

BCX RENEWABLE ENERGY BUSINESS DEVELOPMENT CURRICULUM

**An In-Depth Exploration Of The
Development Process Of Renewable
Energy Projects**

**45 To 60 Minute Presentation For
The Last Workshop Of Each Module**

LESSON OVERVIEW

RENEWABLE ENERGY PROJECT DEVELOPMENT

- I. THE SIX ESSENTIAL PROJECT ELEMENTS
- I. THE FOUR STAGES OF THE PROJECT DEVELOPMENT CYCLE
- I. THE THREE PROJECT DEVELOPMENT MASTER DOCUMENTS
- I. PROJECT TEAM EVOLUTION

I. THE SIX ESSENTIAL PROJECT ELEMENTS

Team

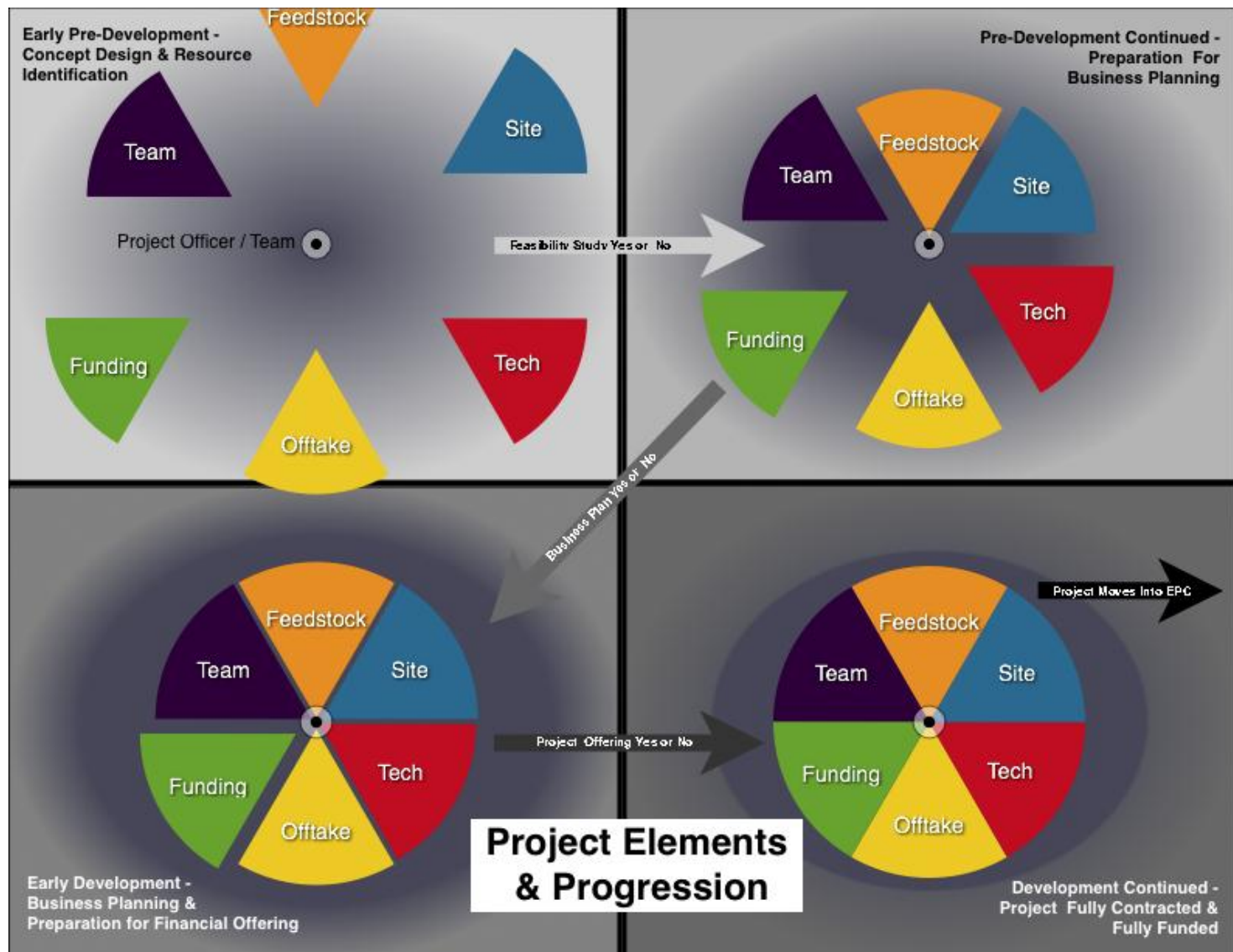
Feedstocks

Technology

Offtake/Market

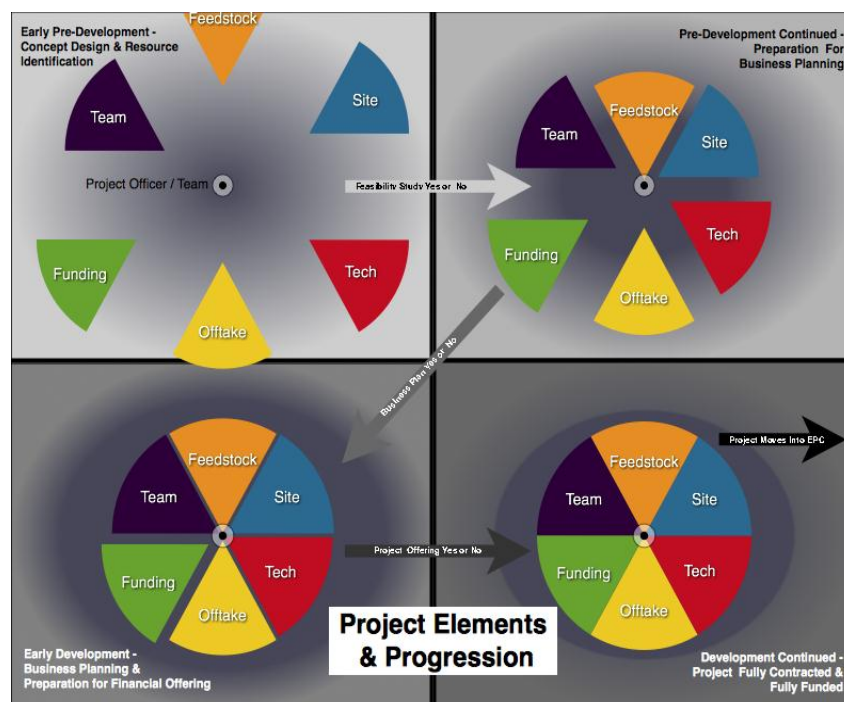
Site

Funding



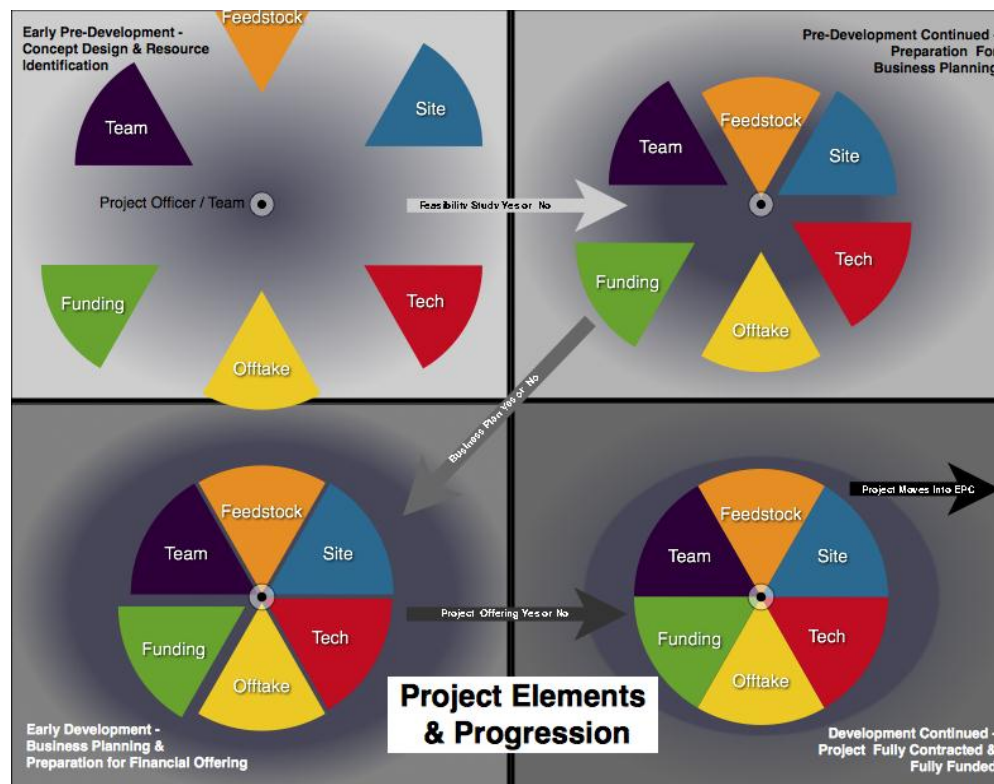
I. THE SIX ESSENTIAL PROJECT ELEMENTS

- Six essential elements are common to all renewable energy projects.
- All six elements must all be “in place,” meaning fully understood, contracted and fully funded before the project can be built and operated.
- Of all of the elements, final project funding (meaning the money invested to actually build the facility) is always the last wedge of the pie to fit into place.
- Until all of the final financial documents and all agreements have been signed, any of the six project elements can and often do change suddenly and have to be nudged back into place.



