CASE STUDY
India's Accelerated Depreciation Policy for Wind Energy

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Executive Summary

India was among the first nations to set up a Ministry for Non-Conventional Energy Sources in 1992 and has since introduced various policy measures to incentivize and promote the growth of renewable energy in the country. Among all the renewable energy technologies, wind power has experienced unparalleled growth over the last two decades, with capacity growing from less than 1 gigawatt (GW) in 1997 to 22 GW at end September 2014. Total wind capacity accounts for two thirds of total renewable energy capacity and almost one tenth of total installed capacity (254 GW) as of September 2014.

One of the key factors underlying this increase in capacity was the Accelerated Depreciation (AD) benefit, which was first introduced in 1994, with a depreciation rate of 100 per cent. In 2002 the depreciation rate was reduced to 80 per cent and the scheme was subsequently withdrawn completely in March 2012. The Generation-Based Incentive (GBI) scheme was introduced in the 2010 financial year as an alternative to the AD scheme (see Box 1), but this also lapsed in 2012. As a result, the wind sector witnessed a steep slump in capacity additions. There has been a persistent demand from the various stakeholders for the reinstatement of the AD benefit for the wind sector, and in August 2014 the AD benefit for the wind sector was reinstated at the previous rate of 80 per cent for plants installed on or after April 1, 2014 (Ministry of Finance, 2014).

Although the AD tax advantage was available for other renewable energy technologies, the wind industry has been the primary beneficiary, due to the relative maturity of the technology, resource availability and pre-existing experience. The AD tax benefit provided the required financial benefit to attract private sector investment in the wind sector, and facilitated the entry of a new class of investors comprised of high net worth individuals (HNIs), corporations, and small and medium-sized enterprises. These investors have harnessed wind energy to meet their captive demand and also used it as an instrument to offset the profits from their other businesses. The rising number of installations also promoted the development of domestic wind equipment manufacturing and other allied services sectors.

Though the AD scheme supported the creation of a large renewable capacity base in the country, it was perceived to be lacking in focus on long-term generation efficiencies (as incentive was linked to the initial capital cost of the project with no provision to penalize for under-performance). The other drawback of the policy was its limitation for large independent power producers and foreign investors (since the tax depreciation benefit could only be availed by entities with profits in the parent business and profits within India). The need to diversify the developer base in the wind sector and also ensure the continued development of wind technology prompted the policy-makers to phase out the AD scheme in 2012.

The re-introduction of the benefit in 2014 is expected to revive the sector and restore investor interest, particularly since the GBI has also been reintroduced (as of 2013). However, without appropriate policy revisions, the success of the re-introduction may well be compromised, at the expense of the broader development of the renewable energy industry in India. In particular, India's experience of the AD scheme suggests some key policy lessons, not only in relation to AD-type policies but also the wider range of policy initiatives. These lessons include:

- **The need to link incentives to performance**: The AD scheme failed in many aspects because it rewarded capacity additions, regardless of how this capacity performed in terms of generation. As a result, overall generation has been below its potential, inefficient installations have occupied some of the best sites in terms of wind resource and there has been no demand for manufacturers to invest in technology development to ensure increased efficiency.

Box 1: The GBI Scheme

In 2009 the Ministry of New and Renewable Energy (MNRE) announced the GBI scheme in parallel to the AD scheme for the period 2009–2012. This scheme was basically introduced to facilitate the entry of large independent power producers and foreign direct investors to the wind power sector who could not avail the AD benefit. It was aimed to broaden the investor base and create a level playing field between various classes of investors. The intended objective was to increase actual generation of power by incentivizing higher efficiencies with the help of generation/outcome-based incentives.

When announced, the policy provided an incentive of INR0.50 (0.8 US cents/kilowatt hour [kWh]) per unit of electricity fed into the grid over and above the state-fixed tariff for a period of no less than four years and a maximum period of 10 years.

After it expired in 2012, the scheme was reinstated after a gap of one year in August 2013. The scheme in its present form provides the same incentive of 0.8 US cents/kWh with a cap of INR10 million per megawatt (MW) (US$167,000 per MW) to be available for all projects on or after April 2014 and for the remaining 12th Five-Year Plan (FYP) period (2012–17). The MNRE has set a target of achieving 15 GW of wind capacity during the 12th FYP period under this scheme, for which the total estimated subsidy is around US$2.5 billion.

- **The importance of monitoring**: Where incentives are linked to performance, there is an obvious need to introduce monitoring mechanisms that assess this performance in an effective and efficient manner. Further, even where performance is not the basis for payment (as in the case of the AD scheme), there may be potential for introducing systems that penalize poor performers through fines or some other mechanism.
- **The need for policy to appeal to all investors:** One of the weaknesses of the AD scheme was that only companies with existing book profits in India could access it. This policy excluded a large class of potential investors who had experience in developing and managing large-scale wind projects as profitable businesses, including independent power producers using Special Purpose Vehicles and foreign investors.
- **Sharing the risk and return between investors and government**: The success of AD can be attributed to the fact that it offered a good level of financial support at a low level of risk for investors. This may have been appropriate in the early stages of wind power development when the technology was less mature and more uncertain. However, it has led to a culture where investors expect to reap rewards from wind power development while taking minimal risks, a situation that is no longer appropriate given the maturity of the technology.
- **The importance of wider infrastructure**: While capacity additions have been significant, there is an increasing concern that, without further investment, the grid infrastructure will be unable to support continued capacity additions. Already, there have been instances of curtailment, and without further investment, these can be expected to continue and worsen. Policy measures need to take this phenomenon into account and to address it accordingly.
- **Clarity on policy transition:** The experience with AD schemes highlights the importance of recognizing the need for effective communication between the government agencies and industry stakeholders on official targets and scheme objectives, as well as to understand industry perspectives, plans and expectations.

Table of Contents

LIST OF ACRONYMS

AD	accelerated depreciation
CAGR	compound annual growth rate
CUF	capacity utilization factor
CWET	Center for Wind Energy Technology
FY	financial year
FYP	Five-Year Plan
GBI	generation-based Incentive
GW	gigawatt
GoI	Government of India
HNI	high net worth individuals
IPP	independent power producers
IREDA	Indian Renewable Energy Development Agency
IWPA	Indian Wind Power Association
IWTMA	Indian Wind Turbine Manufacturers Association
KWh	kilowatt hour
MW	megawatt
MNRE	Ministry of New & Renewable Energy
NPV	net present value
PTC	Production Tax Credit
REC	Renewable Energy Certificate
RPO/RPS	Renewable Purchase Obligation/ Standard
SERC	State Electricity Regulatory Commission
SPV	Special Purpose Vehicle
SERC	State Electricity Regulatory Commission
SNA	State Nodal Agency
WET	wind energy turbine

1.0 Introduction

Recognizing the role that renewable energy technologies can play in enhancing sustainability, access to energy and security of supply, the Government of India (GoI) has introduced various policy and incentive measures to promote the growth of renewable energy in the country. The Accelerated Depreciation (AD) scheme has been one these support initiatives. While available to other renewable energy technologies, favourable wind density and speed conditions have meant that wind energy capacity growth has been predominant.

This study aims to review the AD scheme that industry experts and stakeholders alike consider to be the main driver for growth of wind energy in India. The report examines the wind sector's progress under policy presence with the aim to identify the extent to which it encouraged the development of capacity and weaknesses in the policy that may have limited its success. It draws on research conducted to date on this policy and on a series of interviews with industry stakeholders held between June and August 2014 (see Annex B).

Part 2 of the report provides an overview of the Indian electricity and renewable energy sector detailing its history and current status. It summarizes the policy landscape for renewable energy, outlining the quantitative and qualitative targets, strategies and policies adopted to achieve these targets. Part 3 of the report gives a detailed assessment of the AD scheme objectives, design and performance, highlighting the strengths and weaknesses of the policy. Part 4 describes the experience of the United States in introducing policies for the wind sector, comparing and contrasting with the AD scheme, and draws lessons for policy-makers. Part 5 reflects on the positive and negative lessons that can be drawn from the AD scheme and how these should be incorporated into future policies, particularly the reintroduction of the AD scheme in 2014.

2.0 Overview of India Electricity and Renewable Energy Landscape

2.1 INDIAN ELECTRICITY SECTOR

Since independence, GoI has made constant efforts to develop the country's power infrastructure, so as to support overall socioeconomic development. As a result, the country has achieved a grid-connected capacity of 248.5 GW (as of May 31, 2014) from a base of 1,362 MW (as of December 31, 1947).[1]

India is well endowed with both conventional and renewable power generation resources, but coal and hydro have been the primary commercial sources to date (see Figure 1). Coal is by far the largest source utilized for electricity production in the country, accounting for over half of capacity in recent years, with hydro accounting for close to 20 per cent. However, the installed capacity mix has undergone a change during the last two decades, with the share of renewable energy source steadily increasing.

Although India's generation capacity has increased significantly over the years, it has not been able to keep pace with the rising demand, and hence the country continues to face energy shortages. Figure 2 shows that India's energy deficit has reduced considerably over time, and the peak demand deficit has come down from more than 16 per cent in the 1995 financial year (FY) to 4.2 per cent in FY 2014; it is further anticipated to reduce to 2 per cent in FY 2015.[2] The electricity consumed per capita in India stands at 917.18 kWh (2012–13), which is among the lowest rates in the world.[3] Further, there are issues of access to electricity in rural areas, which has a strong bearing on the overall social and economic development of the population. The growth of renewable energy resources can not only address some of the electricity access challenges but can also provide long-term energy security to the country.

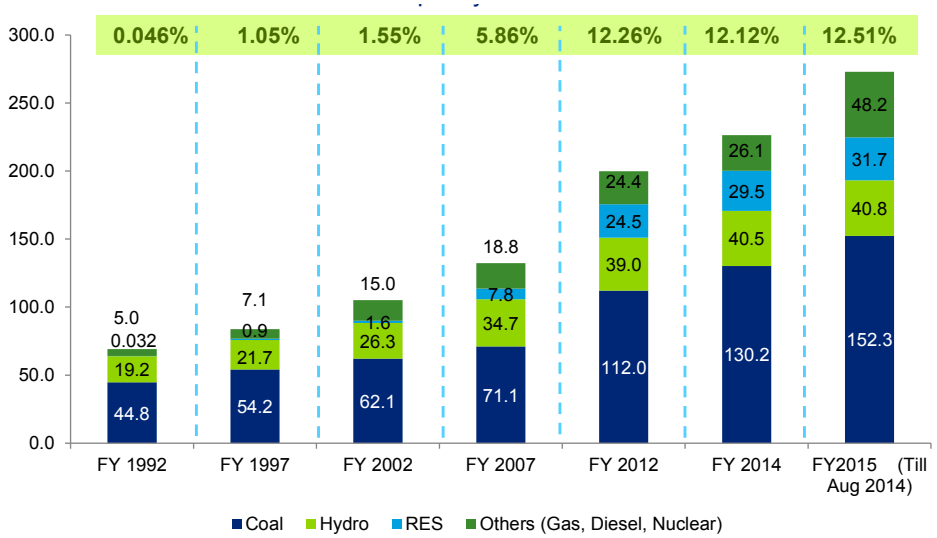

Figure 1: India's generation capacity and renewable energy's share

Central Electricity Authority (2013b)

[1] Here and throughout, this report is limited to grid-connected capacity, unless explicitly stated otherwise.

[2] The Indian Government's financial year runs from April 1 to March 31. Here and throughout, the date given refers to the year in which the financial year starts. Thus, financial year 2014 runs from April 2014 to March 2015.

[3] In 2011 the World Average consumption was 4180 kWh (World Bank 2011), whereas India's per capita consumption in 2011–12 stood at 883.63 kWh (Central Electricity Authority, 2013a).

