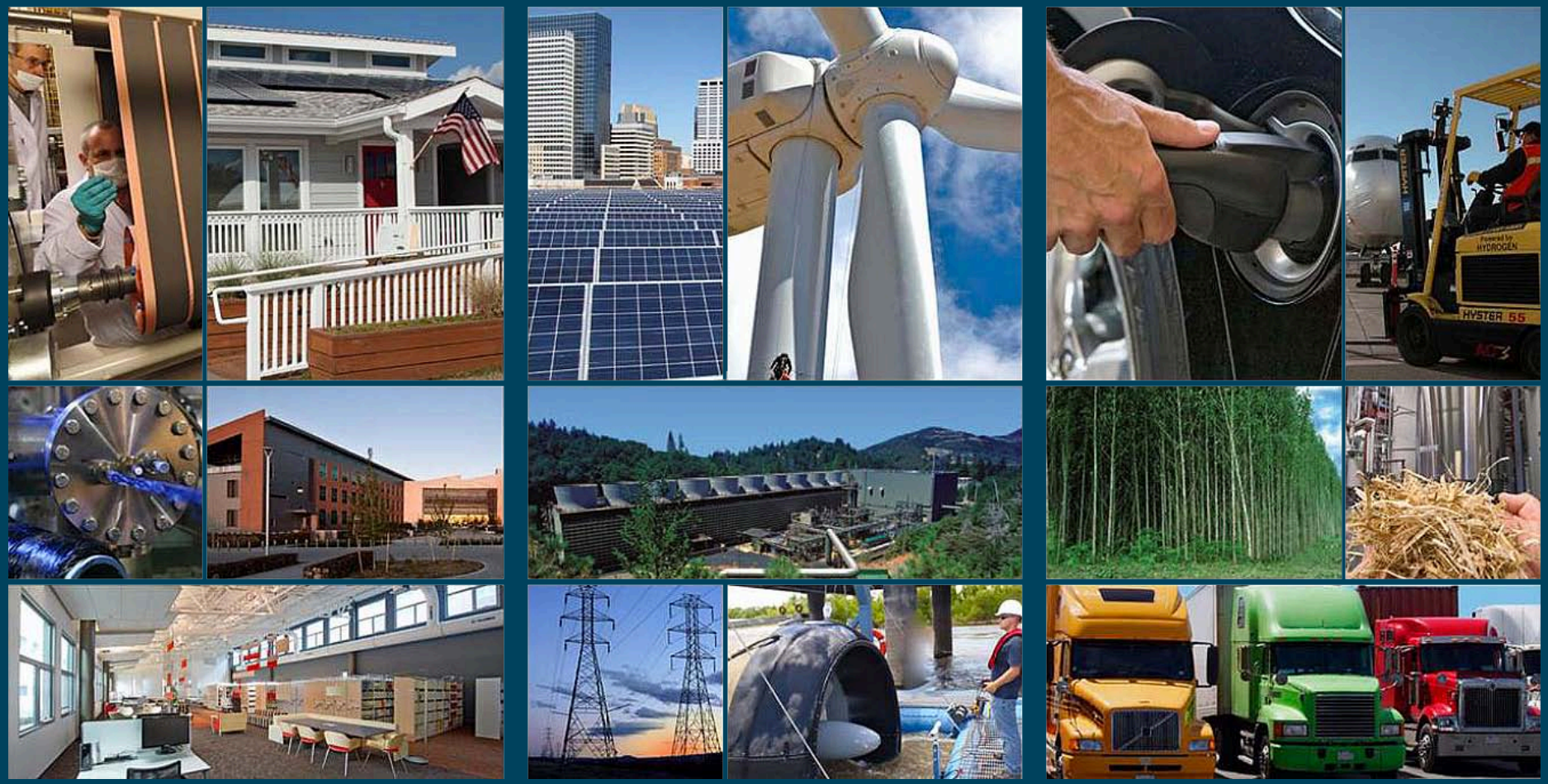
Large-Scale Renewable Energy Guide

Brad Gustafson, FEMP



U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

FEMP Federal Energy Management Program

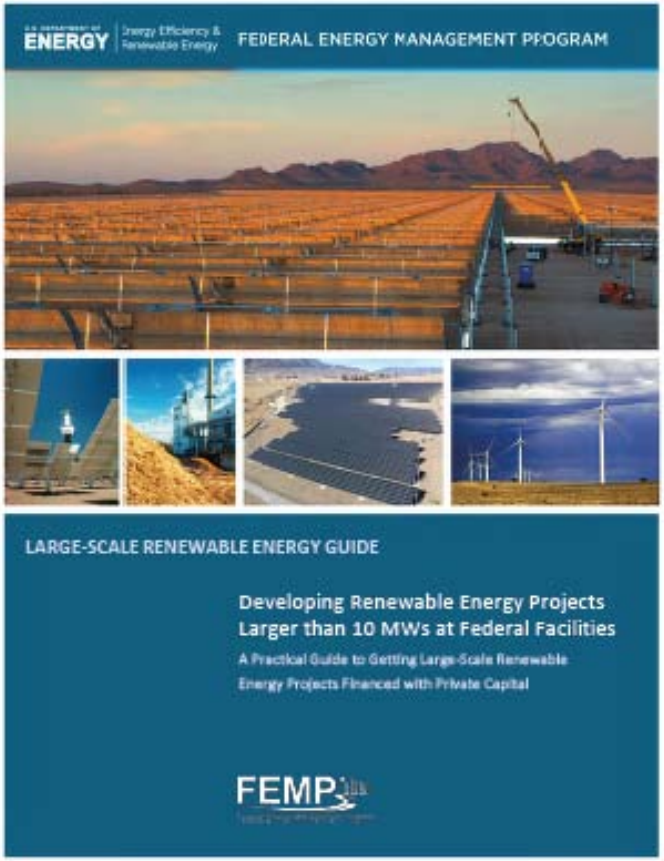
Large-scale RE Guide

Large-scale RE Guide: Developing Renewable Energy Projects Larger than 10 MWs at Federal Facilities

Introduction and Overview

Federal Utility Partnership Working Group

May 22, 2013



Federal Energy Management Program

Office of Energy Efficiency

and Renewable Energy

