C2C CERTIFIED™ "HOW-TO" GUIDE

Renewable Energy and Carbon Management

RENEWABLE ENERGY & CARBON MANAGEMENT

1. INTRODUCTION

As part of the UN Climate Conference in Paris in 2015, industrialised and developing countries alike agreed to specific targets on renewable energy and carbon emissions. India, for example, in 2016 committed itself to increase renewable and low-carbon electricity to a 40% share of all electricity generated, while reducing its emissions intensity (emissions per unit of GDP) by 33-35% from its 2005 levels by 2030[1].

The Cradle to Cradle (C2C) Certified™ Products Program[2] addresses the questions of carbon management and the use of renewable energy. Manufacturers measure energy use and develop strategies for improvement as part of the certification process.

ASPIRATION OF CRADLE TO CRADLE

"Cradle to Cradle envisions a future in which industry and commerce positively impact the energy supply, ecosystem balance, and community – a future powered by current solar income and built on circular material flows."

APPAREL CONTEXT

Energy is a critical factor in textile production. From spinning and dyeing to weaving and sewing – all the essential production steps require substantial use of energy and hence emissions of carbon. To meet C2C Certified standards, the garment industry will have to address energy use – specifically, by reducing energy use, sourcing renewable energy, and offsetting the remaining carbon emissions.

DEMAND FOR RENEWABLE ENERGY

In response to the increasing demand for a more sustainable use of energy, global brands are increasingly committing to using renewable energy alone. One example is the RE100 initiative, by which some of the world's most influential companies, from a variety of sectors, have undertaken to use only 100% renewable electricity. Alongside multinationals such as Apple, Google and Unilever are prominent brands from the apparel industry such as Nike and H&M.

MANUFACTURER BENEFITS

For manufacturers, there are two significant advantages in measuring energy usage and improving renewable-energy sourcing and carbon offsetting:

- **Cost savings.** By being able to measure energy consumption in their factories, manufacturers can analyse and identify the most energy-intensive machines and processes. With that information, they can then reduce energy usage by streamlining various processes or by replacing old energy-intensive machines with newer, more efficient ones.
- **Better relationships with brands.** Brands are favouring those manufacturers that source renewable energy and minimise their carbon footprint in the production process.

[1] The Guardian (2015) "India unveils climate change plan", https://www.theguardian.com/world/2015/oct/02/india-pledges-40-percent-electricity-renewables-2030
[2] Cradle to Cradle Certified™ is a certification mark licensed by the Cradle to Cradle Products Innovation Institute

2. C2C CERTIFIED CRITERIA FOR RENEWABLE ENERGY AND CARBON MANAGEMENT

The four components of the C2C Certified criteria for Renewable Energy and Carbon Management are as follows:

A. assessing total energy demand and GHG emissions
B. developing a Renewable Energy strategy
C. using renewable energy and addressing on-site GHG emissions
D. calculating the embodied energy for the product

A. Assessing total energy demand and GHG emissions

For all levels of certification, manufacturers need to be able to assess and quantify their overall energy demand and GHG emissions. For this purpose, a factory-level audit of energy use and emissions is necessary.

The most accurate measure of energy consumption is through metering. Metering helps to identify opportunities for efficiency improvements, and can improve detection of supply issues or equipment issues.

To measure energy consumption accurately, consider the following two-strand approach

Metering energy consumption
Metering lets you analyse your energy efficiency throughout the product cycle.

Allocating energy consumption to products
To plan and prioritise improvements to your factory's overall energy efficiency, it is helpful to establish the amount of energy required to produce each individual product or product group.

BEST PRACTICE: METERING ENERGY CONSUMPTION IS THE FIRST STEP TO HIGHER EFFICIENCY

Energy measurement is essential for all C2C Certified levels. For BASIC to GOLD levels, manufacturers need to measure the energy used in the final manufacturing stage of the garment; for PLATINUM level, manufacturers need to measure the energy consumed in other parts of the supply chain as well – from "Cradle to Gate".

Step-by-step guide to implementing a metering system:

1. Illustrate all energy flows.
2. From these illustrations, the manufacturer can determine the number of meters needed and select optimum locations.
3. In order to determine data requirements, the manufacturer needs to decide which efficiency ratios are worth calculating (it might also be necessary to measure temperatures, flow rates and pressure rates).
4. When purchasing and installing meters, select durable and high-quality meters.
5. It is important to consistently record data, and regularly check the meters for reliability; the data can be recorded with the help either of Microsoft Excel or of tailor-made software
6. When analysing the data, drivers of inefficiencies can quickly be identified, such as:
   - transport
   - old/outdated machines
   - air conditioning
   - heating
   - inadequate insulation
   - stand-by time

With this information on energy consumption – ideally information on the energy consumption of each individual product – it is then possible to set energy-reduction targets and develop energy-reduction initiatives.