I. THE SIX ESSENTIAL PROJECT ELEMENTS

- **Team** - The people responsible for the project's conceptualization leading to a detailed and comprehensive feasibility study, writing or overseeing the writing of a business plan, writing or overseeing the writing of a financial offering, marketing that offering to potential investors and or brokers and securing the funding to build the facility.



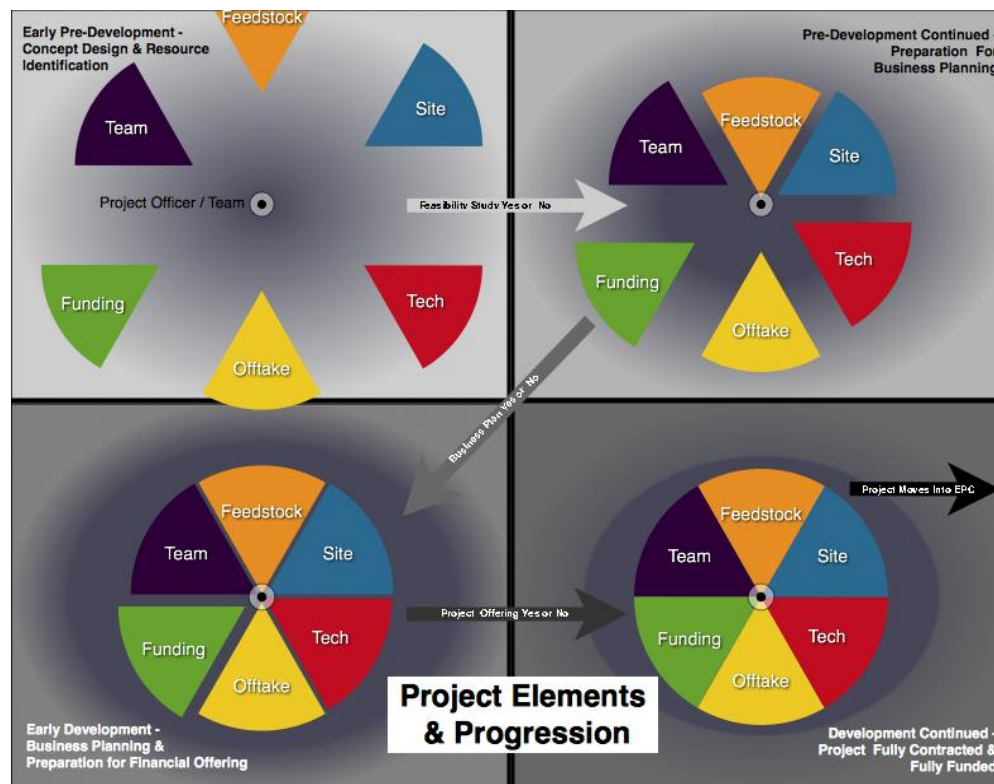
I. THE SIX ESSENTIAL PROJECT ELEMENTS

Feedstocks – The primary materials and other critical inputs that the facility will transform into one or more energy products.

Technology – The equipment used to transform feedstocks into energy products.

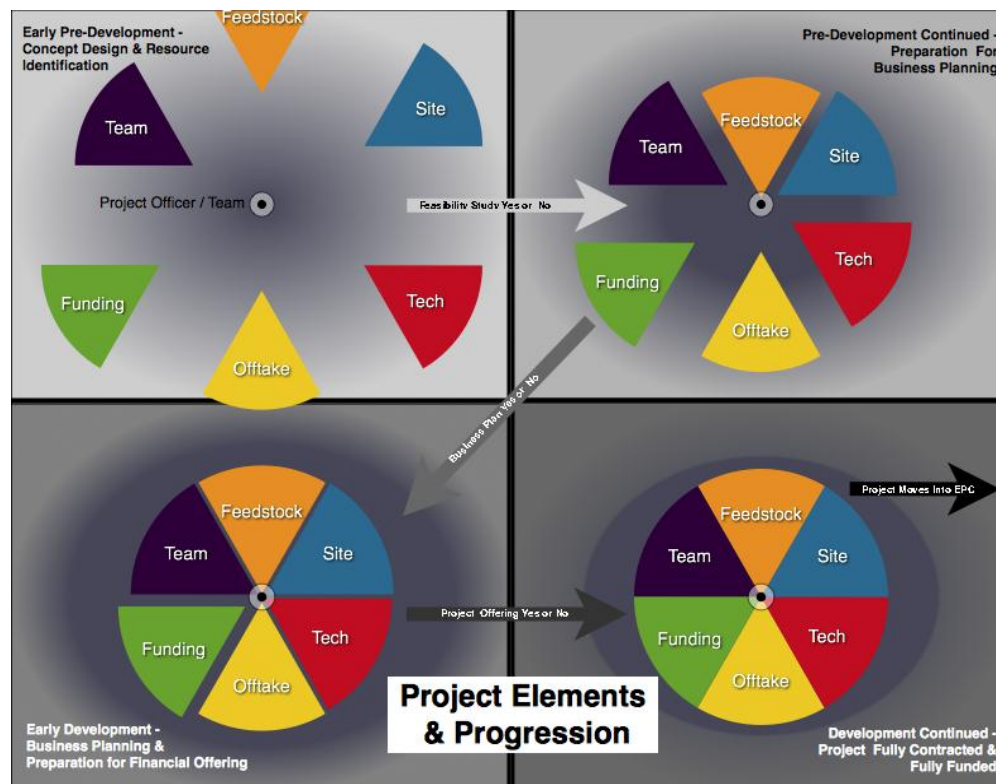
Offtake/Markets – The sales agreements with the purchasers of the energy products produced and or the market the product will be sold into.

Site – The specific real estate where the facility will be located.



I. THE SIX ESSENTIAL PROJECT ELEMENTS

Funding - The money needed to develop, design, build, commission and begin operations of the facility. There are several successively larger injections of Funding needed to develop a renewable energy project from its **Pre-Development Stage** all the way through its **Development Stage** and beyond into its ongoing operation.



I. THE SIX ESSENTIAL PROJECT ELEMENTS

The Project Team

- The team leader is the first element that must be identified and in a best case scenario a project team at least partially organized at the very beginning of a new renewable energy project.
- The project team is considered by most investors to be the most important element of any project.
- Teams usually start out small and add members as the project progresses. Project teams should be kept as small as possible.
- Team members should be selected very carefully according to their knowledge, experience and most importantly their ability to work well with each other under stressful conditions.
- The team members must be flexible and adaptable as a project rarely ends up exactly as it was originally conceived.

I. THE SIX ESSENTIAL PROJECT ELEMENTS

The Project Team

- Throughout the development process, the deals with all of the other project elements simultaneously and brings them into progressively tighter focus.
- The project team should count on having to continuously adjust and rework the six elements of the project and all of their assumptions and agreements until final contracting and full funding is achieved.
- Project development work is complex, lengthy and requires dedication and perseverance. Any project can “fall apart and melt down” a number of times before full funding is achieved and most do.
- The project development team should realize that nothing is “real” until the money needed to build the facility is literally “in the bank.”

I. THE SIX ESSENTIAL PROJECT ELEMENTS

Feedstock

- Feedstock is often considered by most investors to be the second most important element of any renewable energy project.
- Investors are rightly concerned that the supply of feedstock:
 - Really exists and is available in the needed quantities over the expected life of the planned facility without stressing the natural resource base they come from or that causes harm to the natural environment
 - Is available at the quality levels required by the technology selected
 - Is affordable at the quality levels necessary
 - Has been contracted for an acceptable period of time and is therefore considered “secure”
 - Is not overly subject to unexpected supply interruptions
 - Is available from other sources in case of supply interruption
 - That contingency plans have been made in case of supply interruptions
 - Will not be subject to delay or interruption from well-meaning environmental advocates
 - Is located close enough to the point of use to avoid undue transportation “penalties.”
- Unless all of the above criteria and any other investor concerns about feedstocks have been answered to their complete satisfaction a project will not get funded

I. THE SIX ESSENTIAL PROJECT ELEMENTS

The Technology Package

- The technology package selected by the project team is usually considered by potential investors as important as the feedstocks that it will use.
- The term “package” refers to all of the various machines and equipment used in the facility
- The total technology package for most projects can be divided into three parts:
 - The feedstock preparation and handling package, which prepares the feedstock for use by the transformation package and delivers it into the transformation or conversion unit or package
 - The transformation package, which transforms the feedstocks into one or more useable product and byproducts
 - The product storage and handling package which holds and handles the product or products and any by-products until they are delivered to the customer or “Offtaker”
- For most projects, investor prefer that the technology packages selected are considered by the financial community as “commercial,” which means that they have been in use in similar facilities for a number of years or long enough so that they have an established track record of performance. It is then considered, “finance-able.”
- New or “emerging” tech packages that do not have years of proven operation are generally much harder to finance.