U.S. Department of Energy

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Federal Energy Management Program

FEMP works with key individuals to accomplish energy change within organizations by bringing expertise from all levels of project and policy implementation to enable Federal Agencies to meet energy related goals and to provide energy leadership to the country.

FEMP
Federal Energy Management Program

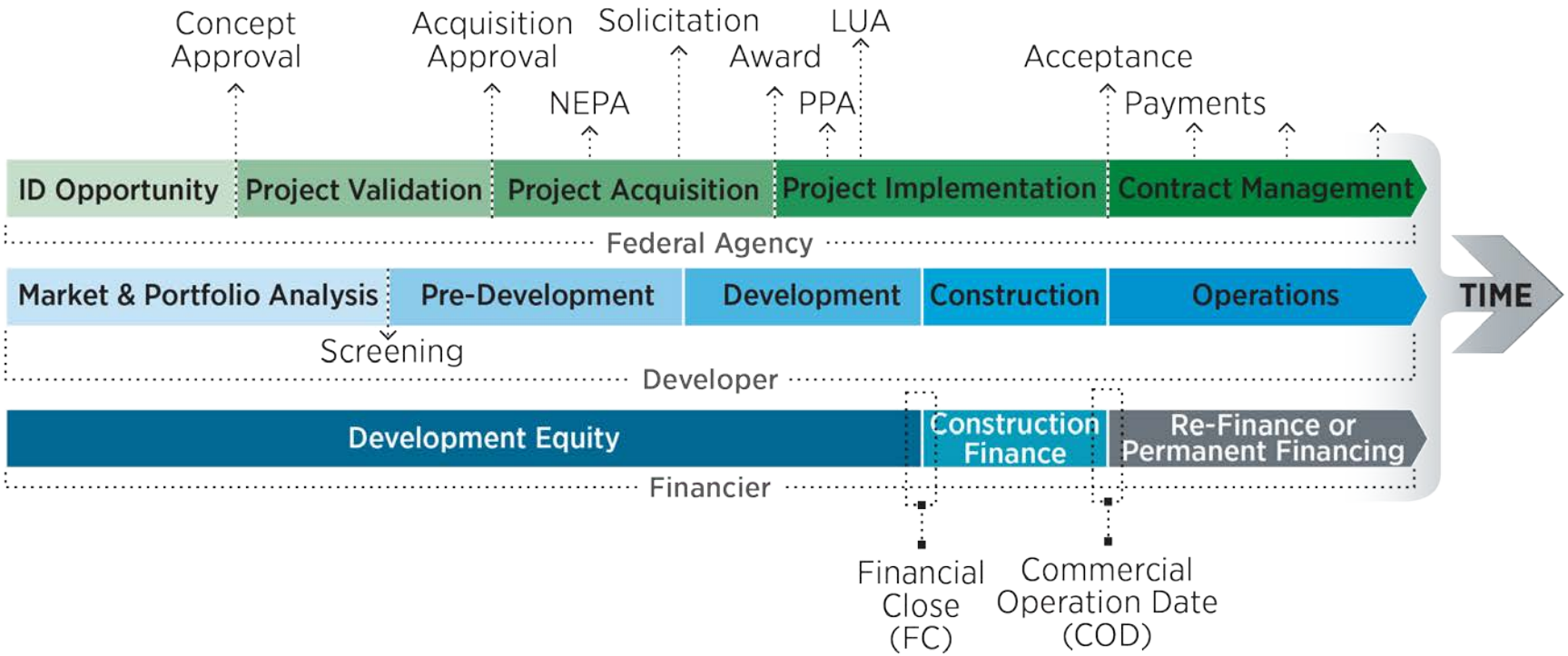
U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