BEST PRACTICE: ALLOCATING ENERGY CONSUMPTION TO PRODUCTS BY USING THE PRODUCT'S STANDARD ALLOWED MINUTES (SAMS)[1]

There are many ways to allocate energy consumption to individual products. Using SAMs is one of the more accurate methods and is recommended especially if the product mix is very heterogeneous.

Detailed example

- A textile manufacturer produces a total of 30 million garments per year: 10 million of these garments are T-shirts and 20 million are jeans
- The company consumes 80 million kWh of electricity per year
- To calculate the amount of electricity needed per garment, the manufacturer allocates the energy consumption based on the SAM per garment. Each T-shirt takes 2 SAMs to make, while each pair of jeans takes 4 SAMs to make; so overall, the manufacturer spends 20 million SAMs each year producing T-shirts and 80 million SAMs producing jeans.

In other words, four-fifths of the manufacturer time is used for jeans production, so the correct figure for jeans is 0.8. Accordingly, the manufacturer should allocate four-fifths of its electricity consumption to jeans, namely 64 million kWh. That equates to an electricity consumption of 3.2 kWh per pair of jeans.

$$\textbf{Weight}_i = \frac{\text{no. of pieces produced}_i \times \text{SAM}_i}{\sum(\text{no. of pieces produced}_n \times \text{SAM}_n)} \qquad \textbf{Weight}_i = \frac{20{,}000{,}000 \times 4 \text{ min.}}{100{,}000{,}000 \text{ min}} = 0{,}8$$

$$\textbf{kWh/piece}_i = \frac{\text{electricity consumption in kWh} \times \text{weight}_i}{\text{no. of pieces produced}_i} \qquad \textbf{kWh/piece}_i = \frac{80{,}000{,}000 \text{ kWh} \times 0.8}{20{,}000{,}000} = 3.2 \text{ kWh/piece}_i$$

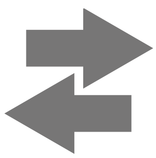
Determining the carbon footprint of your factory is much like determining its energy consumption, as outlined above, with an additional conversion step:

Measuring fuel consumption

To determine the carbon footprint, you need to know how much fuel is being consumed in the production process. The measurement method will depend on the type of fuel used. Where accurate weight or volume information is not available through meters, bills and invoices may be used to document fuel quantity.

Allocating that fuel consumption to products

Again, it is helpful to establish how much fuel is consumed by each individual product. The approach here is exactly the same as that used for allocating the energy consumption (see above).



Converting fuel consumption into a carbon footprint

The final step is to convert the fuel consumption – e.g. x kg of wood – into a carbon footprint, i.e. y kg of CO_2. This calculation is based on a conversion rate per fuel type. See the detailed table below.

[1] The SAM (Standard Allowed Minute) of any particular task is, essentially, the normal time taken by a worker to complete that task.

BEST PRACTICE: CONVERSION RATES FOR CALCULATING THE CARBON FOOTPRINT

Translating fuel consumption into carbon footprint requires a conversion rate – the emission factor.

Emissions (in tCO2e) = fuel consumption (in unit, e.g. kg) x emission factor (in tCO per unit)

The following table shows the emission factors for the most important fuel types; in each case, the factor should be used as a multiplier in the calculation, as shown above.

Fuel type	Quantity (in unit)	Emission factor (in tCO2e per unit)
Natural gas	1 mcf	0.0534 tCO2e per mcf
Liquefied petroleum gas	1 litre	0.00161 tCO2e per litre
Motor gasoline	1 litre	0.00228 tCO2e per litre
Diesel	1 litre	0.00269 tCO2e per litre
Wood	1 kg	0.00178 tCO2e per kg

B. Developing a Renewable Energy strategy

Based on the assessment of their total energy demand and GHG emissions, manufacturers need to develop a plan for increasing renewable-energy use and reducing carbon emissions. The ultimate goal is to use 100% renewable energy in the final manufacturing of the product. The plan should address quantitative targets and include a detailed timeline of when individual initiatives will be launched.

C. Using renewable energy and addressing on-site GHG emissions

For different certification levels from SILVER to PLATINUM, different percentages of energy used at the factory need to be renewably sourced or offset with Renewable Energy projects or else with Renewable Energy certificates (RECs). The same percentage of direct on-site GHG emissions needs to be offset as well. This requirement is in line with the *Cradle to Cradle* principles, and is to “encourage manufacturers to participate in the demand for renewable energy with the goal of producing more than 100% renewable energy for a product”.

