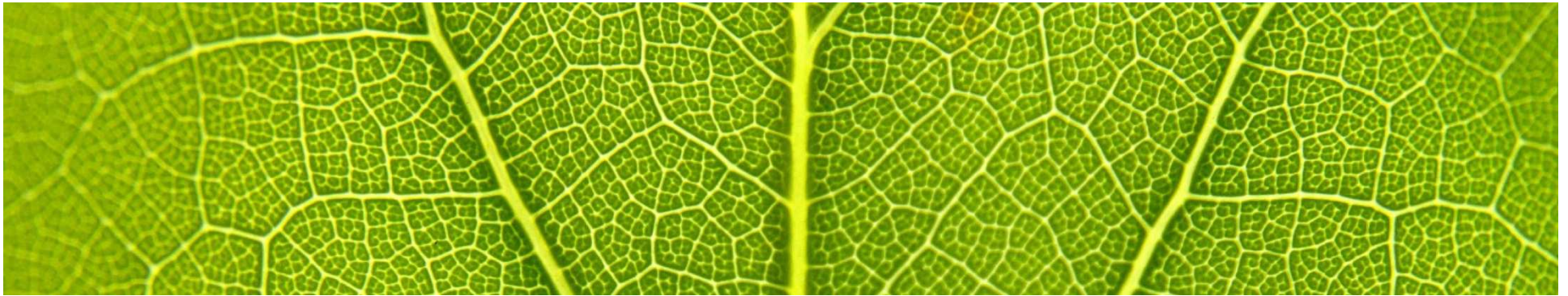


ECOFYS



sustainable energy for everyone



Offshore Wind Energy in India

**Deskstudy for market potential and
opportunities for international collaboration**

05/03/2014

Bastiaan van Wijk

About this presentation

- > Ecofys has performed a desk study for Offshore Wind Energy in India
- > **Main goal:** Support international collaboration on topic of Offshore Wind
- > **Approach:** Deskstudy NL + India (WinDForce) and interviews ~15 stakeholders India & NL

Presentation contents

- > 1. Background (potential, policy, market)
- > 2. Recent developments
- > 3. Topics for collaboration
- > 4. Hurdles and risks
- > 5. Recommendations

