A REVIEW OF AFRICAN INDCS

A carbon compensation approach to mobilize financial resources towards meeting INDC objectives

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Combating climate change in Mediterranean, African and Middle East Countries

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Introduction

Framework:

- ✓ Initiated as a part of a Project Graduation Report(Pfe) – Master Degree on Finance
- ✓ Project and traineeship hosted by CIRED – Summer 2016

Objective: Developing an innovative approach/model:

- ✓ to determine an incitative compensation value for CO2 reduction in developing countries
- ✓ to evaluate financial resources needed to compensate CO2 reductions ➔ supporting INDC implementation
- ✓ Tool to be used by decision makers (COP, countries, funding organisations, carbon buyers)

Introduction

Starting points:

- ✓ Additional resources are requested by developing countries to meet their so-called « conditional » INDC objectives
- ✓ Developing countries did not mention any indication on the precise meaning of « conditionality » apart from need of additional financial resources

Principles towards low-carbon transition:

- ✓ Conditions and modalities to access to these resources should be incitative enough to provide for achievement of INDCs' objectives
- ✓ **A price signal:** CO2 compensation for emission reductions, based on a « Reference CO2 value » may provide for an appropriate response

Features

Modeling exercice:

- ✓ Under EXCEL environment
- ✓ Fixing a « minimum-acceptable » Internal Rate of Return-IRR (e.g. 10%) for GHG mitigation projects
- ✓ Main variable: oil prices (e.g. 40US$ ➔ 100US$/bbl)

❑ Application:

- ✓ Tunisian INDC ➔ Renewable Energy component of the INDC (Tunisian Solar Plan) ➔ 5 Ren technologies
- ✓ Objectives 2016-2030 (MW, toe savings, emission reductions, Investment needs)
- ✓ Can be applied to any action included in any INDC, and to any country where data are available

❑ Assumption considered to determine a nationally acceptable IRR to implement conditional objectives (e.g. 12%)

- ✓ -1% considering Energy risks
- ✓ -1% considering Climate risks

❑ « Acceptable » IRR: **10%**

INDC objectives

6 Illustrative examples of African INDCs

	Tunisia	Morocco	Gabon	Ethiopia	Kenya	Côte d'Ivoire
Type of Contribution	**Pourcentage reduction in carbon Intensity 2030 VS 2010**	Pourcentage emission reductions as compared to BaU	Pourcentage emission reductions 2030 as compared to BaU	Pourcentage emission reductions 2030 as compared to BaU	Pourcentage emission reductions 2030 as compared to BaU	Pourcentage emission reductions 2030 as compared to BaU
Timeframe	2020-2025-2030	2030	2010-2025	2030	2030	2030
Objective	**41% /2010 (38% / BaU)**	**32%**	**50%**	**64%**	**30%**	**28%**
Non conditionned	13%	13%	Not mentioned	Mentioned but not quantified		
Conditionned	28%	19%	Not mentioned	Mentioned but not quantified		
Financial resources needed	**20 Bl US$**, of which **18 bl US$ international support**	**45 Bl US$** of which **35 Bl US$ of international support**	Mentioned but not quantified	**150 Bl US$**	**40 Bl US$**	Mentioned but not quantified