I. THE SIX ESSENTIAL PROJECT ELEMENTS

The Technology Package

- The project must balance the overall cost of the technology package against its efficiency and long-term operational robustness.
- The team must anticipate how often the facility will not be in full operation due to regularly scheduled maintenance requirements
- The total package must be chosen specifically for the expected quantity and quality of the feedstocks used
- The technology must be “permit-table” meaning the project team must be able to secure the necessary permits needed for its operation. This is a very important selection requirement as some states and/or communities have much more strict permitting requirements for certain types of technologies than other states or communities.
- The technology selected should be as efficient as possible, meaning it should operate in such a way to take maximum advantage of the feedstock, operate cleanly and safely while maintaining as low an operating and maintenance cost as possible.
- The technology should be selected with careful consideration of the by-products and potentially harmful wastes that are produced and that may cost too much to dispose of or use as an input in some other industrial process

I. THE SIX ESSENTIAL PROJECT ELEMENTS

The Technology Package

- Comprehensive engineering studies created in the latter part of the **Development Stage** will be required before full project financing is achieved and will include
 - Permitting studies for each type of permit required
 - Complete engineering diagrams
 - Construction diagrams
 - Construction schedules
 - Others as required for the project
- All permits must be applied for and received before construction begins
- All EPC and O&M firms that will participate in the project must be identified and contracts negotiated and signed prior to final project funding.

I. THE SIX ESSENTIAL PROJECT ELEMENTS

Offtake / Market

- After Feedstocks and technology considerations, the Offtake or the Market for the product produced is generally the next most important issue the project team must resolve for potential investors.
- Generally, offtake agreements with buyers must be fully negotiated and contracted before a project will receive financing and must include
 - Actual price that will be paid for the product
 - The duration of the contract, generally over an agreed upon number of years
 - Price escalators such as standard cost of living increases, inflation rates, etc.
 - Understanding of unanticipated sales price increases due to cost factors such as increases in transportation, utility or feedstock costs, etc.
 - Product volume levels to be sold to each offtaker
- For some products where a portion of sales will be made to the general public, convincing and comprehensive market analysis, marketing studies and marketing plans will also be required before investors and or financing institutions will put up the required capital for a project

I. THE SIX ESSENTIAL PROJECT ELEMENTS

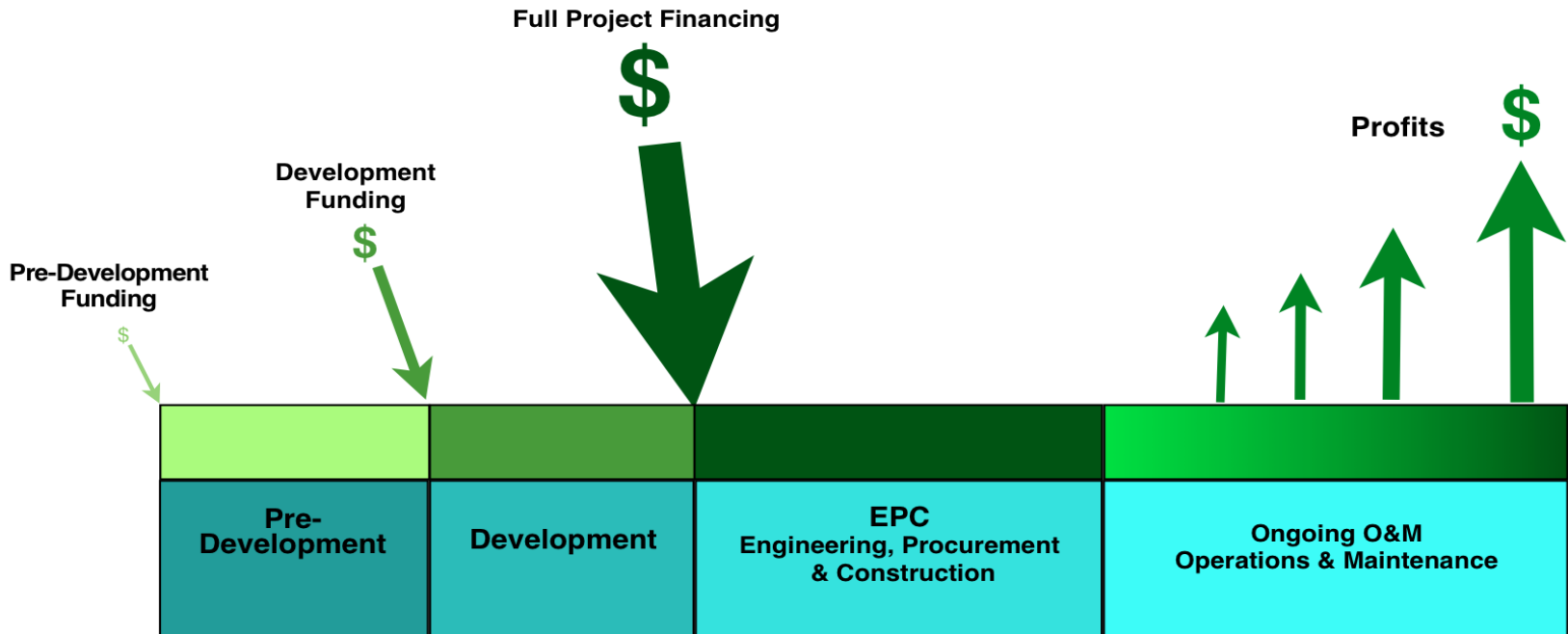
The Project Site

- The project team must select a project site that:
 - Is permit-able. This is a critical consideration as some areas are located close to water sources or environmentally sensitive areas that are protected or areas that are too close to human or wildlife habitats and so are unavailable to some types of technologies
 - Is close enough to major utilities such as water delivery systems and power grids, etc.
 - Is close enough to major transportation infrastructure such as roads, highways and railroads so that feedstocks and finished products can be safely and effectively transported from their sources and to their markets within reasonable cost parameters
 - Is close enough to the source of the needed feedstocks so as to avoid significant additional transportation costs
 - Is close enough to waste disposal sites or other industrial users of the by-products or wastes that may be generated from the technology selected

I. THE SIX ESSENTIAL PROJECT ELEMENTS

Project Funding

SOURCE & TIMING OF PROJECT FUNDS



Pre-Development Funding: May come from Development team, from friends and or family members, from venture capital investors, or others.

Development Funding: May come from venture capital investors, individual investors interested in the project, grants or other sources.

Full Project Financing: May come from or a combination of venture capital investors, individual investors interested in the project, banks, grants, loan gauntness, investment firms and or a wide variety of other project investment sources.

