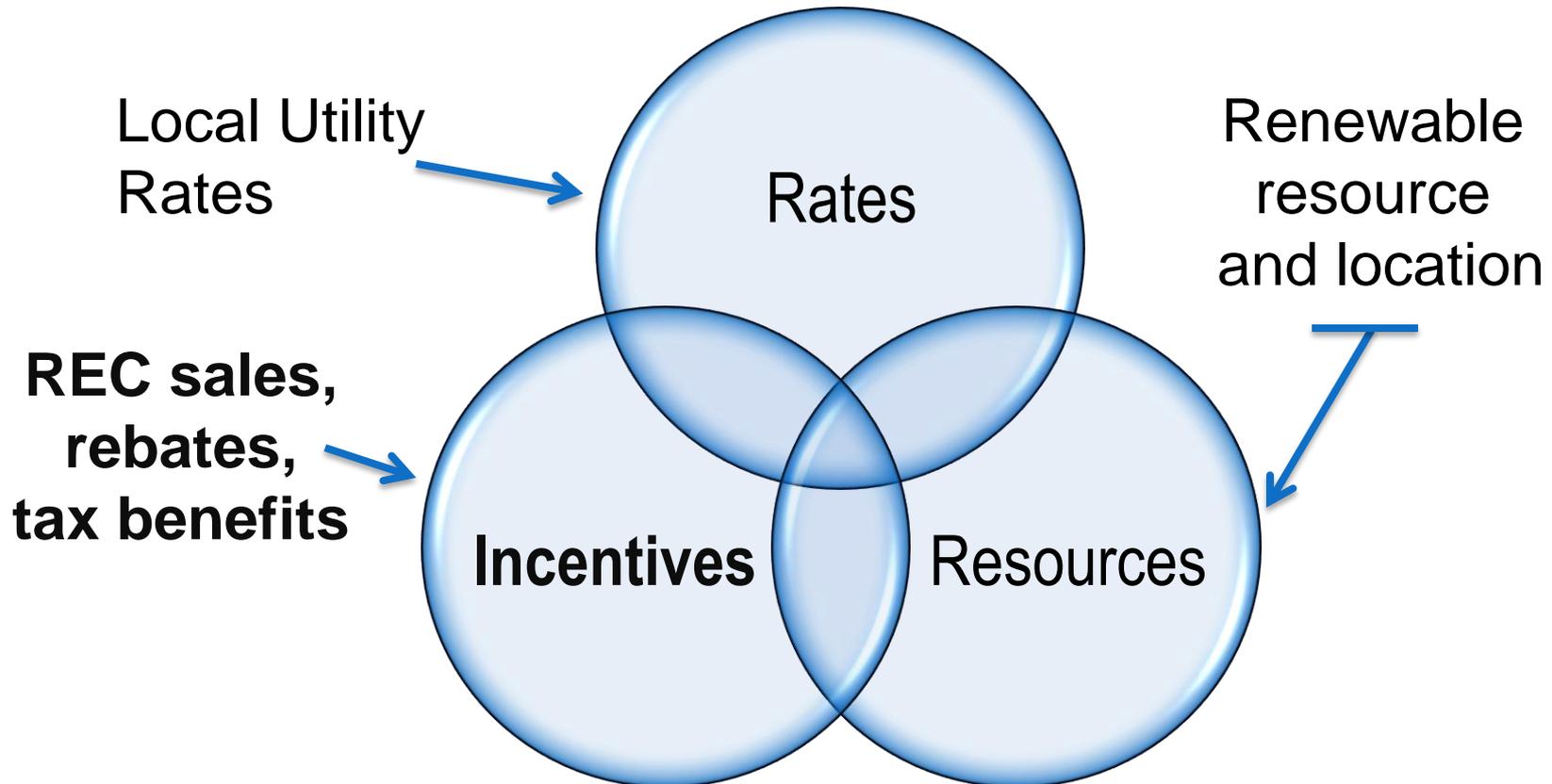
Practical Economical Compatible

Project Foundation



Practical Economical Compatible

Project Foundation



Go Big with Renewables

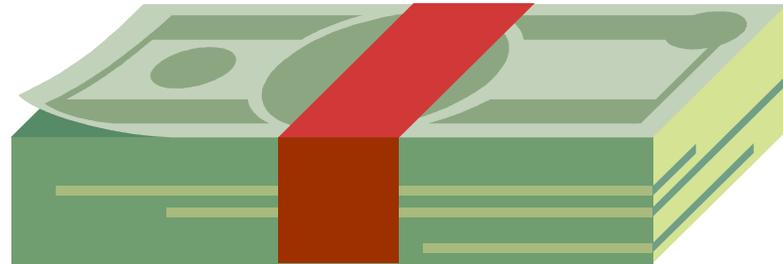
Project Foundation

- **Preliminary Analysis**
 - **Economical**
 - **Compatible with environmental & mission**
- **Renewable projects in the area**
- **Discard projects with conflicts**