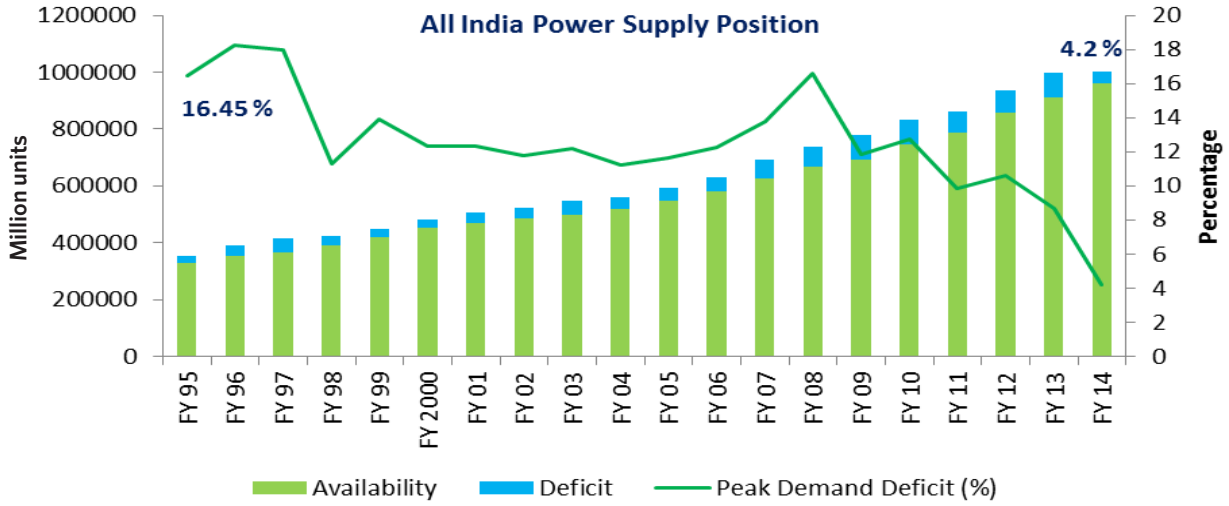

Figure 2: Indian power supply position

Central Electricity Authority (2013b)

To address the increasing demand for power, it is essential to increase the sector's generation capacity and address the key challenges of infrastructure, supply shortages and transmission and distribution losses. To this effect, the government has set a progressive target of adding more than 118.53 GW of capacity in its 12th Five-Year Plan (FYP) (2012–17) (Central Electricity Authority, 2013). Achieving these targets will require investments totalling INR1,372,580 crore (US$228.8 billion) (Ministry of Power, 2012).[4, 5]

2.2 HISTORY AND STATUS OF RENEWABLE ENERGY IN INDIA

India possesses vast renewable energy potential: Figure 3 shows the current assessed renewable energy potential by energy source. The figure shows that solar is estimated to have the highest potential in India, with solar photovoltaic power generation potential estimated at 20 MW per square kilometre (km^2) and solar thermal power generation potential estimated at 35 MW per km^2 (ABPS Infrastructure Advisory Private Limited, 2009). Apart from solar, wind has the highest potential, with the National Institute of Wind Energy estimating potential at 102 GW (National

[4] Conversion rate: US$1 = INR60.

[5] These estimates are based on the benchmark cost approved by Central Electricity Regulatory Commission (CERC) and prevailing trends for conventional technologies. Technology upgrades and cost reductions are generally not considered for the calculations. The capital outlay is not just for capacity additions but for overall investment and upgrade plans for the power sector.

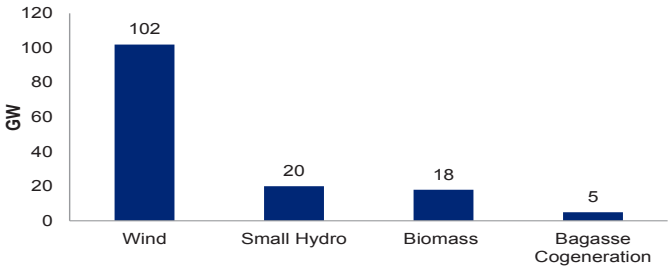

Figure 3: Renewable energy potential in India*

** Wind data are from the National Institute of Wind Energy (2014); small hydro data are from the Ministry of New and Renewable Energy (2014c); and biomass and bagasse data are from Ministry of New and Renewable Energy (2014a).*

Institute of Wind Energy, 2014) and other studies assessing total wind potential in excess of 200 GW (see Annex A, Section 2 for more detail). Also, with an estimated potential of 18 GW, India is also very well placed to harness biomass energy to meet its rural energy needs (MNRE, 2014a). In addition, the country's small hydro potential is estimated around 20 GW (MNRE, 2014c).

The renewable energy sector has grown at a tremendous pace over the last decade, with its share in the installed grid-connected capacity increasing from 7.32 per cent in FY 2008 to 12.57 per cent as of August 2014 (31 GW). Figure 4 shows renewable energy capacity additions by technology type, and with close to 21 GW of installed capacity at the end of FY 2014, wind accounts for 67 per cent of the total renewable energy capacity.

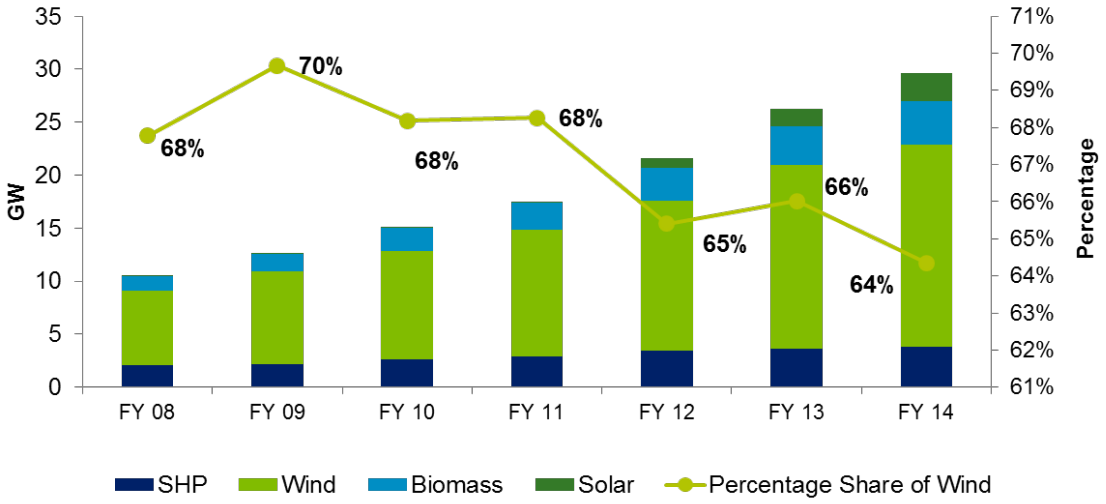

Figure 4: Renewable energy capacity additions and share of wind

Source: Central Electricity Authority Report- Growth of Electricity Sector in India 1947-2013, FY 14 values as per MNRE

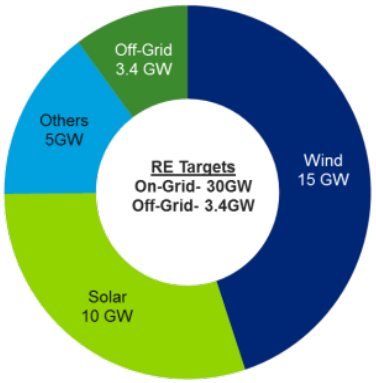

Figure 5: Renewable energy targets for 12th FYP

Source: Planning Commission (2011)

Although the share of renewable energy technologies has increased significantly, there still is a very large untapped potential for specific technologies in the country, particularly in technologies other than wind power. India's 12th FYP sets a target for an additional 30 GW of grid-connected renewable energy capacity (excluding large hydro) (Planning Commission, 2011).[6] Of this, half (15 GW) is expected to be wind capacity, 10 GW is expected to be solar, 2.1 GW small hydro and the balance primarily from biomass (see Figure 5). In addition to 30 GW of grid-connected renwable energy capacity, MNRE also plans to add 3.4 GW of off-grid renwable energy capacity. These targets are, however, subject to change on annual revision by the ministry, keeping in mind the sector dynamics.

More detail specific to the renewable energy sector is set out in the *Strategic Plan for New and Renewable Energy Sector for the Period 2011–17*, which was issued by MNRE in 2011. This plan aims to develop renewable energy technologies to a commercial scale in close concert with corporate, scientific and technical institutions to support the realization of capacity targets.

The MRNE also specifies implementation plans for each technology, with the plan for wind power comprising the following activities:

- **Re-powering of existing wind turbines** by initiating a pilot scheme.
- **Wind Resource Assessment**: Updating and expanding the existing database on wind resource and conducting an offshore wind assessment.
- **Regular interaction with all stakeholders** to periodically address policy, regulatory, evacuation and transmission matters for wind power.

[6] There are a number of long-term targets for renewable energy, set at different points in time (e.g., the National Action Plan on Climate Change, the MNRE, the Integrated Energy Policy). The 12th Five-Year Plan target is the most recent update by GoI, and the most relevant as it factors in recent changes.

- **Regular interaction with states** to periodically address land acquisition, environmental and forest clearance and state policy issues.
- **Prepare pilot project for off-shore wind.**
- **Support development of evacuation and transmission infrastructure for renewable power.**

To establish a dedicated approach to developing high-potential wind power in the country, the 12th FYP recommended establishing a National Wind Energy Mission (MNRE, 2014b). The mission aims to establish a long-term stable policy framework to provide better coordination supporting a proactive deployment of wind technology in the country. MNRE is in the process of establishing this framework and has conducted preliminary consultations with stakeholders to gather industry views.

2.3 POLICY LANDSCAPE FOR RENEWABLE ENERGY

The renewable energy industry in India has benefited from a range of policy and regulatory support mechanisms at both the central and state levels (see Figure 6 for a graphical representation and Box 2 for a description of how central-level policies affect and support state-level policies). These support mechanisms have evolved over the years in line with the changing requirements of the energy sector. As a result of these mechanisms, the country was among the top five nations in terms of renewable energy capacity and generation (BP, 2014). Section 2 of Annex A sets out more details on the policy environment for renewable energy in general, and wind energy in particular, in India.

Box 2: Central- and State-Level Renewable Energy Policies

The Indian power sector—including the renewable energy sector—is governed by overarching central-level policies that build the framework, address broad issues related to renewable energy in the country and provide a direction for development. The central-level policies are implemented on a pan-India basis—they are available to all states irrespective of the state-level policies. In the case of the Accelerated Depreciation (AD) scheme (a central-level incentive), the tariff set by the state regulator is calculated separately considering the AD tax advantage for wind power projects under this scheme.[7]

Apart from the central-level governing policies, respective states announce their own renewable energy or technology-specific policies to promote their development. These policies provide for preferential tariffs (approved by the state regulator) and other benefits/incentives, such as the streamlined single-window clearance mechanism, evacuation and transmission facilities, banking arrangements, tax exemptions, land site allotment, and research and development incentives, over and above the central-level policies.

These state-level policies run in active concert with national-level policies to provide a holistic environment for renewable energy development. For example, Generation-Based Incentives (GBIs) and AD benefits that are provided by the central government are available to developers over and above the state's preferential tariff for wind power projects.

See Annex A, Section 2 for more details on centrally mandated and state mandated policies.

[7] See Central Electricity Regulatory Commission (2014) for further discussion

3 .0 A Cautionary Tale

3.1 INTRODUCTION

The AD scheme for renewable energy was introduced in 1994.[8] The scheme was applicable for all renewable energy technologies, including wind, biomass and small hydro. For the wind energy sector, the scheme provides a tax benefit on *windmills and any specially designed devices which run on wind mills and any special devices including electric generators and pumps running on wind energy* (Republic of India, 1961). The AD scheme was one of the initial initiatives that the central government introduced to open up the power sector to private participation.

Depreciation is an accounting concept that allocates an asset's cost towards expense during its period of useful life. As with other expenses, depreciation is deducted as an expense before calculating the taxable profit, thus reducing the tax burden on a company. AD increases the depreciation on the assets during the initial years of the asset's useful life, which allows the asset owner to write off more of the value of the asset during the initial years of ownership, thereby reducing the greater proportion of taxable income.

Since the AD scheme is a tax-saving scheme, it does not directly provide any financial assistance to wind power project developers. However, there can be significant post-tax benefits for the investor, in terms of the timing of cash flows. Reducing tax liability in the early years of a useful life period increases profits in the near term, albeit at the cost of higher taxation in the longer term. Given that near-term cash flows are more highly valued by investors than longer-term cash flows, this represents a benefit in terms of the net present value (NPV) of a project.[9]

On the government side, there is no budgeted cost set aside for the scheme since there is no direct disbursement of funds. However, the government, and therefore society as whole, does accrue a cost in relation to the tax revenue forgone from the developers and in terms of the use of resources that could be employed elsewhere. Again, this benefit relates to the timing of cash flows: the government foregoes (more highly valued) tax revenue in the near term and recoups this (less highly valued) revenue in the later term when tax receipts are higher.