I. THE SIX ESSENTIAL PROJECT ELEMENTS

Project Funding

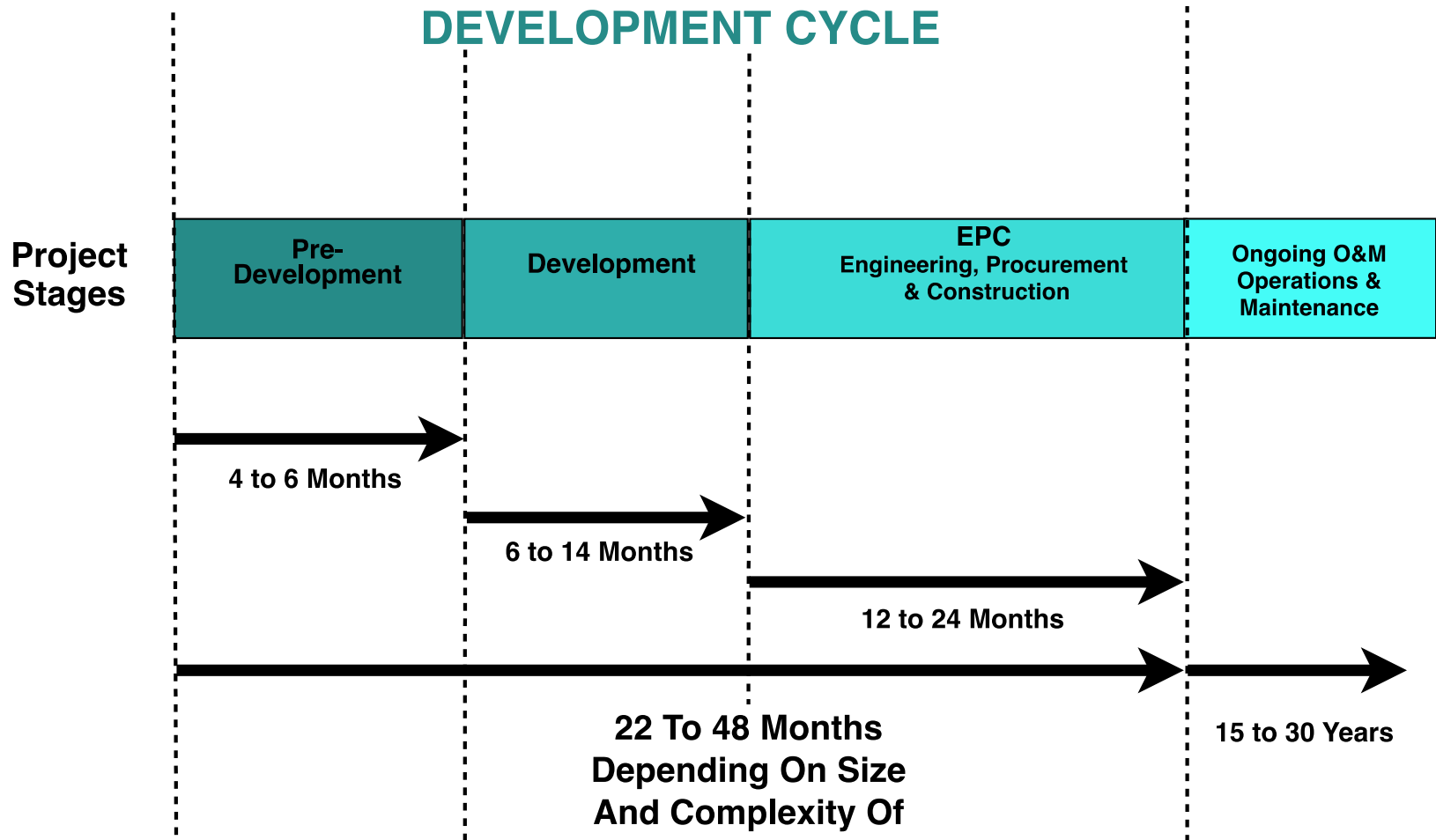
- There are several levels or “rounds” of funding for renewable energy projects that must be raised from investors or project participants during progressive stages of the **Project Development Cycle**:
 - **Pre-Development Funding**: Working capital needed to write a project’s feasibility study and to write a business plan. Project pre-development takes time and out of pocket expenses, which can mount up significantly. Often these funds come from the project team members, from friends and family members, grants and more rarely from venture capital firms or individuals that specialize in “early-in” project financing.
 - **Development Funding**: A larger infusion of capital needed to begin move the project through **the Development Stage** and is used to create and formalize all of the many project agreements, designs, marketing plans, EPC plans and operation plans, etc. Development funding is also used to write the projects Formal Business Offering documents and to market the project to investors for full project financing, the largest funding round in any project. A useful rule of thumb for the amount of development money a team will require to raise the full project financing for the project is usually somewhere between 2 to 6 % of that total project costs.

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Project Funding

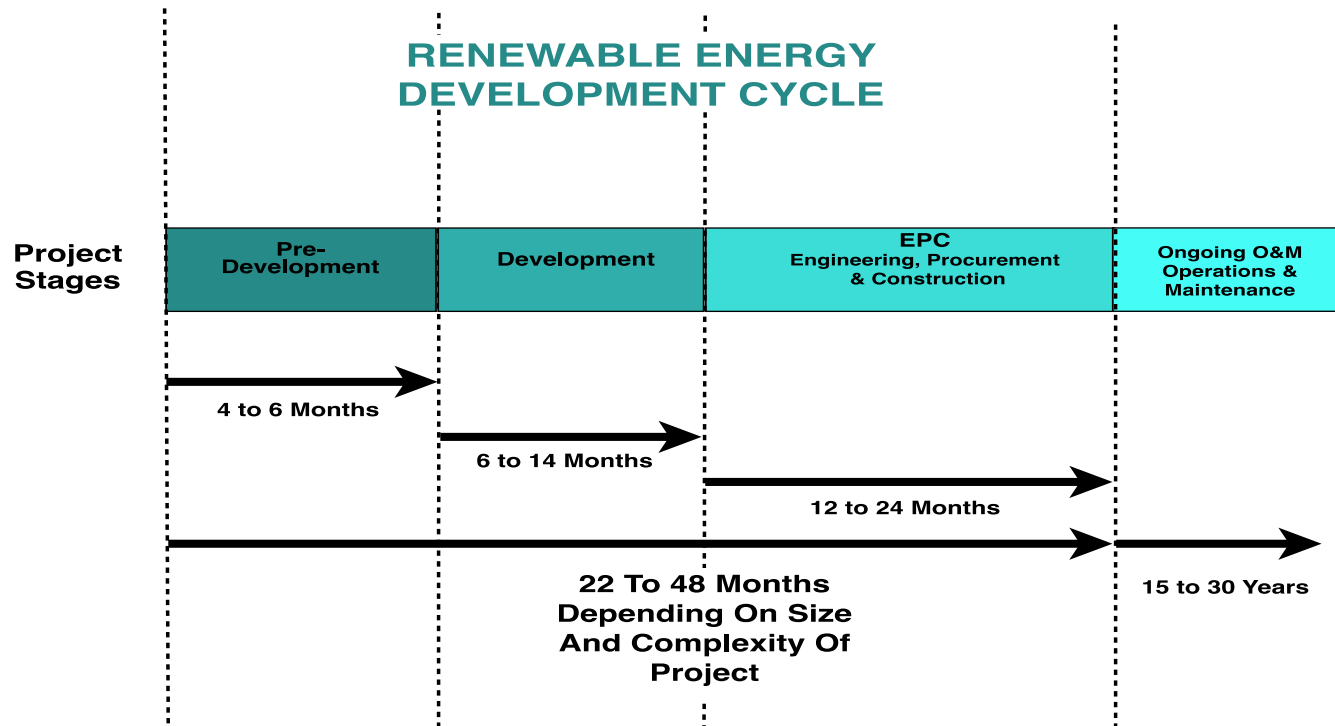
- **Full Project Financing:** Is the total amount of capital needed to actually do all of the work stipulated in the plans, contracts and agreements that were outlined and written during the project's **Development Stage**. This is the money needed for EPC, for facility testing and commissioning and for the first few years of operations until the project begins to make a return for its investors.
 - Raising full project financing requires that all of the pre-development and development activities have been successfully accomplished because total total capital costs cannot be definitively determined until all of the steps leading up to and through the writing of the project's Financial Offering have been successfully accomplished.
 - Full project financing is by far the largest sum the team will have to raise.
 - It will not be invested into the project until all of the investors and or financial institutions are convinced that the project team has carefully planned and fully contracted every aspect of the project and that the needed expertise to carry out the plan has been assembled.