Compatible – Environmental and Mission

Project Structure

- **Government or Third Party Owned?**
- **5 MW PV ~ \$23 Million**



Big Projects Require Big Money

Project Structure

Government Owned

BASICS

- **Funded by O&M, ECIP, UESC or ESPC**
- **Value: kWh for project life**
 - **Purchase a “stream” of kWh for the project life**
 - **Cost: Investment, O&M, R&R**
- **Test: Positive Net Present Value using Building Life Cycle Cost (BLCC)**

Project Structure PPA

BASICS

- **FAR 41 utility contract**
- **10 USC 2922(a)**
 - 30 year authority
 - 40 USC 591 exception
- **kWh power purchase agreement (PPA) cost/kWh**
 - Lower life cycle utility costs
 - Test: BLCC
- **NOT a construction project**

Project Structure

BOTH: Government Owned & PPA

REQUIRE

- Resource and location
- Environmental compliance
- Mission compatibility
- Interconnect agreement
- Net metering helps

PROVIDE

- Renewable energy
- Energy security potential
- Distributed generation benefits



Project Structure

Government Owned

REQUIRES

- Funds
- Construction Contract
- Effective O&M/R&R for project life

PROVIDES

- “Free” kWh
 - Investment and O&M
- Credit for RE goals



Project Structure PPA

REQUIRES

- Authority for purchase contract:
10 USC 2922(a)
- Long term authority for ground lease
- Replacement RECs for credit