Sections 4 and 5 below give detailed information on different ways of sourcing renewable energy and offsetting GHG emissions.

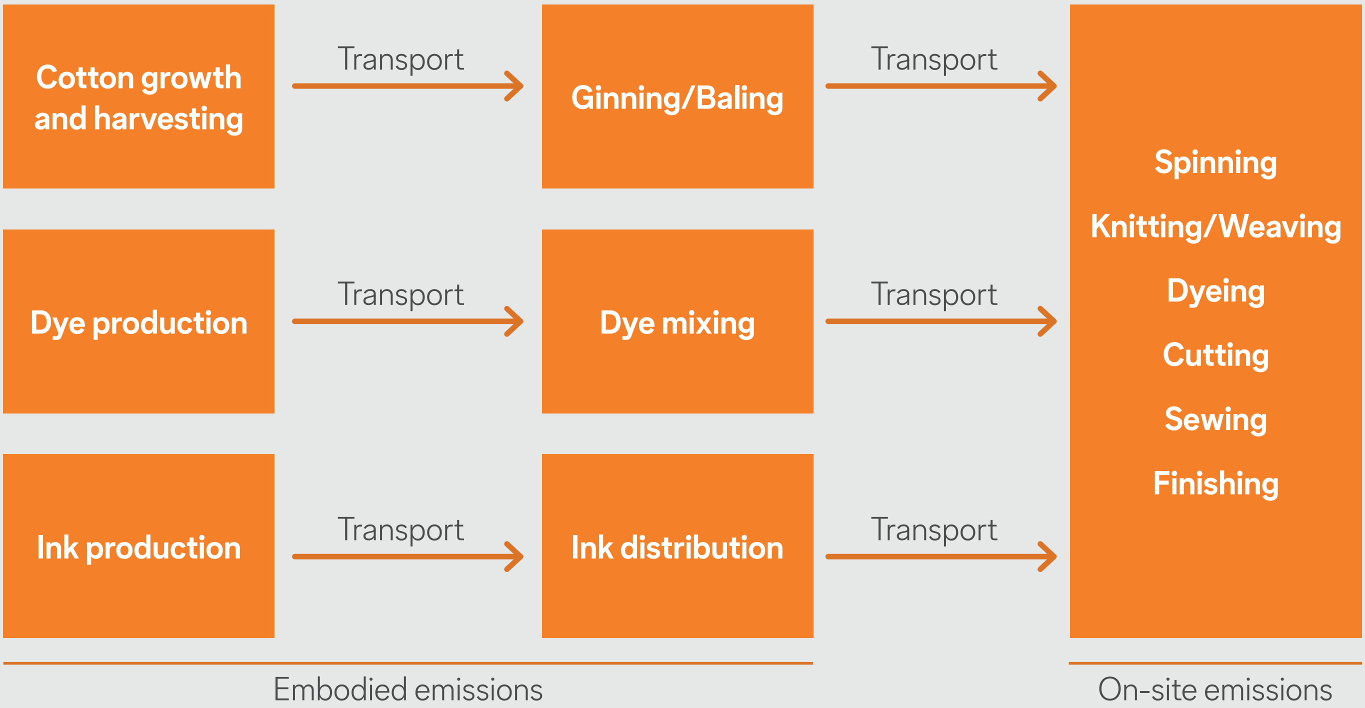
D. Calculating the embodied energy for the product

In order to achieve PLATINUM level, the manufacturer needs to understand the energy – and GHG emissions – associated with the entire supply chain. The manufacturer can then show the relative contributions of each stage, from extraction of raw materials through to final manufacturing, and can identify the choices, e.g. made in the product's design phase, that have the greatest impact on emissions.

BEST PRACTICE: DETERMINING THE EMBODIED ENERGY ASSOCIATED WITH A PRODUCT AND CALCULATING THE CARBON OFFSETS FOR C2C PLATINUM

Illustration of value chain

As outlined, the embodied energy includes the carbon footprint that occurs before the final manufacturing stage:



This includes all production steps that occur upstream of the final manufacturing site – in particular the cotton production and transportation. To calculate the carbon offsets required to cover **5%** of the embodied emissions, data is needed on the emissions for the production steps before the final manufacturing stage, as well as the total annual emissions from transportation of the product.

