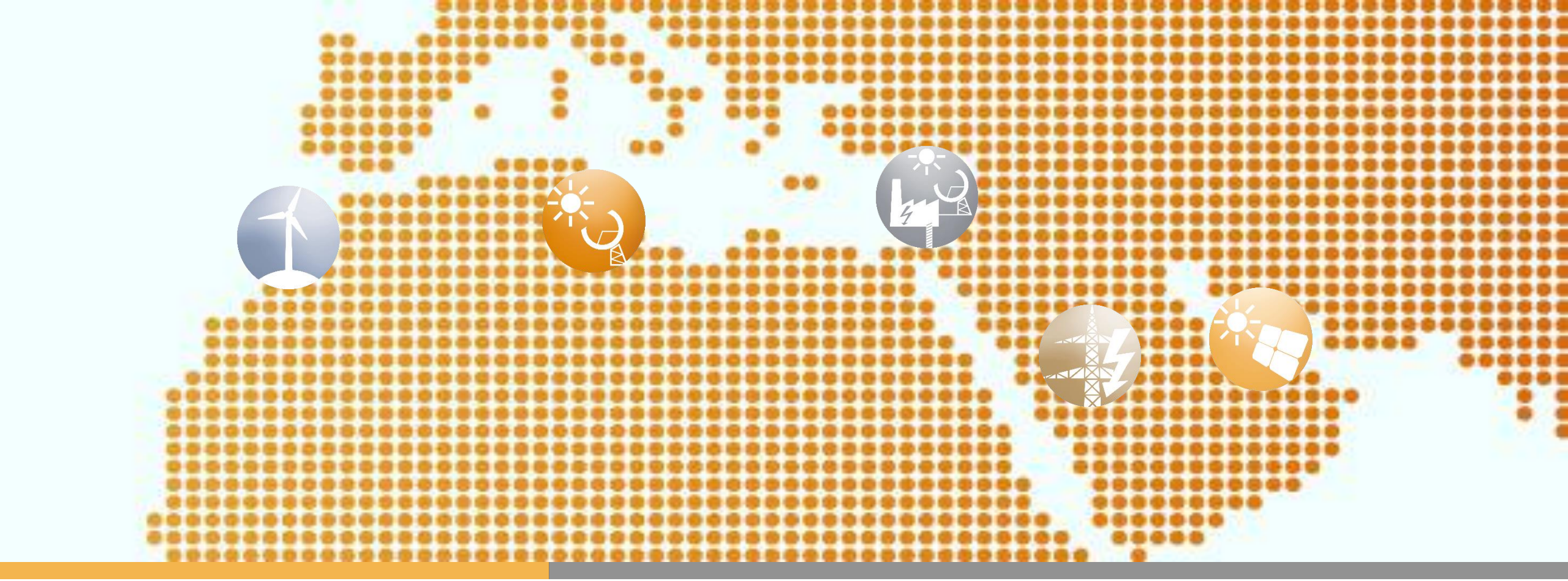


Dii Toolkit Initiative

Dii Desert Energy

Dii Toolkit for RE Grid Integration, Project Development & Industry Localization

Fadi Maalouf
21st Jan 2021

Document History

DOCUMENT CHANGE HISTORY RECORD SHEET

Document Title / Number	Rev.	Description Of Change	Effective Date
Dii Toolkit Initiative Dii-Toolkit-Initiative-fm170817-R1	R1	Initial Release – For Information	17-Aug-2017
Dii Toolkit Initiative Dii-Toolkit-Initiative-fm170923-R2	R2	Updated – For Information	23-Sep-2017
Dii Toolkit Initiative Dii-Toolkit-Initiative-fm180521-R3	R3	Updated – For Information	21-May-2018
Dii Toolkit Initiative Dii-Toolkit-Initiative-fm210119-R4	R4	Updated – For Information	19-Jan-2021
Dii Toolkit Initiative Dii-Toolkit-Initiative-fm210121-R5	R5	Updated – For Information	21-Jan-2021

Category	Name	Designation	Signature	Date
Author	Fadi Maalouf	CTO - Director IPP & EPC	F2M2	21-Jan-2021

Outline

- Introduction
  - Dii Objectives
  - Dii Partners
- Dii Toolkit Initiative
  - Why Toolkit?
  - Toolkit Description
  - Toolkit Approach
  - Recent Publications
  - Recent Studies
- Contact

Introduction
Dii Objectives

Desertec Industrial Initiative (Dii)

Launched in 2009 as a 'not-for-profit' entity in Germany for exploring the potential of renewables in the desert areas of MENA, improving market conditions and examining the synergies to be captured through connecting the European and MENA power markets. In 10 years' time, Dii Desert Energy has grown from a rudimentary 'Desertec Vision', initially mainly concentrated on power from the deserts for Europe, (Desertec 1.0) via a focus on the conditions of renewables in the local markets (Desertec 2.0) toward a highly recognized market enabler for 'green electrons' and 'green molecules' from the deserts of MENA for MENA's own population, and for MENA to become a 'Power House' for the world markets (Desertec 3.0). Today, Dii Desert Energy are looking at the entire power system starting with various forms of Renewable Energy (RE) generation, grids, new technologies & innovations, energy storage, e-mobility, smart cities, towards the long-term objective of 'energy without emissions'.

Dii Vision

Increased competitiveness of renewables shall swiftly lead to economic growth and secure 100% energy supply without harmful emissions or waste.

Our Mission: No Emissions!

Towards a fully emission free energy supply in MENA before 2050 and making MENA a 'power house' for the global energy markets offering benefits to the region.

Dii Strategy

Connecting the international industry active in the MENA region with authorities and institutions. Focus on practical conditions for 'green electrons' and 'green molecules' along the energy value chains leading to tangible and profitable projects and other benefits for local and international stakeholders.

Introduction
Dii Partners

Shareholders

ACWA POWER

国家电网公司 STATE GRID CORPORATION OF CHINA

Associated Partners

Why Toolkit?

- In the ever-evolving energy markets, the power of information and in particular know-how, innovation, & collaboration, are key success factors.

Objective: Accelerate RE Implementation

- **So What Is The Bottom Line?**
- **Use Top Down Analysis**
- **Q&A To Establish Workflow!**

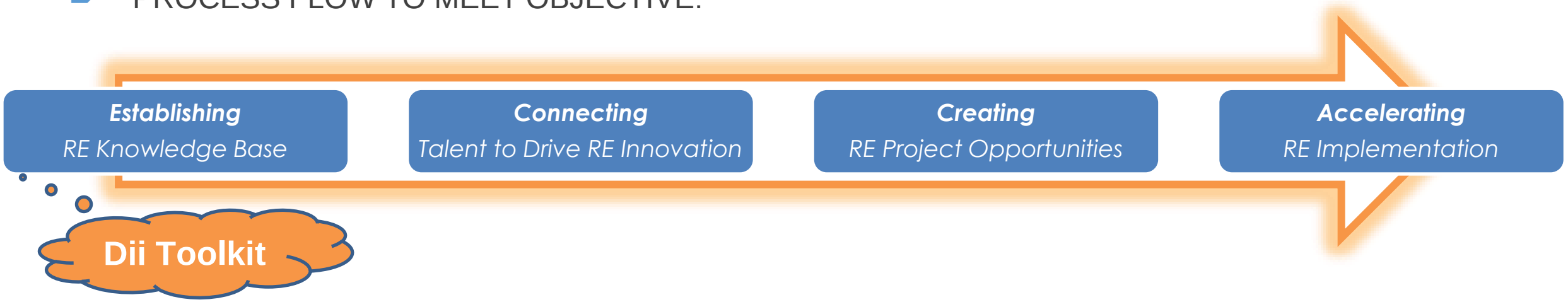
Bottom Line

Why Toolkit?