3.2 THE POLICY ENVIRONMENT

3.2.1 Policy Objectives

The primary aim of the AD incentive was to increase the wind energy capacity base and facilitate an all-round development of wind energy sector in the country. There were no specific objectives cited in relation to the AD scheme, but the MNRE subgroup on wind (Ministry of New and Renewable Energy, 2011) and various other MNRE documents set out the following objectives for the renewable energy sector:

- **Increase share of renewable sources in the electricity generation mix to reduce electricity sector greenhouse gas emissions, air pollution and water use**. It is proposed that the share of renewable energy resources in overall mix of capacity is to be increased gradually to address the high dependence on polluting resources like coal in India. Due to the high capital costs of renewable energy technologies, certain financial incentives are required to attract investments.
- **Promote development of renewables, including the wind sector, in India**. The huge untapped potential of wind energy in India—along with other advantages, such as simplicity in operation, no fuel requirement, mature technology, low operations and maintenance costs, short gestation period, and ease of capacity expansion—makes it the preferred technology over other renewable energy technologies.

[8] AD is currently applicable to mineral exploration and development of infrastructure facilities (water, air pollution control) up to 100 per cent.

[9] NPV is the difference between the present value of cash inflows and the present value of cash outflows, where present value refers to cash flows that are discounted by a certain rate to reflect that future cash is less valuable than current cash.

- **Encourage private sector investments in the wind sector.** The AD scheme was introduced with the objective to create market dynamics that would leverage the boom of wind technology and allied sectors expected to serve as key economic inputs to India's economy. The objective was to encourage the participation of private sector investment in the development of projects as well as to drive the growth of the domestic manufacturing industry. It was expected that increased installations would consequently support the demand for wind power turbines and associated equipment, providing a market opportunity for setting up manufacturing facilities and allied services, such as turnkey solution providers and maintenance service providers.

incidence in the initial years and, considering the time value of money, the AD scheme could provide significant benefit to the companies and the high net worth individuals (HNIs) that had high book profits to absorb the deductions available under the scheme.

The depreciation of wind assets was allowed at rate of 100 per cent in 1994, with only half of the depreciation rate allowed during the first year for assets commissioned after September 30 of any financial year. In line with the intended objectives, the scheme benefit attracted investments in the wind energy sector and annual grid-connected capacity installation rose steadily from 61 MW in 1994 to 236 MW in 1995 (see Figure 6, which maps the various policy and regulatory milestones in the

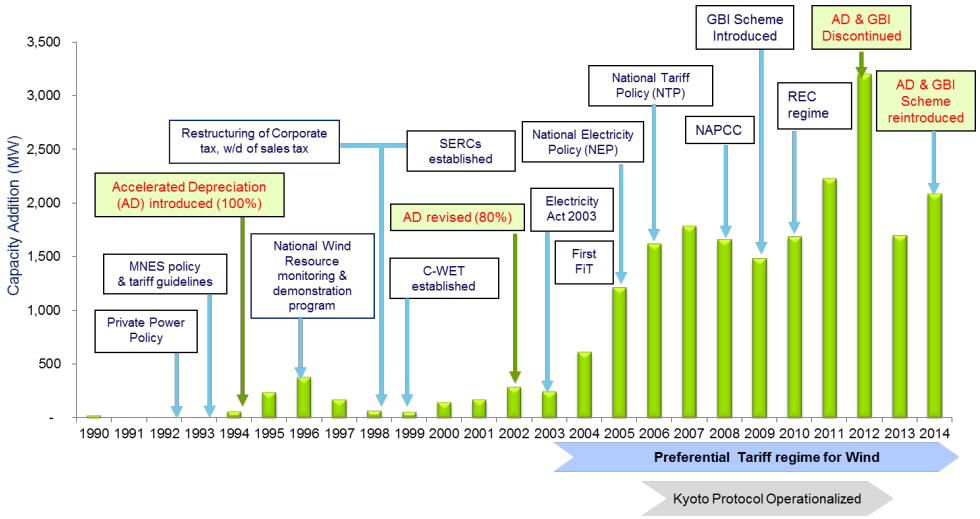

Figure 6: Evolution of the Indian wind sector

Source: Ministry of New and Renewable Energy (2015b)

3.3.2 Policy Design and Progression

The Indian AD scheme allowed investors to take advantage of high depreciation on assets in their initial years. The depreciation for AD benefits is calculated by the written-down-value[10] method, as per the Indian Income Tax Act, and it could be used to offset the profits in the parent company. The developer could thereby reduce the tax

development of the wind sector in India and the annual capacity additions). Wind capacity developed during the initial years was for captive consumption, and it was only after the evolution of regulatory framework, which provided for a preferential tariff structure for wind projects, that the capacity addition picked up. The preferential tariff could be used in tandem with the accelerated depreciation benefits. With the growth of capacity, the investment in the turbine-manufacturing sector also increased and a domestic industry began to develop.

[10] Under the written-down-value method, depreciation is calculated upon the original cost in the first year and on the written-down value, in subsequent years of the asset, over the expected useful life of the asset. Using this method, the amount decreases annually, whereas the rate of depreciation remains constant.

As the technology matured and the market began to stabilize, the AD benefit was revised to 80 per cent in 2002 (see Figure 6 for a timeline). The AD scheme was withdrawn from April 1, 2012 in response to concerns that it had (i) incentivized the development of inefficient capacity rather than generation, (ii) appealed to a restricted group of investors and (iii) had become more of a tax instrument than a vehicle for the development of a sustainable industry. In addition, it has been suggested that the short-term loss of tax revenue was also a factor motivating the government to discontinue the policy.

Following withdrawal of AD, the benefits of the GBI scheme were available to the developers, but this was in turn withdrawn in April 2013 (see Box 1). Since the withdrawal of the AD scheme, industry stakeholders persistently have made requests to the government to reinstate the AD benefit. The discontinuation of AD benefits to the wind sector has been discussed in various forums, and the wind associations have made strong representations to MNRE to restore the benefits. For example, the Indian Wind Power Association (IWPA) has persistently made concerted efforts and has held meetings with the concerned government officials to request reinstatement of the scheme (Indian Wind Power Association, 2012a, 2012b). Also, in January 2014, the ministry conducted a national-level consultation on the National Wind Energy Mission and discussed the reinstatement of the AD scheme, among other sector issues (Indian

Box 3: AD Policy Implementation

MNRE has been issuing technical guidelines for setting up wind power plants in India. The Center for Wind Energy Technology (CWET), set up under the aegis of MNRE, has been the designated agency for issuing certifications to the developers as well as wind turbine manufacturers. Developers have to follow these guidelines and standard specifications in employing the approved turbines and components. The wind project developers have to furnish all the required documents for setting up wind power systems and obtain approval from CWET. After technical approval and certification from CWET, the developer needs to obtain the commissioning certificate from the concerned utility or State Nodal Agency.

After the implementation of the GBI scheme for wind projects in 2009, the wind power producers intending to avail the AD benefit were required to submit all the documentary proof and register with the Indian Renewable Development Agency (IREDA). IREDA would issue a certificate of eligibility for availing the AD benefit from the Income Tax Department and a Unique Identification Number for each wind turbine generator. Once in operation, developers had to provide their generation data to IREDA. The details of depreciation availed by the companies were submitted to the Income Tax Department as part of the annual financial accounts. Figure 7 represents the structure of the AD scheme.

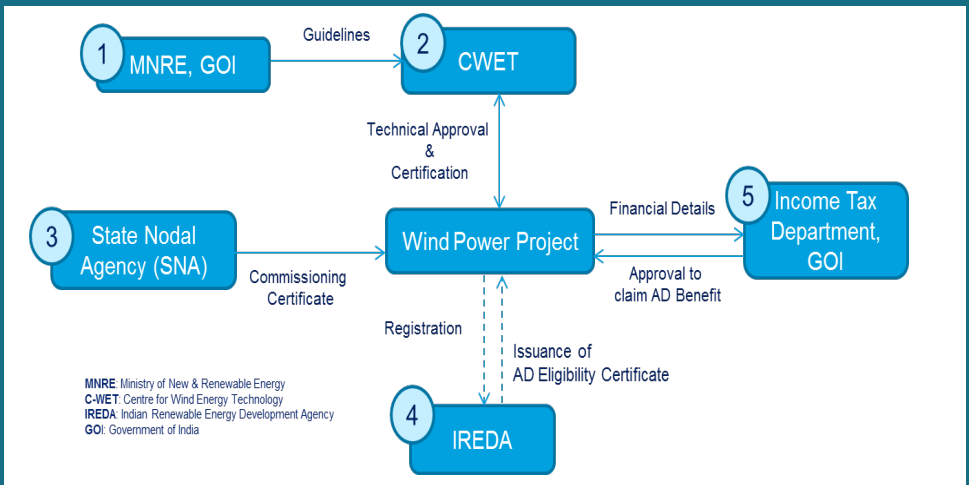

Figure 7: AD Scheme Implementation

Wind Power Association, 2014). More recently, the newly appointed Union Minister of Power held a discussion meeting with stakeholders in the wind sector to discuss sector issues, wherein the industry emphasized the restoration of the AD tax benefit for the sector (Press Information Bureau, 2014). As a result, GoI announced the reintroduction of the AD scheme in the 2014 budget (Business Standard, 2014). The scheme has been reintroduced in the same form as at the time of withdrawal, with an 80 per cent depreciation rate.[11]

GBI scheme in 2012, the wind sector witnessed a steep fall in annual capacity additions (1,699 MW in FY 2013 and 1,249 MW in FY 2014).

Disentangling the effects of the GBI and AD policies is difficult. However, in many quarters the AD scheme is widely regarded as being the primary force behind this capacity development. The IWPA has stated that AD is not a subsidy and as such should stay untouched, while the Indian Wind Turbine Manufacturers Association (IWTMA) has frequently pressed for reinstatement, suggesting a positive influence

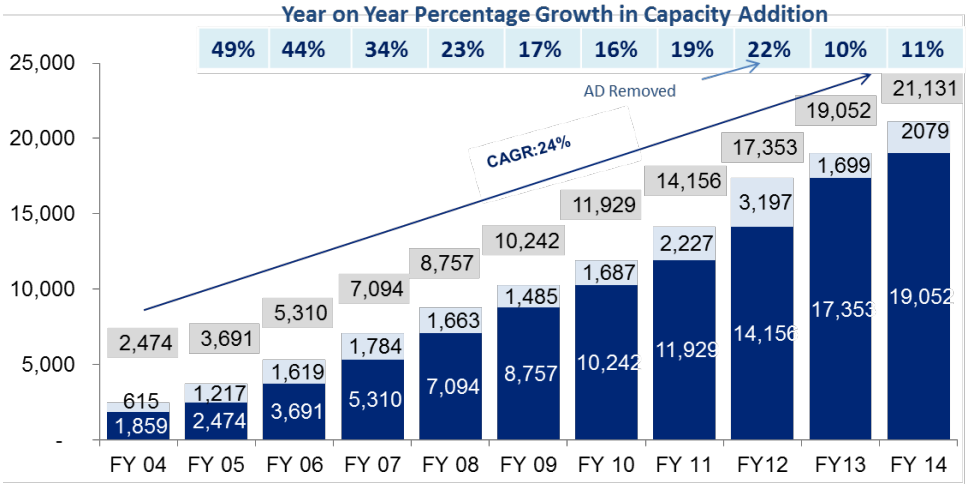

Figure 8: Wind Capacity Addition (MW)

Source: Ministry of New and Renewable Energy (2015)

3.3 ISSUES AND ANALYSIS

3.3.1 Policy Performance

The wind sector grew at a compound annual growth rate (CAGR) of 24 per cent between 2004 and 2014 (see Figure 8). The growth rate was very high for the period up to 2008 (CAGR: 37 per cent) and at a more moderate level from then until 2012 (CAGR: 19 per cent). The average annual capacity addition has been around 1,500 MW during the last 10 years, peaking in 2012 when the AD and GBI schemes were running concurrently. However, after the withdrawal of the AD scheme and the of AD on the turbine manufacturer's business (Derivatives Capitaline, 2013). Similarly, the stakeholders interviewed for the paper also attributed growth in the industry to the AD scheme.

It may also be observed that wind power technology in India has experienced higher growth among all the renewable energy technologies. Wind technology got the maximum traction in the early years and was considered for captive generation by industries in several power-starved states like Tamil Nadu. In addition, it scored over the rival renewable technologies like small hydro and biomass (solar technology came in very late) because of factors like very low gestation periods, low manpower requirements for operations, low operation and maintenance costs, established supply chains and the availability of vast untapped potential.