Embodied Emissions (in tCO2e) = (Total annual transport emissions (in tCO2e) + Total emission for pre-manufacturing production (in tCO2e)) x 5%

Example: Calculating the embodied emissions to be offset at Pratibha Syntex

Per 1,000 T-shirts, the data reveals that there are carbon emissions of 10.88 tCO2e for the annual transport and 38.86 tCO2e in the cotton production. Thus:

Embodied Emissions = [(10.88 tCO2e + 38.86 tCO2e)/1,000] x 5% = 0.00249 tCO2e to be offset per T-shirt

3. LEVELS OF ACHIEVEMENT

Overall, the C2C Certified criteria serve to differentiate textile producers according to their renewable-energy use and carbon emissions: by gradually sourcing more renewable energy and offsetting more emissions, C2C Certified applicants can graduate to the next level. Note that for BASIC to GOLD levels, the criteria refer only to the final manufacturing stage of the product, whereas the PLATINUM level considers the entire value chain – from Cradle to Gate – including emissions that occur at the sites of Tier-2 suppliers. The specific criteria for the different levels of achievement are as follows:

BASIC	Measurement of annual energy use and GHG emissions associated with the final manufacturing stage of the product
BRONZE	Development of renewable-energy use and carbon-management strategy
SILVER	5% of energy renewably sourced or offset with renewable-energy projects, and 5% of direct on-site GHG emissions offset for the final manufacturing stage
GOLD	50% of energy renewably sourced or offset, and 50% of direct on-site GHG emissions offset for the final manufacturing stage
PLATINUM	>100% of energy renewably sourced or offset, and >100% of direct on-site GHG emissions offset for the final manufacturing stage The embodied energy associated with the product from Cradle to Gate is characterised and quantified, and a strategy to optimise is developed. At reapplication, progress on the optimisation plan is demonstrated. ≥ 5% of the embodied energy associated with the product from Cradle to Gate is covered by offsets or otherwise addressed (e.g. through projects with suppliers, product re-design, or savings during the use phase).

Details of the requirements and instructions can be found in the C2C Certified Product Standard.

4. HOW TO OPTIMISE ELECTRICITY CONSUMPTION AND SOURCE RENEWABLE ENERGY

The ultimate goal of C2C Certified is a future in which factories make a positive impact on the ecosystem balance. Drawing on granular measurement of the current electricity and fuel consumption, this section discusses two aspects:

A. Optimising electricity and fuel consumption
B. Sourcing renewable energy

A. Optimising electricity and fuel consumption

Optimising electricity and fuel consumption means eliminating all unnecessary use of any energy source. In a typical garment factory, there are various opportunities for reducing electricity and fuel consumption while maintaining the output level.

- Meter the data, and analyse it to identify inefficiencies in the production process
- Devise a clear energy-management plan, perhaps with the help of a professional agency, to reduce or eliminate those inefficiencies
- Study the optimisation opportunities listed in this section, and pursue some or all of them

Optimising electricity consumption

There are a number of practical and cost-effective energy-efficiency improvements that require upfront investments and may be phased in over time. Further resources for optimising electricity consumption can be found online:

LINK TO FURTHER SOURCES

For further helpful information on optimising energy consumption, see the following:

Lawrence Berkeley National Laboratory's reference list
A comprehensive list of energy-saving opportunities – including items on realised savings, capital costs, and payback time – can be found in the article "Energy-Efficiency Improvement Opportunities for the Textile Industry"

NRDC – Clean by Design
A practical guide for responsible sourcing can be found in NRDC's 10 Best Practices for Textile Mills to Save Money and Reduce Pollution

SHOWCASE: COTTON BLOSSOM'S SEWING MACHINES

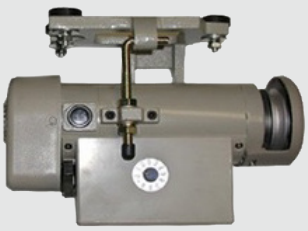
Replacement of sewing machines

Cotton Blossom has been a pioneer in the movement to replace clutch-motor sewing machines with servo-motor sewing machines. Having confirmed, with the help of a specialised agency, that the energy-saving potential would be 60–80% per machine, the company duly replaced more than 2,500 sewing machines – about three-quarters of its total stock. The replacement proceeded slowly, phased over five years, to ensure a smooth transition and avoid disrupting production.

The *total investment of $2.3 million* lead to significant energy-savings, a productivity boost, and increased output.