II. THE FOUR STAGES OF THE PROJECT DEVELOPMENT CYCLE



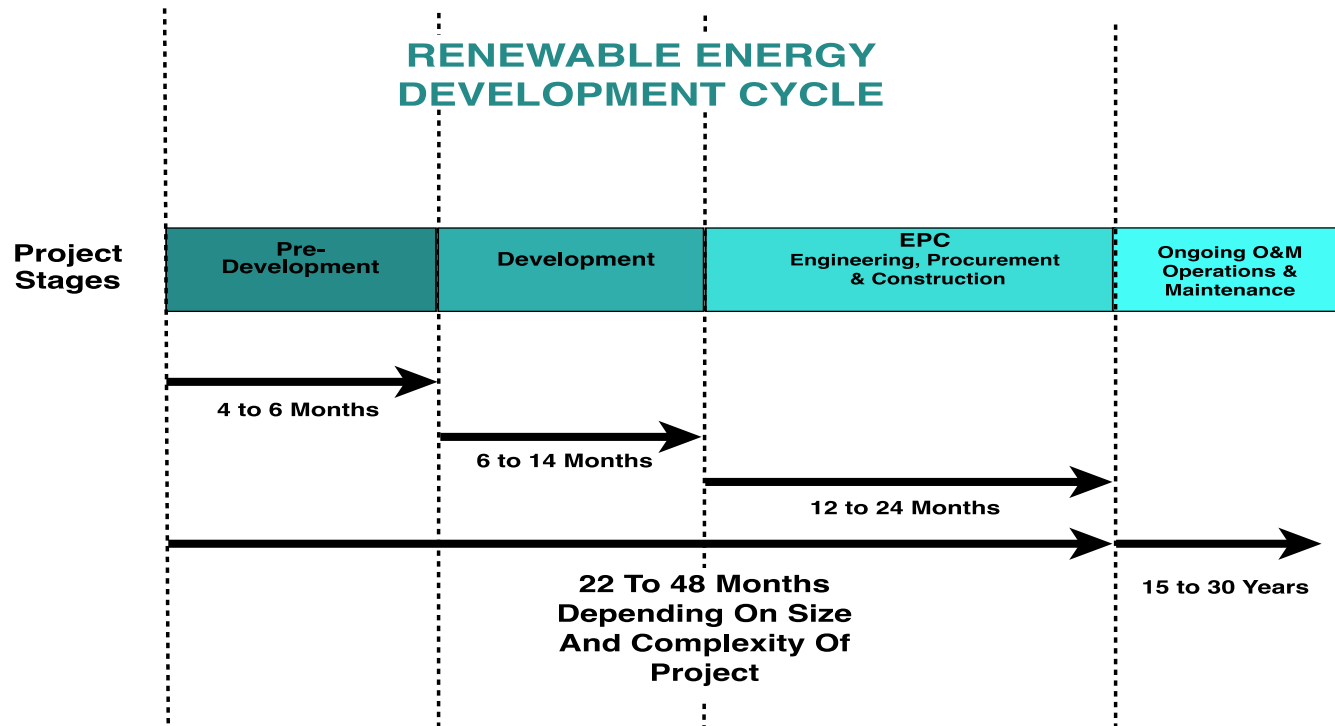
II. THE FOUR STAGES OF THE PROJECT DEVELOPMENT CYCLE

- Most of the project team's work is accomplished in the first two stages of **Pre-Development** and **Development** when the team will be operating substantially on its own.
- As a project evolves through the second **Development** stage, more and more outside experts and assistance will be required. However the team is always the driving force behind the project.



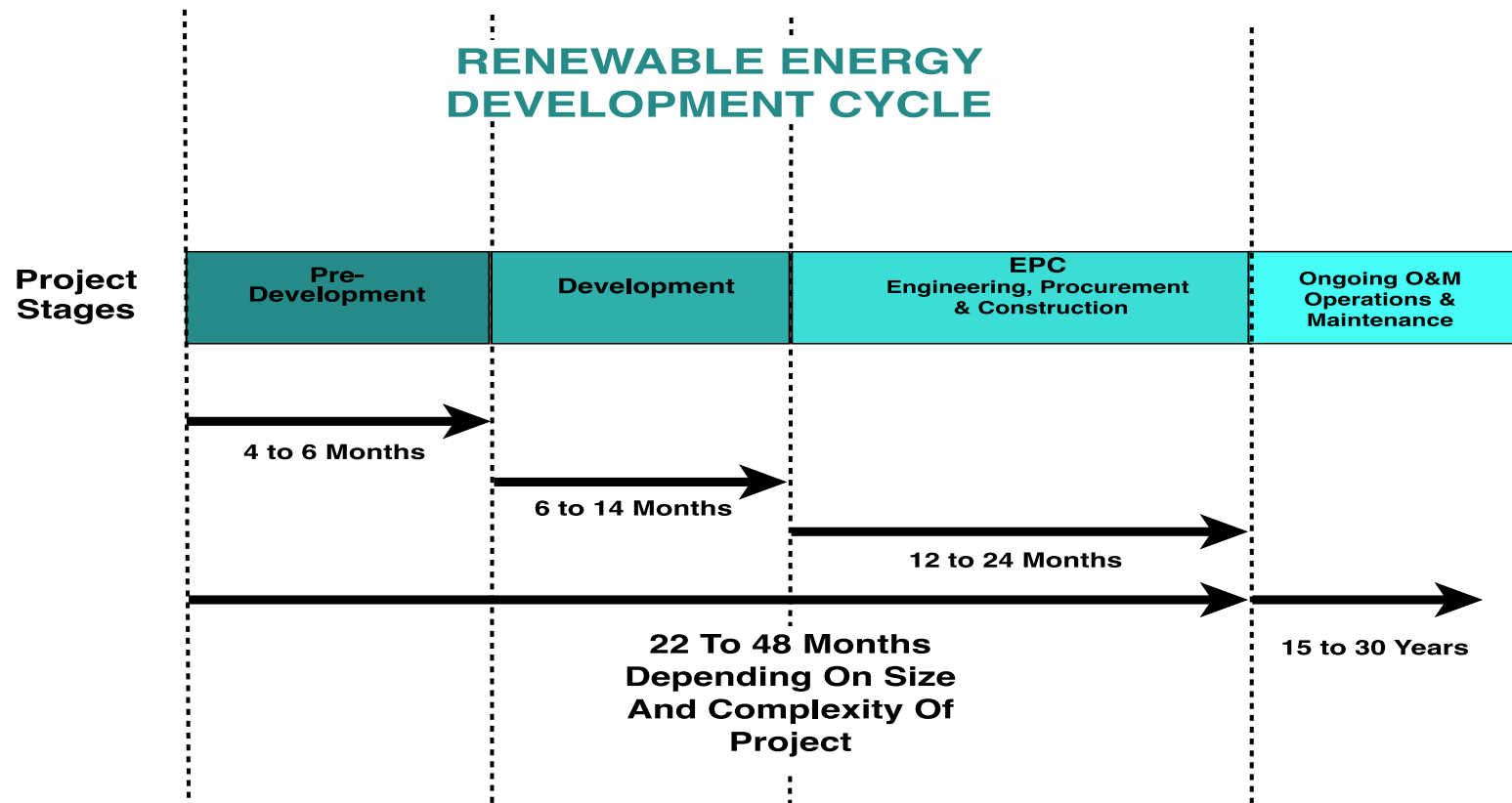
II. THE FOUR STAGES OF THE PROJECT DEVELOPMENT CYCLE

- Project team oversight is required during the third **EPC** stage.. EPC work is complex and so is usually contracted out to a specialized EPC engineering firm.
- The team must decide if it intends to operate and maintain the facility itself or whether it wants to contract with a specialized **O&M** engineering company to run the facility once it is built and officially commissioned for continued use.
- Some engineering firms do both EPC and O&M work.



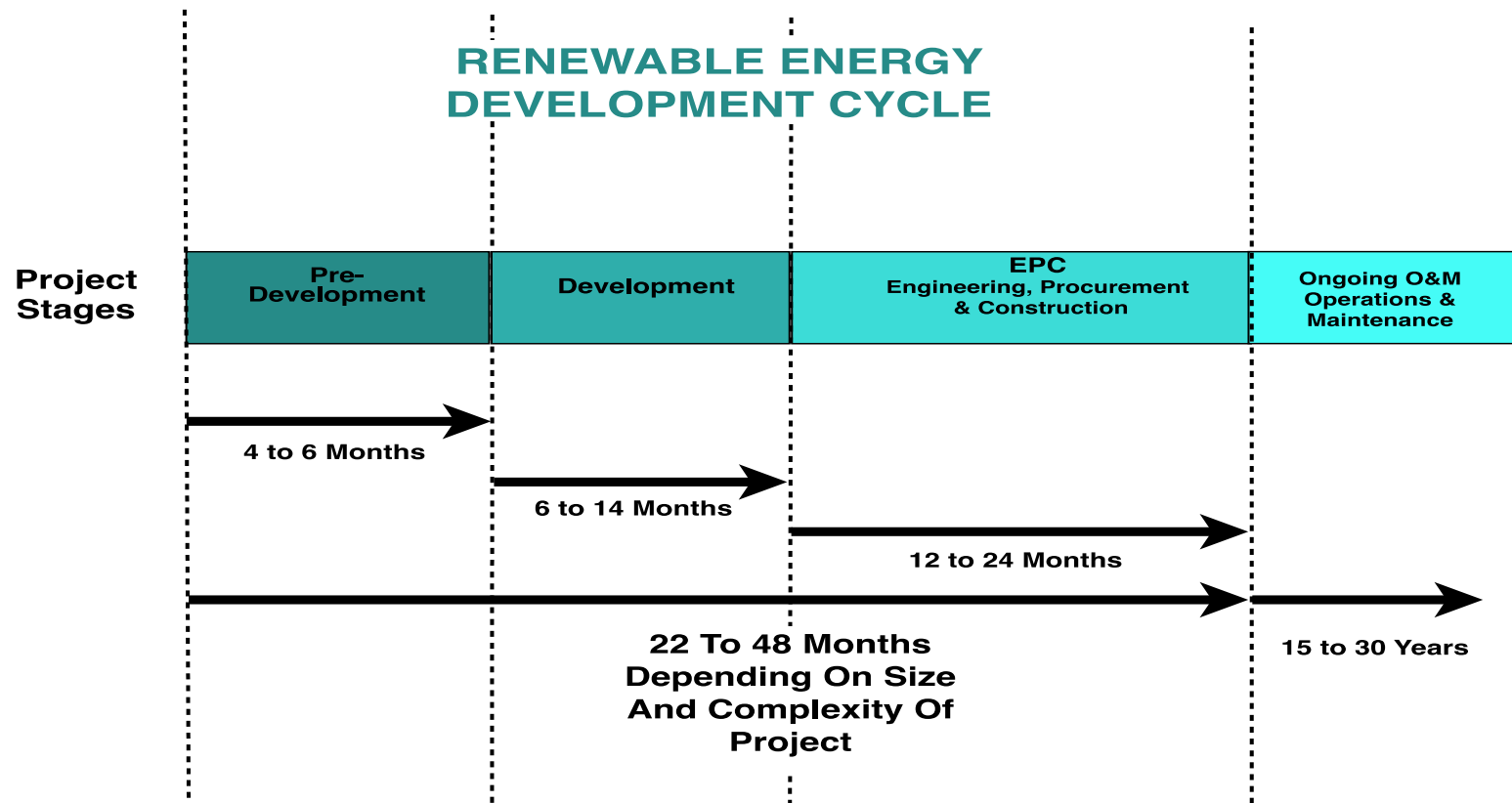
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- Any of the four stages could be accomplished in less time. However, experienced renewable energy project developers will almost always advise new project teams to plan on each stage taking significantly longer to accomplish than they originally expect.