FEMP Renewable Energy

- Works to increase the proportion of renewable energy in the Federal government's energy mix.
- The program does this by providing
  - Web-based Knowledge and Tools
  - Direct Project Technical Assistance
  - Interagency Coordination
  - Renewable Energy Guidance and Reporting Requirements
- Technical Assistance supports
  - Distributed-scale RE projects (smaller than 10 MWs)
  - Large-scale RE projects (larger than 10 MWs)

A Common Process

The Guide shows a common process for large RE projects, in spite of different terms, from three key perspectives: Developer, Federal agency, and Financier.



U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Federal RE Market

- DOD goal: produce 3 GWs of renewables by 2025
- Federal goals:
  - 7.5% of total electricity must come from renewable electricity by 2013 and beyond
  - 28% reduction in greenhouse gas emissions by 2020

Use of the Guide

- DOE
  - FEMP is applying the Guide in its implementation support to the DOE Pantex 11.5 MW ESPC wind farm
- Army
  - Energy Initiatives Task Force has adapted much of the process for Army specific practice. The Guide is a companion document to the EITF process and internal Army guidance.
  - Committed to partnering with FEMP to meet 1 GW goal.
  - EITF supporting Ft. Detrick (15 MW solar PV), Ft. Drum (28 MW Biomass), and Ft. Bliss (20 MW solar PV) projects
- Navy
  - Incorporated many elements of the Guide into its project development process
  - Looking for FEMP assistance to fine tune its process

Key Strategic Issue: Competitive Projects

- Attracting private capital investment to the Federal sector is essential to accomplish RE project goals.
- Federal Project opportunities must compete within competitive capital markets for:

  (1) project development investment and

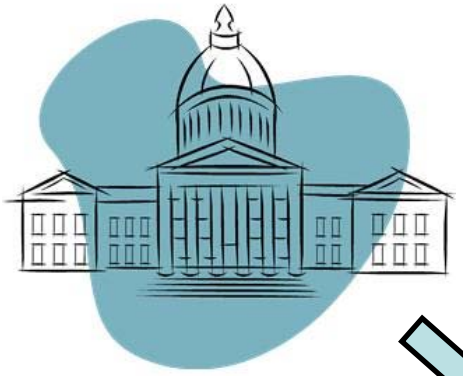
  (2) project execution capital investment.

Introduction

The Guide provides a general resource that:

- develops Federal employee and private sector awareness and understanding of each other's operating environment, goals, language, and process.
- creates a methodology to:
  - build strong business cases
  - define and mitigate risks
  - establish good project characteristics
- so that the private sector will:
  - respond to the Federal competitive process
  - invest in and develop the projects.