The following manufacturers offer servo-motor machines: Siruba, Pegasus, Juki, Yamato

Clutch motor
- runs constantly
- higher electricity consumption



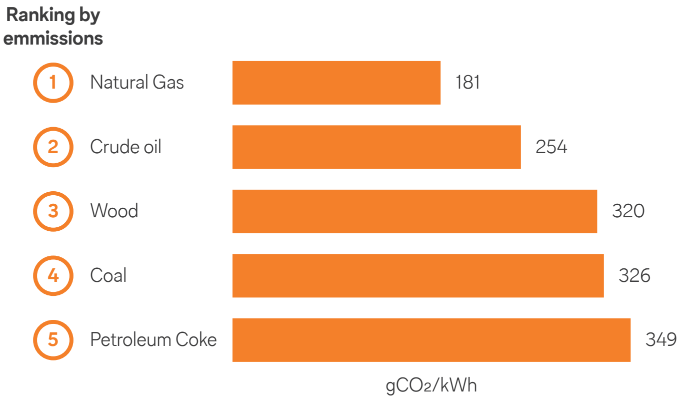
Servo motor
- runs when actually in use
- consumes just 20–40% of the energy used by a clutch motor
- more user-friendly
- generates almost no heat

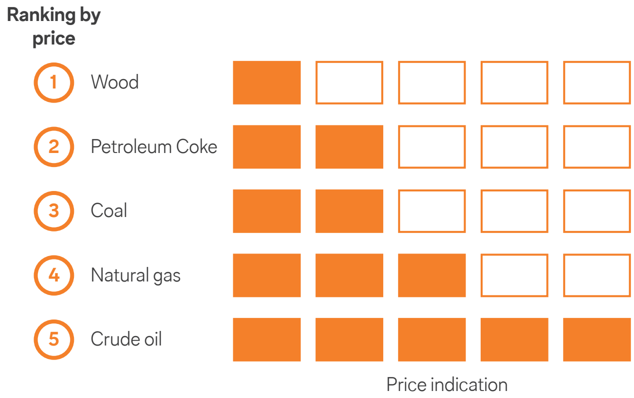
Optimising fuel consumption

The textile industry is characterised by a high demand for heat, particularly in the wet-processing divisions. This heat is often produced by on-site fossil-fuel combustion. The various conventional fuels differ widely in price and carbon emissions.

Ideally, heat requirements for production are met by renewable energy alone. Currently, the relevant innovative technologies are not commercially viable. In the interim, it is possible to select the most efficient conventional fuels in systems that capture and use all of the heat produced.

The graphs below provide an indicative comparison of the most common fuel types:





BEST PRACTICE: MAKING FUEL TYPES COMPARABLE

To compare the efficiency of different fuel types in terms of price and emissions is complex; it's important to compare how much of each fuel is needed for generating the same amount of energy. One helpful way of making the different fuels comparable is to set them in a specific scenario:

Suppose that you want to heat up 1 m^3 (= 1000 litres) of water by 1°C – that would require 1000 kcal of energy

The following table lists, for the five most common fuel types, the amount of CO_2 emitted, and the cost per unit of energy. Whereas CO_2 emissions can be clearly determined, prices are obviously volatile and may depend on external factors.

Fuel type	Emissions (in gCO_2/1000 kcal)	Price range (in USD/1000 kcal)
Natural gas	210 g	7.50 – 12.50 $
Crude oil	296 g	30.00 – 40.00 $
Wood	372 g	0.00 – 10.00 $
Coal	379 g	5.00 – 10.00 $
Petroleum	405 g	5.00 – 10.00 $

When committing to improving fuel efficiency, focus on a few of the factory's specifics, particularly in the wet-processing division, where the major proportion of thermal energy is required. Here is a list of relevant opportunities:

Cross-divisional

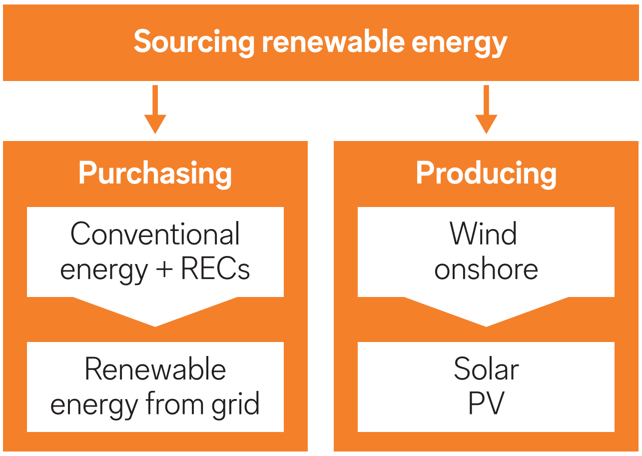
- Install or increase insulation
- Avoid heat-injected processes where possible
- Reduce the distance of transportation
- Recover heat

Wet processing

- Combine preparatory treatments
- Implement a bleach-bath recovery system
- Introduce point-of-use water heating in continuous washing machines
- Use counter-flow current for washing
- Install heat-recovery equipment in washing machines
- Install insulation for high-temperature dyeing machines
- Carry out cold-pad-batch pre-treatment
- Use innovative dyeing technologies
- Carefully control the temperature in atmospheric wet-batch machines
- Use discontinuous dyeing with airflow dyeing machines

B. Sourcing renewable energy

There are two distinct approaches to sourcing renewable energy:



Purchasing renewable energy

The most convenient way to source renewable energy is purchasing from a utility or broker, where this option is available. If these sources of bulk renewable energy are legitimate, they will provide documentation both to validate the renewable source of energy and to guarantee that the credits can be claimed. The most reputable sources are third-party verified; validation takes the form of Renewable Energy Certificates (RECs), which are globally accepted as certifying the authenticity of the renewable energy.