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III. THE THREE PROJECT DEVELOPMENT MASTER DOCUMENTS

The three critical and essential master documents of every renewable energy project are a **Feasibility Study**, a **Business Plan** and a **Financial Offering**. They:

- Are complex, lengthy, have specific formats
- Must be carefully prepared to comply with all legal requirements
- Must follow all of the rules, regulations and legal requirements of the city, county, state and nation where the plant will be located
- Are not the only legal documents that will be necessary to prepare for a renewable energy project.
- Are used to raise capital to move the project to the next stage of development and should therefore be considered important sales tools for the project

III. THE THREE PROJECT DEVELOPMENT MASTER DOCUMENTS

Feasibility Study: Is an initial summation of the proposed project addressing all of the six **Essential Project Elements** and is:

- Usually written by the project team midway in **the Pre-Development Stage**
- Written after the team has done a fairly comprehensive survey of the project's **Six Essential Elements**
- Used to evaluate the project to determine if the concept is feasible and practical to pursue further
- Used to raise the development capital needed to move the project through the **Development Stage**
- Usually paid for out of the pockets of the project team or with capital raised from friends and or family members

III. THE THREE PROJECT DEVELOPMENT MASTER DOCUMENTS

Business Plan: Is an official document used to raise capital to further develop the project and:

- Is often prepared by or with the assistance of a professional business plan writer or an attorney
- Must accurately represent all the aspects of the project
- Cannot exaggerate any detail of the project
- Must carefully outline all the risks associated with the project
- Must comply with all federal legal requirements and those of the state where it is written
- Must cover in detail all six essential elements of the project
- Once completed the business plan is then “put on the market” with the intent to attract “early-in” project development investors

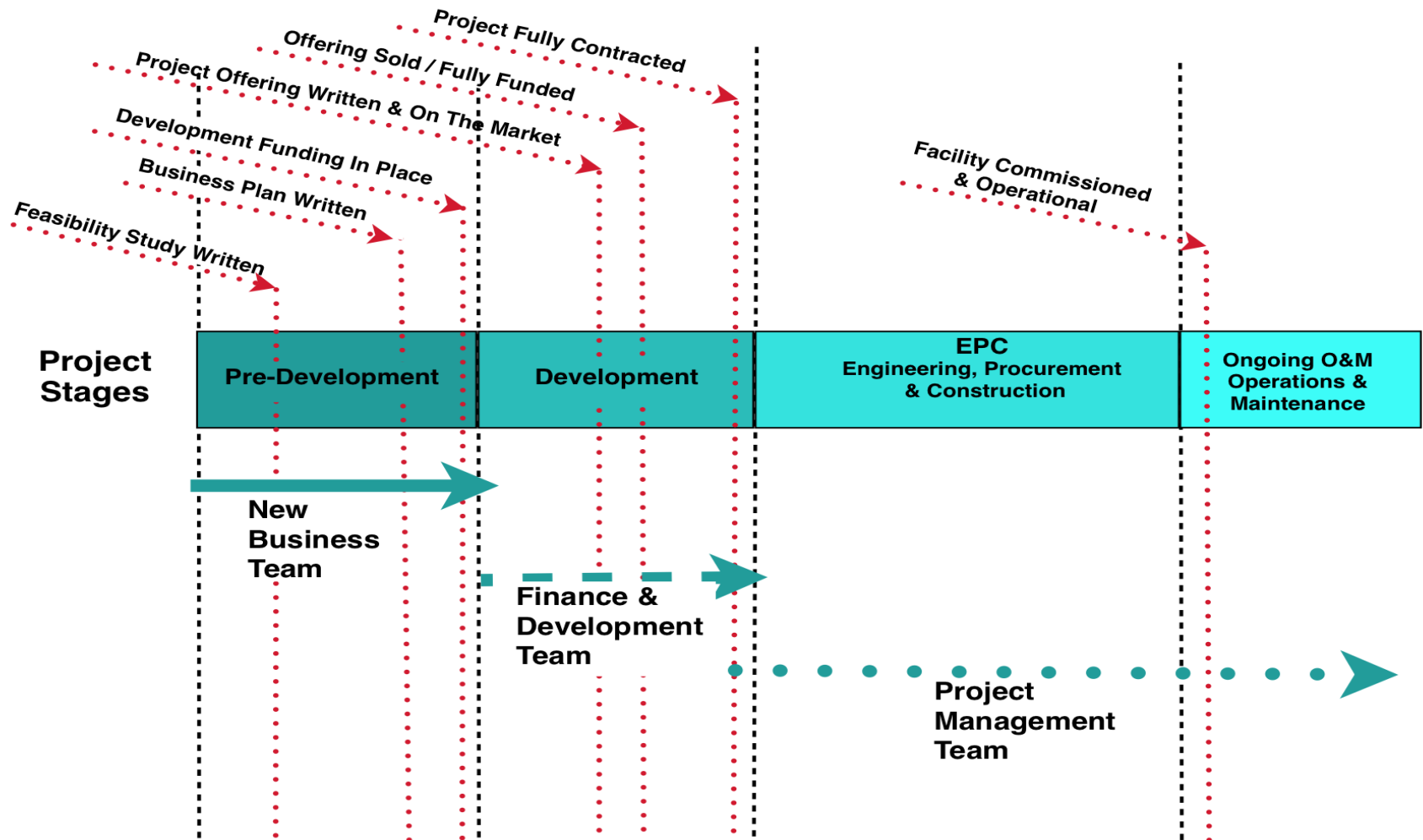
III. THE THREE PROJECT DEVELOPMENT MASTER DOCUMENTS

Financial Offering: Is a group of official documents prepared specifically for “qualified” investors who can prove that they have the financial means to risk the investments being sought. It:

- Is written midway in the **Development Stage**
- Is used to attract the largest sum of money raised by the development team
- Is used to raise capital needed to design, procure the equipment and real estate needed by the project, construct the project facility from the ground up, get the new facility tested and commissioned for continuous use, and operate the facility until it begins to make money.
- Requires the oversight of competent legal council and is almost always written by an attorney
- Must be in full compliance with all Security and Exchange Commission and IRS regulations and those governing financial offerings of the state where the project will be located.
- Has many possible forms depending on the type of legal structure required by and the type of financial instruments required for the specific project in question
- Is expensive to produce and can cost from several thousands of dollars to several tens of thousands of dollars