[11] In exercise of the powers conferred by Section 295 read with Section 32 of the Income-tax Act, 1961 (43 of 1961), the Central Board of Direct Taxes hereby made the amendment to Income-tax Rules, 1962 (http://www.incometaxindia.gov.in/_layouts/15/dit/pages/viewer.aspx?path=http://www.incometaxindia.gov.in/communications/notification/notification43_2014.pdf&k=&opt=&isdlg=0)

Findings from stakeholder interviews:

"Accelerated Depreciation tax incentive scheme is the prime mover behind increased growth in nstallation base of wind power in India..."

This progressive growth in wind energy capacity was in line with the scheme's objective of increasing the renewable energy share in the country's energy mix. According to the *Wind Power Draft Sub-Group Report* (MNRE, 2011b), AD was the primary means supporting increases in capacity, but this came at the expense of increases in generation from wind projects. The AD scheme attracted large and small profit-bearing companies and captive users who invested basically to minimize their tax liabilities, with little concern for subsequent generation from these same assets. In addition, since there was no policy measure to penalize the investor for under-performance, the AD scheme did not promote adoption of the latest technology machines with higher operational efficiencies. Consequently, lower-efficiency machines occupy the country's most windy potential sites, underutilizing the huge potential (MNRE, 2011b). Therefore, power generation has been below potential from individual sites and from the installed capacity base as a whole.

The capacity growth has generated demand for wind power plant equipment and machinery. Leveraging the low input costs, high domestic demand and a favourable policy environment, India emerged as a major turbine manufacturing hub. The prime example of an Indian manufacturing firm that has been able to create an impact on the global market is Suzlon, which was established in 1995. Subsequently, a host of international turbine manufacturers, such as Enercon, Gamesa and Vestas also set up their manufacturing facilities in India to cater to the growing domestic demand. These players have also graduated to offering turnkey solution services ranging across design, construction, commissioning, long-term operation and maintenance services.

However, since the domestic market emphasis was not on technology development or on efficiency improvement, there was little incentive for manufacturers to invest in continued development of turbine functionality and size or in improvements to enhance operational efficiency (Mizuno, n.d.). Simultaneously, the growth of the wind sector and wind turbine manufacturing in locations other than Europe (notably the United States and China) led to a wider choice of technologies for Indian project developers.

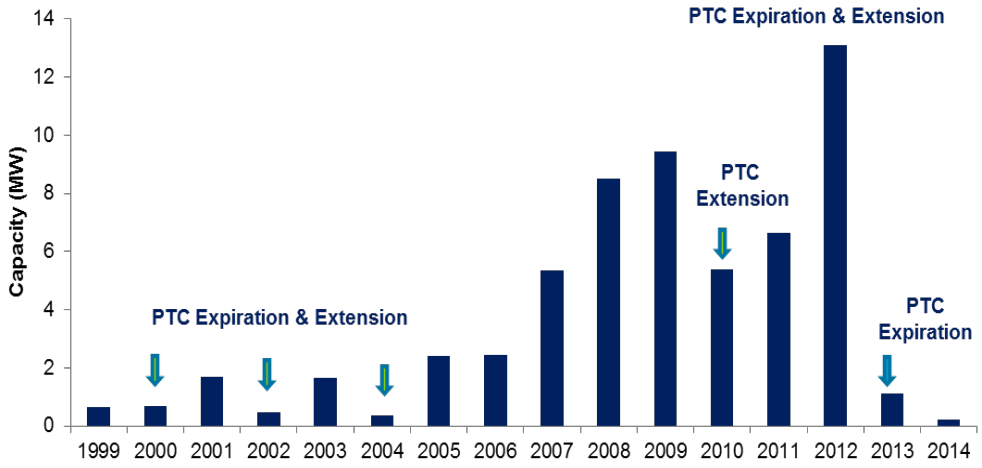

Figure 9: Export and Import of Wind Turbine Generators(2003–2013) in US Million $

As a result, Indian turbine manufacturers lost their share in the global export market of wind energy turbines in recent years and are currently no longer considered competitive at the global level.[12] See Annex A, Section 2 for more details on technical specifications.[13]

[12] Average turbine size (rated capacity) is lower than global average. The highest capacity offered by Indian manufacturers is 3 MW, as compared to 5 MW by Chinese manufacturers.

[13] In recent years, the growth in wind power deployment in China has supported the development of a strong wind turbine manufacturing industry. Among the top 10 global manufacturers, four of these are Chinese.

Finally, the AD scheme was limited in terms of the types of investors targeted. Two groups—the large independent power producer (IPP) players who invest through Special Purpose Vehicles (SPVs) and project companies with limited book profits that could not be offset against the high deductions available during the initial years—were not supported under the AD scheme. Thus, the scheme was perceived as restrictive for the development of large-scale wind projects on IPP mode and also for the foreign players who could not avail any benefit from the scheme.

The AD (and other) incentives, together with the technical maturity of wind power versus other renewable energy technologies, has meant that, as described in previous sections, renewable energy growth in India has been primarily driven by wind power with other technologies being of lesser importance. To the extent that there are commercially viable resources that have not yet been exploited, and considering that the government is targeting yet further additions, this imbalance is not necessarily a problem. However, going forward, security of supply and development of a broader renewable energy industry will require that other technologies also be brought to the fore.

Findings from stakeholder interviews:

"In wind-rich states there is seen a rising urgency for development of transmission infrastructure. If the evacuation infrastructure is not developed simultaneously to channelize the entire power produced through wind energy, benefits from promoting AD may not be reaped fully..."

Not only have resources been focused on the development of wind power in general, the wind projects themselves have often been concentrated in areas with particularly strong resources (e.g., in the southern state of Tamil Nadu). The locations, in turn, have created problems of dispatchability with an increase in wind energy share in the state's portfolio (around 13 per cent of total energy in FY 2012 for Tamil Nadu). Related, there is the problem of a mismatch between growth in installed capacity and growth in evacuation infrastructure capacity, which could not grow at the same pace. As a result, wind generation has decreased, with almost 5,000 million kWh lost due to a lack of evacuation facilities in 2010–11 (Centre for

BOX 4: ASSESSING POLICY AGAINST OBJECTIVES

Previous sections identified the main objectives for the AD scheme as: increasing the share of renewable energy in the electricity generating mix, promoting the development of the entire wind sector and increasing private sector participation in the energy sector. To what extent has the policy succeeded in meeting these objectives?

Increase share of renewable sources in the electricity generation mix to reduce electricity sector greenhouse gas emissions, air pollution and water use: Capacity development under the AD scheme has furthered the goal of increasing the share of renewable energies in the generation mix. However, this increase is still likely to have been below the potential due to the lack of monitoring of generation from these same assets. Furthermore, the lack of supporting policies regarding infrastructure development is likely to have restricted generation further, since connections have not always been made in a timely manner and curtailment has sometimes been necessary.

Promote development of renewables, including the wind sector in India: The AD scheme, in supporting large capacity additions, has undoubtedly supported the development of the broader wind energy industry. Indian companies were among the first to enter the global market, and they experienced widespread success. However, performance in recent years has faltered as Indian industry has failed to keep up with developments in the turbine market, and the Indian industry accounts for a declining proportion of the global market. It is highly likely that a lack of emphasis on operational aspects, as manifested in the AD scheme, is at least partly responsible.

Encourage private sector investments in the wind sector: The AD scheme has attracted investment by large corporates, small and medium-sized enterprises and HNI individuals, who have been able to avail themselves of the tax advantage due to having profits elsewhere in their business. To this extent, the AD scheme has indeed increased private participation in the sector. However, other potential participants, notably IPPs that invest through SPVs and foreign investors, have been excluded by the policy since they do not have pre-existing book profits against which they could offset the tax benefits provided by the AD scheme. Since IPPs tend to understand the power sector and focus on generation rather than capacity additions, their exclusion could be at the expense of increasing generation from renewable sources and developing a sustainable and long-term industry.

The cost at which these objectives have been met is difficult to determine due to a lack of publicly available data on the scheme (see Section 3.2.2 scheme monitoring).

Budget and Governance Accountability, 2013). If benefits are to be captured, the development of infrastructural facilities will be required to support the continuation of the AD scheme.

Findings from stakeholder interviews:

"The policy restricted the diversity of investor class as IPPs and foreign players investing via SPVs could not avail the tax benefit…"

3.3.2 Policy Analysis

This section considers how policy design and implementation led to the positive and negative outcomes outlined in the previous section.

Scheme type: AD is predicated on having book profits against which an investor can offset the capital costs associated with project development. This has meant that the diversity of investor basis, although broadened, has not been as wide as it could possibly be, excluding large IPPs, project companies with limited book profits and foreign investors. This exclusion has in turn had implications for the generation realized from projects, as well as for the development of the supporting value chain. Large IPPs usually aim to develop larger-capacity plants as their investments are focused on accruing profits from the electricity generation. In contrast, the majority of players who entered the sector by accessing the AD benefit invested in small-scale installations mainly to take advantage of the tax-saving benefit (MNRE, 2011b). The resultant sector capacity portfolio was mainly comprised of a large number of small-scale installations that were mostly no more than a few kW of capacity. Since there was no motive to increase system efficiency and generate higher power, the developers did not invest in procuring the latest technology in higher-capacity turbines to tap the site's generation potential, and there was no impetus on local wind turbine companies (and related companies) to improve the performance of their turbines.

Basis of incentive: The AD scheme rewarded the development of capacity rather than generation from capacity, and as a result, there was no mechanism to monitor and penalize under-performance in terms of availability of capacity and associated power generation. On the one hand, this focus and the associated simplicity in policy design addressed the immediate problem at hand effectively by incentivizing investment in capital stock with low policy-related costs. However, it has also had three main negative consequences. First, there was no incentive to ensure that projects generated power effectively or efficiently. The full benefits of projects, in terms of potential generation, have not been realized, at a cost to the country in terms of both foregone tax revenue and resources. In turn, this lack of concern for the performance of wind projects meant that the wind industry in India had little incentive to maintain its competitive edge in the global marketplace. Finally, given that the scheme benefit was linked to the initial capital cost of the project with no subsequent monitoring, investing in wind generation plants became more of a financial instrument for the investors rather than a means to incentivize development of renewable power (see also above on "Scheme Type"). In the most extreme cases, the tax benefit encouraged the development of fraudulent schemes where projects were not developed, but companies and individuals received the tax benefit (Centre for Budget and Governance Accountability, 2013).

Findings from stakeholder interviews:

"Emphasis on generation became low priority under the scheme, inducing inefficiencies and low generation by developers. The scheme became more of a financial instrument for investors by availing tax benefit…"

Level of incentive: The tax benefit available under the policy was quite attractive in the initial years for the developers, leading to the high level of capacity additions. However, a lack of data on the costs and the outcomes of the policy (see below) makes it difficult to assess whether the level of support was in fact higher than it needed to be to realize the outcomes. However, stakeholders interviewed as part of this project considered that the cost of the policy to the

government in foregone revenue was a factor in the withdrawal of the benefit.

Scheme monitoring mechanisms: There are few mechanisms in place to monitor the physical and financial outcomes of the scheme, making it difficult to assess the extent to which the AD scheme has realized its objectives and the cost of doing so. On the physical side, there are no publicly available detailed records of exactly which projects have benefited from the AD scheme and the generation associated with these projects. On the financial side, there are no publicly available records on the total tax benefit that has been granted to projects. Together, these factors mean that assessing the precise impact of the AD benefit and the associated cost (in terms of foregone tax revenue) is not possible. This is of concern because it limits the extent to which it is possible to assess whether the scheme represents value for money to society and whether alternative policies would be more cost effective.

Certainty: For investors, there was little risk associated with the scheme, and this is likely to have contributed to the high level of investment and capacity installation seen. The AD scheme provided a fixed tax benefit linked to the installation cost on which the tax depreciation was calculated. So investors who planned their projects based on the AD benefit could clearly predict the project's financial stream, thereby reducing the uncertainty associated with other benefit schemes that are dependent on highly variable components. For example, the financial support received under GBIs depend on the availability of physical resources and associated generation, and also depend on the availability of funds to make the payments and timeliness of disbursement of these funds.

Furthermore, there was little time risk associated with the benefit. In the early years of the scheme, investors were able to recoup all the benefits in the first year of operation (100 per cent depreciation rate). This meant that there was little risk associated with the government withdrawing the scheme since the time between the final investment decision and capturing the benefit was limited.