The market for renewable energy varies globally. In some locations, certificates may not be automatically transferred when the renewable energy is purchased from the grid. In some cases, the only verifiable way to claim that your energy is renewable is through direct purchase of RECs. Proceeds from the sale of RECs provide incentives for the expansion of renewable electricity generation. The RECs purchase process is simple, is adaptable to specific energy requirements and does not require upfront capital investment.

RECs can be viewed as guarantees or “green attributes” of renewable energy – serving as evidence that an electricity supplier has produced a certain amount of electricity from a renewable source. Often, electricity from multiple sources is fed into the electricity grid. By buying RECs equal to the energy required for a specific activity, a company can then claim renewable-energy use for that activity.

BEST PRACTICE: HOW TO ACQUIRE RECS IN INDIA

TIn India, RECs can be traded only on CERC-approved[1] power exchanges, notably IEX (www.iexindia.com) and PXIL (www.powerexindia.com):

- To be eligible for trading, you first have to register as a client
- Having determined the quantity of RECs that you want to purchase (1 REC corresponds to 1 MWh), you need to deposit funds equivalent to your bid into your member account
- You can now bid in REC trading sessions to purchase either solar RECs or non-solar RECs
- Solar RECs typically sell for Rs 3,500 ($52) each, non-solar RECs for Rs 1,500 ($22; as of December 2016)
- Non-solar RECs are equally acceptable for C2C Certified purposes

In addition to the Indian sources just mentioned, there are other websites trading in recognised RECs. One advantage of them is that they might not require you to create an account or to register as a member, and will simply allow you to make a purchase by credit card. In addition, their prices might be more competitive, thanks to the global market. Here are two such websites: TerraPass and GoodEnergy

Producing renewable energy

Direct use of renewable electricity can be achieved by on-site production – in particular, through wind on-shore or solar photovoltaic (solar PV) systems. These systems are currently the most feasible and cost-effective options, and are rapidly approaching par with conventional sources. The full range of options is shown in the chart below.

	Type	Costs[2]	Size (MW)
	**Wind on-shore**	1,300–1,600 $/kW 45–85 $/MWh	10–200
	Wind off-shore	3,200–4,800 $/kW 120–150 $/MWh	100–600
	**Solar PV**	950–1,600 $/kW 45–140 $/MWh	0.01–100
	Solar CSP	3,200–5,400+ $/kW 160–250 $/MWh	50–400
	Biomass/Biogas	2,100–3,800 $/kW 85–150 $/MWh	1–30
	Small Hydro	1,100–3,000 $/kW 20–200 $/MWh	1–10
	Geothermal	1,500–5,400 $/kW 40–85 $/MWh	2–100

Taking into account costs, project-size variability and financing requirements, small and medium-sized garment factories in India will currently find that the most feasible and cost-effective options for producing renewable energy are on-shore wind and solar PV.

[1] CERC = Central Electricity Regulatory Commission (of India)
[2] Cost for adding new capacity and levelised cost of energy | Source: IEA; BTM; Research firms: BCG; Bloomberg; United Nations

SHOWCASE: WHAT TO CONSIDER WHEN SETTING UP WIND-ENERGY PROJECTS IN INDIA

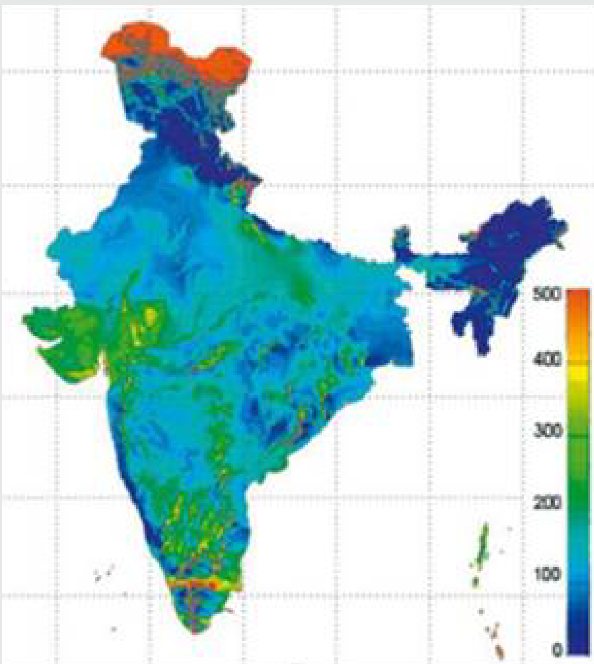
Wind energy has become one of the most prominent initiatives for renewable energy in India. Backed by strong policy support, the country's wind-power capacity is rapidly moving closer to the ambitious target of 60 GW by 2022. The main drivers are so-called Generation Based Incentives (GBIs) and Accelerated Depreciation (AD).

