

# Space-Time Renewables Composite

**Space-Time Renewables Composite:** context-rich visual analytics for site prospecting, managing, and maintaining wind farms.

- Wind Prospecting
- Terrain Friendliness
- Grid Accessibility
- Purchase Plan Compliance
- Operational Reliability
- Uncertainty Mitigation

## Wind Prospecting

Identify viable wind corridors, sites and predictable wind terrains using telemetry feeds from Met-towers and climate data providers such as NCDC / NOAA

## Terrain Friendliness

Assess terrain suitability from ground hardness to accessibility, supply lines and land compliance

## Grid Accessibility

Use spatial visualization to assess "electric distance" and "spatial distance" and help predict transmission congestion problems ahead of investments

## Purchase Plan Compliance

Simulate contractual compliance for various generation capacities under alternative weather, humidity and other ambience conditions

## Operational Reliability

Monitor functioning of wind assets under various load and operating parameters. Use auto-alerts triggered by threshold violations to deliver timely maintenance

## Uncertainty Mitigation

Utilize wind forecast data and spatial anemometrics to mitigate wind intermittency and increase reliable throughput and scheduling

## Major Vertical Markets Served:

- Utilities (Power, Gas, Water, Public Sector, Municipalities)
- Process Manufacturing
- Oil & Gas
- Telecommunication
- Transportation

**Space-Time Renewables Composite** delivers the visual analytics and context-rich, situational information necessary to properly site, manage and maintain a wind farm. Satellite and asset-level views enable context-rich decision making and support online initiation of corrective action and environmental response.

## HALFWAY SOLUTIONS ARE FOR HALF-SUSTAINABILITY

US President Barack Obama said, "Not only is climate change real, it's here, and its effects are giving rise to a frightening new global phenomenon: the man-made natural disaster." Successfully integrating renewable energy into our electric grid is a critical step toward mitigating the impact of global warming. Some see renewable energy as a path to energy independence. While taking important steps for the greater good, wind farms and other renewable energy sources still need to be profitable investments that deliver reliable energy and meet contractual requirements.

**S**o, what's the problem?

You've got data. You have analytics. You've got maps. You know the attributes of your turbines and how they will respond to the intensity and shifting direction of the winds. Sensors may even be providing you with real-time status.

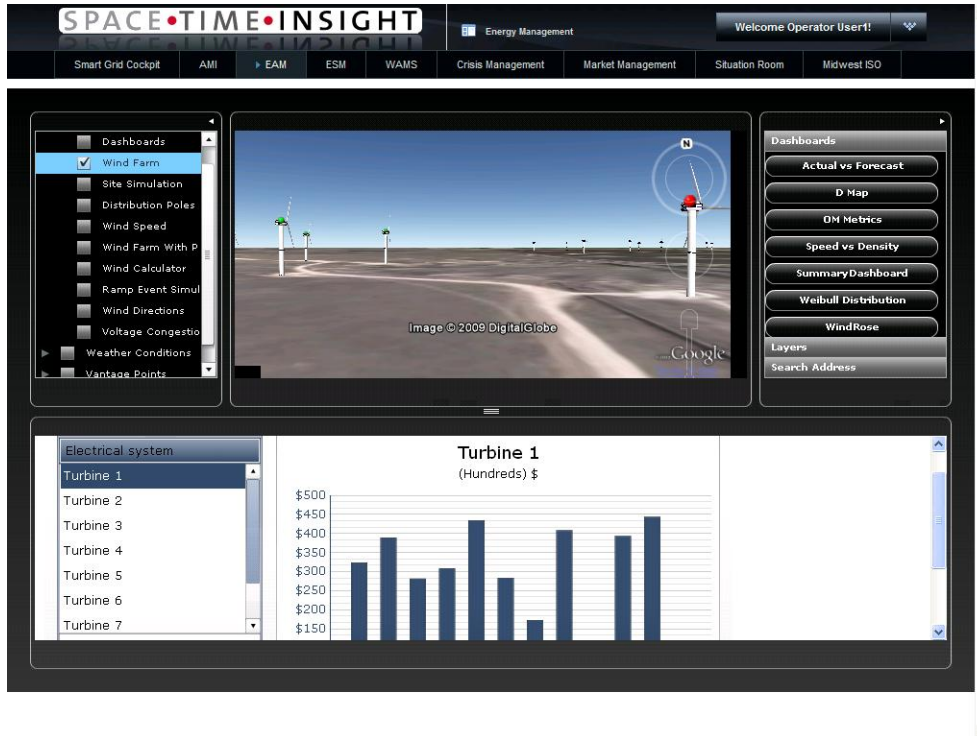
That still isn't enough. The data elements necessary to assess wind corridors, manage contractual compliance and monitor and maintain asset reliability reside in data silos and are rarely integrated for intelligent decision-making. Similarly, the data necessary to mitigate intermittency, avoid congestion and deliver on the reliability expected by ISOs are analyzed in separate applications. The lack of integration and a common interface for action, dampen decision-making, undermine confidence and complicate timely action taking.