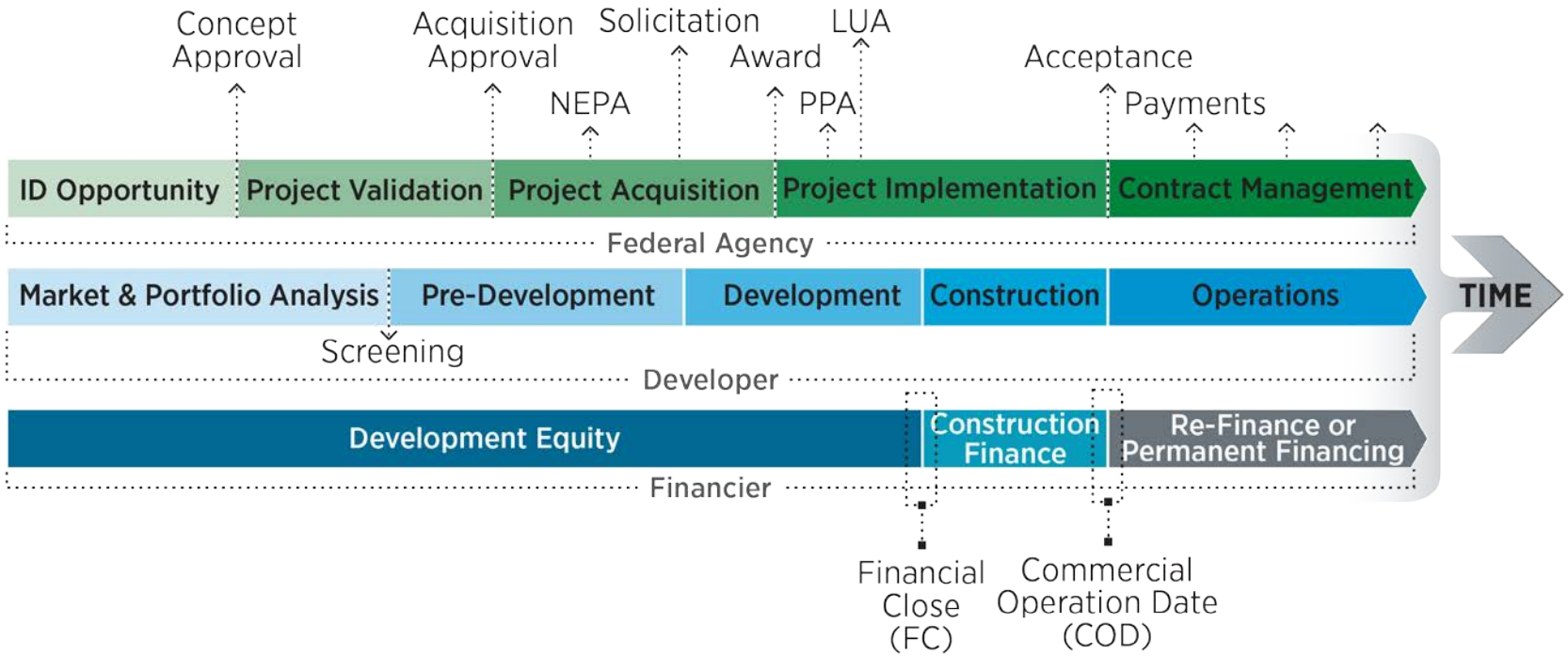
A Common Goal



Federal agencies and private developers both want to deploy significant amounts of large-scale renewable energy projects on Federal lands using private capital financing.

A Common Process and Understanding

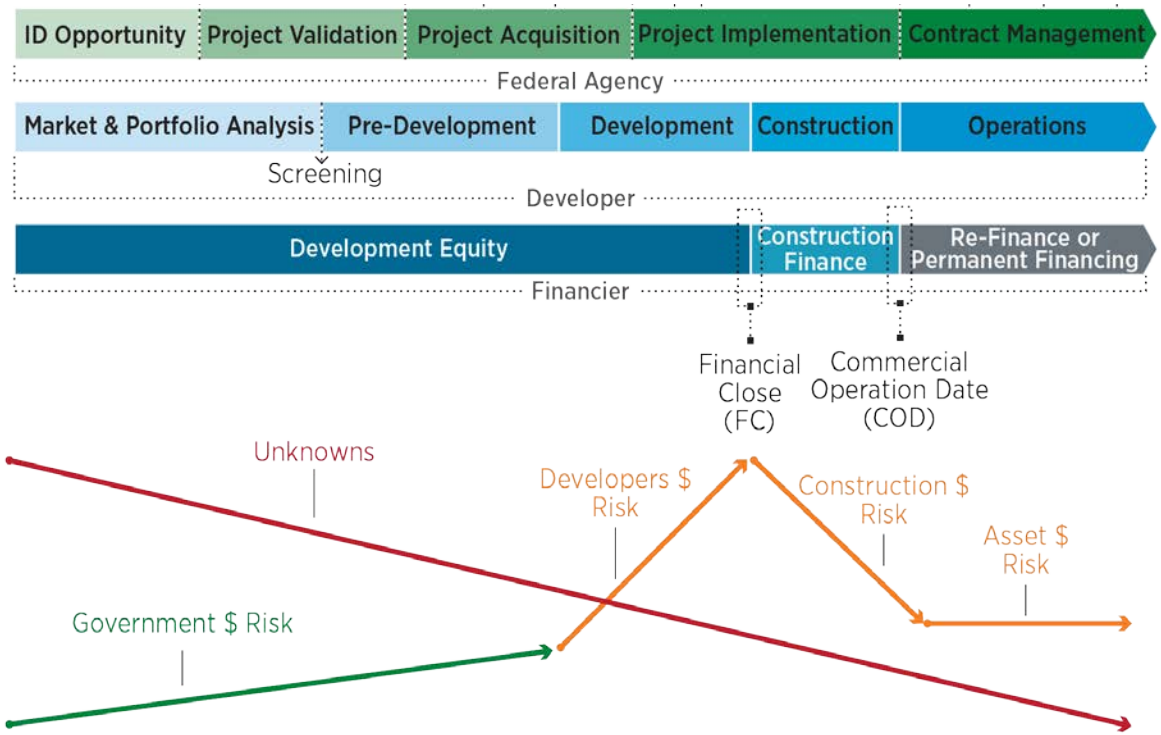
The Guide shows a similar process in spite of differences in language and terms from three key perspectives: Federal agency, Developer, and Financier.