PROVIDES

- Tax credits & benefits
- REC sale
- Reduced risk:
no kWh = no cost

PPA = Tax and REC Sale Benefits

Project Structure PPA Options

- **Utility company partnership**
- **Competitive acquisition**

Project Structure PPA

OFFSITE PURCHASE

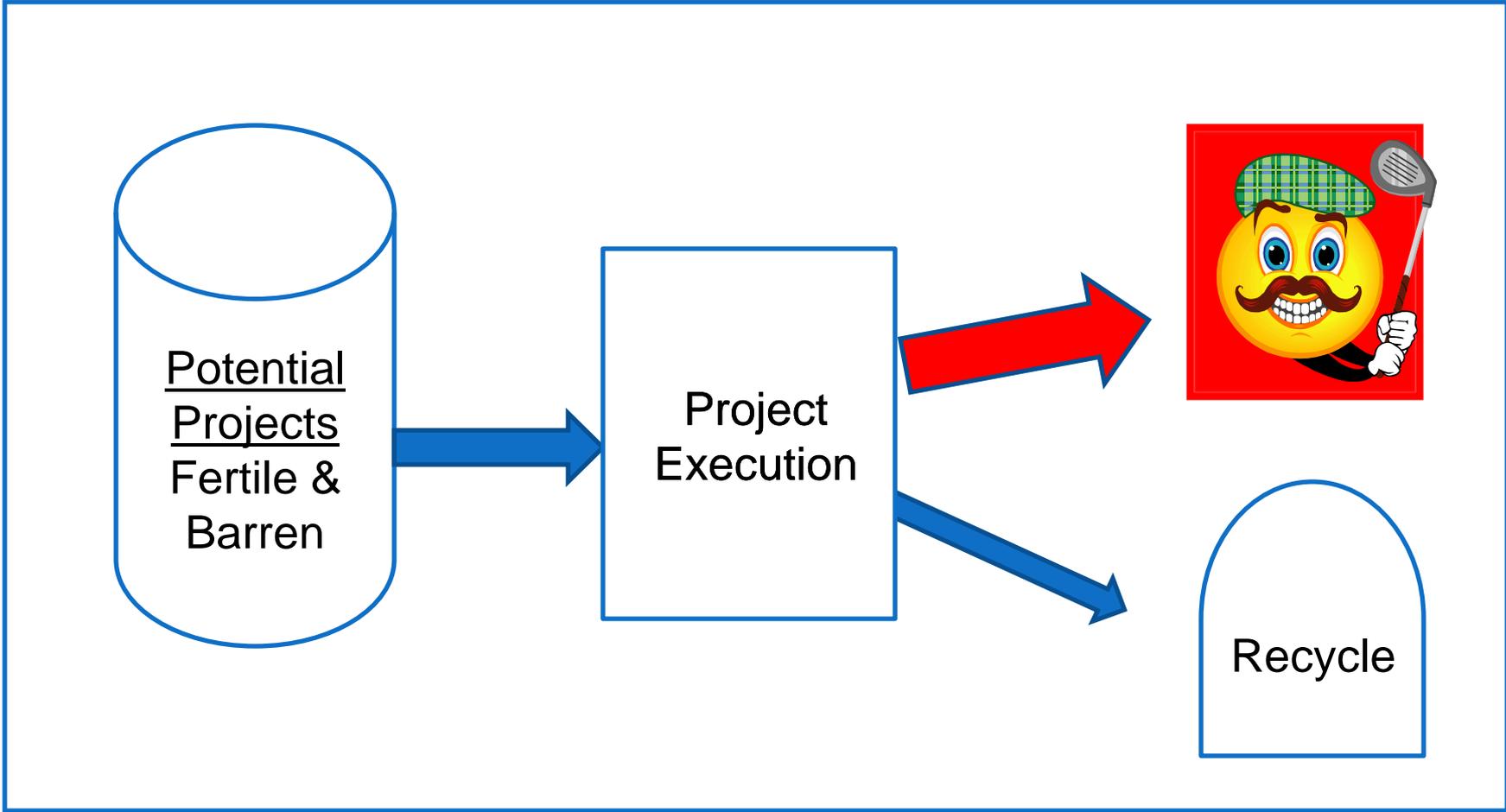
REQUIRES

- **Retail transmission access**

NOT REQUIRED

- **Environmental**
- **Land lease**
- **Mission compatibility**

Successful Project

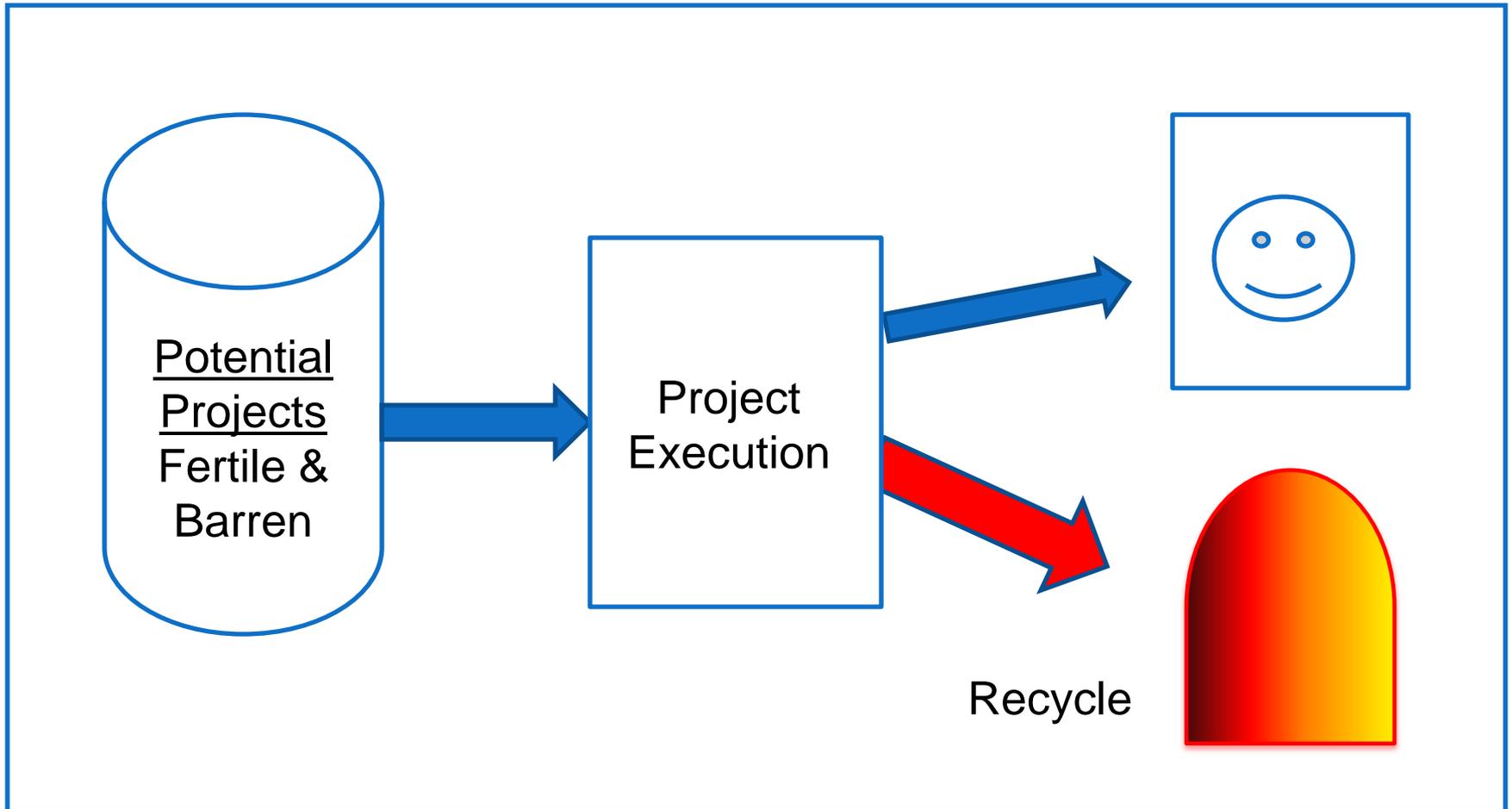


Successful Project

- **Local project champion & management support**
- **No more than one scrooge**
- **Core execution team:**
 - Contracting
 - Engineering
 - Environmental
 - Legal
 - Real property
- **Supporting members**



Recycle: Unsuccessful Projects



Recycle: Unsuccessful Projects

- **Lack of local champion or management support**
- **Management SUPPORT**
- **Uneconomical project**
 - **Low electric rates - current cost of electricity**
 - **High standby charges**
 - **No local financial incentives**
- **Mission conflict**
- **Environmental conflict**

Summary

- **Goals**  **not mandates**
- **Pursue economical projects**
- **Big projects help big goals**
- **Big projects need big funding**
- **Consider the PPA method**



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