If the turbines are remote, crucial decision elements are probably missing, starting with visual understanding of your operations in space and time. The answers to what is happening, when, where and under what circumstances are fuzzy abstractions, unless you have a visual grasp of environmental factors.

You wouldn't drive your car by watching the map on your GPS navigator instead of looking through the windshield. Why would you make operations decisions that determine the success of your renewable energy investments based on two-dimensional, partial abstractions of reality? Even fruit bats with brains the size of marbles use sonar to capture a real-time, physical view of where they are going.

**S**pace-Time Renewables Composite (STRC) is where data meets reality. By delivering geospatial and visually intuitive analytics, Space-Time Renewables Composite adds context to data, improves decision making, accelerates informed action-taking and strengthens your ability to generate energy under a variety of ambient conditions.

Increased control over renewable energy assets means greater ability to anticipate and mitigate wind intermittency and deliver energy reliably to meet contractual purchase plan requirements. The full continuum of operational concerns is simplified from condition-based maintenance to power management and automation of incident-based compliance reporting.



## Space-Time Renewables Composite - Features

- **Wind Prospecting.** Identify viable wind corridors, sites and predictable wind terrains using telemetry feeds from Met-towers and climate data providers such as NCDC / NOAA
- **Terrain Friendliness Assessment.** Assess terrain suitability from ground hardness to accessibility, supply lines and land compliance
- **Grid Accessibility Analysis.** Use spatial visualization to assess "electric distance" and "spatial distance" and help predict transmission congestion problems ahead of investments
- **Purchase Plan Compliance.** Simulate contractual compliance for various generation capacities under alternative weather, humidity and other ambient conditions
- **Guided Remedial Procedures.** Display online pop-up scripts to guide execution of remedial action schemes mandated by best practice or critical infrastructure regulations
- **Root Cause Analysis.** Play back events on-screen for root cause analysis and insight into preventive actions
- **Asset Data Access.** Instant access to assets complete with real-time and historical data and analyses
- **Space-Time Renewables Composite Guidelines:** Repository for storage of configurable operating thresholds, exceptions, condition-based alerts and procedures

## Space-Time Renewables Composite - Customer Benefits

- Improve ability to select high performance wind farm sites
- Understand transmission congestion issues in advance and plan accordingly
- Increase predictability of revenue from generated power
- Strengthen your rate case with reasonably predictable compliance with purchase plan contracts - despite changing weather, humidity, and other environmental factors
- Strengthen compliance with built-in guided compliance procedures and report automation
- Improve understanding of past events to support training and forward planning efforts
- Enhance ability to conduct condition-based maintenance based on real-time understanding of asset condition, enabling greater asset reliability and throughput reliability
- Enable users to intuitively follow recommended procedures by using pre-authorized remedial action scripts