U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

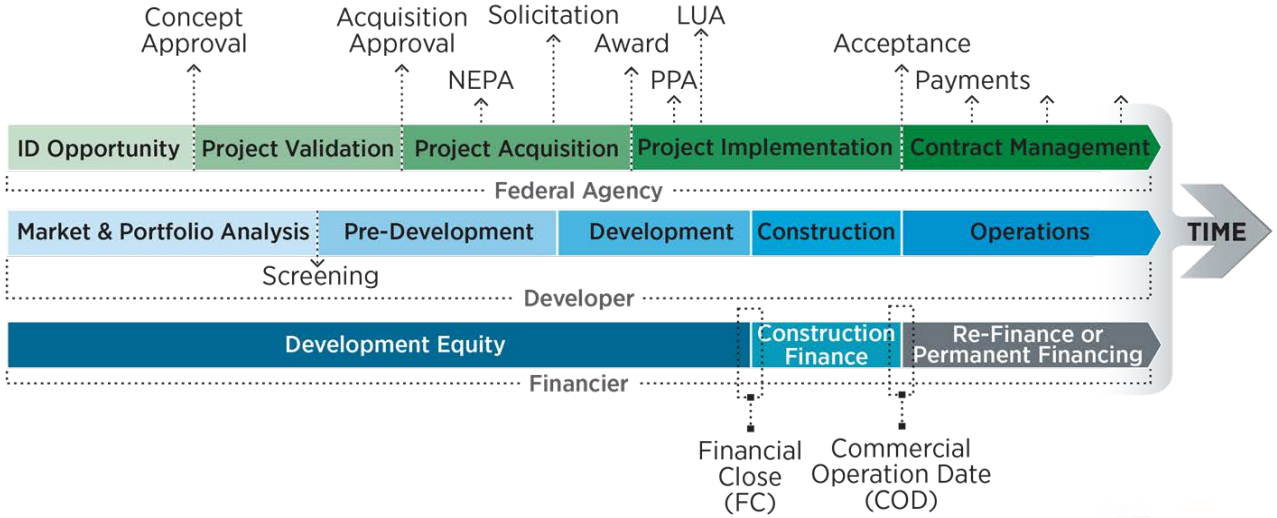
A Process that Acknowledges Risk

- Risk is an important driver of project development.
- The Guide acknowledges risk; a framework and process for managing projects in a risk environment is introduced.



U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Project Development



ID Opportunity

Market & Portfolio Analysis

→ Project Fundamentals

Project Validation | Project Acquisition

Pre-Development | Development

→ Project Development Framework

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Project Fundamentals

ID Opportunity

Market & Portfolio Analysis

Baseline	Economics	Policy	Technology	Consensus
Energy Market Drivers	Market specific Dollars and Cents	Conditions for Success	What, where when, how many,	Defend, defend, defend…
What defines the market and is it supportive or a barrier to RE? • Define market driver(s) • Define competitive metric • Source of fuel • Vulnerabilities of existing system • Impact to economy • Industry structure • Regulatory structure • How does the system work?	Dominant inputs to energy economics – what is it in your case? • Define economic tradeoff /MWh and dependencies on other markets • Fuels? • Wholesale rates? • Retail rates? • Avoided capacity costs? • Carve out market – Policy/Regulatory?	What is the pathway to secure contracting; support and barriers. • Legislative policy • Regulatory policy • Economic development • Jobs • Energy security • Environmental policy • Licensing rules • Permits – streamlining and definition	Commercial technologies; resource availability; alignment with market. • What is commercial • What is not • Resource availability-technical • Market limitations or opportunities for each technology • Integration/ reliability constraints	• Communicate • Create a forum • Defend fundamentals • Build consensus • Raise the level of conversation • Repeat, repeat, repeat and build consensus on defendable FACTS, not supposition.

