



Item 2: Committee Education on Enterprise Risk Management

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Finance & Audit Committee Meeting

ERCOT Public

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What is Enterprise Risk Management?

One definition:

“... a process,

- effected by an entity's board of directors, management and other personnel,*
- applied in strategy setting and across the enterprise,*
- designed to identify potential events that may affect the entity, and*
- manage risks to be within its risk appetite,*
- to provide reasonable assurance regarding the achievement of entity objectives.”*

Source: *COSO Enterprise Risk Management – Integrated Framework. 2004.*
COSO.

Defining Risk

What is Risk?



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Risks are different from opportunities. Risks represent downside outcomes.

Defining Risk

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Risk of loss of value
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- Fuel prices
- Interest rates
- Heat rates
- Exchange rates
- and how these factors
move together
- Correlation risk
- Spread risk

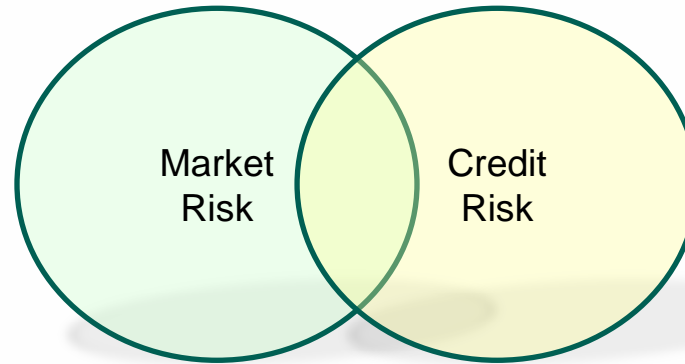


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- Credit quality risk
- Concentration risk
- Performance/delivery risk

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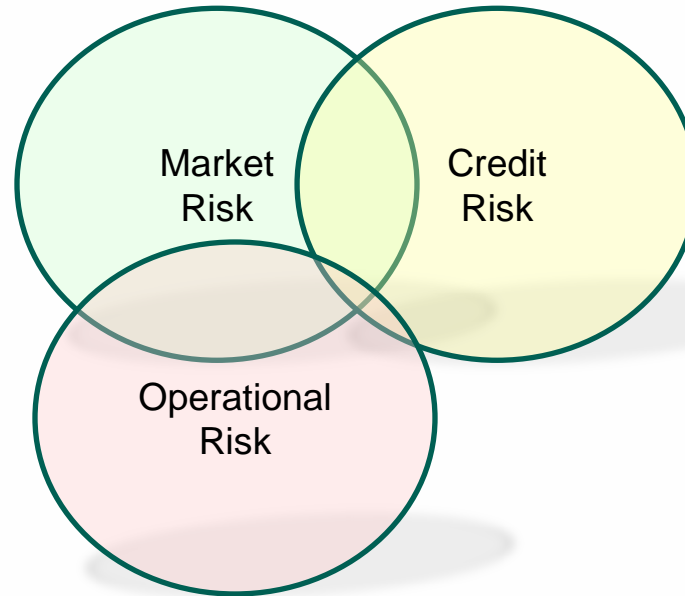
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- People
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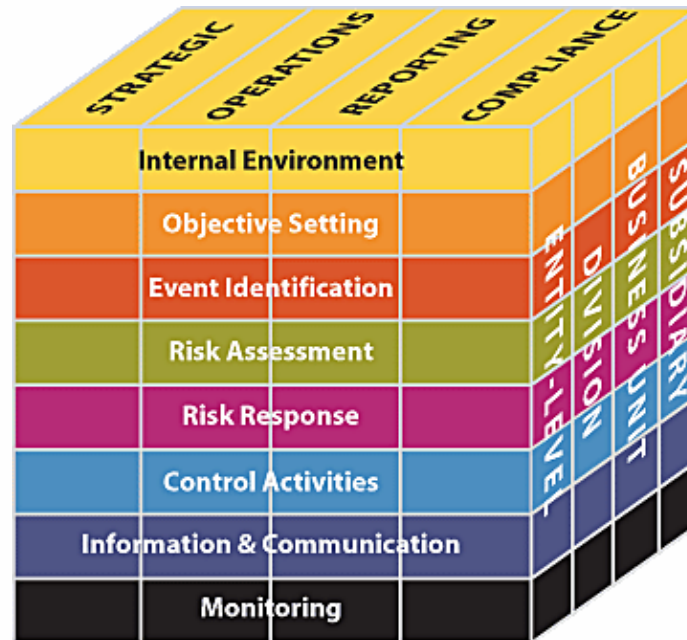
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- **For ERCOT, the primary risks are operational and credit.**
- **For ERCOT Market Participants, the predominant risk is often market risk arising from changes in fuel and electricity prices.**