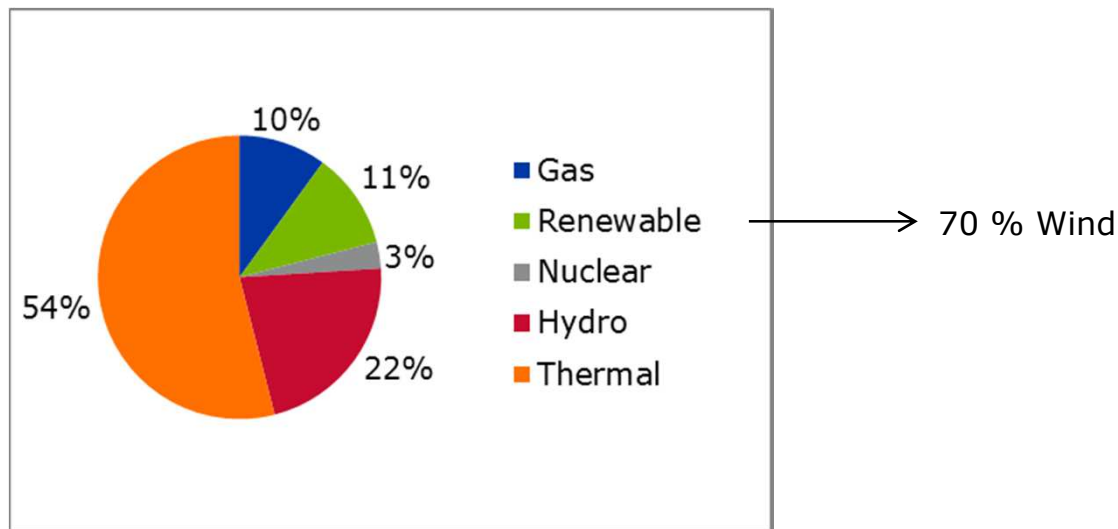


Rijksdienst voor Ondernemend
Nederland

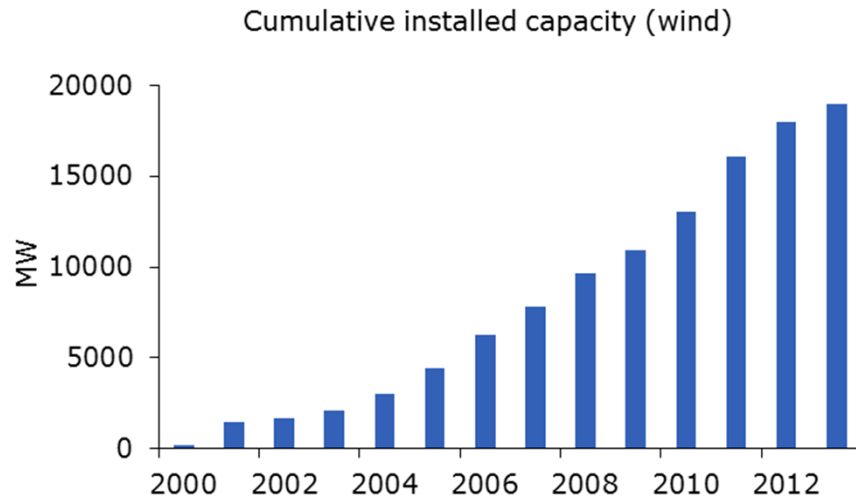


Indian Renewable Energy Sector

- > 5th largest electricity market in the world, annual demand growth: ~8 %
- > Current installed capacity onshore wind: 19 GW