Project Development Framework

Project Validation | Project Acquisition

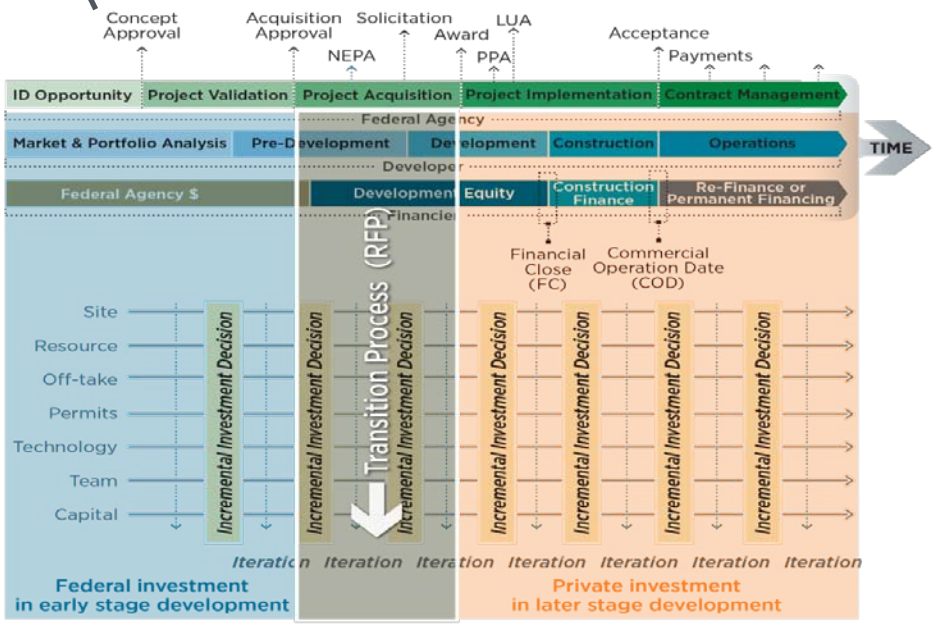
Pre-Development | Development

Site	Resource	Off-Take	Permits	Technology	Team	Capital
No site, no project	Engineering assessment	Off-take contract – (Revenue), Pathway to market /interconnection	Anything that can stop a project if not in place.	Engineered system	Professional, experienced, diverse	Once all is in place you can structure financing
• site control • size and shape • location to load • location to T&D • long-term control • financial control • clear title • lease terms/length • assignment or collateral concerns • environmental • slope • soils/geotech • vehicle or labor access • O&M access • upgradable • other infrastructure • survey	• volume • frequency • variability • characteristics (power vs. speed) • 24 hour profile • monthly variability • seasonality • annual variability • weather dependence • history of data • siting decisions • std. deviation across key parameters • P50, P90, P95 • Technology suitability • etc.	• credit of counterparty • length of contract • terms and conditions • reps and warranties • assignment • curtailment • infrastructure/ interconnection • performance • milestones • enforcement • take or pay • take and pay • pricing • pricing terms (fixed or variable) • RECs	• local permitting/ entitlements • building permits • land disturbance • environmental • cultural impacts • resource assessments • wildlife impacts • habitat • NEPA, EIS • utility interconnection • other utility or PUC approvals • etc.	• engineering design plans • construction plans • not generic "solar panel and inverter • engineered resource/conversion technology/balance of system designs • Design Development or Construction drawings • Specifications • Bid set • etc.	• business management • technical expertise • legal expertise • financial expertise • utility interconnection expertise • construction/ contract management • operations • power marketing/ sales • etc.	• development equity • project equity • project debt • mezzanine or bridge facility • tax equity • grants, rebates, other incentives • environmental attribute sales contracts (RECs) • bond finance • non-recourse project finance • etc.

A common reliable, repeatable process

Identifiable stages

Consistency >> lower risk >> attractive projects
Iterative disciplined process for investing



Common understanding of important project characteristics

Government leads investment to ID good projects

Solicitation and developer selection

Developer completes and operates project

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

A difference of perspective: Authorities

We can do anything that is not prohibited by law.

Being a government of prescribed powers, we can only do that which is authorized by law.