- **Q: What accelerates RE implementation?**
- **A: Creating RE project opportunities.**
- **Q: Who creates RE opportunities?**
- **A: By connecting RE talent to drive innovation.**
- **Q: What is the basis RE talent?**
- **A: Establishing RE Knowledge Base. This is the bottom line! A solid foundation!**

Why Toolkit?

- PROCESS FLOW TO MEET OBJECTIVE:



- The Dii Toolkit “Establishes RE Knowledge Base” thus enabling talent connection, opportunity creation, & therefore renewable energy implementation acceleration.
- Dii Toolkit Initiative sets a solid foundation for achieving the goal of energy independence via renewable energy, therefore accomplishing Dii Objectives.

Toolkit Description

- Dii's "Toolkit for Renewable Energy Grid Integration, Project Development & Industry Localization" is derived from Dii's partners as well as Renewable Energy (RE) industry expert professionals' know-how, experience, & best practices.
- The objective of the Dii's Toolkit is to provide RE industry stakeholders, both private and public, with access to state-of-the-art measures & techniques (tools) which enable accelerated and smooth integration of large amounts of renewable energy into existing power grids & ensure tangible and durable benefits to the region.

Dii Toolkit scope of work includes:

- Tools & checklist for bankability of RE projects, system requirements for RE grid integration, operators' technical capability to manage high levels of variable RE generation, local industry & job creation & retention factors, business transparency factors.
- Practical tips on project development, public and private procurement and localization, thus assuring: best value for money, industry involvement, job creation, sound financing, transparency & build of trust amongst stakeholders.
- Planning for gradual increase of RE generation at local, national, regional and international scale.
- Country case studies & sharing of know-how & expertise.
- The Toolkit database will be available at Dii's website platform, exclusively for Dii's partners & network members.

Toolkit Approach

- Dii Toolkit Approach to Creating Value and Knowledge Base
- WHAT TO DO vs. HOW TO DO

WHAT TO DO ?

HOW TO DO ?

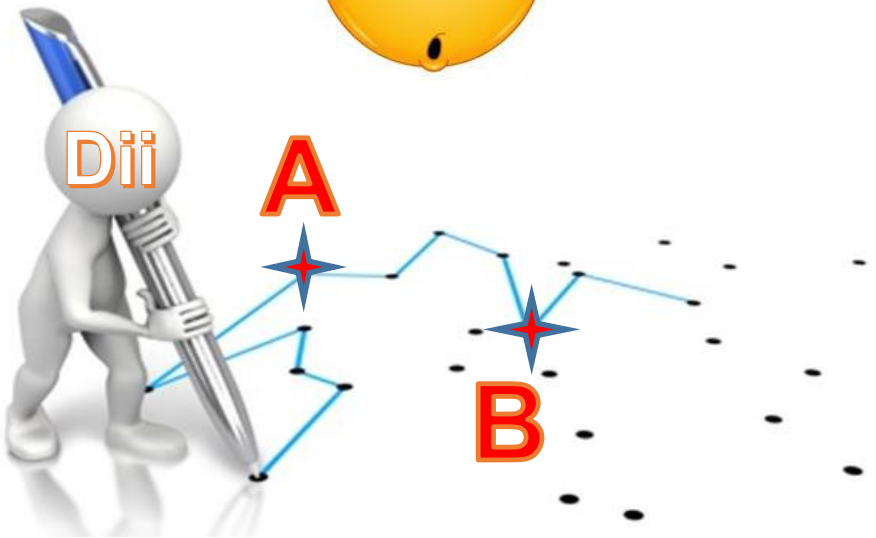
Toolkit Approach

WHAT TO ?

Limited

Objective:
Trip from A to B

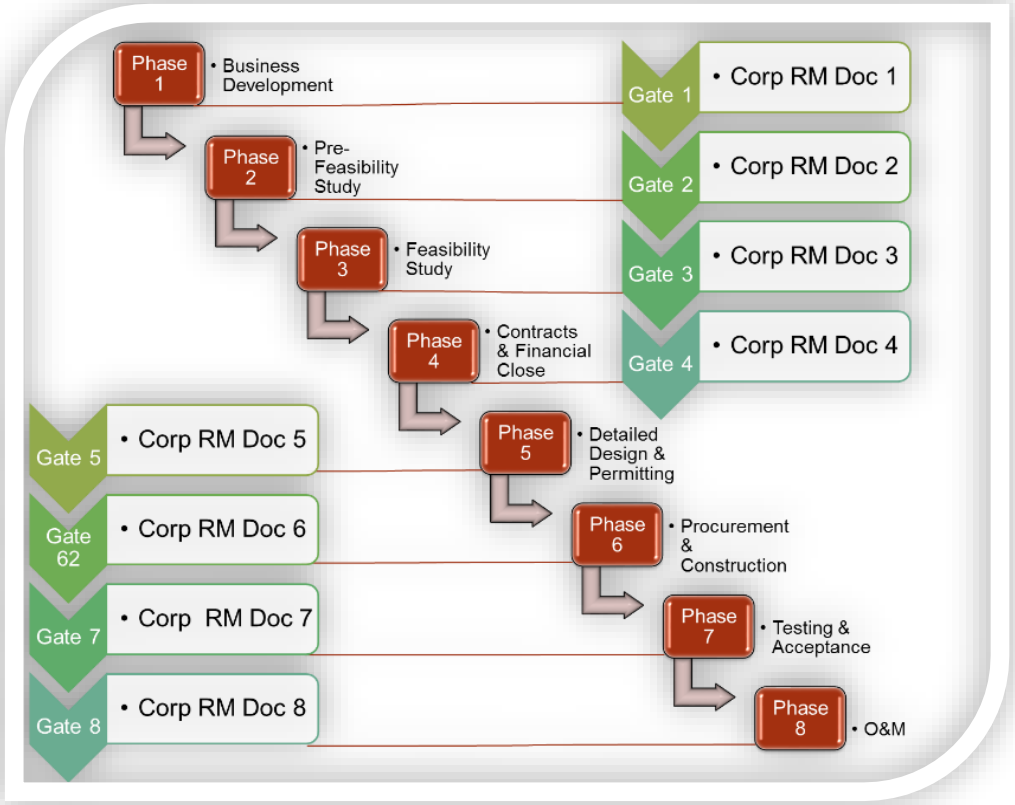
HOW TO ?



Comprehensive View

Recent Toolkit Publications
How To?

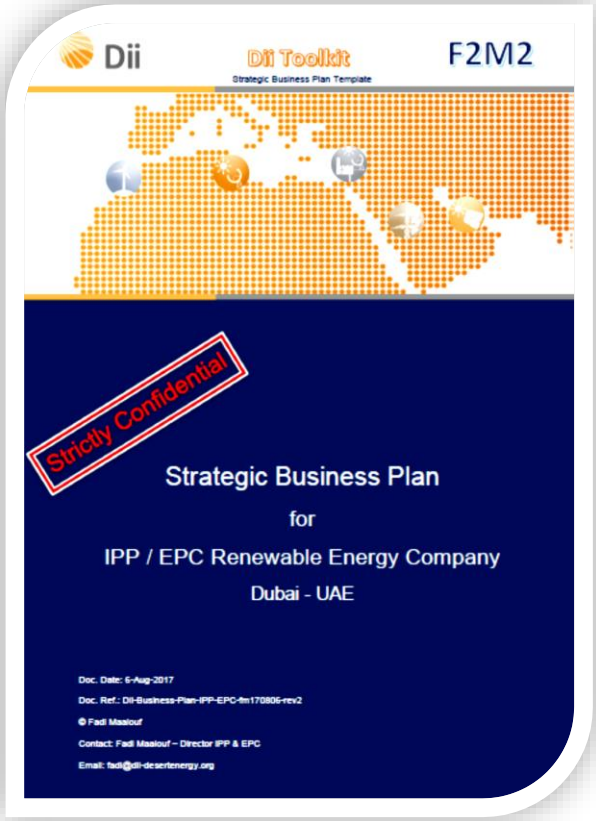
IPP Solar PV Project Development Roadmap
8-Phase Bankable Approach!