- > Current growth target: 30 GW wind & 9 GW solar (2017)
- > Growing international manufacturing hub
- > No offshore wind (yet)



Indian Renewable Energy Sector



> National level:

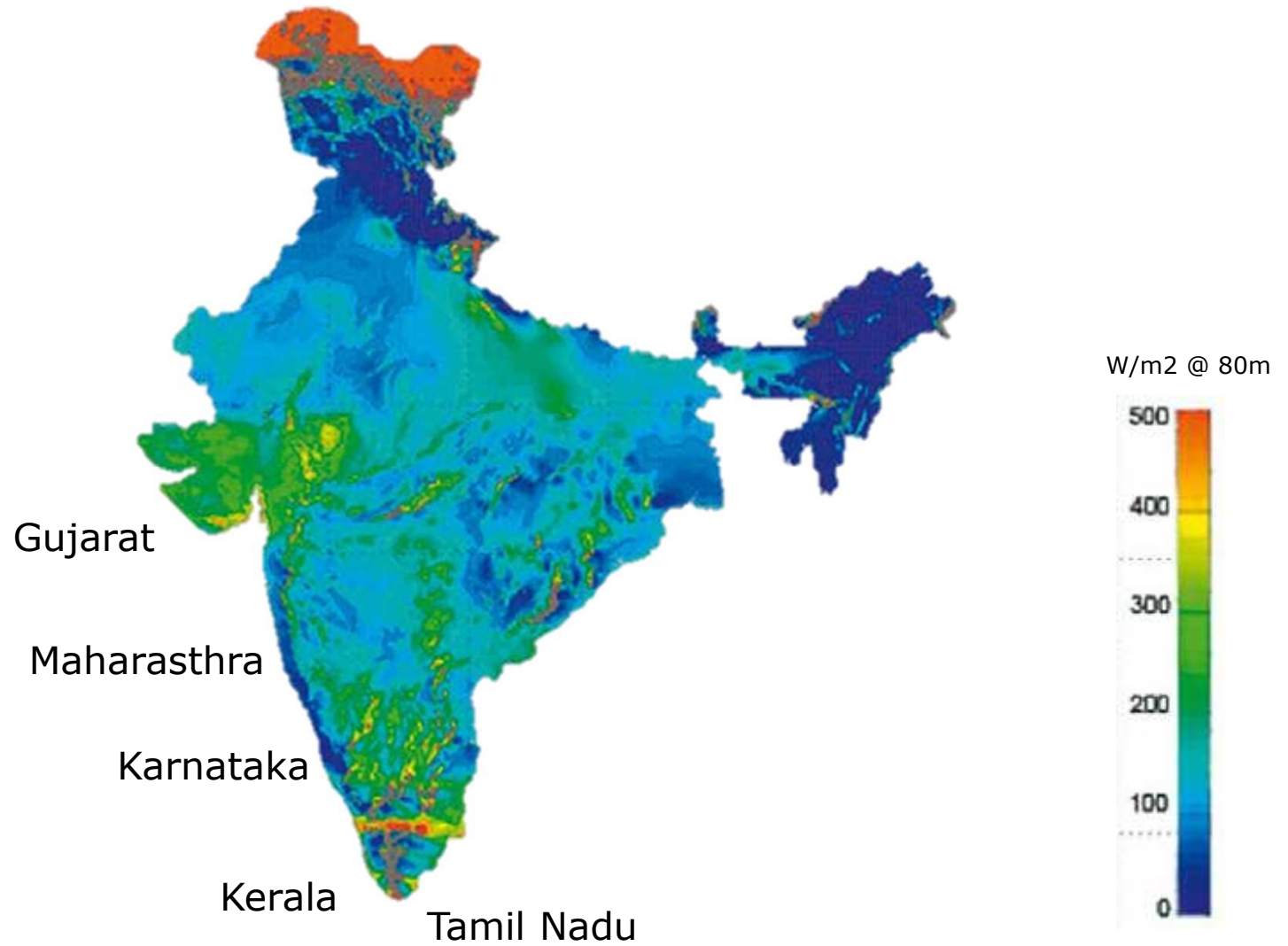
- *Electricity Act & National Tariff Policy (2003)*
- *5-Year Plans*

