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Wise CLIMATE

Effective Public and Private Partnerships
in Climate Prediction and Services

John A Dutton

Prescient Weather Ltd

The World Climate Service

The Pennsylvania State University

RAILROAD

*How will my customers and their needs evolve?
Where should I be building track over the next century?*

ENERGY UTILITY

*How will demand for power and regulations about emissions change?
Will I have water for my hydro-power turbines? Where should I build wind farms?*

WINE PRODUCER

Where should I be buying land for my vineyards two to four decades out?

WATER AUTHORITY

What is the probability that I will have sufficient water supplies for my customers for the next century or more? What we can do now to improve the situation?

GOVERNMENT

What must we do to ensure that our economy and nation remain vigorous and vital as the climate evolves?



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If you knew then what we knew then ...

$$2 \times 2 \times 2 \times 2$$

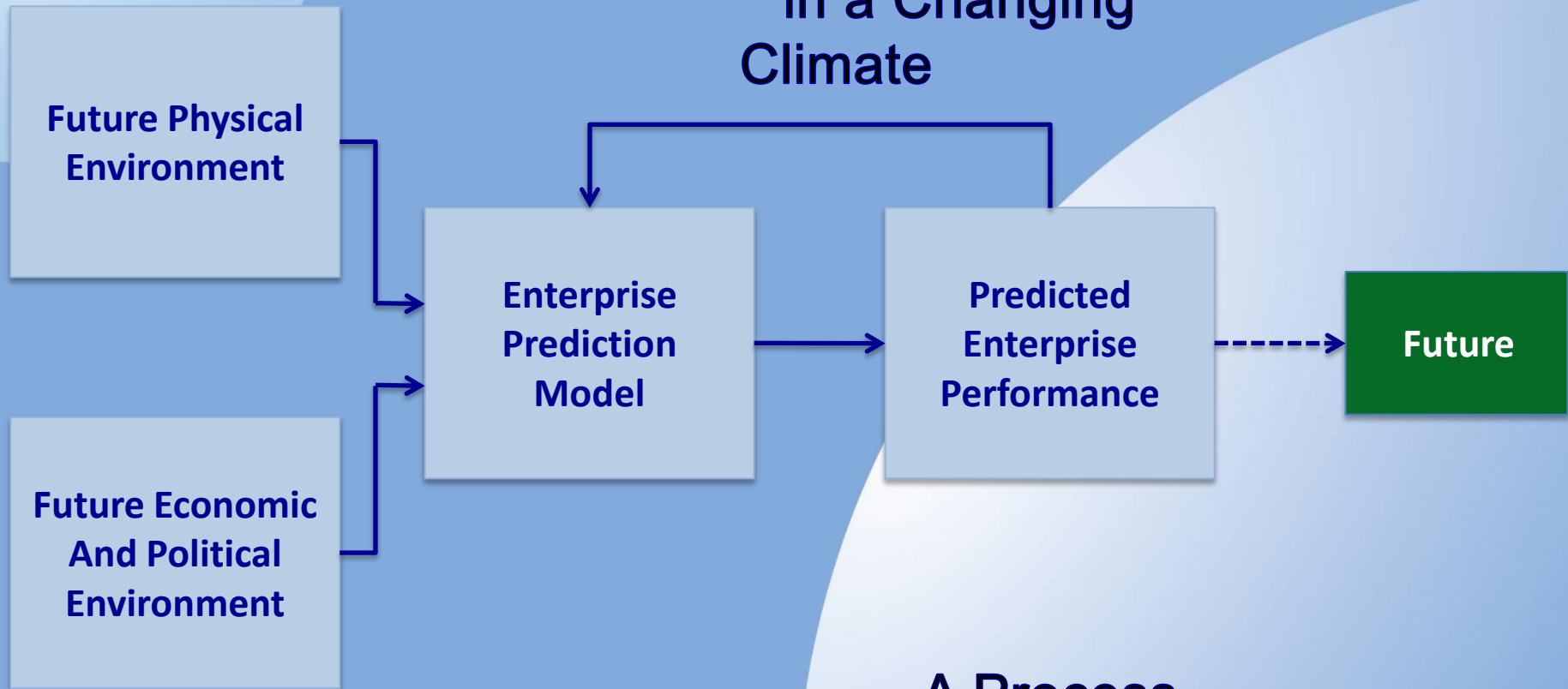
T Temperature	W Water	S Solar	V Wind
Red	Brown	Yellow	Light Blue
		Grey	Maroon
	Green	Yellow	Light Blue
		Grey	Maroon
Blue	Brown	Yellow	Light Blue
		Grey	Maroon
	Green	Yellow	Light Blue
		Grey	Maroon



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If you knew then what we knew then ...