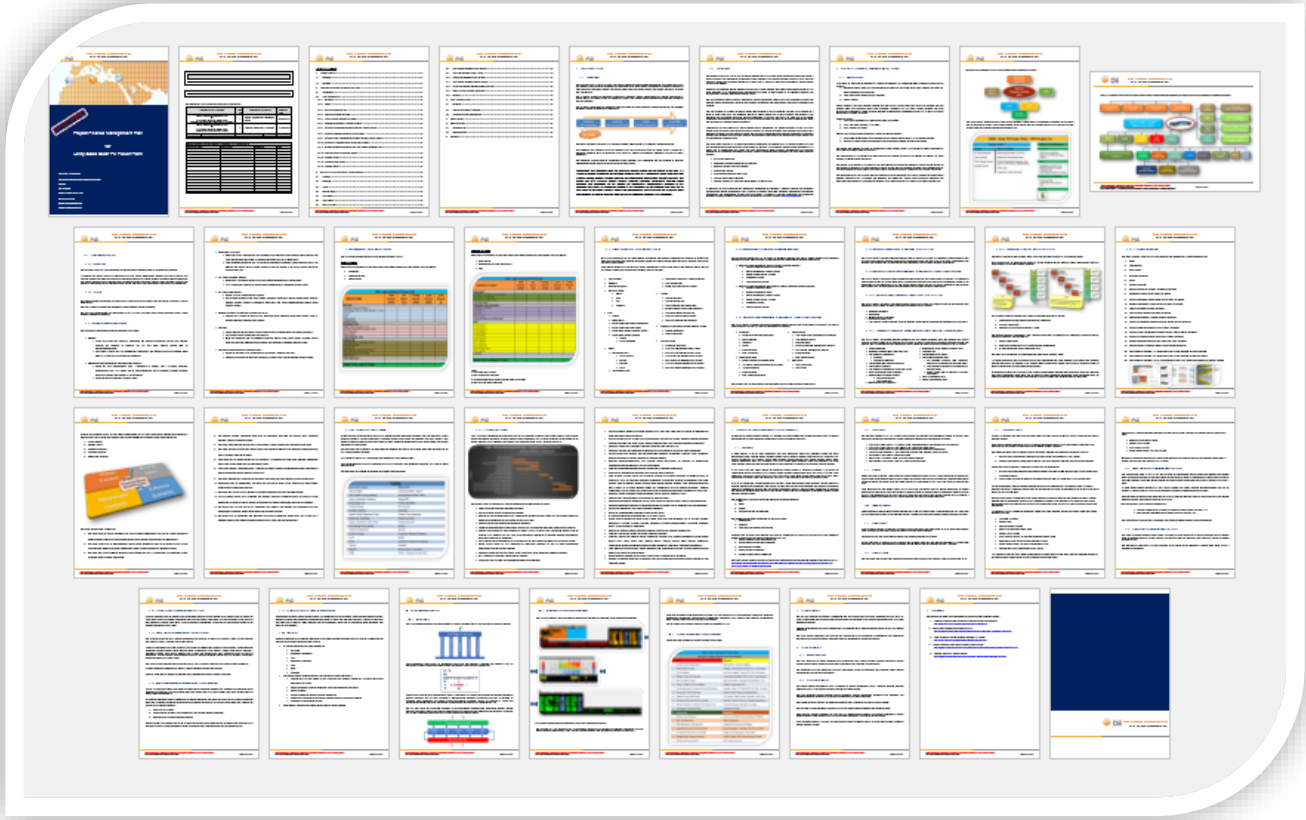
Pre-Feasibility Study
LCOE Financial Model

Recent Toolkit Publications
How To?