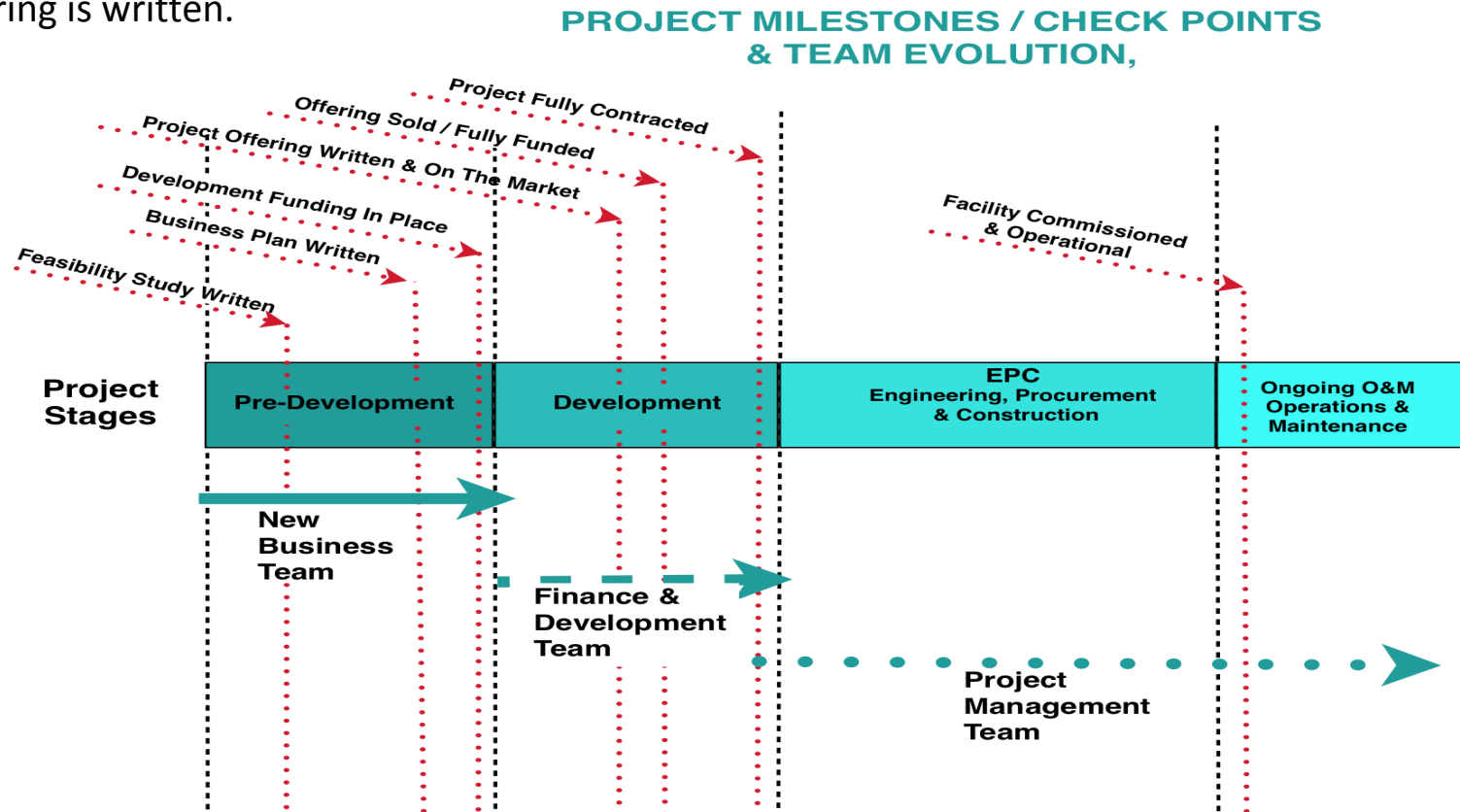
III. THE THREE PROJECT DEVELOPMENT MASTER DOCUMENTS

PROJECT MILESTONES / CHECK POINTS & TEAM EVOLUTION,



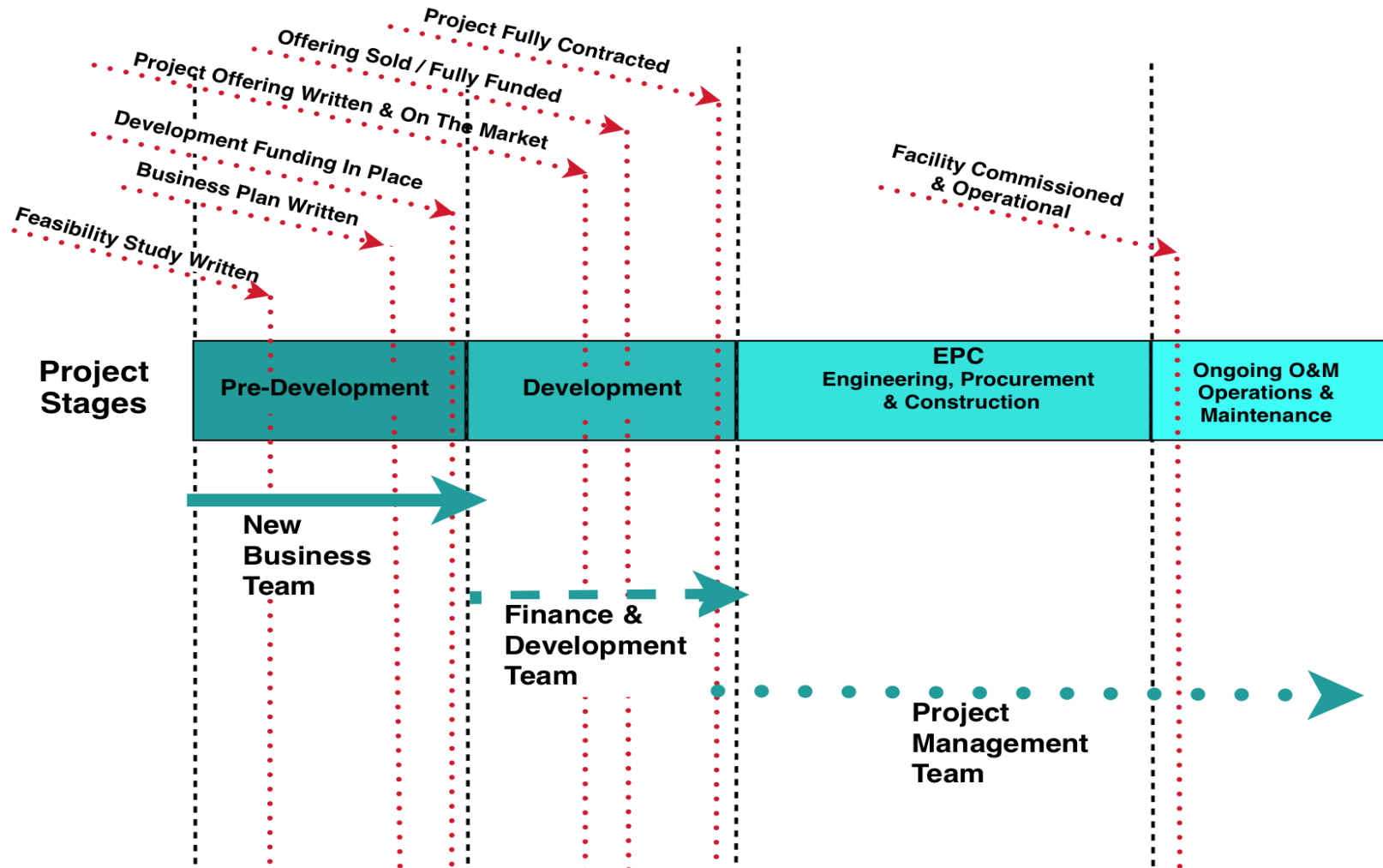
III. THE THREE PROJECT DEVELOPMENT MASTER DOCUMENTS

The three master documents can also be seen as milestones or “Go / No-Go” waypoints in the project development process. Before each successive stage of project development is reached, a decision to proceed or stop must be made. For instance, somewhere in mid Pre -Development Stage when a project is largely conceptual, the project team has to decide to take the project to the next level of commitment and produce a robust feasibility study or let it all go. The same question should be asked before the Business Plan is written and again before the Financial Offering is written.



IV. PROJECT TEAM EVOLUTION

PROJECT MILESTONES / CHECK POINTS & TEAM EVOLUTION,



IV. PROJECT TEAM EVOLUTION

As can be seen in the graphic above the project team must be able to evolve during the four stages of the project development cycle.

New Business Team

- During the **Pre-Development Stage** the project team is in essence a **New Business Team**.
- The project team literally dreams up an idea for a business with lots of brainstorming and research. Ideas fly back and forth and a concept of a possible business is imagined and then checked against the reality on the ground. The idea is re-imagined and researched again; often many times.
- This continues until a fairly clean concept of what may be possible is achieved and the team decides to write a feasibility study. The study is largely used to assure team members and potential early round investors that the project stands a reasonable chance of succeeding.
- Then the team writes a formal business plan used to attract development funding investor capital.
- Using the business plan as a sales tool and the concept has been “sold” to project development investors, the team morphs into what can be called a **Finance & Development Team**.