Unlike other government subsidy or incentive schemes for the power sector, the AD scheme did not depend on fund disbursal from the government. Such schemes are marred by delays in disbursements, which adversely affects the project's cash flows. The administration of the AD scheme, on the other hand, is quite simple and does not require any prior approvals for accessing these benefits.

While this certainty was attractive for investors, it has impaired the development of a culture in which risk and reward are balanced, as well as one where investors expect to assume risk in proportion to the reward that they receive and look to manage these risks. While it is appropriate that the government covers some of the risks associated with immature technologies and markets, onshore wind energy is now generally regarded as a relatively mature technology. The government continuing to assume risk on behalf of developers could therefore be considered a poor use of public resources and detrimental to the overall development of a self-sustaining renewable energy sector.

Findings from stakeholder interviews:

"AD allows investors to save tax on their main business and large corporates in the manufacturing sector use the power generated by wind assets for their captive use. Hence, the twin objectives of Tax Saving and Captive Power largely motivate them to invest in wind assets, which complements the objectives of the Wind Project Developers. The scheme is a great support to SMEs as wind energy installations under AD provide a cheaper source of electricity, reducing their costs…"

Simplicity: As previously discussed, the focus on capacity with lack of monitoring requirement meant that the AD benefit was a relatively simple mechanism to understand and implement. In addition, using the existing income tax structure to administer the benefit further increased administrative simplicity on both the side of the government and the investor. These factors meant that the scheme could be put in place quickly and at a relatively low cost, on both the

government and project developer sides, leading to the high-capacity additions seen.

However, simplicity also has some downsides in terms of policy consequences: first, and as previously discussed, it has stopped the scheme from realizing its full potential in terms of generation and investor diversity. Second, addressing these weaknesses has led to the introduction of other policy mechanisms (such as the GBI), which has complicated the investment environment somewhat.

3.3.3 Government Response

Considering the perceived weaknesses of the AD scheme and the associated effects, the government decided that there was an urgent need to diversify the developer base in the sector and accord higher importance to power generation and system performance. In particular, the government wished to increase the role of IPPs that set up high-capacity plants and focus on efficient operations and economies of scale. However, IPPs usually invest through SPVs and were therefore excluded from the AD scheme. Thus, with an objective to broaden the investor base by creating a level playing field for various classes of investors, the government introduced the GBI scheme in 2009.

The GBI scheme was introduced in parallel with the AD scheme, and investors had the option to access either of the two benefit schemes. The GBI scheme benefit was based on actual generation of power. Thus, investors that opted for the GBI had a greater focus on operational efficiencies and development of higher-quality projects so as to ensure that the generation-linked incentives were maximized. This led to a shift in the business model for wind project development, with large capacities being developed on the GBI scheme.

Findings from stakeholder interviews:

"Under the AD scheme, the sector was restrictive for IPPs and foreign investors, but its removal led to a steep fall in installations, which indicates that despite sector growth there still is persistent need of an effective financial incentive to support consistent sector growth. The presence of both schemes, AD and GBI, will prevent skewed investor base portfolios in the wind sector…"

Both schemes were discontinued in 2012, and, subsequently, annual installations with annual installed capacity fell from 3,168 MW in 2011–12 to 1,700 MW in 2012–13 (Press Information Bureau, 2014). Disentangling which scheme had the greater effect—through the removal of both—is difficult given the lack of clear data. However, given that, in recent years, the AD benefit accounted for the majority of capacity developed (estimated at 70 per cent in 2011), it is widely concluded that removing the AD benefit did indeed have a significant effect, with small and medium industry participants that still make up the majority of the market choosing to cut their investments (Bloomberg, 2012).

Under pressure from wind power industry associations and mindful of the downward trend in wind installations, the government reintroduced the GBI benefit in February 2014 and later in the year announced that the AD benefit would be reinstated also. The AD benefit has been reintroduced without any amendment to the benefits or scope of the scheme as they stood at the time of discontinuation in 2012. While the re-introduction of both schemes ensures that a full range of investors are incentivized to invest in wind power projects, the other concerns relating to AD, such as the performance of projects developed, have not been addressed.

In the following section, we review the experience of similar policies introduced in the United States, drawing comparisons with the AD scheme and identifying broad lessons for policy-makers. It mainly considers two policies put in place in the United States—the investment tax credit, which ran during the early 1980s, and the Production Tax Credit (PTC) policy that was introduced in 1992.

Findings from stakeholder interviews:

"The wind market is likely to revive immediately with the reintroduction of AD and wind sector will regain the lost glory as both AD and GBI schemes will address the requirements of different stakeholders leading to holistic development."

4.0 Comparative Policies: The Experience of the United States

4.1 U.S. INCENTIVE FOR RENEWABLE ENERGY[14]

There is a long record of government support for wind energy in the United States, but the policies have been introduced and rescinded over time, often with significant gaps in support to the industry. Notably, there was an early policy-driven boom in the wind sector in the United States (mainly California) in the early 1980s, but upon withdrawal of government support, the industry collapsed and only revived when government support was reintroduced in the 1990s.

In the early 1980s, the wind industry benefited from a range of federal- and state-level tax incentives. In California, the combination of these incentives allowed a tax write-off of nearly 50 per cent of the installation costs. In addition, federal regulations required utilities to purchase all of the power generated by independently owned renewable energy plants and pay a price equal to the utility's avoided cost—a cost that the California Electricity Commission set at up to seven times the level seen in other states. Together these policies led to a boom in the California wind sector, and by 1987 a total capacity of 1,300 MW accounted for 90 per cent of worldwide capacity.

However, as in the case of the AD benefit in India, the generous tax incentives attracted investors who were not necessarily concerned with project performance, but with capturing the tax benefit. Poor project planning with little concern for future generation means that inefficient turbines were installed in inappropriate locations. Also, as in India, there was little oversight of how projects performed and criteria for granting credits were underdeveloped. Together with a shift in the political environment towards free markets, these abuses led to subsidies being rescinded and the ultimate collapse of investment in the sector.

In 1992 the government introduced the production tax credit (PTC), which offered taxpayers a per-kWh tax credit payable on production from eligible facilities for the first 10 years of operation. Drawing on the lessons learned under California's investment tax credit in the 1980s, the government changed the incentive structure such that the incentive was payable on the production and sale of electricity over a period of time, and by introducing certain criteria for eligibility (e.g., the beneficiary had to have an ownership interest in the facility). Together, these incentives aimed to ensure that projects developed were well planned, of a long-term nature and focused on delivering power. Originally, only facilities placed in use between 1993 and 1999 were eligible, but this expiration date has repeatedly been extended, often for a year or two at a time. The PTC expired at the end of 2013.

Between 1992 and 1999, growth was limited due to broader economic and policy factors; these factors include the industry's lack of responsiveness to policy changes, the relative immaturity of wind technologies and relatively low fossil fuel prices. Between 1999 and 2004, the PTC expired and was renewed three times, leading to disruptions in the development of the industry and relatively low capacity additions (see Figure 10). However, after 2004, maturing technology and increasing fossil fuel prices meant that wind energy became a more attractive option, and capacity was added at a record rate. By the end of 2013, wind capacity stood at just over 61 GW, placing the United States in second place in terms of capacity, just behind China (BP, 2014).

Figure 10 shows the impact that the repeated expiration and extension of the PTC has had on capacity additions, with drops in capacity additions occurring whenever the PTC expired, compared to continuous growth during periods of policy certainty. In 2000 there was a 93 per cent drop in installations from 1999 levels; in 2002 there was a 73 per cent drop from 2001 levels; and in 2004 there was a 77 per cent

[14] This section draws substantially on Hinman (2014)

drop from 2003 levels. Analysis suggests that between 1999 and 2004, capacity additions were approximately half what they could have been if the policy had been continuous. Again, this parallels the Indian experience, where the withdrawal of the AD scheme has led to curtailments in capacity additions. Going forward, policy clarity is needed for U.S. wind developers, but the relative maturity of the technology and the lower costs of developing projects may mean that this clarity is restricted to no further renewals.

The success of the U.S. wind industry demonstrates the far-reaching benefits that tax credits can have in creating jobs, boosting market competitiveness and building a more sustainable, clean energy future. The PTC has been the prime incentive program in the development of the U.S. wind market

4.2 SUMMARY

The lessons from previous policies both within a country and elsewhere can be a useful tool in future policy development, and the experience of the United States offers valuable lessons for Indian policy-makers considering the future of the industry in their country. In both cases, withdrawal of the enabling policy led to a steep fall in installations, which is starkly similar to the Indian experience wherein the withdrawal of AD led to steep drop in installations.

The U.S. and Indian experiences not only reinstate the need to provide an effective financial incentive for promotion of renewable energy but also the importance of policy clarity to maintain sustained growth. This applies not only to capacity additions, but also to the detrimental effect on the development of the wider industry. Each time policy support is withdrawn, it has a consequent effect on investment and innovation in the wider supply chain, including turbine and component manufacturing and supporting services. As a result, the competitiveness of the Indian industry vis-à-vis overseas competitors is also likely to be adversely affected, since the years in which the sector is not supported represent lost years in terms of the industry development.

However, an analysis of the situation in the United States also highlights that factors other than policy—such as maturity of technology and broader energy environment—are also important in the development of capacity. Furthermore, the appropriateness of policies is likely to be country and time dependent. As wind energy matures, with costs and risks falling, the policies that were once appropriate may become less so.

It is widely considered that the AD benefit provided the impetus for investment in the high-capital-cost renewable energy sector, and withdrawal of the benefit correlates with a steep fall in capacity additions. However, since its removal was concurrent with the removal of the GBI benefit, it is difficult to determine the exact effects that can be attributed to removing the

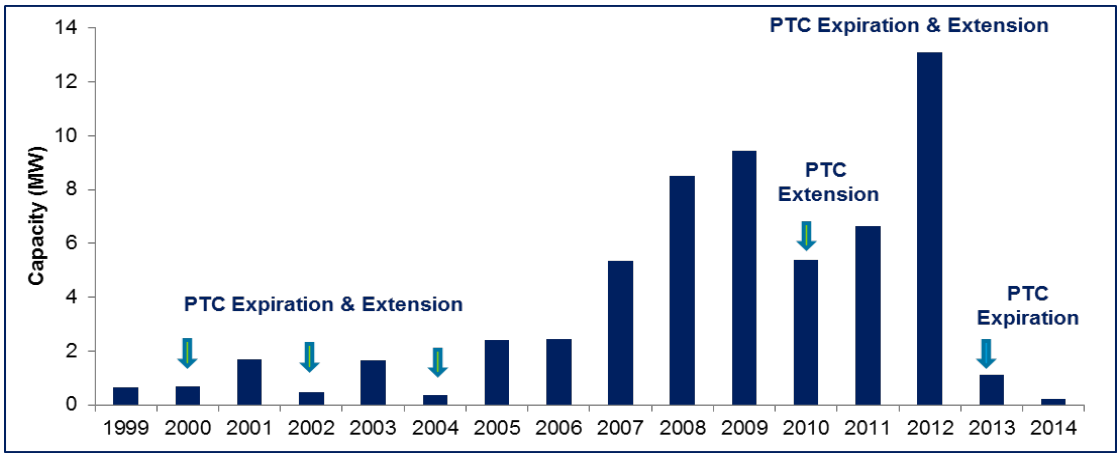

Figure 10: Impact of PTC Expiration and Extension on U.S.-installed wind capacity additions

Source: Office of Energy Efficiency and Renewable Energy (n.d.)

5.0 Lessons Learned

AD benefit. All the key stakeholders attribute a large part of the growth in capacity and the broader wind energy sector to the availability of AD benefits. However, in spite of the progressive development and dominant position of the wind industry in the renewable energy mix, there have been a number of issues over recent years that have led to policy changes.

This section identifies the positive and negative lessons learned from the experience of the AD scheme and suggests measures to further enhance the development of the wind sector in India. Many of the lessons described below are also relevant to other policy initiatives that encourage the growth of renewable energy, both inside and outside India. The section concludes by considering the reintroduction of the AD scheme, and how the policy framework could be modified to better address the weaknesses identified.