Planning for Success in a Changing Climate



A Process...
... Not a Product



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If you knew then what we knew then ...

$\mathbf{W} = \{w_1, w_2, \dots, w_K\}$ Physical and Business Environment

$\mathbf{C} = \{c_1, c_2, \dots, c_M\}$ Enterprise Management

$\mathbf{Y} = \{y_1, y_2, \dots, y_N\}$ Enterprise Performance

$$\frac{d\mathbf{Y}}{dt} = \mathbf{F}(\mathbf{Y}, \mathbf{C}, \mathbf{W}, t) \quad \mathbf{Y}(t) = \mathbf{K}(\mathbf{C}, \mathbf{W}, t)$$

\mathbf{W}
Future Environment



Federal Agencies,
Industry Support

\mathbf{C}
Management



Enterprise and Private Advisors

\mathbf{Y}
Enterprise
Performance

Future



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If you knew then what we knew then ...

A New Era for Weather and Climate Services...

Some components of the atmospheric sciences will be increasingly involved in designing the decision process and less in predicting atmospheric evolution.

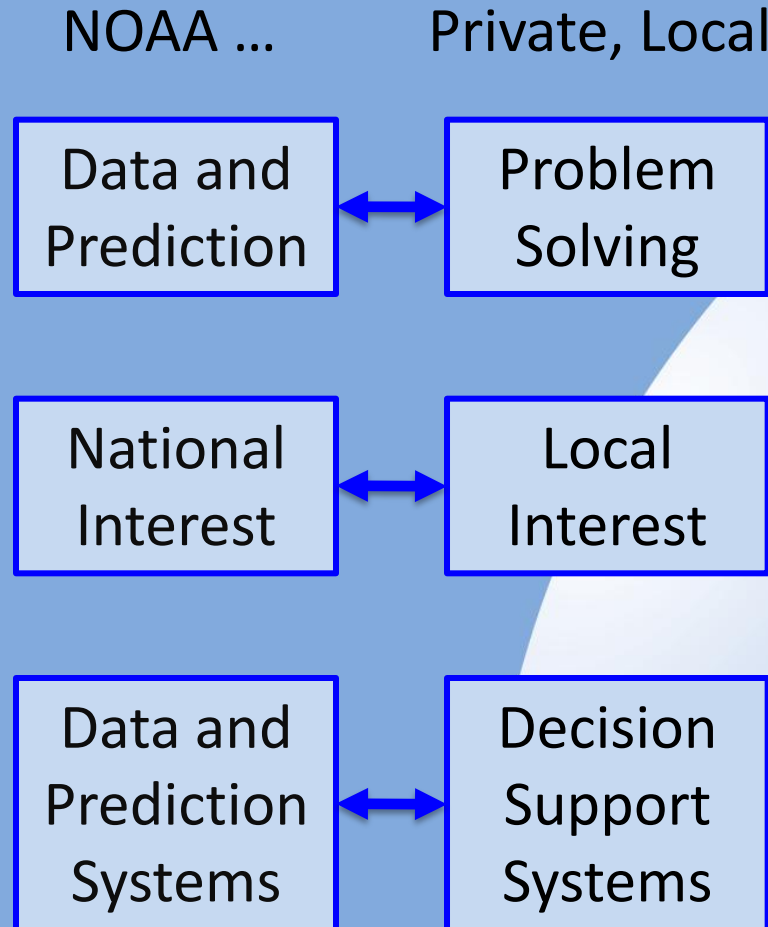
Dutton, *BAMS*, 2002



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If you knew then what we knew then ...

UNWISE CLIMATE ... Threats to the FAIR WEATHER



*Where should the boundaries be?
Who will manage them?*



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If you knew then what we knew then ...

WISE CLIMATE will require an optimum combination of efforts by federal, state, and local governments, the private sector, and academia.

Federal government	Climate forecasts and projections, from months to a century or more, largely from supercomputer prediction and simulation
Academia	New approaches for understanding climate change and for developing long-term enterprise strategies that will facilitate success despite uncertainty about climate
Private weather and climate firms	Interpretation of climate scenarios; incorporation of climate projections in enterprise performance models; assistance in formulating and managing the strategic assessment and decision process for clients

As with **FAIR WEATHER**,
we must create a process for **WISE CLIMATE**



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