

# **Weather-Based Prediction of Wind Turbine Energy Output: A Next-Generation Approach to Renewable Energy Management**

## **Chapter 12**

### **Appendix**

#### **12.1 - Source Code:**

##### **➤ Intro.html:**

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>Wind Energy Predictor</title>
    <link href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.2/dist/css/bootstrap.min.css" rel="stylesheet">
    <style>
        body {
            background: linear-gradient(120deg, #0f2027, #203a43, #2c5364);
            color: white;
        }
        .hero {
            height: 100vh;
            display: flex;
            align-items: center;
            justify-content: center;
            text-align: center;
        }
        .btn-main {
            background: #00c6ff;
            border: none;
            color: black;
        }
    </style>
</head>
<body>
    <div class="hero">
        <div>
            <h1 class="display-4 fw-bold"> Wind Power Prediction</h1>
```

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```
<p class="lead mt-3">
    Machine Learning-based forecasting of wind turbine
    energy output
</p>
<a href="/predict" class="btn btn-main btn-lg mt-4 px-5">
    Start Prediction
</a>
</div>
</div>
</body>
</html>
```

### **Output:**



### ➤ **Predict.html:**

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>Wind Power Dashboard</title>
    <link
        href="https://cdn.jsdelivr.net/npm/bootstrap@5.3.2/dist/css/bootstrap.min.css" rel="stylesheet">
    <style>
```

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```
body {  
    background-color: #f4f7fb;  
}  
.card {  
    border: none;  
    border-radius: 15px;  
    box-shadow: 0 10px 30px rgba(0,0,0,0.08);  
}  
.value {  
    font-weight: bold;  
    color: #0d6efd;  
}  
</style>  
</head>  
<body>  
<div class="container mt-5">  
    <h2 class="text-center mb-5">Wind Energy Prediction  
    Dashboard</h2>  
    <div class="row">  
        <!-- Weather Panel -->  
        <div class="col-md-6 mb-4">  
            <div class="card p-4">  
                <h5 class="mb-3">Live Weather Data</h5>  
                <form action="/windapi" method="POST">  
                    <input type="text" name="city" class="form-control mb-3" placeholder="Enter City Name" required>  
                    <button class="btn btn-success w-100">Fetch  
                    Weather</button>  
                </form>  
                {% if speed %}  
                <hr>  
                <p>Temperature: <span class="value">{{ temp }}</span></p>  
                <p>Humidity: <span class="value">{{ humid }}</span></p>  
                <p>Pressure: <span class="value">{{ pressure }}</span></p>  
            </div>  
        </div>  
    </div>  
</div>
```

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```
<p>⌘ Wind Speed: <span class="value">{{ speed
}}</span></p>
        {% endif %}
    </div>
</div>
<!-- Prediction Panel --&gt;
&lt;div class="col-md-6 mb-4"&gt;
    &lt;div class="card p-4"&gt;
        &lt;h5 class="mb-3"&gt;⚡ Power Output Prediction&lt;/h5&gt;
        &lt;form action="/y_predict" method="POST"&gt;
            &lt;label class="form-label"&gt;Wind Speed (m/s)&lt;/label&gt;
            &lt;input type="number" step="any" name="WindSpeed" class="form-control mb-3" required&gt;
            &lt;label class="form-label"&gt;Hour (0-23)&lt;/label&gt;
            &lt;input type="number" name="Hour" class="form-control mb-3" required&gt;
            &lt;label class="form-label"&gt;Month (1-12)&lt;/label&gt;
            &lt;input type="number" name="Month" class="form-control mb-3" required&gt;
            &lt;label class="form-label"&gt;Day of Year (1-365)&lt;/label&gt;
            &lt;input type="number" name="DayOfYear" class="form-control mb-4" required&gt;
            &lt;button class="btn btn-primary w-100"&gt;
                Predict Energy Output
            &lt;/button&gt;
        &lt;/form&gt;
        {% if prediction_text %}
        &lt;hr&gt;
        &lt;div class="alert alert-success text-center mt-3"&gt;
            &lt;strong&gt;{{ prediction_text }}&lt;/strong&gt;
        &lt;/div&gt;
        {% endif %}
    &lt;/div&gt;
&lt;/div&gt;
&lt;/div&gt;</pre>
```

## **Weather-Based Prediction of Wind Turbine Energy Output: A Next-Generation Approach to Renewable Energy Management**

</body>

</html>

**Output:**

 Wind Energy Prediction Dashboard

 Live Weather Data

Enter City Name

**Fetch Weather**

 Power Output Prediction

Wind Speed (m/s)

Hour (0-23)

Month (1-12)

Day of Year (1-365)

**Predict Energy Output**