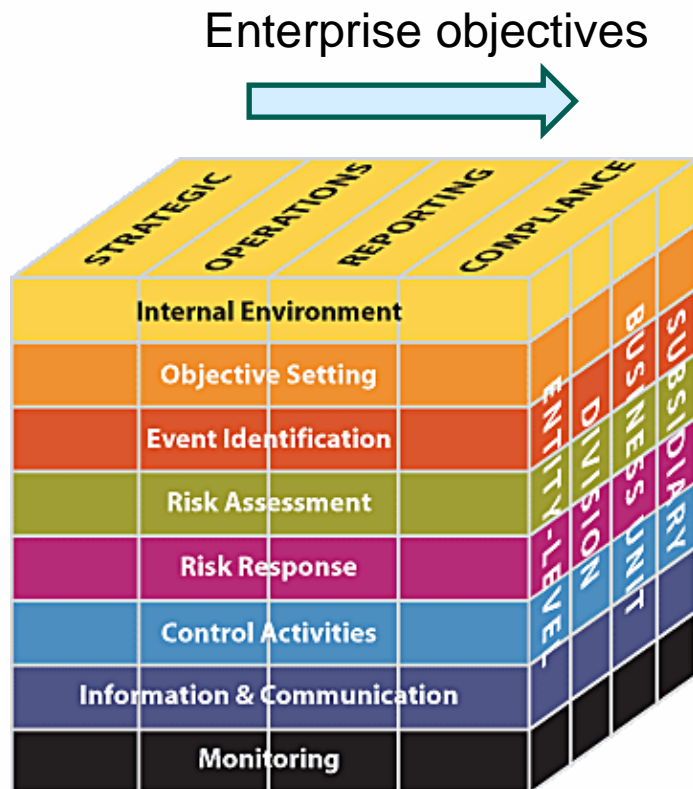
ERM Framework

A number of frameworks have been designed for visualizing components of ERM. One of the most common is the COSO (Committee of Sponsoring Organizations) framework.



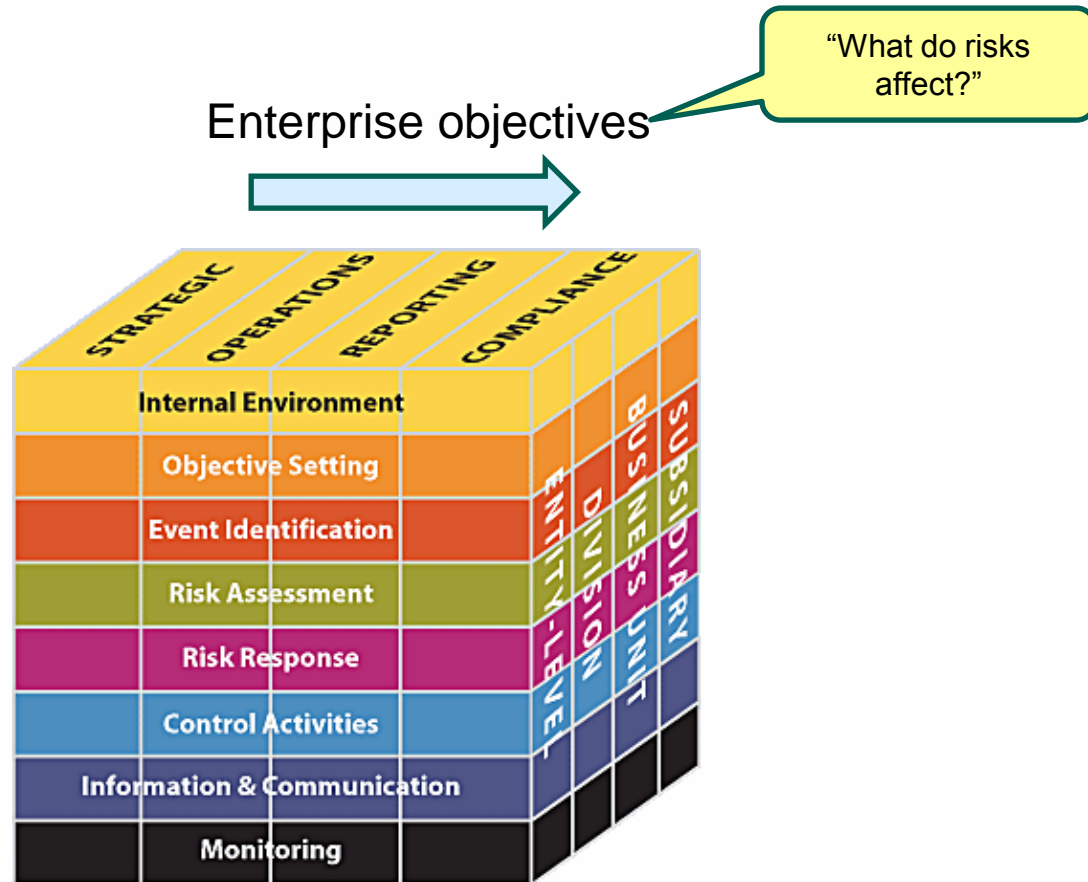
ERM Framework

COSO defines ERM elements across three dimensions.