> State level:

- *Gujarat onshore wind policy (2013)*

- Production based subsidies:
 - Generation based incentive (*)
 - State-wise tariffs (wind-zone)
- Tax incentives
 - Income tax incentives, tax reduction
 - Accelerated Depreciation (*)
- Renewable purchase obligations

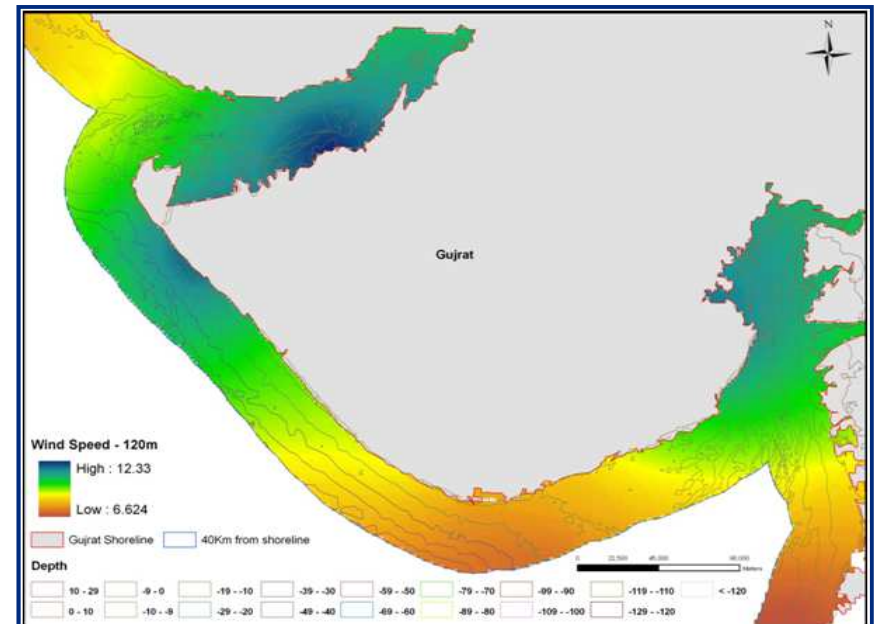
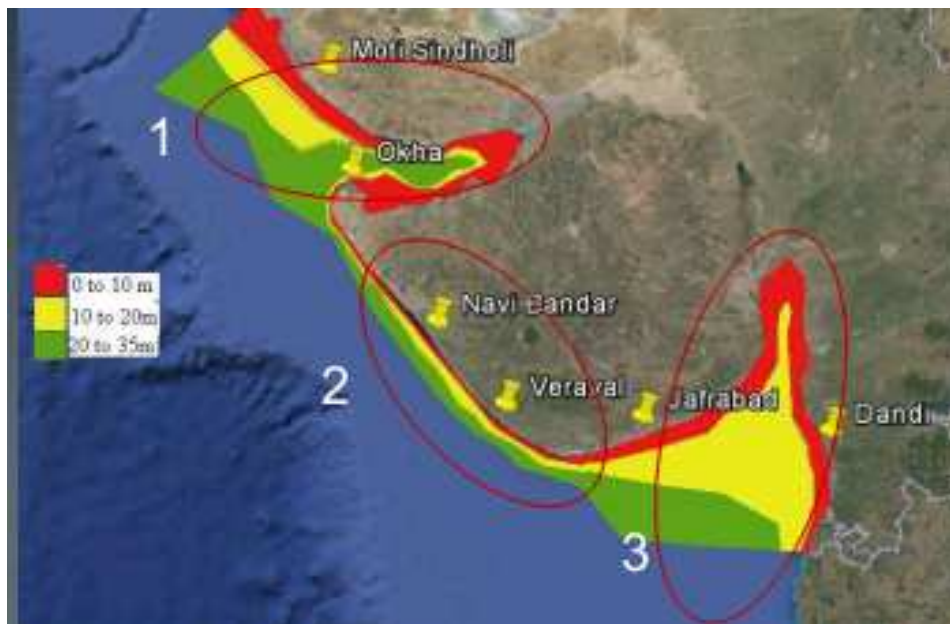
Potential - Offshore



Source: C-WET 2012

Potential - Offshore

- > Favourable offshore wind resources & water depths claimed
- > Quality of data currently insufficient for techno-economic studies
- > No offshore wind measurements



Offshore policy

Draft
National Offshore Wind Energy Policy
2013



 Government of India
Ministry of New and Renewable Energy
Renewable Energy is Green, Clean and Sustainable

- > High-level document
- > Promote a new industry
- > Defines roles & responsibilities
 - MNRE: overall monitoring target & progress
 - NOWA: facilitator, allocation of areas, nodal agency for permitting
 - State Authorities: Ports, infrastructure
 - State Electricity Board: onshore power evacuation (!) and grid connectivity

- > First: Elections Apr-2014
- > Political debate prior to policy establishment
- > Devil in the details: How to implement the policy is crucial
- > Clear policy = boundary condition for market commitment

Wind Energy Market

- > **Developed:** Onshore Renewable Energy & Electricity Market
 - RE Investors:
 - Independent Power Producers (e.g. Reliance)
 - Public Sector Units (e.g. Oil & Natural Gas Company)
 - Manufacturing Industry (e.g. Tata)
 - Sale of Electricity:
 - Utilities
 - Third-party consumers
 - Financers
 - WTG manufacturers (Suzlon + internationals)

- > **In Development:** Offshore Wind Knowledge, R&D, front-end studies
 - Indian research institutes (C-WET, WISE)
 - International agencies (World Bank, EU, GWEC)
 - (Inter)national consultancy & engineering firms

Recent Developments

> **GWEC Project (DNV-GL, WISE, CSTEP)**

- Goal: Policy guidance, resource mapping, techno-economic study, training, partnerships & outlook 2032
- Duration: 2014 - 2018
- Budget: 4 M€ EU + individual contribution
- 3 LiDARs deployed for 1 year (Gujarat & Tamil Nadu)
- R&D platform



> **British High Commission Project (OLDBAUM, IT POWER)**

- Goal: Guidelines for feasibility study, capacity building, offshore resource assessment, grids
- Duration: 2013 – 2015