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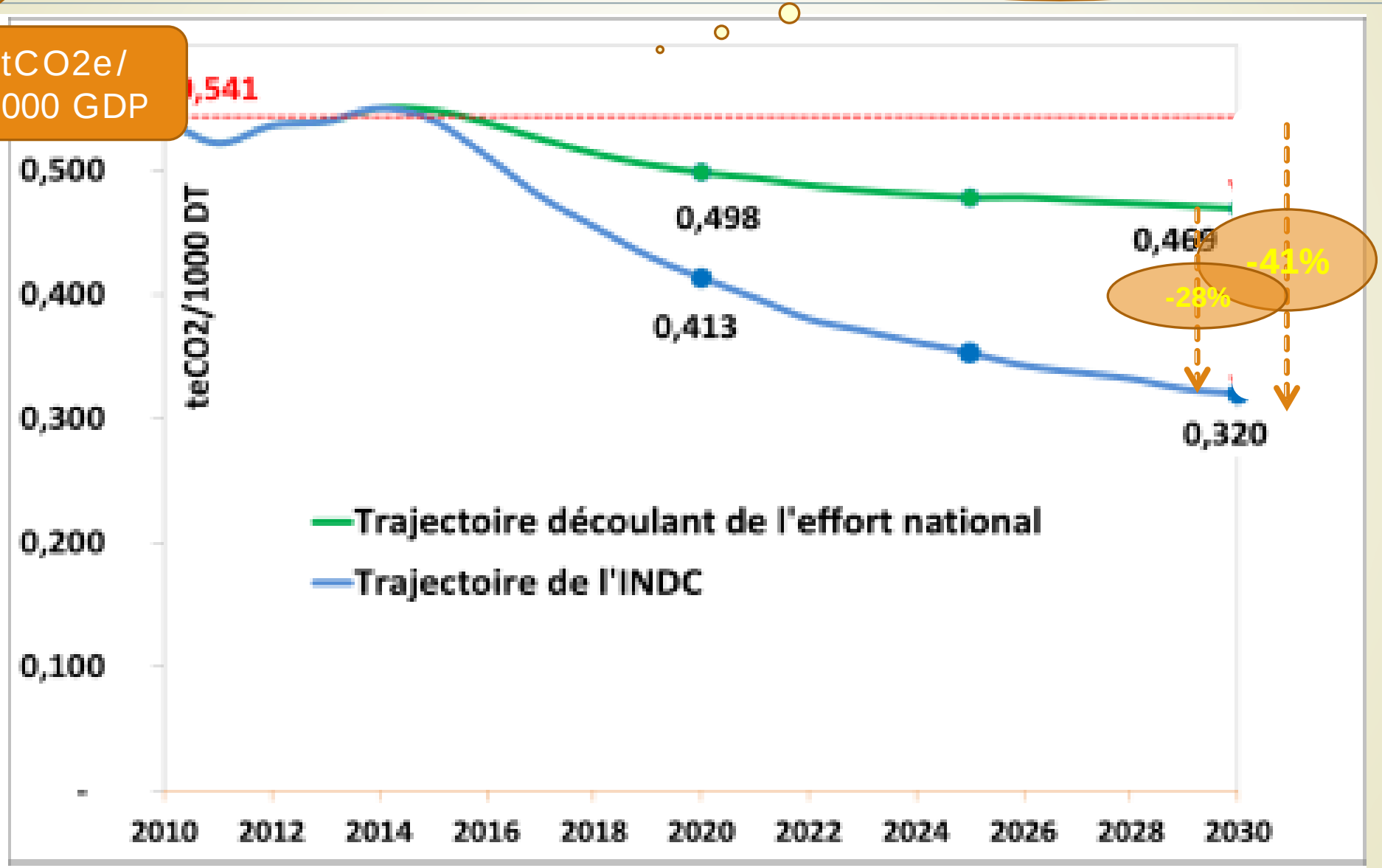
Tunisian objectives

Reduction in carbon intensity

Other ex. China, Singapore, …

1.2 tCO2e/ US$1000 GDP



1000 DT = US$450

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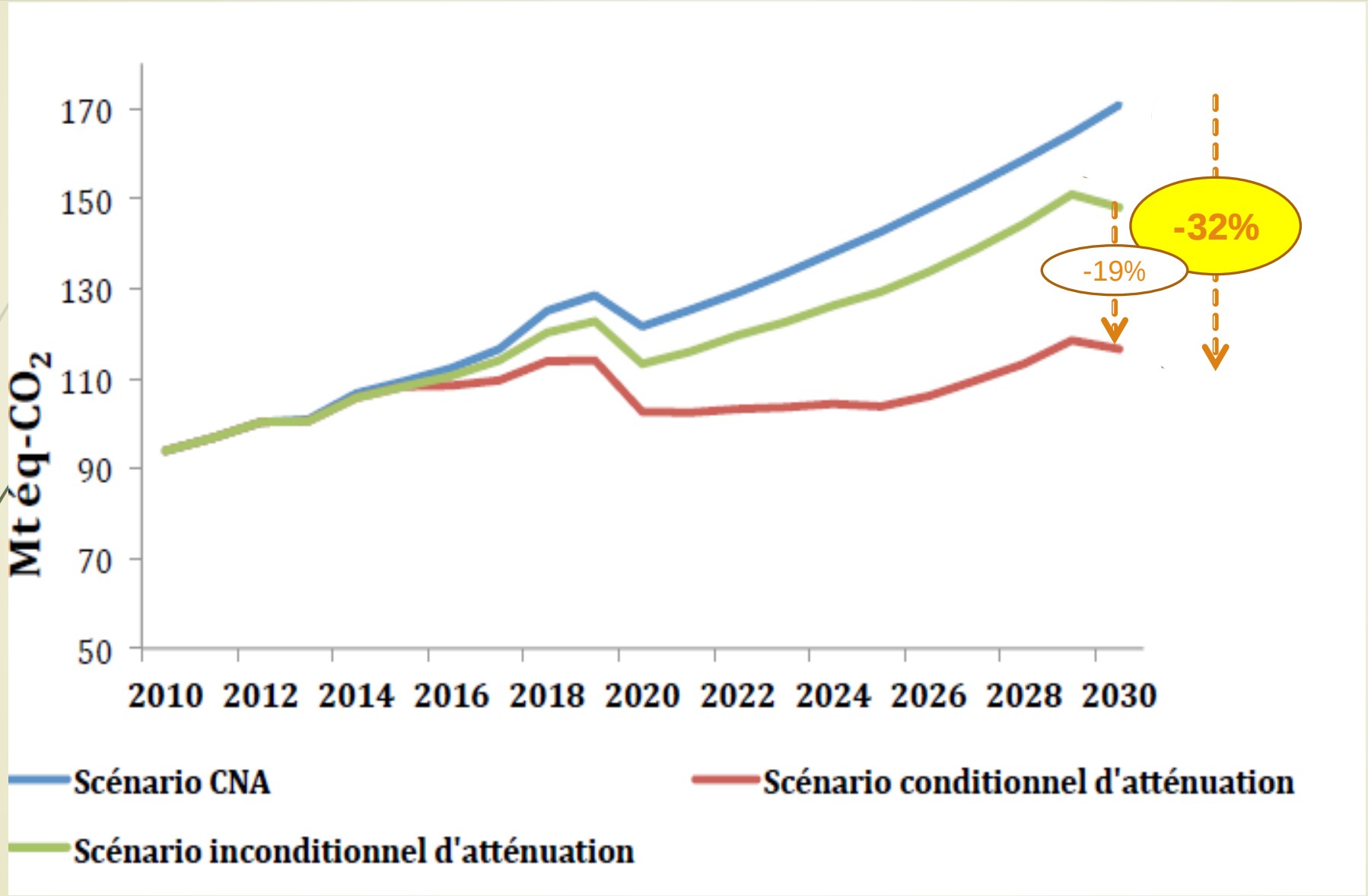
Moroccan objectives