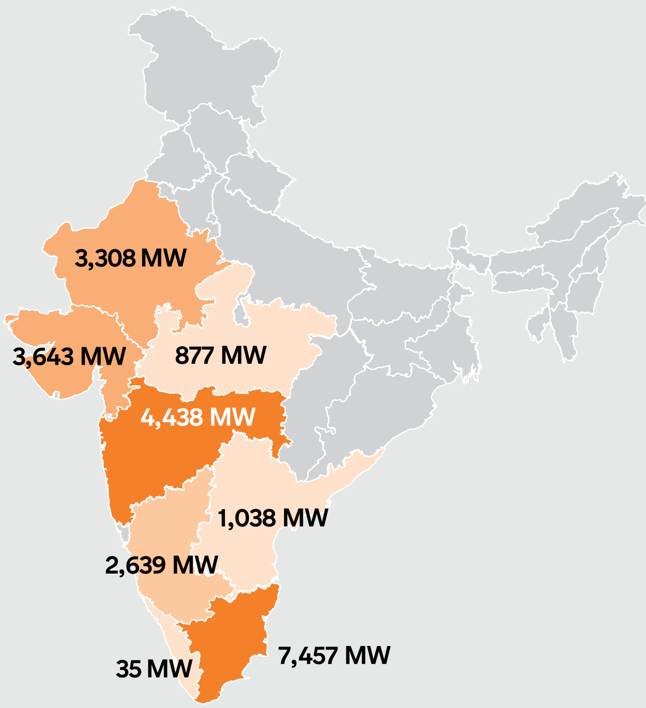
Policy support for wind energy

- *Generation Based Incentive (GBI)*
  The GBI scheme offers independent power producers additional revenue of slightly less than $0.01/kWh (up to maximum of about $150,000/MW over ten years) over and above the Power Purchasing Agreement (PPA) price
- *Accelerated Depreciation (AD)*
  The AD scheme offers 80% of the capital cost as depreciation in the first year of operation, thereby reducing the investment cost through tax savings (Note: the AD scheme phases out in 2017)

Preferred locations for wind energy

Wind conditions favour a few states in Southeast India as particularly conducive to wind energy. Tamil Nadu, Maharashtra, Gujarat, Rajasthan, and Karnataka are the most favourable regions, and the nation's current wind-energy capacity bears that out. Those five states produce more than 90% of India's overall wind energy (the total national output was about 24 GW in 2015).





Left: India wind density map 80 m from Report by WISE for the Ministry of New and Renewable Energy
Right: 2015 wind plant capacity in India from MNRE/analyst reports/Sigma insights

Besides the geographic conditions, there are several other factors that should influence the selection of sites across the country; notably:

Consistency of renewable-energy policies and tariff regimes

Consider how consistent the state government has been and might be in its energy policies, in particular towards wind energy. What are the implications if the state shifts to a tender model, as with solar energy? How does each of the main political parties regard wind energy, and how might state policy change after the next election? Do local regulations and processes make it easier or harder to gain the benefits of AD and GBI?

Transmission and distribution aspects

Consider grid connectivity and grid density. Without adequate connectivity, any project would be doomed to failure.

SHOWCASE: BUSINESS CASE FOR A TYPICAL APPAREL MANUFACTURER INVESTING INTO A WINDMILL

Description of windmill

As outlined above, a critical first step when investing in a windmill is the selection of the correct location, as wind speed is a main determinant in the effectiveness of a windmill.

Business case for windmill with capacity of 750 kWh

Upfront investment:

$537,000 In this example, the upfront investment cost is assumed to be fully self-financed.