Recent Developments

> SUZLON

- Intends to install 2 offshore met masts / FLiDAR
- Approvals for offshore site 20 km from coast, Gulf of Kutch
- Interested in technical support and funding & international cooperation
- Closely involved with Gujarat Government on topic: port facilities & offshore wind



> ONGC

- Often named as party doing the first project
- Demonstration project of 50 MW
- More information expected after interviews



Topics for Dutch collaboration

- > Round of Interviews with Dutch and Indian -> key topics for cooperation
- > Mostly in early development phase

Topics for Dutch collaboration

Topic	Contact
Implementation of policy	MNRE, NOWA, State Energy Development Agencies
Wind Resource & measurements	C-WET
R&D General	C-WET, WISE (Gujarat), C-STEP (Tamil Nadu)
Spatial planning / GIS / Costs	WISE, INCOIS
Geotechnical	C-WET, NOWA
Oceanographic studies	INCOIS, NIOT
Environmental Impact Assessments	NIOT, Ministry of Environment
Port study & development	WISE (study), Suzlon, State Governments (development)
Grid study	PGCIL, MNRE (inter-state)
Maritime Engineering	Suzlon, ONGC

Uncertainties and expected hurdles

> Market **uncertainties**

- Narrow knowledge base & no offshore wind industry
- Costs for offshore wind / lack of discussion
- Grid status and financial capabilities State Electricity Boards
- Political uncertainties on “Draft Offshore Wind Policy”



> **Hurdles** to market entry

- Existing competition: well established consultancy firms
- Local presence (office) required early on
- Operating in India requires great deal of flexibility
- Multitude of regulatory agencies



Recommendations

> To **Dutch industry**

- ✓ There is a strong “first-movers” advantage: it pays to be early
- ✓ Competition exists, thus focus on unique selling points
- ✓ Have a local presence and/or establish partnership early on
- ✓ Align market entry with RvO & embassies

> To **RvO**

- ✓ Active role in identifying opportunities and assessing “the right” timing
- ✓ Involve embassies & continue talks with governments
- ✓ Concrete initiatives
- ✓ Approach with cluster of companies, align internationally
- ✓ Win-win approach
- ✓ Help tap support funds to kick-start projects

To conclude

- > Yes, there are and will be opportunities for collaboration
- > Awareness of uncertainties and hurdles important

- > Let's start today with an open discussion how to make this happen...