IV. PROJECT TEAM EVOLUTION

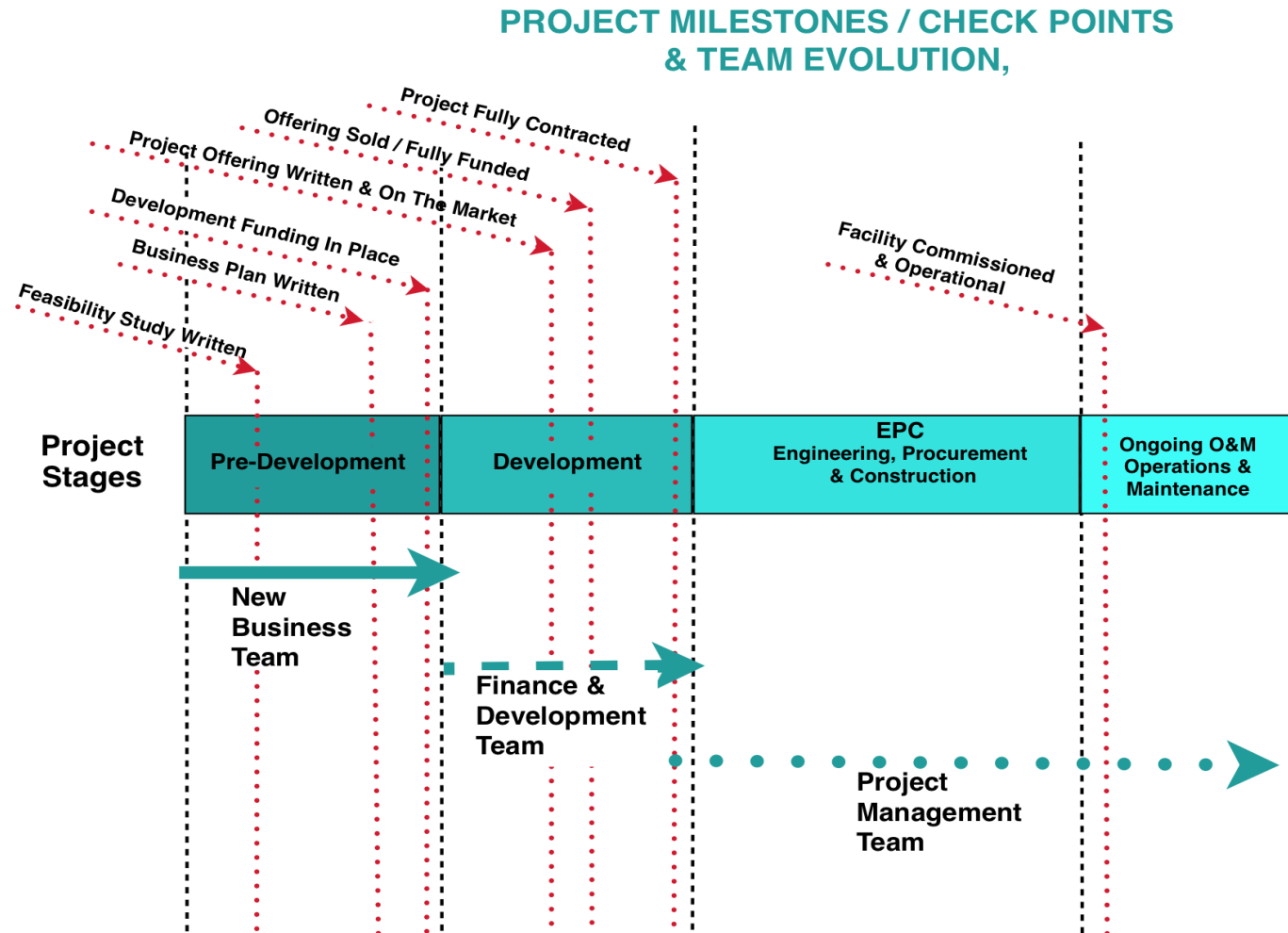
Finance and Development Team

- After development capital has been raised the team enters the **Development Stage** and it in essence becomes a **Finance and Development Team**.
- The team then begins to research write and negotiate the deal points and details of the specific feedstock and offtake agreements, technology purchases, site agreements, team employment and management plans, marketing plans, EPC arrangements, O&M arrangements, in short, everything needed to build and start the business.
- This work culminates in formal project offering documents, The set of formal documents called the “Project Offering” is written according to specific SEC and IRS rules and regulations. The project puts the offering “on the market” to qualified investors as a business “opportunity.”
- Once the project offering has been “sold” to project investors, the team morphs again into what can be called a **Project Management Team**.

IV. PROJECT TEAM EVOLUTION

Project Management Team

The project team's primary work at this point is to oversee the spending of project development funding to get the planned facility actually built and operating.



“Back of the Napkin” Feasibility Study

WORKSHOP ACTIVITY

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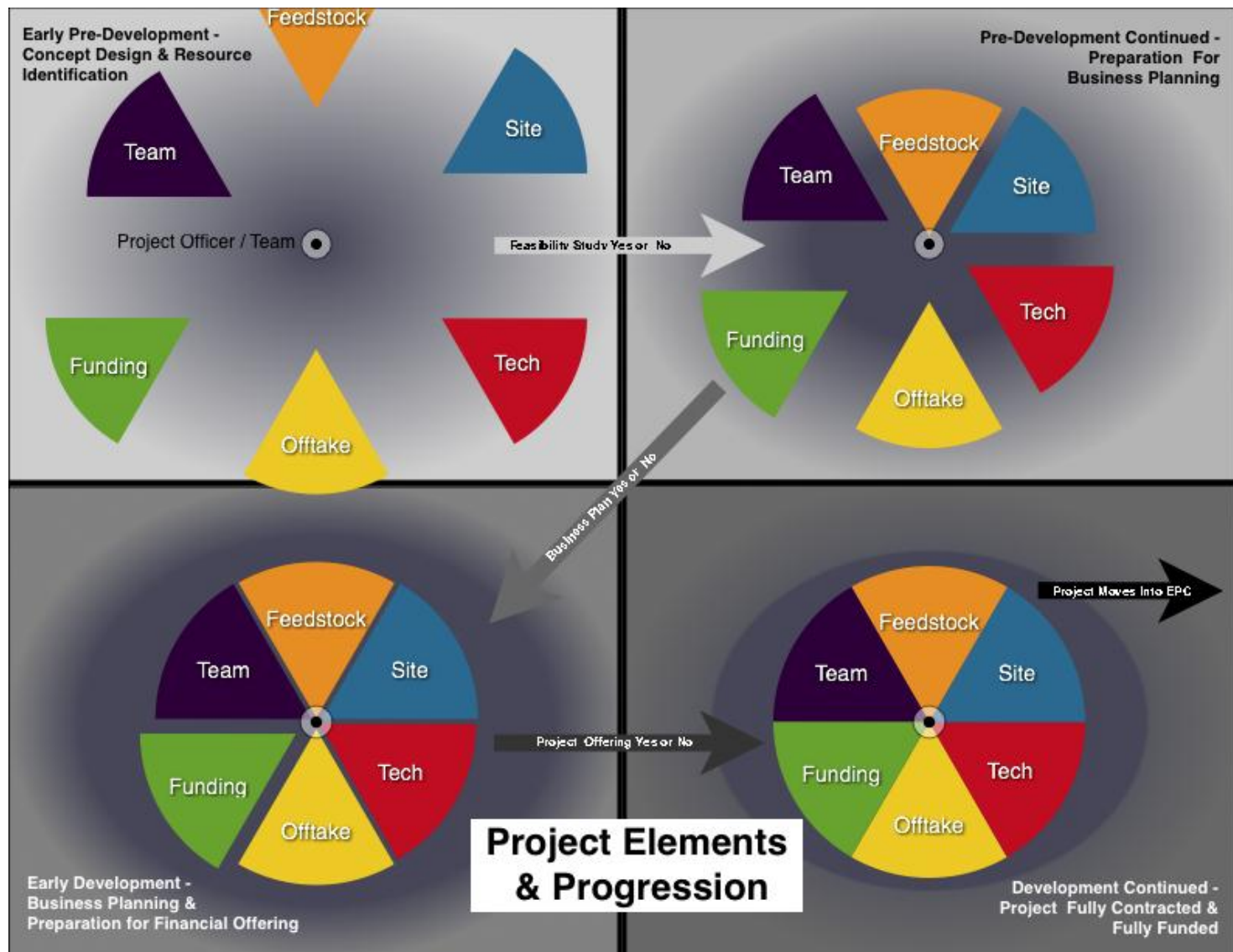
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Workshop Activity

- Either alone or with another class member with whom you could explore what it would feel like to walk into business development...
 - Discuss your business idea(s)
 - Which of the six elements do you think could actually be “in place”?
 - Please refer to [BUSINESS DEVELOPMENT ANALYSIS MODEL Handout For Feedstock And Market / Offtake Ideas.](#)
 - Which of the six elements appear likely?
 - Which of the six elements might be a no go?
 - If no go, can you adjust your strategy for higher likelihood of a “go”?
 - Write or map out your idea that contains your six elements for the technology you just learned.

Workshop Discussion

- Present and discuss each idea.
- Any points of clarification?
- Any “no go” insights?
- Any suggestions for making each project more feasible?

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