Private Lawyer

Government Lawyer

Guide Structure

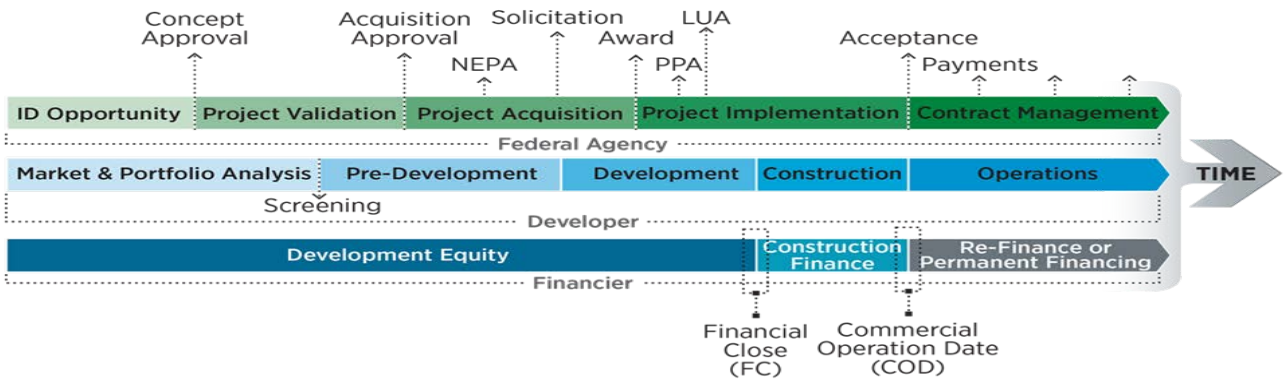
Section I: Language and terms

Section II: A Reliable Repeatable Development Process

- The Commercial process
- Project Fundamentals
- Project Development Framework

Section III: Application of Project Development by a Federal Agency

- The Federal Process



Appendices

Detail in Appendices

Appendix A. Portfolio Approach

Appendix B. Project Development Framework Categories

Appendix C. Overview of Electricity Markets and Key Terms

Appendix D. Commercial Project Financing

Appendix E. 10-Step Project Development Framework Approach

Appendix F. Project Pro Forma Example

Appendix G. Energy Initiatives Task Force Project Assessment

Appendix H. Project Validation Workbook Draft

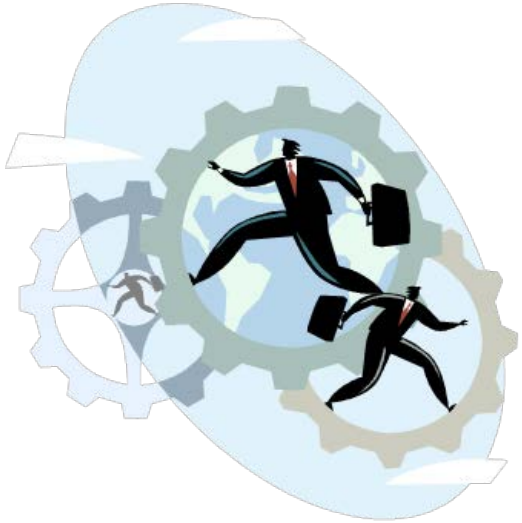
Appendix I. Responses to Comments

Federal Agency Key Points

- Federal Agencies need private capital for large-scale renewables projects.
- Risk is critical for capital.
- Agencies can reduce project risk by using the process and frameworks in the Guide:
  - Do early investment in market analysis, predevelopment
  - Use a consistent approach.
- The Guide helps Agencies understand the private sector process.

Private Developer Key Points

- There is a large Federal market for large-scale renewable projects.
- The Guide helps Agencies follow key methodical steps that:
  - developers understand
  - reduce project risk
  - make projects attractive to private investors.
- The Guide helps the Private Sector understand the Federal Agency process.



Utility Key Points

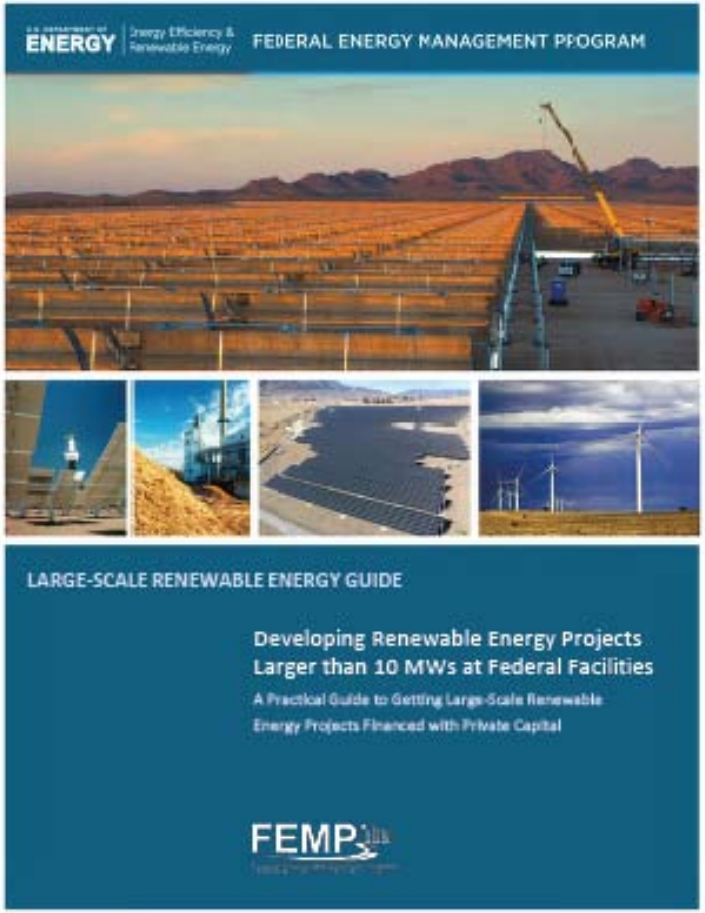
- Federal agencies are committed to hosting large-scale renewable energy projects.
- Utilities will play a key role as potential sole or partial off-takers.
- Agencies need good relationships with their utilities to facilitate interconnection and avoid curtailment.