Strategic Business Plan
for IPP / EPC Renewable Energy Company

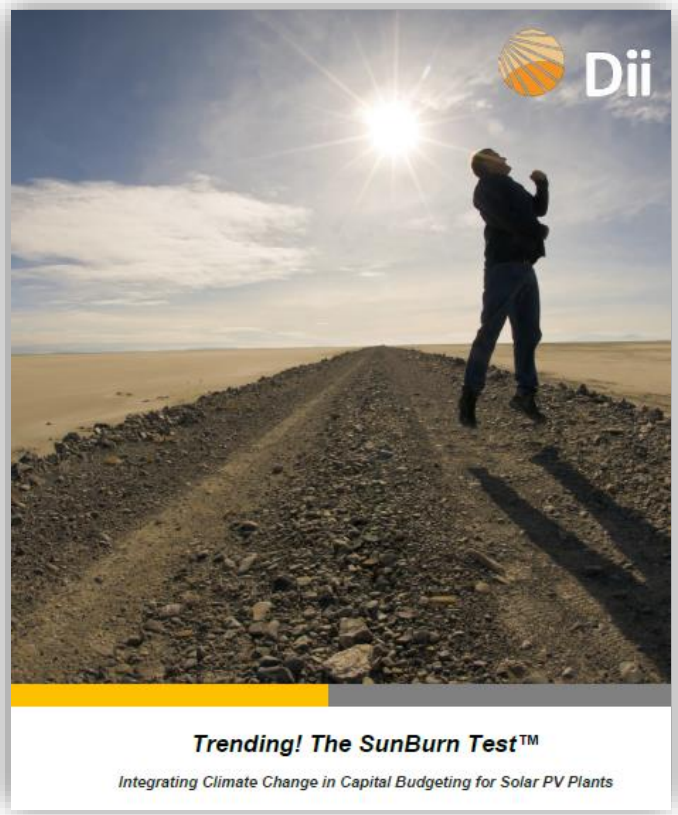


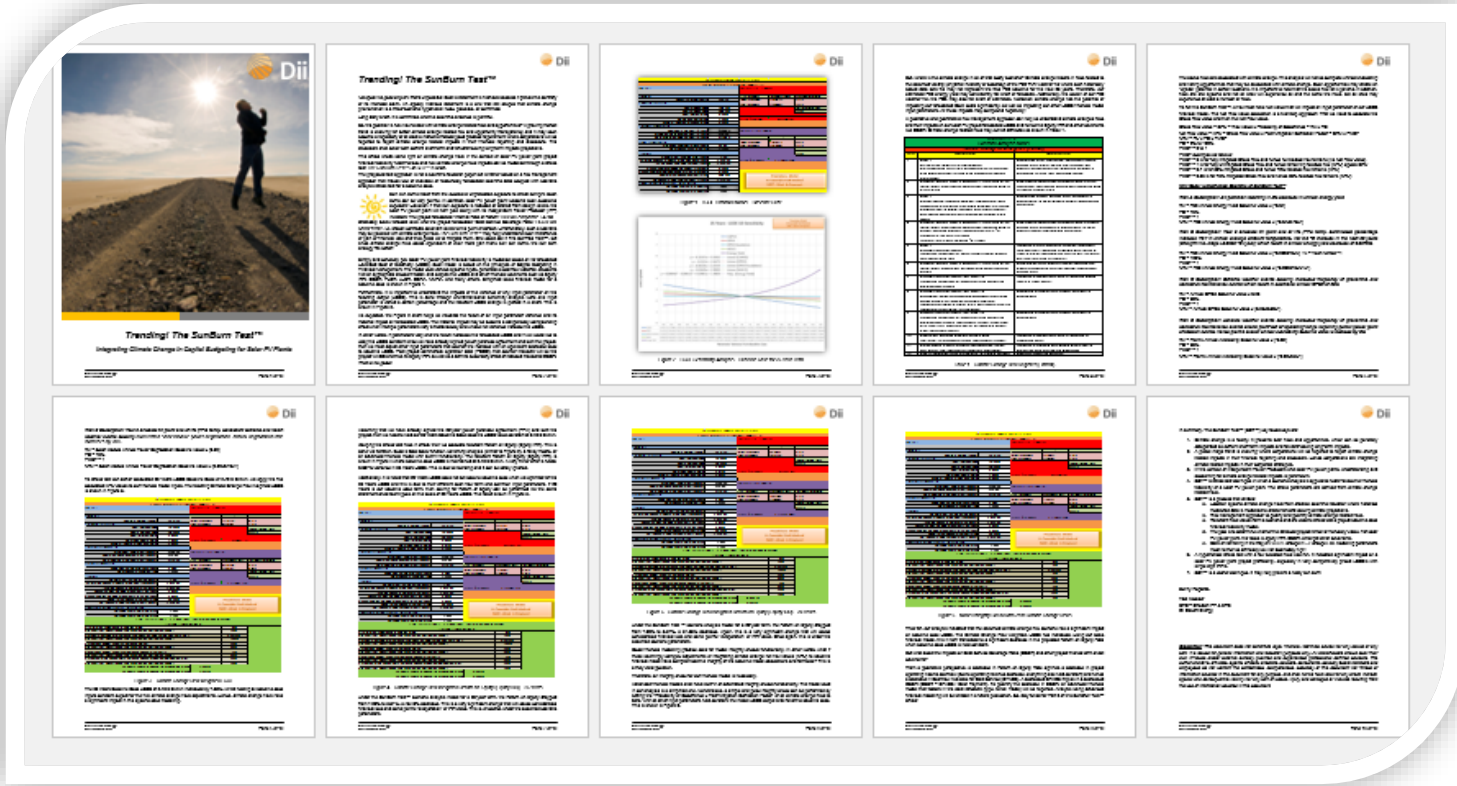
Project Finance Management Plan
for Utility Scale Solar PV Power Plant



Recent Toolkit Publications
How To?

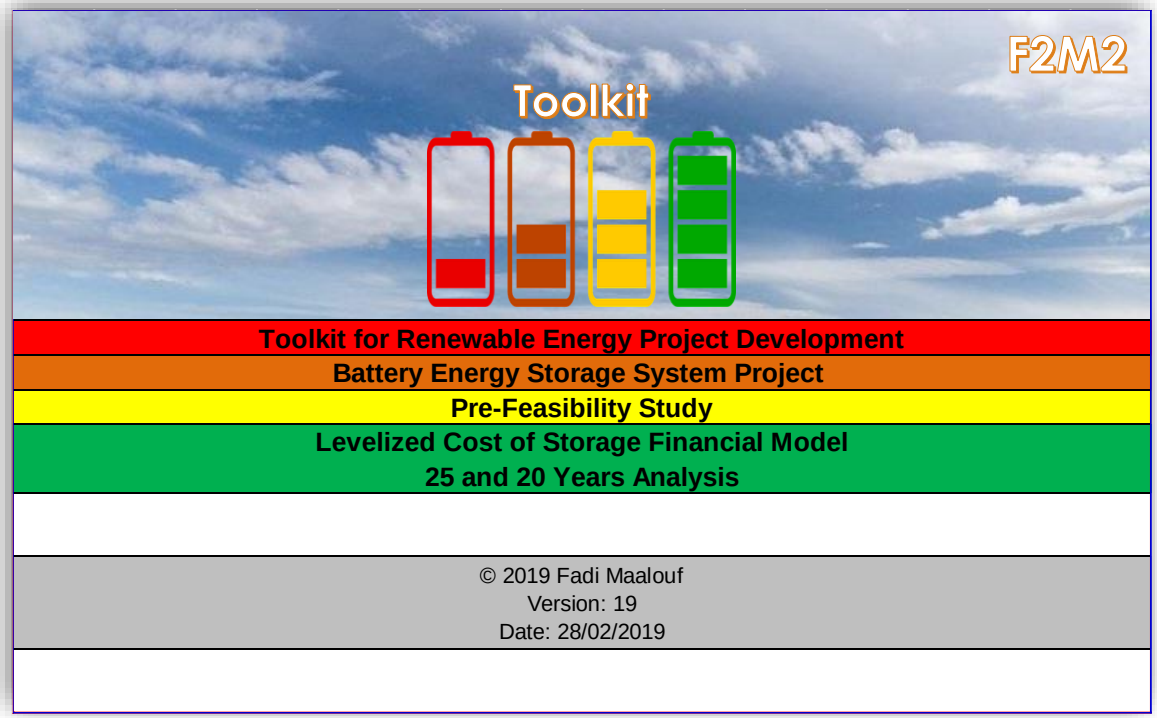
Trending! SunBurn Test ™
Integrating Climate Change in Capital Budgeting for PV Plants



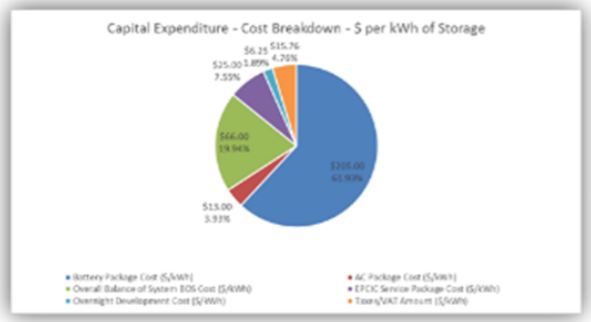


Recent Toolkit Publications
How To?

Battery Energy Storage System
Levelized Cost of Storage (LCOS) Financial Model Toolkit