5.1 POLICY LESSONS

NEED TO LINK INCENTIVES TO PERFORMANCE	The AD scheme failed in many respects because it rewarded capacity additions regardless of how this capacity performed in terms of generation. As a result, overall generation has been below its potential and inefficient installations have occupied some of the best sites for wind resources. Furthermore, although the growth in installations under the AD facilitated the evolution of domestic equipment manufacturing, the long-term success of this sector has been below potential because of a failure to keep abreast of developments in technology. In part, this can be attributed to the structure of the AD benefit: project developers had no incentive to improve their performance and correspondingly placed no pressure on turbine manufacturers to offer more efficient and technically advanced components. In designing future schemes, it is important to consider and emphasize the objective of increasing generation from renewable energy resources. This, in turn, should lead to a greater focus on the performance and continued development of allied industries and services.
NEED FOR POLICY TO APPEAL TO ALL INVESTORS	One of the weaknesses of the AD scheme was that it could only be accessed by companies with existing book profits in India. This excluded a large class of potential investors who had experience in developing and managing large-scale wind projects as profitable businesses. In particular, the benefit excluded IPPs that invested through SPVs that were possibly best placed to support the development of the wind sector and bring about efficiencies in the sector through technological upgrading and operational best practices. Further, there are questions as to whether the types of investments supported under the policy have been of maximum possible benefit to the sector as a whole. Many investments have taken place for tax reasons, rather than with the goal of developing sustainable projects that will generate maximum power over a long period of time. Indeed, one of the major considerations for the withdrawal of the AD benefit was that the scheme was perceived to have become more of a financial instrument for investors than an incentive for power generation.
IMPORTANCE OF MONITORING	Given that the benefit under the AD scheme was not linked to performance, no monitoring requirements were established. As previously discussed, this means that often projects generated low levels of electricity or, indeed, were never even completed. Where incentives are linked to performance, there is an obvious need to introduce monitoring mechanisms that assess this performance in an effective and efficient manner. Further, even where performance is not the basis for payment (as in the case of the AD scheme), there may be potential for introducing systems that penalize poor performers through fines or some other mechanism. With the introduction of the GBI scheme, any wind projects receiving either benefit were required to register with IREDA and provide generation data. Extending this database to create a central generation data management system would allow the MNRE to monitor the performance of plants and take subsequent steps, as required, to improve performance.

SHARING OF RISK AND RETURN BETWEEN INVESTORS AND GOVERNMENT	The AD benefit was so successful because it offered a good level of financial support at a low level of risk for investors. The financial benefit was clear, certain, easily accessible, did not depend on fund disbursal from the government and had little time risk. This structure may have been appropriate in the early stages of wind power development when the technology was less mature and more uncertain; however, it has led to a culture where investors expect to reap rewards from wind power development while taking minimal risks, a situation that is no longer appropriate given the maturity of the technology and market. Other measures could be considered to reduce the performance risk perceptions of investors. In the planning stages, these could include state-driven, investment-grade resource assessments that consider land availability, terrain suitability and grid connectivity. In the operational phase, they could include measures such as best practices in forecasting and analysis of higher-resolution operational data in the Indian Electricity Grid Code.
IMPORTANCE OF WIDER INFRASTRUCTURE	While capacity additions have been significant, there is an increasing concern that, without further investment, the grid infrastructure is unable to support continued capacity additions. Already, there have been instances of curtailment, and without further investment, these can be expected to continue and worsen. Policy measures need to take this phenomenon into account and to address it accordingly.
CLARITY ON POLICY TRANSITION	The concurrent expiry of the AD scheme and the GBI led to a drop in investment. While both policies were subsequently reintroduced, absence of support for over a year affected development of capacity, and also likely adversely affected other businesses within the sector, notably turbine manufacturers. Such uncertainties can be avoided by enforcing measures for strong and streamlined inter-ministerial coordination and by establishing effective communication between stakeholders and the government. Such communications would help MNRE to better design the policy instruments to achieve the intended objectives and would also help the investors to strategize their investment plans in accordance with government plans and incentives.
COST TO GOVERNMENT	The AD scheme did not require direct fund disbursal but still accounted for revenue loss for the government in the form of the time value of tax revenue foregone: this cost should not be discounted. Possible ways of reducing the financial burden include specifying the maximum price per MW that the developer can access under the AD scheme by reducing the AD rate or restricting the scheme to certain project types or investors (e.g., projects below a certain capacity). Assessing the total costs and the associated cost-effectiveness of a policy in encouraging capacity development is difficult due to the lack of data, and this omission needs to be corrected in future versions of the policy.

5.2 FUTURE OF THE AD SCHEME IN INDIA

The effectiveness of the AD scheme in encouraging capacity development is widely accepted. However, this study has identified a number of limitations that should encourage a closer examination as to whether reinstatement of the policy is the appropriate tool for further development of the sector in India. As the sector capital costs fall with the maturity of wind technology, and as the emphasis shifts to generation rather than capacity, schemes that reward the development of large, high-quality projects that meet their generation potential are possibly more appropriate.

This could be achieved to some extent through modifications to the AD scheme, such that some performance-related elements are introduced. For example, introducing benchmarks for project performance during the planning stages could serve as a check on the viability and efficiency of projects. Meanwhile, introducing penalties for operating projects that fail to meet certain targets could also encourage better performance in terms of generation. Such measures may help ensure that the project base is more robust, that the benefits of the scheme are more completely captured and that the policy is less open to abuse. However, in turn, such requirements mitigate some of the perceived advantages of the policy, including the certainty and time frame in which benefits are remitted. They also further extend the policy in the direction of a GBI, with the associated costs.

Although the GBI has not been subjected to a detailed examination in this report, stakeholders indicated that one of the major problems with the policy was delays and unreliability in disbursement of funds by government. Correcting these errors will reduce the need

for an alternative policy where there is no risk associated with the receipt of the benefit and help the government achieve generation rather than capacity additions, shifting the basis of the Indian industry onto a sounder long-term footing.

While reintroducing the AD scheme in its original form may lead to a revival in capacity additions, these capacity additions are likely to be accompanied by the same set of problems and shortcomings identified in this study. Predominant among these is the emphasis given to low-quality developments that focus on inefficient capacity additions (so as to maximize financial gain) rather than long-term power generation. The impacts are not likely to be restricted to the development of turbine sites. In particular, the AD scheme has proved to be unsuitable for supporting the development of a globally competitive wind turbine industry.

It remains to be seen whether other policies, such as the GBI and the Renewable Purchase Obligation, will outweigh the shortcomings of the AD scheme. However, by reintroducing a policy that was removed for well-considered and substantiated reasons, the government has lost one opportunity to help put the Indian wind industry onto sounder and more sustainable footing.

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Annex A: Detailed Description of Market, Policies and Technologies

1. INFORMATION ON WIND DEPLOYMENT, SUBSIDY POLICIES AND COMMUNICATIONS

a. Official/unofficial name of the subsidy policy/program

Accelerated Depreciation (AD) tax benefit for wind power projects in India

b. Official and unofficial objectives of the policy or program

The AD scheme for wind power projects is an enhanced tax-saving facility provided by the Indian government under the Income Tax Act to attract investment from the private sector without providing any capital subsidy. The scheme's aim was to increase capacity in small-scale wind generation projects and promote the development of the domestic wind equipment manufacturing industry. The main objectives of introducing the policy were:

- Increase the share of renewable sources in the energy mix
- Promote the development of the wind sector in India
- Encourage investments in the wind power manufacturing base

The AD tax benefit has been the prime mover for development of wind energy sector and has been instrumental in creating large wind generation capacities as well as promoting the development of a manufacturing base in the country.

c. Date of implementation and other milestones (i.e., scheduled spending reviews for the subsidy program, intended phase-out date, etc.)

The AD scheme was first introduced in 1994, when 100 per cent depreciation was allowed in the first year itself. The AD rate was subsequently revised down to 80 per cent in 2002. From 2009 onward, it was proposed that the AD benefit be phased out for the wind sector and the Ministry of New and Renewable Energy (MNRE) introduced an alternate scheme for wind projects—the Generation Based Incentive (GBI). However, the AD benefit scheme was allowed to run concurrent with the GBI scheme up to March 31, 2012. During this period (2009–12), the wind project developers had the option of accessing benefits under either of the two schemes. The AD scheme was completely phased out from the beginning of the financial year (FY)[15] 2012–13. Subsequently, in August 2014, the AD tax benefit has been reinstated.[16]

d. Details of policy design

The AD scheme basically increases the depreciation on an asset during the initial years of use, which allows the asset owner to write off more of the value of the asset during the initial years of ownership, thereby reducing greater proportion of taxable income. The benefit of the AD scheme to the taxpayer is the tax deferral. There is a significant post-tax benefit as the AD scheme increases the net present value (NPV)[17] of the investment.

The AD scheme for wind energy projects in India provides accelerated depreciation using the written-down value method[18] on windmills and any specially designed devices that run on *wind mills and any special devices including electric generators and pumps running on wind energy* (Republic of India, 1961).

The Indian AD scheme allows investors to take advantage of depreciation up to 80 per cent (100 per cent from 1995–2002) of the project cost if it is commissioned before September 30 of the financial year, or 40 per cent if the project is commissioned before March 31 of the financial year.

[15] The financial year (FY) in India extends from April 1 to March 31 of the following calendar year.

[16] See: http://indiabudget.nic.in/ub2014-15/bs/hbs.pdf

[17] NPV: The difference between the present value of cash inflows and the present value of cash outflows.

[18] Under the Written Down Value Method depreciation is charged at a fixed percentage of the value of the asset each year. In year one, the original cost of the asset is used as the base for the depreciation calculation. In subsequent years, the depreciation charge is calculated on the net book value (i.e.,value with previous depreciation charges applied) of the asset.

e. Overview of the roles of relevant government ministries and independent agencies involved in managing the deployment of the technology

Relevant government ministries and independent agencies involved in managing the scheme and deployment of the technology are set out in Figure A1.

f. Description of the mechanisms used by the government to monitor the performance of the subsidy program and/or to identify any issues or problems concerning the program

The MNRE is the nodal ministry concerned with design and implementation of the scheme. The ministry tracks the number of wind projects installed in the country; it conducts studies mapping the sector's progress, identifying the factors governing the growth and impact of subsidy/incentive programs on technology development and adoption. Committees are formed concerning stakeholders from across the value chain to assess the policy impacts and identify the issues or problems concerning the program. The ministry also hires independent agencies/consultants to conduct policy/sector analysis and assist in identifying issues and form future action plans.

This information is published in annual ministry reports or other appointed agencies and is available publicly for dissemination amongst all stakeholders. Based on the observations and comments from various stakeholders the ministry suggests scheme modifications, withdraws the same or suggests the introduction of new scheme (MNRE, 2011b).

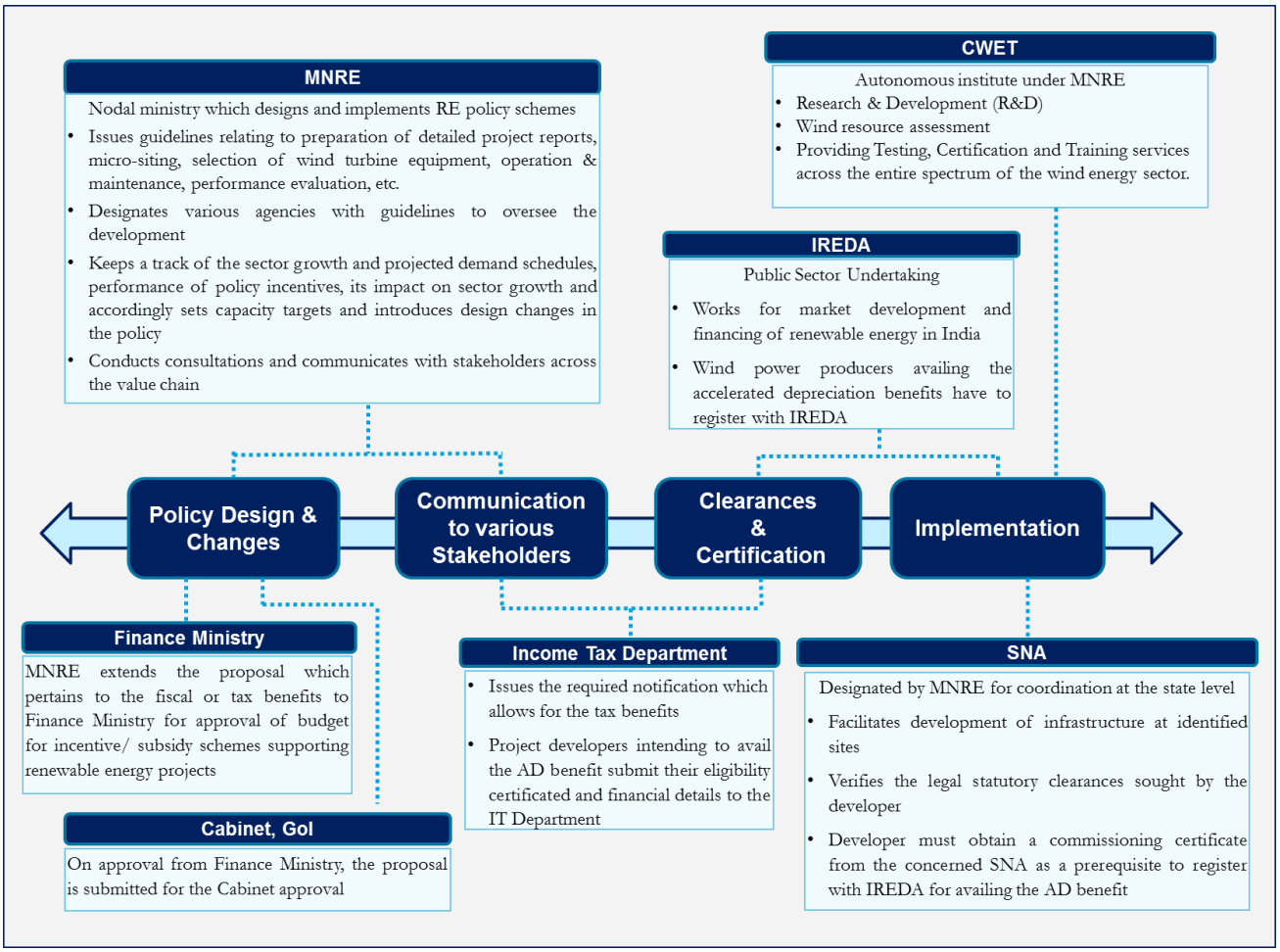

Figure A1: The role of relevant government ministries and independent agencies

Source: Office of Energy Efficiency and Renewable Energy (n.d.)

g. Summary information on subsidy costs to date

The AD scheme is basically a tax-saving scheme and does not directly provide any financial assistance to wind power project developers. The wind projects that satisfy the financial and technical parameters can access the tax benefits and adjust the book profits in the annual statement of accounts. There is no budget provision made by the government for the scheme.

The overall benefit provided to the investor is difficult to quantify on account of varying applicable income tax rates and effective tax shelters available as a result of AD benefit. Also, the details about how much wind power capacity has benefited from the AD scheme is not available in public domain.

As a reference, in 2009 when MNRE conceptualized the GBI to replace the AD scheme, the quantum of GBI per unit of electricity was worked out by computing the net benefit available to the wind power producers under the AD in NPV terms, and the same was distributed over a period of 10 years. This benefit of INR0.50 per unit with an overall limit of INR6.2 million per MW (approximately US$100,00 per MW) was proposed under the GBI scheme by MNRE to compensate for what the investor would get under the AD benefit at that time.

h. Description of the modalities for adjusting the support policy

The Ministry of New & Renewable Energy (MNRE) issues technical guidelines for setting up of wind power plants in India. MNRE has set up the Center for Wind Energy Technology (CWET) as the designated agency for issuing certifications to developers and wind turbine manufacturers. The wind project developer has to furnish all the required documents for setting up the wind power system and obtain approval from CWET. After technical approval and certification from CWET, the developer needs to obtain the commissioning certificate from the concerned Utility or State Nodal Agency (SNA). An AD scheme is basically an enhanced tax-saving facility, so power generators have to submit the details of their financial accounts to the Income Tax Department to access the benefit.

i. Description, including strengths and weaknesses, of the channels of communication between government and subsidy recipients/stakeholders

Different channels of communication adopted by the government are discussed briefly below:

- **Multistakeholder consultations/ workshops:** Multistakeholder consultations/ workshops are carried out by the government to engage all the concerned parties and receive their feedback on the concerned subject. These consultations are organized to gather the viewpoints of all the industry stakeholders and identify the key issues from all perspectives so that the new policy or amendments are designed keeping with the interest and expectations of all parties in mind.

  Strength: This mode of communication is transparent and all inclusive, involving a two-way transfer of information and opinions, fostering a sense of ownership in decision making among the participants.

  Weakness: These consultations are not accessible to all the players individually. They see the participation of key players only. The focus is primarily on big players who can influence the decisions, which may not benefit small players. Also, such consultation workshops are costlier than other channels and the frequency of such workshops is limited.

- **Representations by industry associations such as IWTMA and IWPA:** The government also participates in one-to-one direct interactions with industry stakeholders to hear views on specific aspects.

Strength: As the meetings are direct one-to-one interactions, the information flows easily with instant feedback, helping resolve the issues and queries expeditiously.

Weakness: While the general public may be interested in the proceedings, the meetings are just between two parties, there is less transparency. Also, the concerned party is not representative of all the stakeholders and issue-specific opinions might be subjective.

- **Government notifications through press notes or ministry websites**: Government ministries and agencies issue key policy notifications, annual reports and publications through websites.

  Strength: These reports are available in public domain and are a medium to disburse official information to all parties transparently.

  Weakness: This is one-way communication and the medium is mostly suitable just for disclosure of information.

j. Description of any consultation process that allows stakeholders to make submissions to government, and any published response to those concerns

The concerned ministry (MNRE) regularly conducts stakeholder consultations to review policy design and receive feedback from stakeholders for any changes required. The consultations are conducted to understand sector dynamics from the perspective of all the players across the value chain, covering aspects such as financing, market structure, role and impact of regulations, future plans, etc. The consultations see representation from industry, officials of the state and central government, experts from the field of research and development as well as electricity regulators.

In addition, key associations representing various stakeholders, such as wind turbine manufacturers, project developers, component manufacturers, etc., make presentations to the ministry and government agencies to highlight the concerns and share their experience.

Since its withdrawal (in 2012), the industry stakeholders have persistently made requests to the government for reinstatement of the AD benefit. The issue of discontinuation of AD benefits to the wind sector has been discussed in various forums and the wind associations have made strong presentations to MNRE to restore the benefits. For example, the IWPA has made concerted efforts and has held meetings with the concerned government officials to request the scheme's reinstatement. Also in January 2014, the ministry conducted a national-level consultation on the National Wind Energy Mission and AD scheme reinstatement was discussed amongst other sector issues. More recently, the newly appointed Union Minister of Power held a discussion meeting with stakeholders in the wind sector to discuss sector issues and during that meeting, the industry emphasized the restoration of the AD tax benefit for the sector.

2. TECHNICAL AND MARKET-BASED INFORMATION ON WIND ENERGY

a. Description of any technological specifications for wind energy

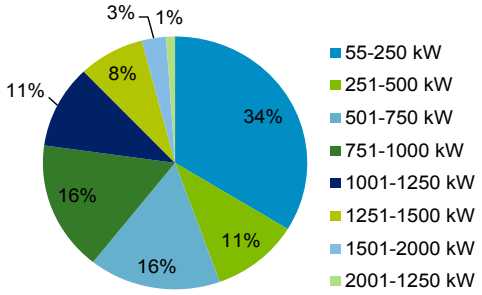

Figure A2: Rating wise WET installed in India (2011).

Source: Consolidated Energy Consultants (2013)

The average size of wind energy turbines (WETs) has increased over the years, but the major share of turbines is still in the capacity range of 500–1,500 KW (Figure A2). This fact can be attributed to the presence of large number of lower capacity vintage turbines installed in the earlier years. These older, lower-capacity

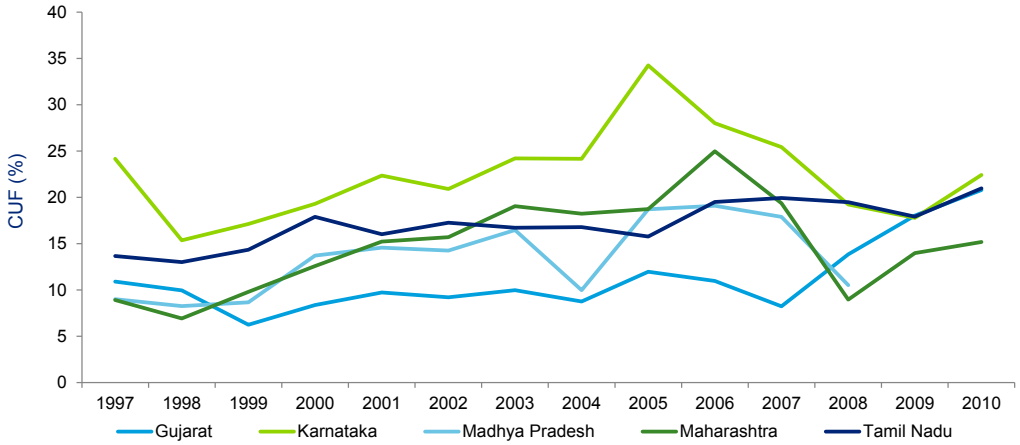

Figure A3: Average CUF in key states

Source: World Institute of Sustainable Energy (2011)

systems installed 10–15 years ago occupy some of the high-potential sites in the country. This presents a huge opportunity for repowering. As per the Global Wind Energy Council's report, *India Wind Energy Outlook 2012*, the repowering potential study conducted by World Institute of Sustainable Energy (WISE) for MNRE estimated India's current repowering potential at approximately 2,760 MW. However, due to the absence of national- or state-level policy guidelines, the repowering of wind stations has not progressed well. There is a lack of clarity on issues such as disposal of old machines, feed-in tariffs for new capacity and evacuation of extra power under transmission capacity constraints.

There has been constant improvement in the capacity utilization factor (CUF) over the years. The average CUF increased from 7–12 per cent in 1988 to 22–25 per cent in 2012. Computer-controlled monitoring of wind turbines on a real-time basis has further facilitated increased efficiencies. The CUF for few key states in India is shown in Figure A3.

b. Overview (market size, formation, trends and industry associations) of the market for wind energy in India)

The Indian wind energy sector has witnessed high growth and today has an installed capacity of 21,262 MW (as on May 31, 2014). India is a major player in the global wind energy market. Wind energy currently occupies the largest share in India's renewable portfolio (67 per cent by installed capacity), making India the fifth largest wind power producer globally. The wind power potential in the country is far from exhausted and the Indian government has set the highest target for wind energy in the country's renewable energy mix (15 GW in the 12th Five-Year Plan period [2012–17]).

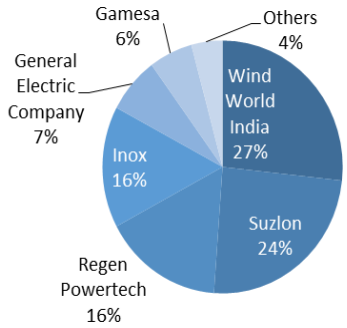

Figure A4: Percentage Share of Leading Suppliers in the Installed Capacity (2012–13)

Source: IISD (2014)

The country has enough Wind Turbine Generator (WTG) manufacturing capacity to meet the domestic target requirements but Indian manufacturers have not yet reached the scale to be competitive in the international market. Presently, with over 9.5 GW of manufacturing capacity, Indian wind turbine manufacturers are catering to both domestic and global markets. Figure A4 shows the manufacturing capacity installed in the 2012–13, highlighting the dominant position of Suzlon and Wind World

(formerly Enercon) in the Indian manufacturing market.

Presently there are 18 major manufacturers offering over 44 different turbine models in the range of 225 kW to 2500 kW capacities. However, the sector lags behind the global average in terms of turbine size and Indian manufacturers still rely on foreign manufacturers to import high-value, complex components.

Industry Associations: Wind power developers and turbine manufacturers have formed associations to support the progress and make presentations to government agencies to influence a facilitative policy environment. Associations presently active in the country are:

- **The Indian Wind Power Association *(IWPA)*** is a 1,000-member pan-Indian association of the people who have invested in the wind power sector. Other stakeholders, like the turbine manufacturers, ancillary equipment manufacturers and service providers, are also members of the association. The association coordinates with several national and industry bodies as IREDA, MNRE, Ministry of Power (MoP), CWET, CERC, Central Electricity Authority (CEA), state utilities, SNAs, etc. to create an enabling regulatory and policy environment for investments in this sector. IWPA publishes a monthly journal to disseminate information to members and also conducts an annual International Conference & Exhibition on Wind Energy.

- **Indian Wind Turbine Manufacturers Association (IWTMA)** is an association body representing the turbine manufacturers in the country. The association sees membership from and is managed by large turbine manufacturers, such as Suzlon, Regen, Gamesa, etc. IWTMA's main objective is to promote wind energy in India, facilitate the extension of knowledge in the field, and interact with national and global energy bodies.

- **Global Wind Energy Council (GWEC)** is a member-based organization representing the wind energy sector globally. The members of GWEC represent over 1,500 companies, organizations and institutions in more than 70 countries, including manufacturers, developers, component suppliers, research institutes, national wind and renewables associations, electricity providers, finance and insurance companies. GWEC works at the highest international political level to create a better policy environment for wind power. IWTMA is one of the founding members of GWEC.

- **Indian Wind Energy Association (InWEA)** was set up in 2002 as a not-for-profit organization under the Societies Act. InWEA has more than 300 members is dedicated to promotion and development of wind power in India. The association is also a member of several international and national industry bodies such as the World Wind Energy Association, the European Wind Energy Association, Confederation of Indian Industry (CII), Federation of Indian Chambers of Commerce and Industry (FICCI) and Associated Chambers of Commerce and Industry of India (ASSOCHAM) among others.

c. Potential and installed capacity

Keeping in view the high potential available in India for the wind energy, MNRE has set a target of adding 15 GW of wind power for the 12th Five-Year Plan period (2012–17). Considering the technological advances, increased potential at higher hub heights and repowering potential in the country, the estimated potential of wind power in India by various agencies has been revised over time, and now stands at around 102 GW at 80m hub height (National Institute of Wind Energy, 2014).

The map of India in Figure A5 highlights the state-wide estimated wind power potential by CWET at 80m hub height. Other research organizations have also estimated wind power potential using different models. Lawrence

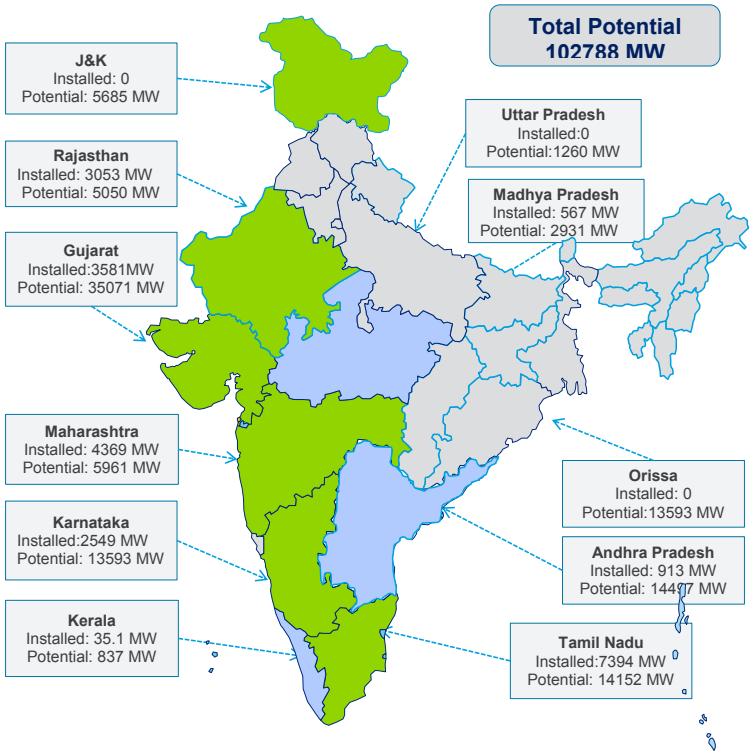

Figure A5: Wind Potential & Capacity across states in India

Source: Ministry of New and Renewable Energy (2015a)

Berkeley National Laboratory (LBNL) estimates the potential wind potential of 2006 GW at 80m hub height and 3121 GW at 120m hub height (Phadke et al, 2011). In addition, coastlines of Tamil Nadu, Andhra Pradesh, Gujarat, Maharashtra, Odisha, Kerala, Karnataka and West Bengal show considerable potential of harnessing off shore wind power. According to the Draft National Off-shore Wind Energy Policy (2013), released by MNRE, a preliminary assessment suggests off shore wind potential of around 1 GW capacity along the coastline of state of Tamil Nadu.

d. Key policy and regulatory initiatives

This section sets out the key policy and regulatory initiatives relating to the energy sector in general and renewable energy in particular. Policies relating to the energy sector in general are set out below.

- **The Electricity Act 2003**: The Electricity Act 2003 paved the way for development of grid interactive renewable energy in India. It mandates the State Electricity Regulatory Commissions (SERCs) to promote generation of electricity from renewable sources of energy by providing suitable measures for connectivity with the grid and sale of electricity to any person, and to fix certain minimum percentages for purchase of renewable power. The Electricity Act 2003 also necessitates periodic the preparation and notification of a national electricity policy, tariff policy and grid code in the country.
- **The National Electricity Policy**: The National Electricity Policy 2005 further pressed the need to boost generation from non-conventional energy sources by increasing competition in the sector through competitive bidding process.
- **The National Tariff Policy**: The Tariff Policy 2006 mandated the SERCs to introduce Renewable Purchase Obligation (RPO) in their respective states, taking into account the availability of such resources in the region and its impact on retail tariffs and procurement by distribution companies at preferential tariffs determined by the

SERCs. The policy introduction helped create a demand-side stimulus for renewable energy in the country.

- **The Indian Electricity Grid Code (IEGC)**: The IEGC 2010 laid down the methodology for scheduling wind and solar energy and the basis for compensating the states with a large wind and solar energy potential for dealing with a large degree of variability in generation through a renewable regulatory charge. IEGC stipulates that power system operators (state/regional load dispatch centers) shall make all efforts to evacuate the available power from renewable energy sources.
- **The Integrated Energy Policy 2006**: The policy suggests a path to meet energy needs in an integrated manner, recommending a special focus on renewable energy development, and sets specific targets for capacity addition through renewable energy sources.
- **National Action Plan on Climate Change**: Realizing the threat from rising greenhouse gasses due to fast-paced industrial growth and a high-consumption developing economy, the Government of India launched the National Action Plan on Climate Change (NAPCC) (July 2008) to promote sustainable growth that supports environmental protection. Under the planned objectives, NAPCC advised that starting in 2009–10, RPOs be set at 5 per cent of total grid purchase, and be increased by 1 per cent each year for 10 years.

Apart from these central policies governing the energy sector, some of the key policy and regulatory initiatives designed specifically for promotion of renewable energy in India are set out below, broken down between state- and central-level policies.

Table A1: Central-Sector Policies[19]

POLICY	FEATURES
Tax Benefits	Accelerated Depreciation (AD): Allows increased depreciation on the assets during the initial years, which allows the asset owner to write off more of the value of the asset during the initial years of ownership, thereby reducing the greater proportion of taxable income and increasing the net present value (NPV) of the investment Direct Tax Incentives: Exemption on income tax on earnings from the project for 10 years. Indirect Tax Incentives: (i) Exemption of excise duty on wind energy generator (ii) Custom duty concessions for certain wind turbine components available
Generation Based Incentive (GBI)	Incentive over and above feed-in tariff approved by the regulators. INR0.50/kWh (0.8 US cents/kWh) subject to max INR10 million/MW (US$1,65,900/MW) (increased from INR6.2 million/MW(US$1,02,858/MW))
Viability Gap Funding	Solar project developers bid for Viability Gap Funding in INR /MW with a selection process on a minimum cost basis under Jawaharlal Nehru National Solar Mission.
Renewable Energy Certificates (REC)	Tradable certificate where one certificate is equal to 1 MWh of energy generated. The floor and forbearance price of 1 non-solar REC is INR1,500 (US$24.89) and INR3,300 (US$54.75) respectively.
Foreign Direct Investment (FDI)	100 per cent FDI is allowed in the wind sector.
Incentives in Research and Development (R&D)	The income tax department provides for a weighted deduction for in-house R&D activity, which entitles wind turbine manufacturers to claim 200 per cent of the expenditure (other than expenses on land and building) incurred for in-house R&D activity.
Land Policies	The Ministry of Environment and Forests has issued guidelines for diversion of forest lands for non-forest purposes, particularly to enable wind generation, including clearance of leasing and forest land for up to a period of 30 years for wind developers.

[19] Currency exchange rate June 2014 US$1 = INR60.2700

Table A2: State-Level Policies and Incentives

POLICY DRIVER	FEATURES
Renewable Purchase Obligation	State Electricity Regulatory Commissions specify the mandatory purchase obligation under Section 86, 1(e) of the Electricity Act, 2003, for purchase of a fixed percentage of energy generated from renewable energy sources. The RPO percentage varies from 0.5 per cent to 10.25 per cent, depending on the local renewable resources and the electricity distributed in those states. RPO obligation can be fulfilled through direct purchase via bilateral contracts and tradable REC mechanisms, which can further generate revenue for renewable energy projects.
Feed-In Tariff	Distribution companies procure renewable energy at a feed-in tariff rate specified by SERC. These are determined based on a number of factors, such as the site's achievable CUF, operating costs, capital expenditure, expected return on equity, etc.
Wheeling Banking and Third Party Sale	Favourable provision for wheeling, banking and third-party sales by wind power
Other Incentives	• Electricity Duty Exemption • Electricity Banking Facility • Energy Cess Exemption • Reduced or no value-added tax on renewable energy components in some states • Capital subsidy support/low-interest-rate loans • Export-Import Policy: Export of renewable energy product to all countries is entitled to an additional duty credit equivalent to 2–5 per cent of freight on board value of exports • Project Facilitation: SNAs facilitate project development right from resource assessment to the final commissioning. SNAs support the developer by facilitating development of infrastructure at identified sites and also verifies the legal statutory clearances sought by the developer from different departments. • Grid connectivity and power evacuation arrangement

Annex B: Stakeholder Consultations

Stakeholders Consulted

	ORGANIZATION
1	Ministry of New & Renewable Energy
2	Indian Renewable Energy Development Agency
3	Indian Wind Turbine Manufacturers Association
4	Tamil Nadu Generation & Distribution Corporation Ltd.
5	M/S Leap Green Energy Pvt. Ltd
6	Inox Wind Ltd.

Key results from Stakeholder Consultations:

POLICY STRENGTHS
• The Accelerated Depreciation (AD) tax incentive scheme is considered to be the prime mover behind increased growth in the installation base of wind power in India. • Increased investments in the wind sector reduce the dependence on fossil fuel-based power generation technologies, helping to reduce coal import expenses. • Clear and high financial benefit and lower risk for investors under the scheme attracted a large number of investments in the wind sector. • The incentive scheme is a great support to small and medium-sized enterprises, as wind energy installations under AD provide a cheaper source of electricity, reducing their costs. • AD allows investors to save tax on their main business, and large corporates in the manufacturing sector use the power generated by wind assets for their captive use. Hence, the twin objectives of tax saving and captive power largely motivate them to invest in wind assets, which compliments the objectives of the wind project developers.
POLICY WEAKNESSES
• Revenue loss to government in the form of tax forgone from developers is perceived to be the highest instigating factor for scheme withdrawal in FY 2012-13. • Emphasis on generation became a low priority under the scheme, inducing inefficiencies and low generation by developers. The scheme became more of a financial instrument for investors by availing tax benefit. • The policy restricted the diversity of the investor class as independent power producers and foreign players investing via Special Purpose Vehicles could not access the tax benefit.
AD POLICY COMPARISON WITH GENERATION-BASED INCENTIVE (GBI)
• Higher capacity addition is expected under AD, as investors benefit immediately from the first tax assessment year, whereas benefits under GBI are limited as they depend on generation. • Incentive encashment under GBI is time consuming, increasing the risk factor for the developer. • Focus on performance would increase under GBI as incentive is linked to generation, influencing higher efficiency. • AD along with GBI is required for holistic development of the sector.
LESSONS LEARNED FROM AD SCHEME EXPERIENCE
• Under lone presence of the AD scheme, the sector was restrictive for independent power producers and foreign investors, but its removal led to a steep fall in installations. This indicates that, despite sector growth, there still is persistent need of an effective financial incentive to support consistent sector growth. • Presence of both schemes, AD and GBI, will prevent a skewed investor-base portfolio in the wind sector.
STAKEHOLDER CONCERNS
• In wind-rich states, there is a rising urgency for development of transmission infrastructure. If the evacuation infrastructure is not developed simultaneously to channelize the power produced through wind energy, benefits from promoting AD may not be reaped fully.

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