For more information

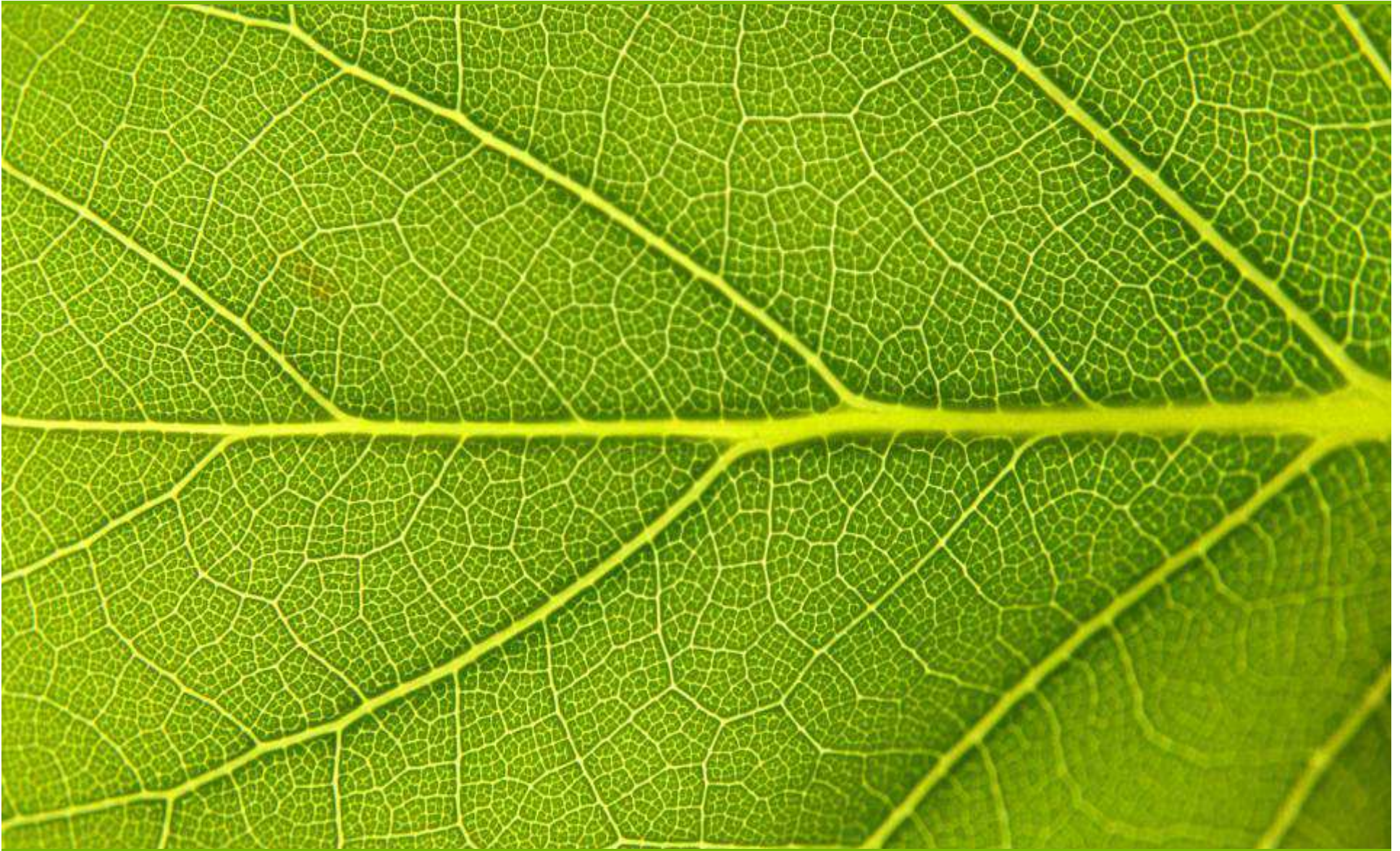


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Thank you for your attention



Abbreviations

List of Abbreviations

AD	Accelerated Depreciation	IOCL	Indian Oil Corporation Limited
CERC	Central Electricity Regulatory Commission	IPP	Independent Power Producer
CRZ	Costal Regulation Zone	IREDA	Indian Renewable Energy Department
CSTEP	Centre for study of Science Technology and Policy	IRENA	International Renewable Energy Agency
CWET	Centre for Wind Energy Technology	IRR	Internal rate of Return
DISCOM	Distribution Companies	kWh	Kilo Watt Hour
DoT	Department of Telecommunications	MW	Mega Watt
EIA	Environmental Impact Assessment	NALCO	National Aluminum Company Limited
EBTC	European Business and Technology Centre	NCEF	National Clean Energy Fund
FIT	Feed in Tariff	NIOT	National Institute of Ocean Technology
GAIL	GAIL India Limited	O&M	Operation and Maintenance
GBI	Generation Based Incentive	OEM	Original Equipment Manufacturing
GEDA	Gujarat Energy Development Agency	OIL	Oil India Limited
GETCO	Gujarat Energy Transmission Corporation Limited	ONGC	Oil and Natural Gas Corporation
GH	GL Garrad Hassan	PFC	Power Finance Corporation
GoI	Government of India	PNB	Punjab National Bank
GUVNL	Gujarat Urja Vikas Nigam	PSU	Public Sector Unit
GW	Giga Watt	RPO	Renewable Purchase Obligation
GWEC	Global Wind Energy Council	SBI	State Bank of India
HPCL	Hindustan Petroleum Corporation	SJVNL	SJVN Limited
HSBC	Hongkong Shanghai Bank Corporation	STU	State Transmission Utilities
IFCI	Industrial Finance Corporation of India	WRA	Wind Resource Assessment