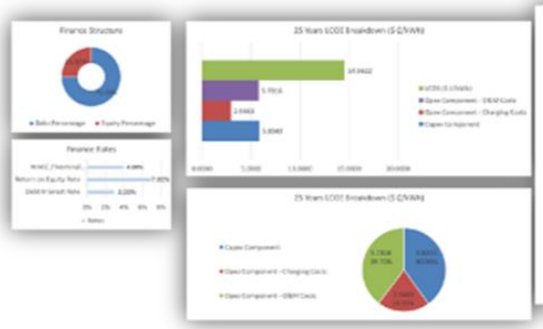


CAPEX

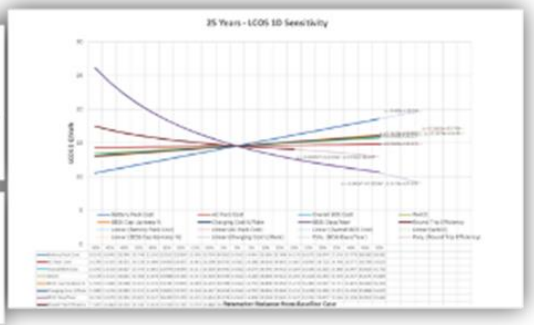


OPEX & Energy

LCOS Breakdown

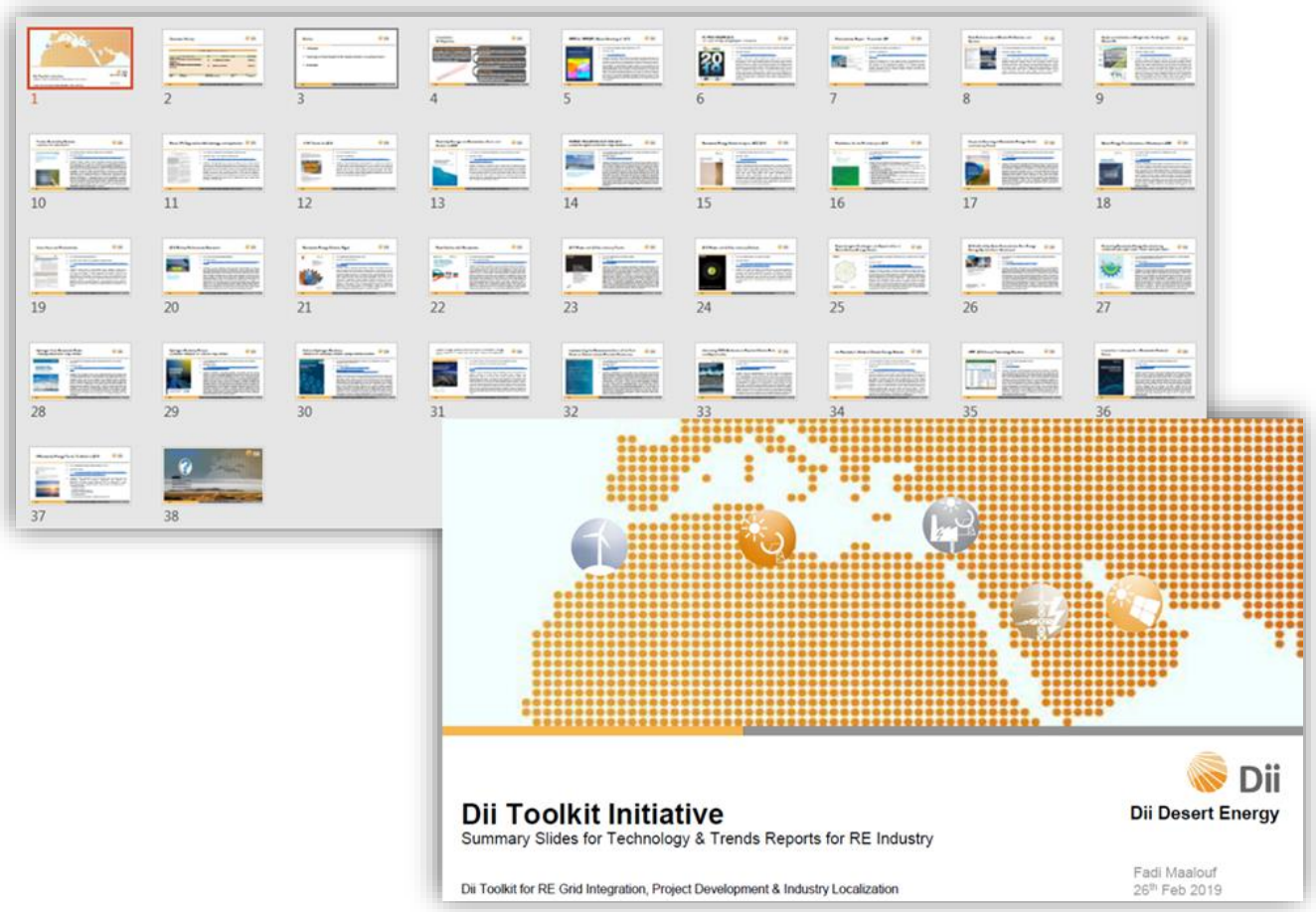


Sensitivity



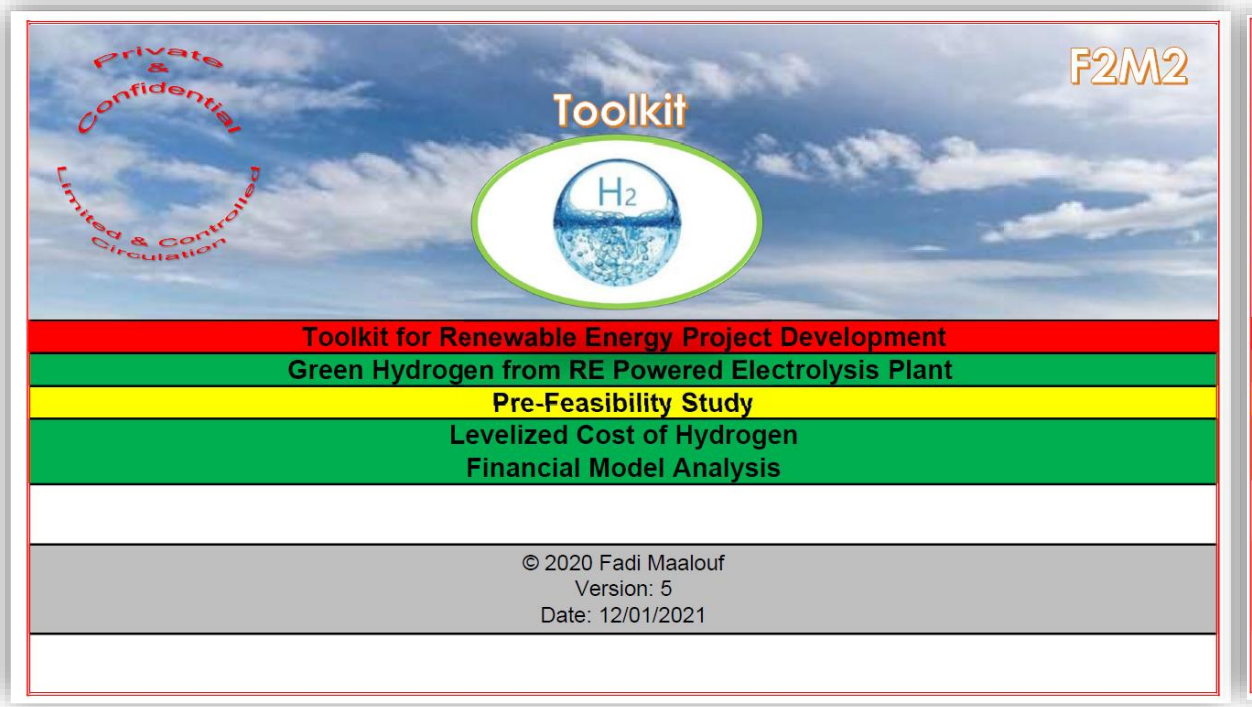
Recent Toolkit Publications
How To?