Outlook

When using the framework, these points are clear:

- Risk reduction is the most universal action a Federal agency can take to attract developers and private capital investment.
- Successful projects are the result of each party working together:
  - to understand each other's terms and processes
  - to define and work toward a common goal

Feedback Welcomed



Anne Crawley

202-586-1505

anne.crawley@ee.doe.gov

Boyan Kovacic

202-586-4272

boyan.kovacic@ee.doe.gov

http://www1.eere.energy.gov/femp/technologies/large-scalereguide.html

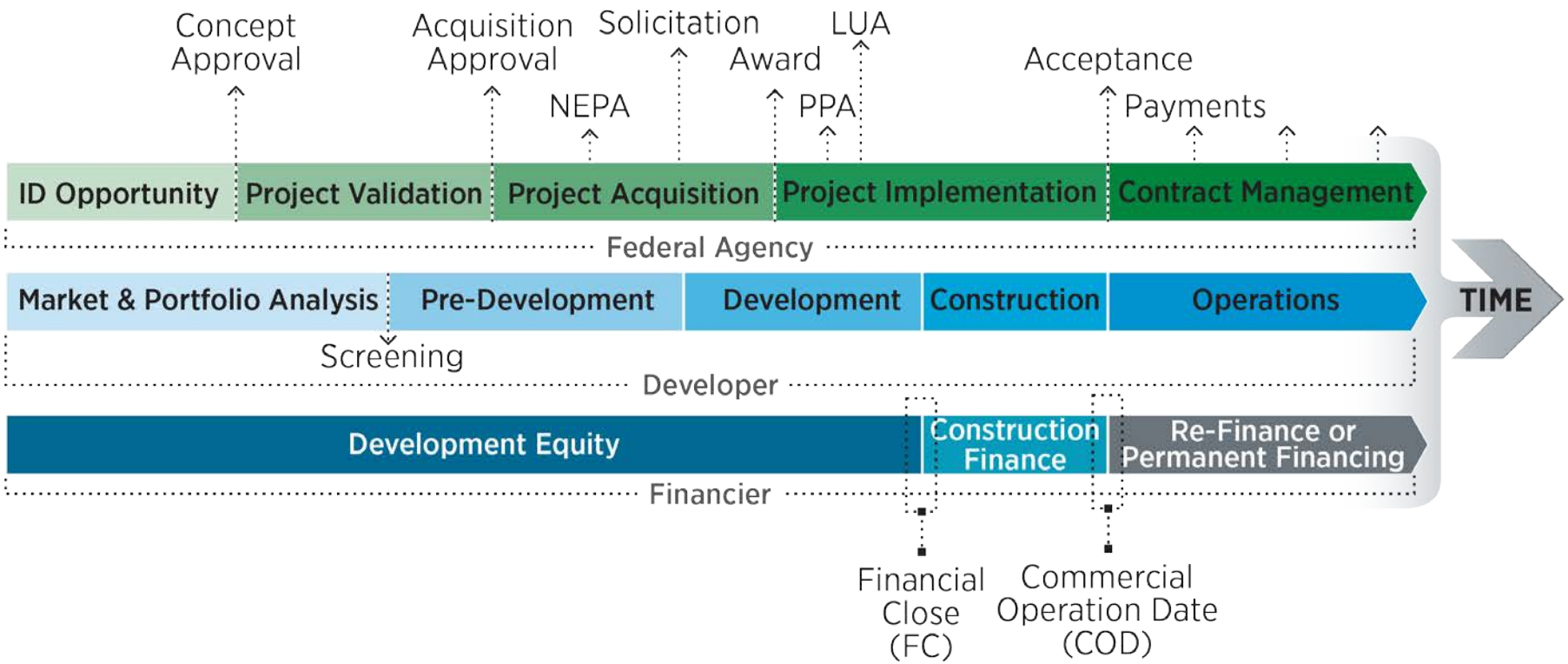
Thank You

Brad Gustafson - FEMP

Brad.Gustafson@ee.doe.gov

202 586-5865

Common Process



U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy