Review

# A Review on Electric Traction using WE System

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**Abstract:** In this analysis, the recent trend the generated renewable source energy (like wind energy) utilized the traction system. Present a limited conventional source. Environment pollution by the burning of diesel fuel will be increased. And the using wind energy source controls the pollution and efficiency will be increased. In this process, the wind energy system is connected to the network and synchronized frequency by the power grid. Grid supply to the locomotives load for (traction system). The power applied off the 25 KV. This system used very high voltage and bear on high power. Almost renewable energy source use of the traction system near about eight percent in India. Locomotives use the DC motor. A doubly fed induction generator is used for converting wind energy to electrical energy.

**Keywords:** Wind Energy System (WES), Renewable Source Energy (RSE), Traction Power Supply System (TPSS), Indian Railway (IR)

## Introduction

Indian Railways are using electric traction system by 25 KV system (Hughes *et al*., 2005). This system is most useful with high power and high voltage (Prats *et al*., 2006). Day by day growth load demand in this system. Limited Availability of conventional source and pollution due to the utilization in the fuel Renewal energy source (Liserre *et al*., 2006). Using wind energy system with the grid system (Adel Tabakhpour *et al*., 2014). Attach to traction advance. Electricity System load with help off supplied power locomotive (Vaishnav *et al*., 2016). Railway Reportedly doing commissioning project in JAISALMER Of 26MW (Hughes *et al*., 2005; Adel Tabakhpour *et al*., 2014; Kincha *et al*., 2004). By the Railway Energy Management Company (REMC) by the Indian railway. Wind energy has utilized a form of Renewable energy source clean energy (Bhuvaneswari *et al*., 2006). Such modern electricity of traction power. Supply system and renewable energy. Source it is looking forward to a renewable energy source (Hill, 1994). Like wind and solar energy. This source Present a huge amount and not ended source (Hill, 1994). Development of the locomotive load and these result in need Traction Power supply System (TPS) (Sheshadri *et al*., 2004). Renewable energy source Connected to grids interfacing of the distributed generation system to the development Power (De Gusseme *et al*., 2008). Alternative current source or DC source. Supply rectified by a half control rectifier converter (Prats *et al*., 2006). In this research

Paper for regenerative energy utilization. Is summarized not only in DC railway but also AC railway (Jenkins *et al*., 2005). Railway traction system has efficiency is very high (Kale *et al*., 2014). And low Pollution This Generally (RTS) started in the 20century (Liserre *et al*., 2006). Load demand increases every day. So it is the connection (RTS) like Wind energy (Adel Tabakhpour *et al*., 2014). Non-conventional energy source. That is diesel, coal steam in the limited in my country (Bhuvaneswari *et al*., 2006; Celli, G., S.B. Tennakoon and F. Pilo, 2000; Adel Tabakhpour *et al*., 2014; Kale *et al*., 2014).

So, wind energy has clean and green. The energy of using the traction system (Kale *et al*., 2014). In this conclusion steam in the limited in my country network as an (RSE) (Thomas *et al*., 2013).

Doing the following step:

1. Wind energy at the DC power Source provided (Prats *et al*., 2006)
2. Wind energy supplies the Traction system (Kincha *et al*., 2004)
3. Interconnected power is used by substation to run locomotive (Sheshadri *et al*., 2004)

The local government considers the renewal energy Source and (TPS) (Mazouz *et al*., 2017; Jenkins *et al*., 2005). This network root of handling the energy (RSE) with wind energy (Adel Tabakhpour *et al*., 2014).
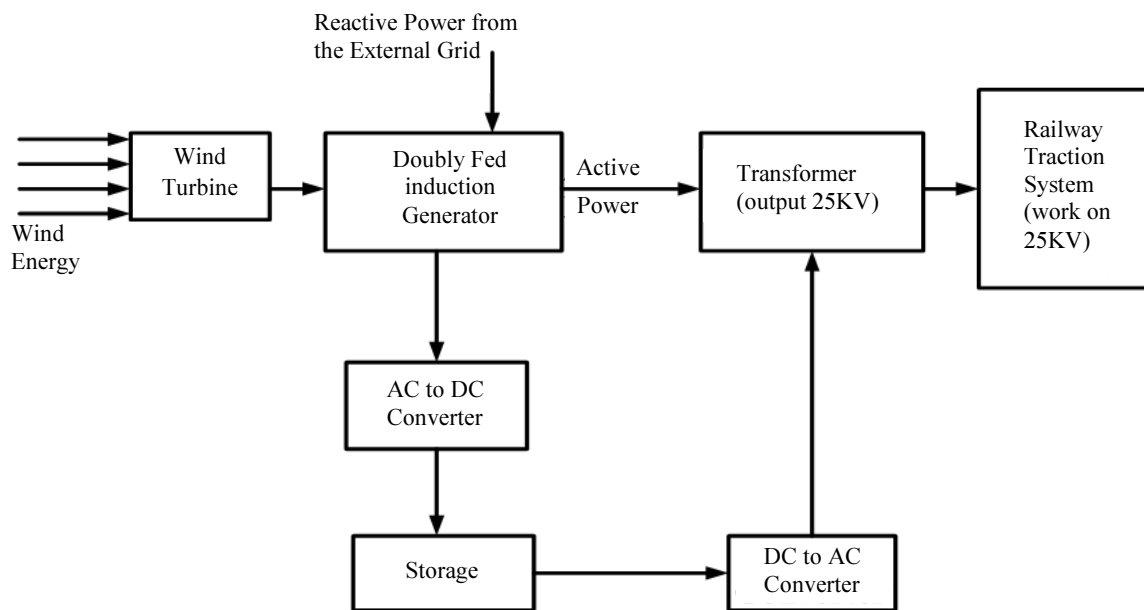
**Fig. 1:** The Methodology used For Power Transfer Scheme from Wind Turbine to Railway Traction

Conversion system beyond the traditional wind miles (Maheshwari and Bhalja, 2007). And (S) using DC series motor has required to the high torque in the locomotive energy power (Lozano *et al*., 2010). And wind power connected the bridge supply (De Gusseme *et al*., 2008). By the synchronizing method and Frequency will be same of both the power Station (Kale *et al*., 2014). Alternating current (TPS) given AC from over headline in Given the wind energy by (RSE) (Thomas *et al*., 2013). (RTS) large distance is very cheaper (Kumar and Singh, 2014).

## Methodology

This paper is basically focused on the power transfer Scheme from wind energy to the traction system of the railway. In the wind-based generation generally, Doubly Fed Induction Generator (DFIG) is used which is not able to generate reactive power itself. So reactive power need to supply from the external grid and DFIG will generate active power that's fed as output.

In India, railway traction system is working on 25 KV grid system so a transformer is required to supply this rating power. When the traction system has not demanded the supply then power generated by this system is stored into the different storing system as shown in Fig. 1.

## Renewable Energy Source

Renewal energy source that supplies power in wind energy (Hughes *et al*., 2005; Liserre *et al*., 2006; Adel Tabakhpour *et al*., 2014). Wind energy source future prospective needs high electric power (Kumar and Singh, 2014). The railway traction system is a very useful source. Wind energy (Xuesong *et al*., 2010). Solar energy in the presence of very large amount (Elgendy *et al*., 2013). Supply this source (RSE) produce the power supply and Interconnected (RSE) (Ramki and Tripathy, 2015). Of the wind energy is the grid network is a renewable energy source (Dash *et al*., 2014) energy has a railway choice have a good option (Thomas *et al*., 2013) Indian railway as setting up in Lithuania Railway Station (Hughes *et al*., 2005; Liserre *et al*., 2006; Bhuvaneswari *et al*., 2006). Wind energy is good to choose the traction System (Bhuvaneswari *et al*., 2006). It uses the large benefit of the traction system. Renewable energy source uses the most useful. And provide the increase the efficiency and decrease or Control the pollution on the atmosphere.

## Describe the Wind Energy Conversion System

Renewable energy source links up to grid user Interface via DC current above figure (Maheshwari and Bhalja, 2007). Power generation system Energy convert (Lozano *et al*., 2010). It is a Dominant component and connected to the energy source (Kale *et al*., 2014). RES applied to the grid and Converted power (RSE) should be Alternative current Source OR Direct current source (Thomas *et al*., 2013). Convert fixed to DC link wind energy generated. Variable AC voltage Power Improvement link on DC link (Kumar and Singh, 2014) is shown in Fig. 2.

## Locomotive Traction System with R.S.E. System

As Per the average natural of the wind energy global warming have to do (Esram and Chapman, 2007). With worry somebody. Use of source Contributed in India than very large and renewable energy huge amount of in percentage India (De Gusseme *et al.*, 2008). So clean and green Energy Depending on the system by lay out (Ramki and Tripathy, 2015). (RSE) Power supply to the interconnected to Transfer to the grid (Coelho *et al.*, 2009).
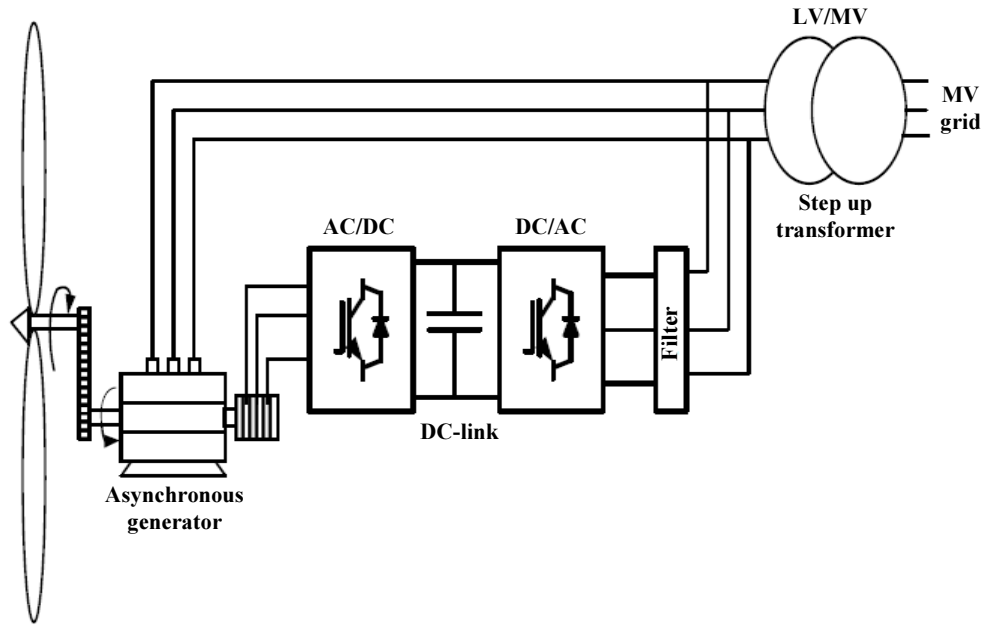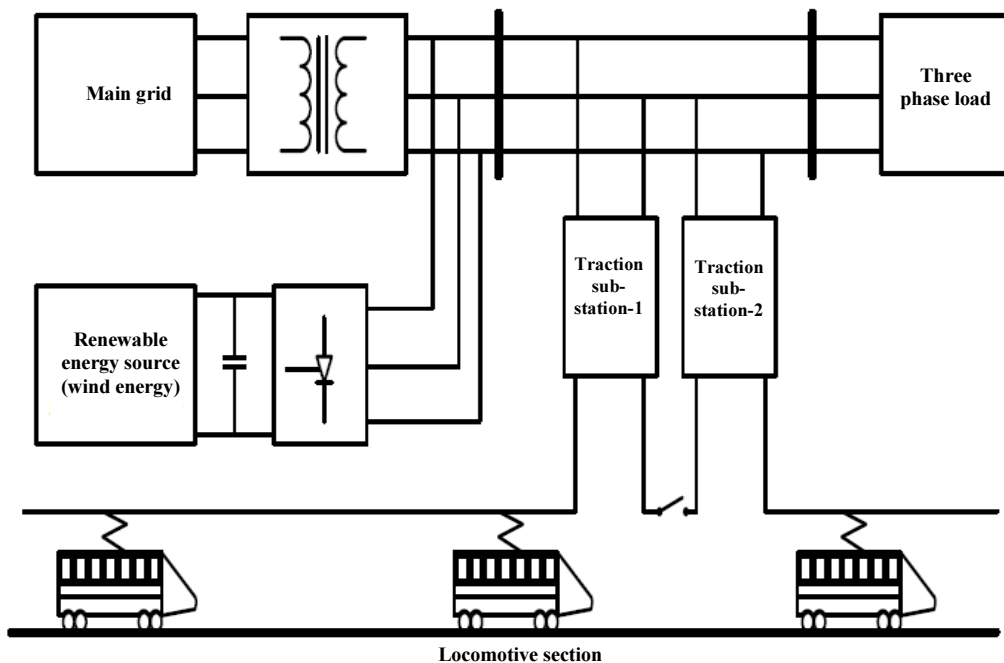


**Fig. 2:** Wind energy system



**Fig. 3:** Power transfer scheme from hybrid grid to railway traction system

Wind energy RSE System regularly produces the energy in Nature, (De Gusseme *et al.*, 2008). Renewable energy source act (Coelho *et al.*, 2009; Mazouz *et al.*, 2017). As an AC source grid connected With something in the Way (port) .important role (Jenkins *et al.*, 2005; Dash *et al.*, 2014). Of the Component of the power, electronic source Developed the fast working and utilized the (RSE) (Thomas *et al.*, 2013). To the system the base grid. The turbine of the wind-related to the generator and developed to the energy (Liserre *et al.*, 2006; Kale *et al.*, 2014). And connected to the transformer and marge to three-phase power System (Tibor *et al.*, 2011). System grid and synchronized the frequency of the grid supply (Veeraraghavan *et al.*, 2014; Dash *et al.*, 2014). As the Dissimilar of the more locomotive load (Coelho *et al.*, 2009), like diesel, each other which slowly result to use the electric railway system (Jenkins *et al.*, 2005; Lozano *et al.*, 2010).

It is called a traction power system Railway Traction Power Supply System (RTPSS). Indian railway already used in electric has been 25 kV (De Gusseme *et al.*, 2008). Applied to the traction system. Sub-station of (IR) network (Jenkins *et al.*, 2005; Veeraraghavan *et al.*, 2014). Study of power specification general India railway (Prats *et al.*, 2006). Substation so is some rating each supply 220 kV 50 Hz as Fig. 1. In traction system used in DC series motor. As run as a run resistance

control (Kincha *et al.*, 2004). Than Speed increases association (Kale *et al.*, 2014). Of the Switch series to parallel D, supply is still better to use (Thomas *et al.*, 2013). Basic Element of distributed generation System as the joint the Renewable energy to the power of the grid is expanded to the Supply. This system is shown in Fig. 3.

*Transformer and Rectification Substation*

In general purpose, supply has been concern t to run Electric train admin only three-phase powers supply single or two-phase power supply. Single phase waste of the three-phase supply neglected The Unbalance system feeding the two-phase at Change the Part by part each to A-B, c-c and proper Locomotive is provided to each other system Balance.

*Locomotive Design*

Train wagon s series of the traction system 2.5 MW for DC model in the proper use of a step-down transformer in the system 25 KV. To. 750 v two half rectifier. Traction system connected of a train engine and wagons Series use of the transformer in a step down in traction system Voltage converted 25 KV two half control SCR with Freewheeling rectifiers. Wind energy Produce the AC/DC source Converted to the fixed. Steam Link turbine developed to the variable alternating.
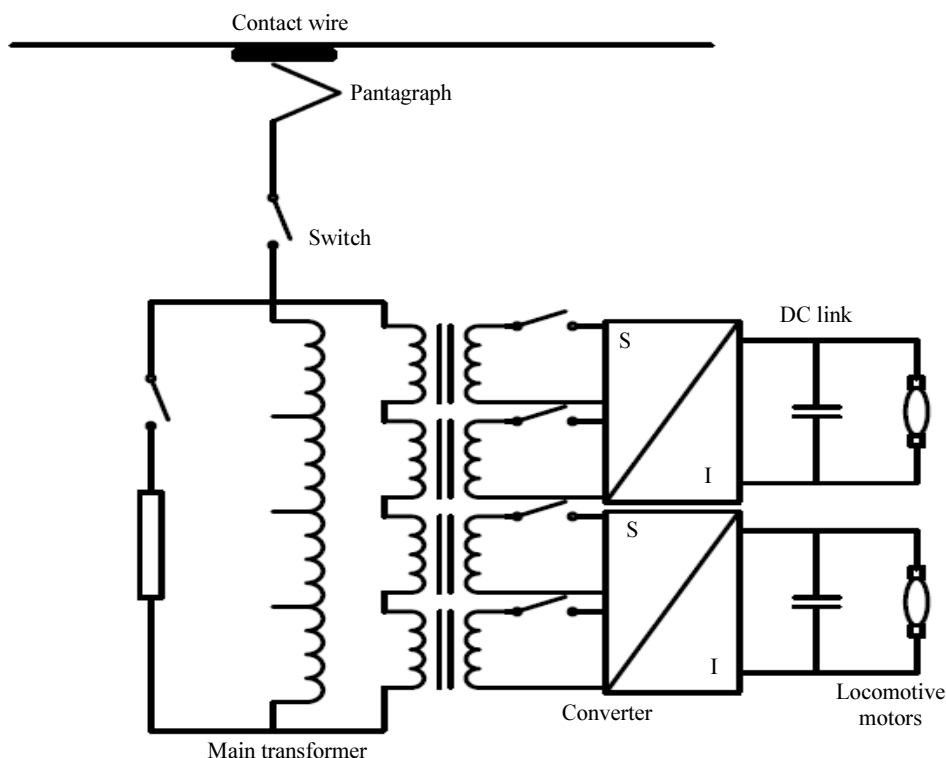


**Fig. 4:** Representation of traction supply to the locomotive

Current and voltage divided the capacitor from the grid and change the product the power to grid wind energy system type of Renewable energy system. Current source feeding energy conversion system with the synchronizing the frequency. In India have Different technology uses in the railway traction system and different. Different source so high Speed and very high-efficiency .losses and maintenance Will be low in the traction system. Provide efficiency is very high. This system is sown in Fig. 4.

*DC Link*

Change capacitor has a use for. Maintain across the DC motor in the DC links. The capacitor will almost change but no change the balance across the traction system in motor in the DC link supply with the traction system.

## Type of Storage System

Storage system generally applied to reference in particular load. Power is not distribution proper way also for improve. The caliber of generating power wind power system uses the most important method for energy storage has renewable Source energy. Wide-scale general considers as energy .system so air is not blowing at energy at same location use of the standard method.

*Flywheels*

The flywheel of a most important element of mechanical device. This application to collect the kinetic energy Of a relationship mass. Traction system fit use In 20-year ago use flywheel. It is boundary of power generation OR DC motor assemble Set.

First priority class consist of steed rotor renewable energy speed low near about (6000 rpm).

The flywheel of manufacturing in the modern composition material .because if increase the higher efficiency has of advanced methods of the increase the high speed.

*A. Advantage*

1. more economical
2. Less energy Consumption
3. Environment friendly
4. Less noise and pollution

*B. Limitation*

1. Required completed circuitry
2. Required highly skilled and Trains operators
3. Required more research

## Conclusion

This paper analyzing important technique inter Connected Renewable energy source of in Using wind energy with traction system use of (RSE) energy of green energy less Pollution in the environment and efficiently high In (TP) with help of synchronized the Grid. And in this research is very reliable and produced about the output waveform Torque speed .it is more efficient Comparison than other source traction system like (distal). This technic utilized Wind turbine, DFIG, converter, and other basic resources to make Electric Traction using wind energy System for Indian railway.

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## Author's Contributions

Dr. Anurag Dwivedi is Coordinated the data-analysis, contributed to the writing of the manuscript, designed the research plan, and organized the study. Mr. Dhananjay Kumar is Contributed to the writing of the manuscript and coordinated the mouse work. Er. Nitesh Tiwari is Coordinated the data-analysis, contributed to the writing of the manuscript, designed the research plan, and organized the study.

## Ethics

Authors should address any ethical issues that may arise after the publication of this manuscript.

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