Technology and Trends for RE Industry 2019

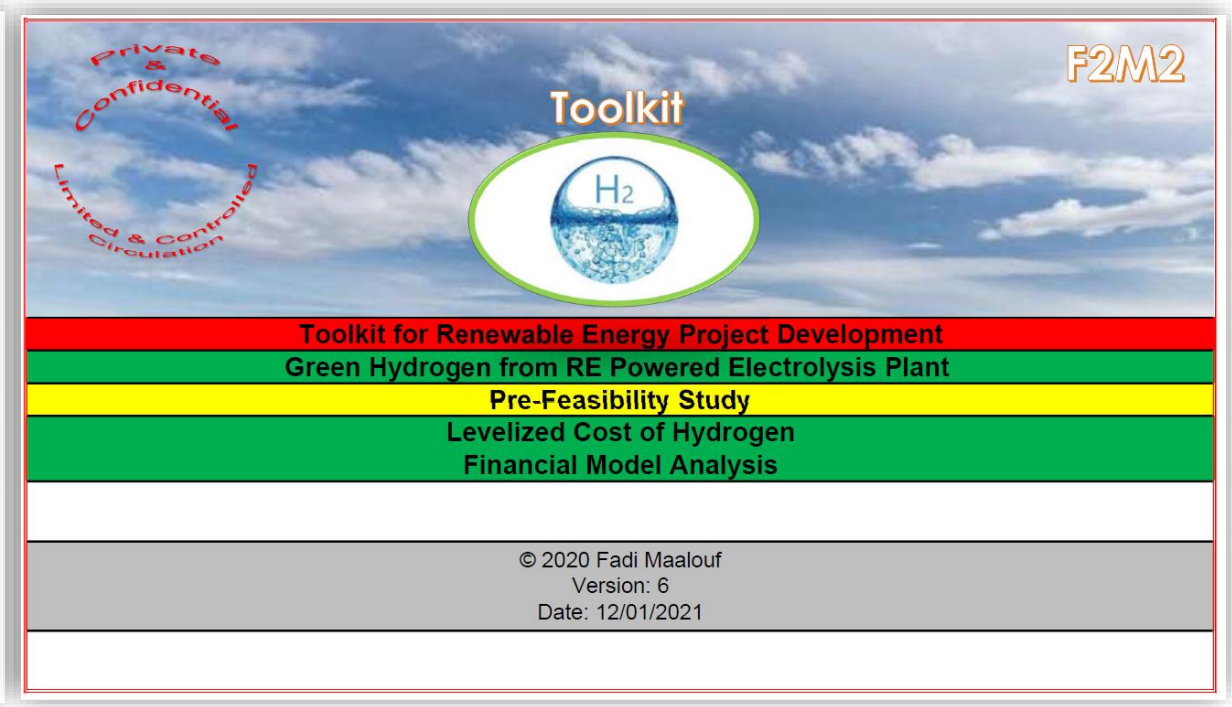


Recent Toolkit Publications
How To?

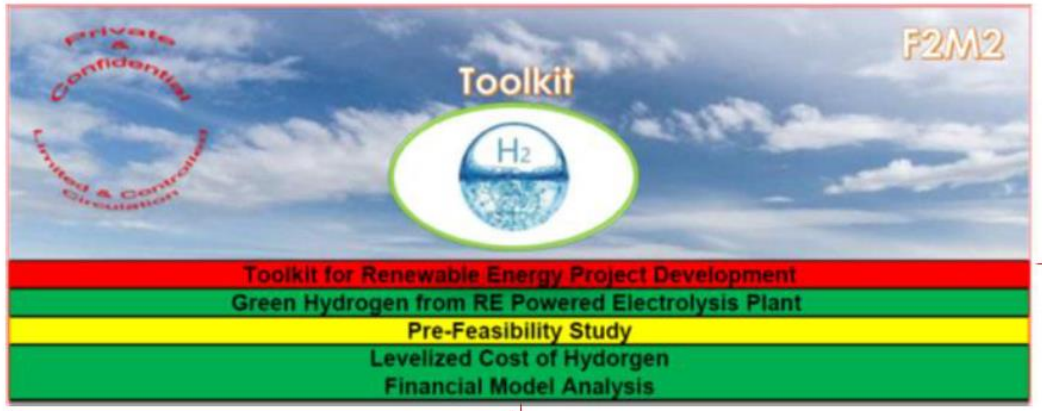
LCOH Financial Model Toolkit V5
Green Hydrogen Production



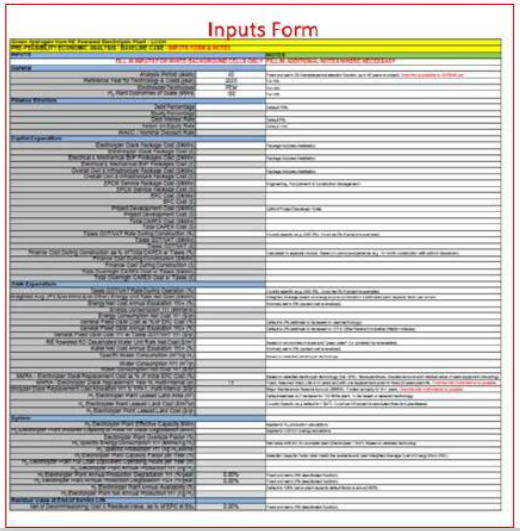
LCOH Financial Model Toolkit V6
Green Hydrogen Production & Delivery Infra Pathways

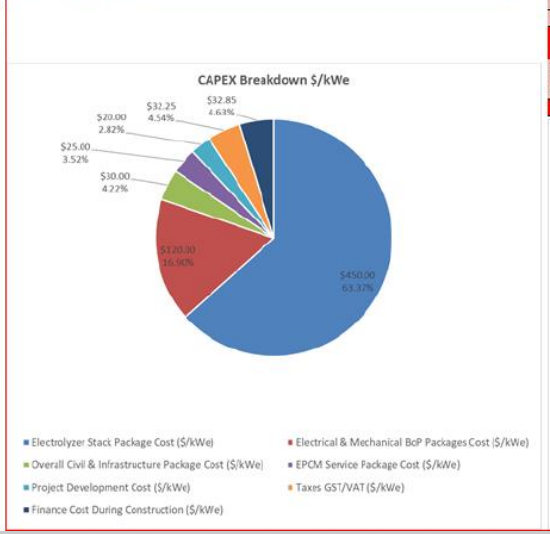


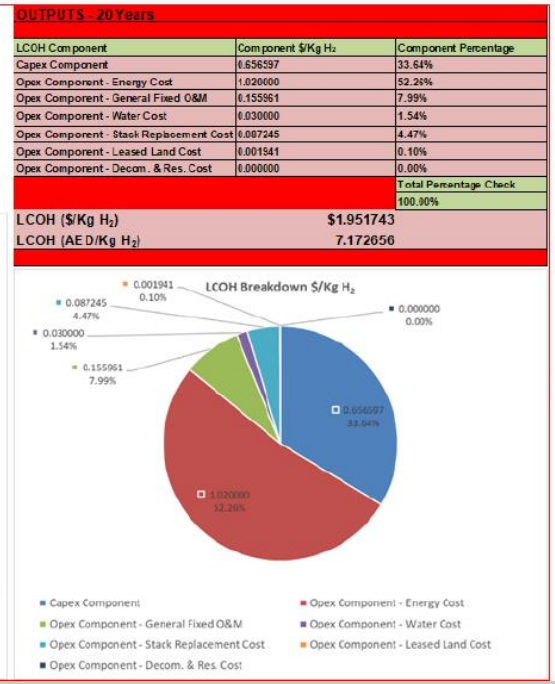
Recent Toolkit Publications
How To?



GREEN HYDROGEN
Innovative Financial Model Toolkit for Analyzing Levelized Costs (LCOH)