In our example here, the Generation-based Incentive (GBI) support scheme is used. This support scheme offers wind-power generators a subsidy of slightly less than $0.01 per kWh of energy produced. The net profit of the windmill project can be calculated as follows:

Production profit & loss (per year):

Revenues

$68,100	Revenue from energy production (of 1.35 million kWh per year) & taking advantage of the GBI scheme
$5,400	Value of RECs received for renewable energy production
$73,500	**Total Revenue from renewable energy production with windmill**

Costs

$6,700	Maintenance cost per year
$21,500	Depreciation per year
$28,200	**Total Cost per year**

Gross profit

$45,300 Overall yearly gross profit from the windmill

Tax mitigation

$7,500 Tax mitigation (based on 35% corporate tax rate and linear depreciation of windmills for 25 years)

Net Profit

$52,800 Overall net profit for the manufacturer per year

Using the GBI scheme, the investment in the windmill has a nominal payback time of less than 11 years, even though the typical lifespan of a windmill is 25 years.

5. OFFSETTING EMISSIONS

The ultimate goal is to eliminate emissions from non-renewable sources, a scenario that requires a long-term perspective. In the meantime, textile companies can, or must, support the development of renewable fuels and GHG-reduction projects by offsetting their remaining emissions. After determining the carbon footprint of the factory – as explained above – the next step is to offset some or all of the emissions. A factory offsetting all its emissions is regarded as carbon-neutral, and, in that respect, as not polluting the environment. Note that offsetting might also be required for achieving a specific C2C certification level.

Like RECs, carbon offsets are verifiable claims linked to specific projects. Brokers issue a certificate confirming that a company has offset x tons of CO_2 equivalents. To be accepted by the C2C Products Innovation Institute, the offsets must show the name of the carbon offsetting project, the type of project, and the location. If that information is not shown on the certificate directly, the offsets should at least include a link or serial number tied to that information. There are several ways to acquire such certificates. Three options are discussed below, each with a list of potential sources:

A. acquiring offsetting certificates from the global/ conventional market
B. acquiring offsetting certificates from social projects
C. acquiring a certification licence for your own offsetting project

A. Acquiring offsetting certificates from the global/conventional market

There is a major global market in which offsetting certificates are bought and sold. The payments are channelled into large-scale projects, such as wind farms. Many of the certificate issuers have user-friendly websites, enabling prompt online purchase. This option usually represents the best value, with the lowest price per ton of CO_2-emission offsetting.

Among the numerous providers offering official certificates approved by the C2C Certified Products Program are the following:

- UN Climate Neutral Now, https://offset.climateneutralnow.org/ (all projects listed here are linked to a registry and thus provide detailed project information)
- TerraPass, www.terrapass.com
- Carbon Footprint, www.carbonfootprint.com

B. Acquiring offsetting certificates from social projects

As an alternative, credits may be purchased in order to specifically support social projects, typically smaller-scale and often locally based. These investments might be certified by organisations similar to Fairtrade, and are still subject to third-party verification through a registry. The price per ton of CO_2-emission offsetting tends to be slightly higher, but the advantage is that the proceeds go to worthy and accredited social or local projects.

Among the providers offering these certificates are the following:

- FairClimateFund, www.fairclimatefund.nl/en
- Climate Friendly, www.climatefriendly.com
- myclimate, www.myclimate.org

C. Acquiring a certification licence for your own offsetting project

A third option is to register your own emissions-offsetting project and to get a certification licence for it. Some agricultural or voluntary biogas projects may qualify for accreditation. Accreditation is long-term project, requiring measurement, validation and audits, and the engagement of an approved verification body.

Among the organisations that issue the licences are the following:

- Green-e, www.green-e.org
- The Gold Standard, www.goldstandard.org
- VCS, www.v-c-s.org
- Climate Action Reserve, www.climateactionreserve.org

6. GETTING STARTED

Given the energy-saving potential within the textile-manufacturing industry, many specialised agencies have emerged, offering tailor-made services to help clients tap their full energy-efficiency potential. For manufacturers, these agencies generally present a very positive business case. The savings derived from consulting them typically exceed the costs, and overall they tend to add considerable value to the companies that hire them.

BEST PRACTICE: EXTERNAL AGENCIES CAN CREATE VALUE FOR TEXTILE MANUFACTURERS

What does an external agency typically offer?

- The agency will conduct site visits and an energy audit, and then identify specific opportunities, the scope of savings, and potential roadblocks
- After presenting a final report, the agency will usually support the client during the implementation process and will often monitor progress as well
- Costs necessarily depend on the specific project; an indicative price is $12,000 in total
- Requirements often vary over time; remaining open to using new vendors is recommended.

Examples of agencies offering an energy audit

- Dexler Energy: http://www.dexlerenergy.com
- Schneider Electric India: http://www.schneider-electric.co.in/en/
- Siri Exergy & Carbon Advisory Services: http://siriexergy.com