Mexico, Gabon, Kenya, Ethiopia, South Korea…

Reduction in carbon Emission vs BaU



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Conditionality in INDCs

- **Tunisia:** Direct additional resources + participation to market mechansims
- **Cote d'Ivoire:** International donors and funders + International Carbon markets + Carbon Price signals
- **Ethiopia:** Need for international support to stimulate investments
- **Gabon:** International donors and lenders+ national Carbon markets

Model Application

5 Renewable technologies Solar Tunisian Plan

- PST objectives (MW):
  - **Wind power**
  - **Centralized PV**
  - **Roof PV**
  - **Parabolic Thermo Solar**
  - **Biomass**
- Actual CAPEX costs in Tunisia
- Actual OPEX costs in Tunisia

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Illustrations of IRR without CO2 Compensation

Wind

Hypothèses	TRI	Temps de retour
Prix de baril 40$US	0,70%	19 ans
Prix de baril 60$US	7,20%	11 ans
Prix de baril 80$US	12,40%	ns
Prix de baril 100$US		

PV

Hypothèses	TRI	Temps de retour
Prix de baril 40$US	-5%	>20 ans
Prix de baril 60$US	0,40%	20 ans
Prix de baril 80$US	4,40%	14 ans
Prix de baril 100$US	7,80%	

Biomass

Hypothèses	TRI	Temps de retour
Prix de baril 40$US	-6,30%	>20 ans
Prix de baril 60$US	0,00%	20 ans
Prix de baril 80$US	4,50%	13 ans
Prix de baril 100$US	8,20%	10 ans

Various reference values for CO2 Compensation

€ / téCO2	US40/bbl et TRI=10%	US60/bbl et TRI=10%	US80/bbl et TRI=10%	US100/bbl et TRI=10%
Eolien	**55,5 €**	**19,0 €**	**0,0 €**	**0,0 €**
PV	**135,5 €**	**99,5 €**	**63,0 €**	**26,7 €**
Centralisé	135,0 €	99,0 €	63,0 €	26,5 €
toits	136,0 €	100,0 €	63,0 €	27,0 €
CSP	**379,0 €**	**343,0 €**	**305,0 €**	**270,0 €**
Biomasse	**114,0 €**	**82,0 €**	**49,0 €**	**17,0 €**
TOTAL	**107,5 €**	**75,7 €**	**50,7 €**	**34,1 €**

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ey Results

Resources needed (2016-2030) to compensate CO2 in Tunisia, considering oil price assumptions

Récapitulation des ressources nécessaires pour "compenser" le CO2 évité, selon les hypothèses de prix du baril

M€	US40/bbl et TRI=10%	US60/bbl et TRI=10%	US80/bbl et TRI=10%	US100/bbl et TRI=10%
Eolien	**857**	**294**	~~0~~	~~0~~
PV	**1 433**	**1 052**	**666**	**283**
Centralisé	773	567	361	152
toits	660	485	306	131
CSP	**1 293**	**1 170**	**1 041**	**921**
Biomasse	**401**	**288**	**172**	**60**
TOTAL	**3 984**	**2 804**	**1 879**	**1 264**

≈4 bl €

≈2.8 bl €

≈1.9 bl €

≈1.3 bl €

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Future developement

- **Under preparation:** Doctoral Research PhD
- Disccussions with CIRED to host such research

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Thank you for your attention