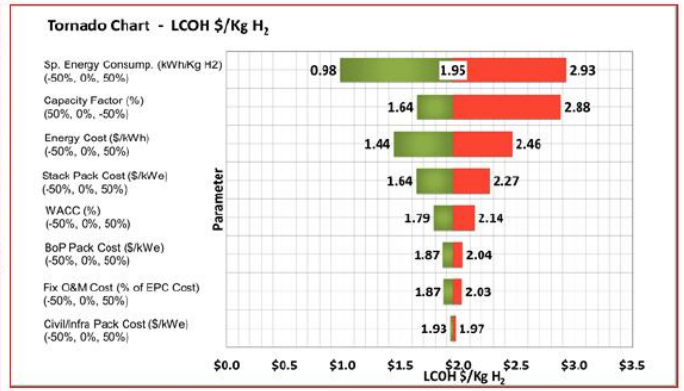


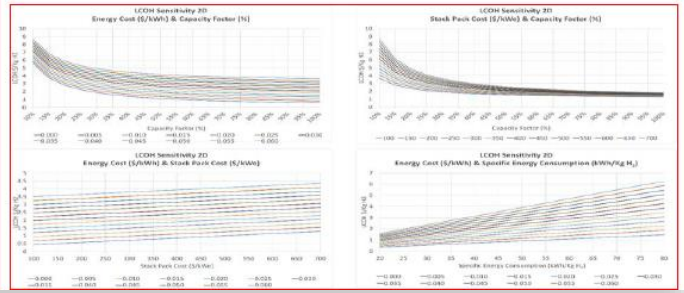




OUTPUTS - 20 Years

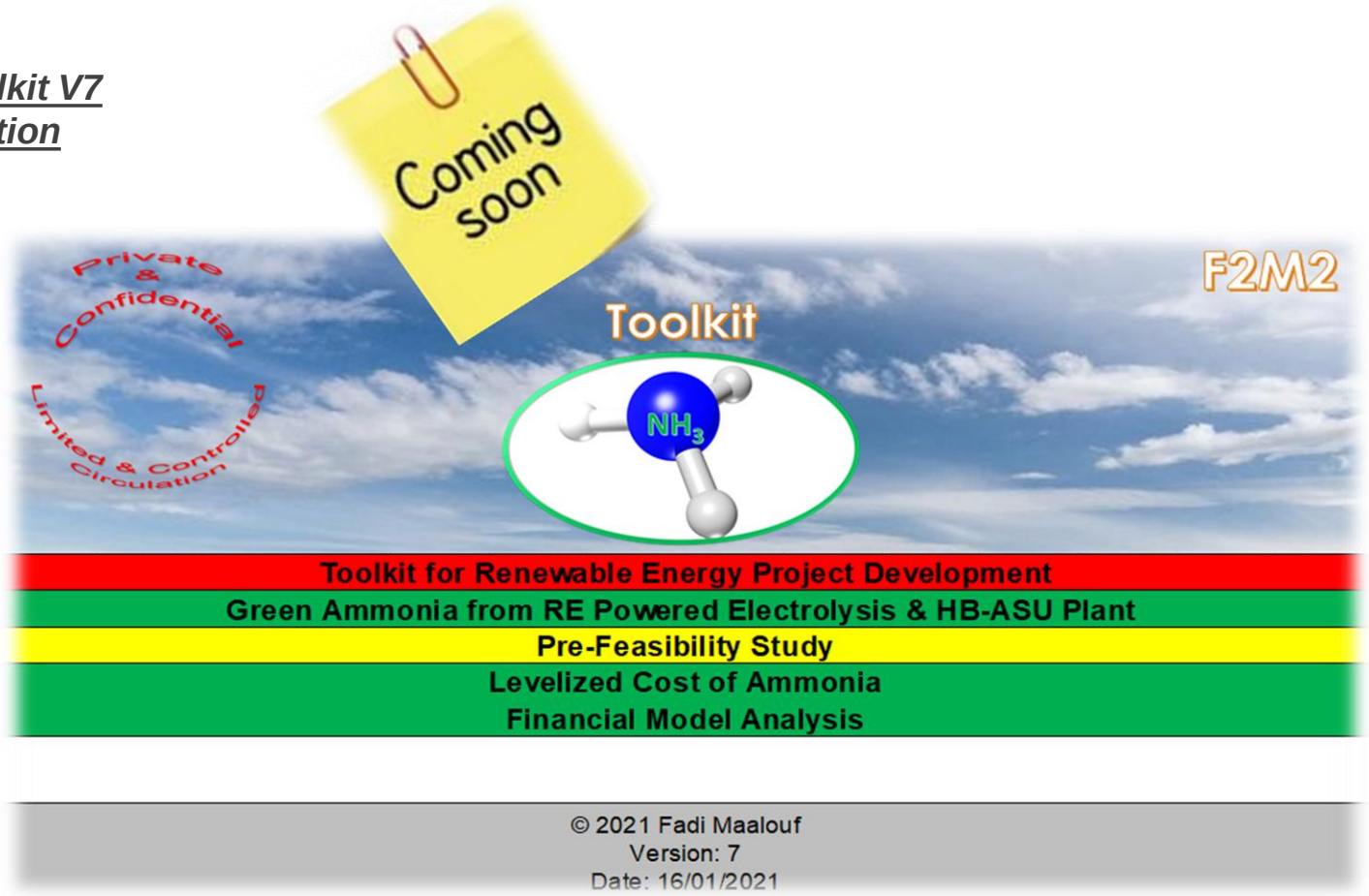
LCOH Component	Component $/Kg H2	Component Percentage
Capex Component	0.656597	33.64%
Opex Component - Energy Cost	1.020000	52.26%
Opex Component - General Fixed O&M	0.155961	7.99%
Opex Component - Water Cost	0.030000	1.54%
Opex Component - Stack Replacement Cost	0.087245	4.47%
Opex Component - Leased Land Cost	0.001941	0.10%
Opex Component - Decom. & Res. Cost	0.000000	0.00%
		Total Percentage Check
		100.00%
LCOH ($/Kg H_2)	$1.951743	
LCOH (AED/Kg H_2)	7.172656	





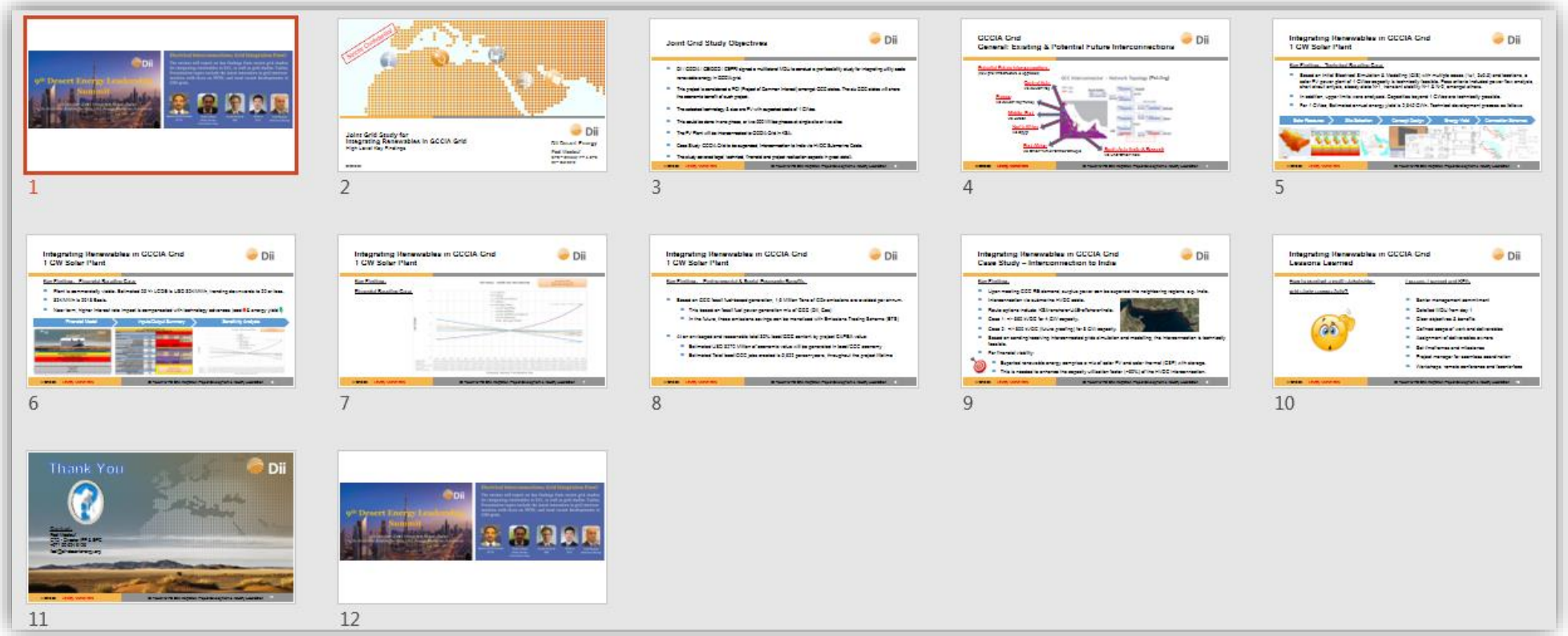
Recent Toolkit Publications
How To?

LCOA Financial Model Toolkit V7
Green Ammonia Production

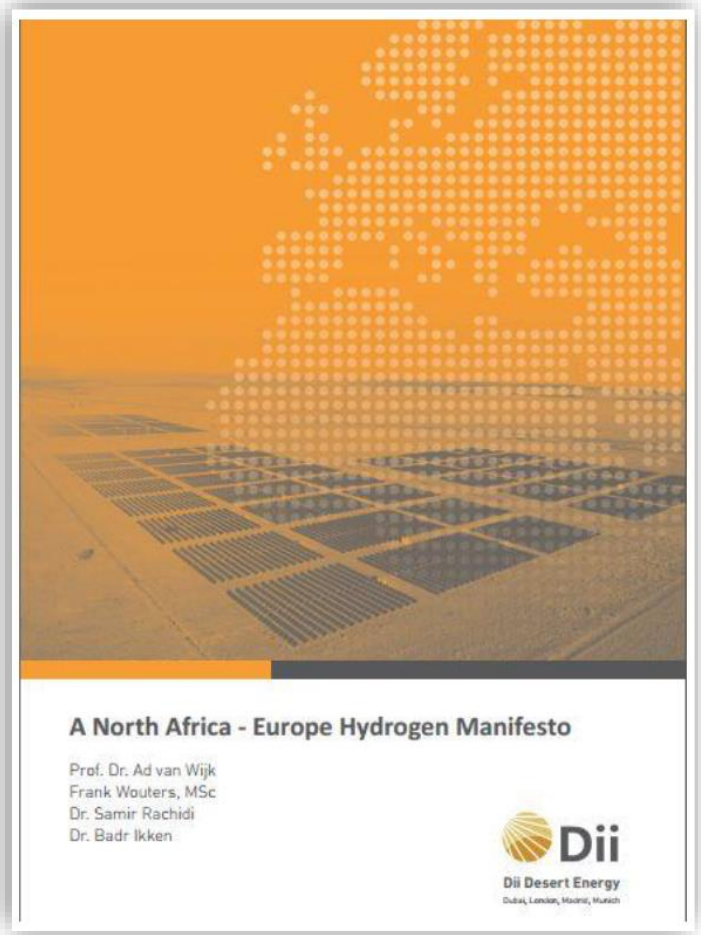


Recent Studies

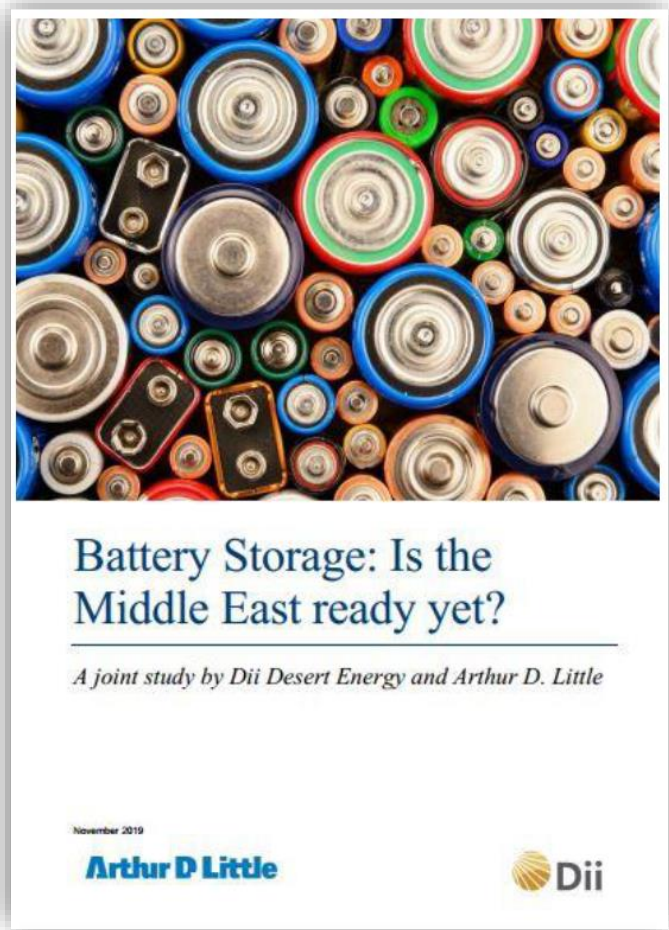
Joint Study for Integrating Renewables in GCCIA Gird

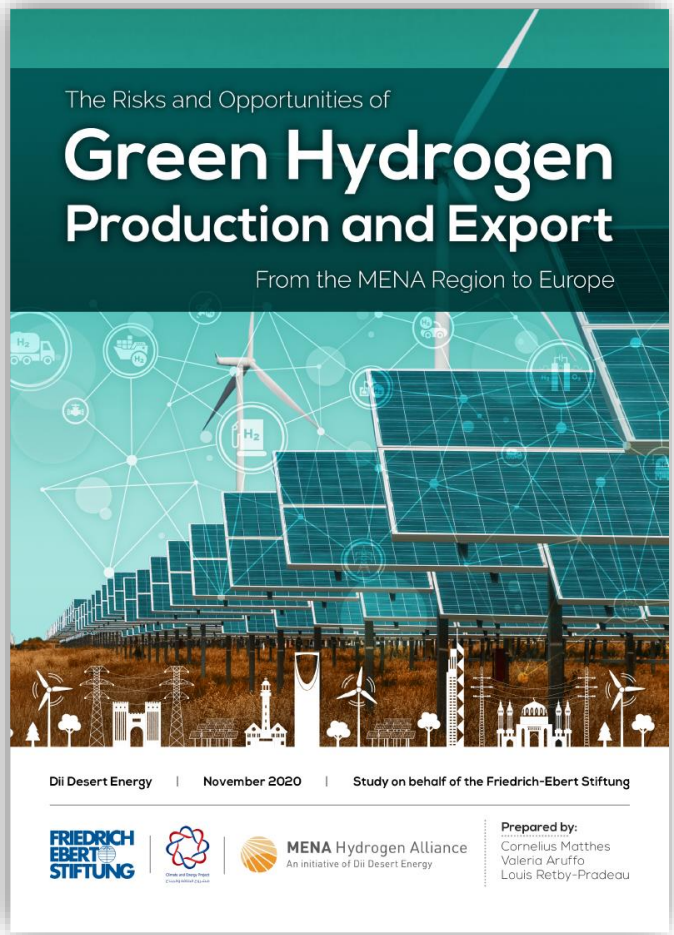


Recent Studies



Recent Studies





Dii Desert Energy Team

Paul van Son
President
paul@dii-desertenergy.org

Cornelius Matthes
Chief Executive Officer
cornelius@dii-desertenergy.org

Fadi Maalouf
CTO & Director IPP & EPC
fadi@dii-desertenergy.org

David Short
Director Finance
david@dii-desertenergy.org

Alexander Sarac
External Legal Director
alexander@dii-desertenergy.org

Valeria Aruffo
Director External Relations
valeria@dii-desertenergy.org

Sascha Gaede
Director Mediterranean
sascha@dii-desertenergy.org

Shereen Bashi
Head of Finance & Control
shereen@dii-desertenergy.org

Louis Retby-Pradeau
Director Business Development
louis.retby.pradeau@gmail.com

Frank Wouters
Chairman of the Adv. Board
frank@frank-wouters.com

Nader Yassa
IT Consultant
nadsam@gmail.com

Gerhard Hofmann
Co-Head of Communications
hofmann@agentur-zukunft.eu

Thomas Isenburg
Co-Head of Communications
thomas.isenburg@gmx.de

Inigo Viani
Director Business Development
ivianidr@yahoo.es

Thank You

Contact:
Fadi Maalouf
CTO - Director IPP & EPC
+971 50 624 6126
fadi@dii-desertenergy.org
www.dii-desertenergy.org