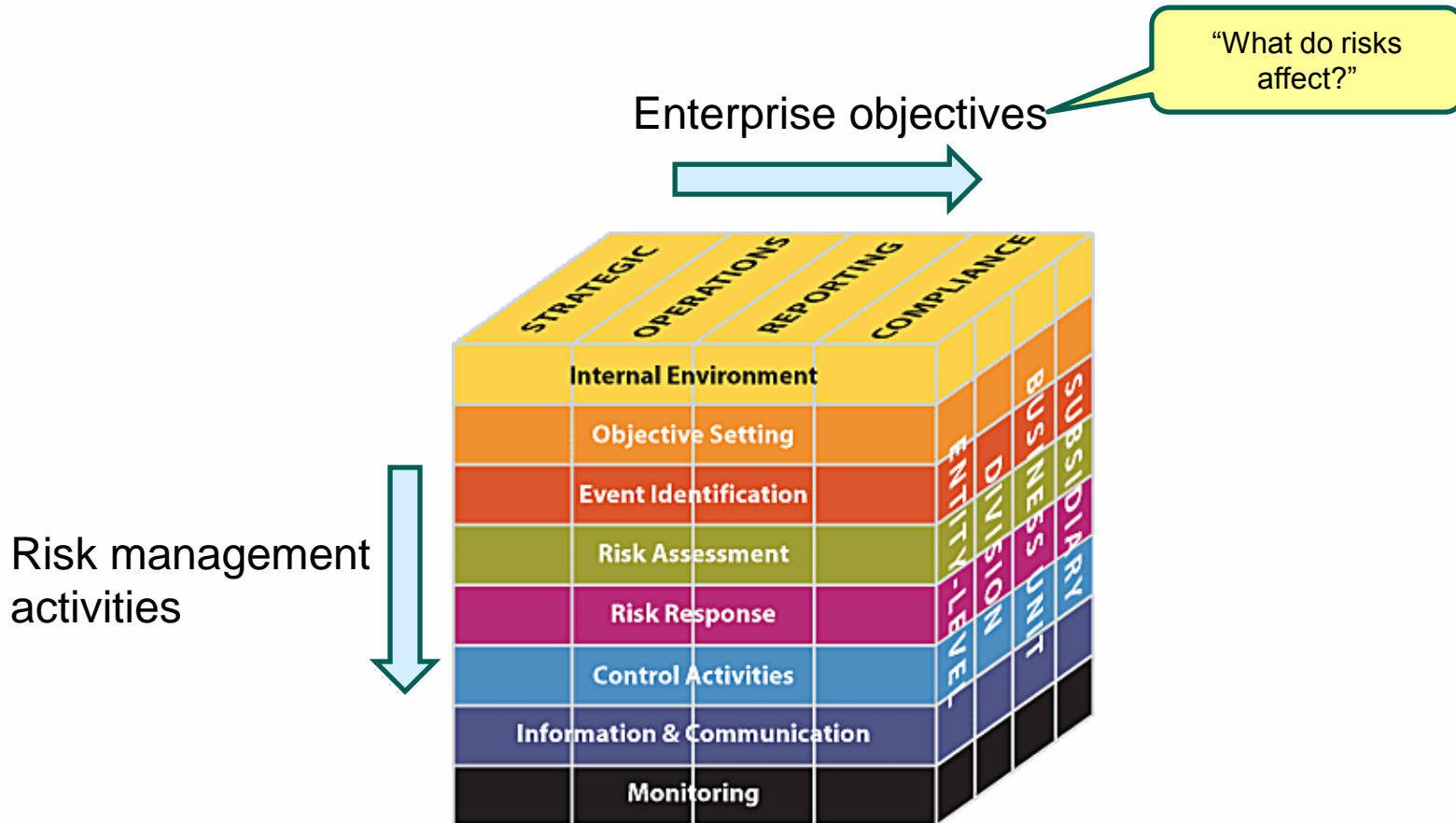
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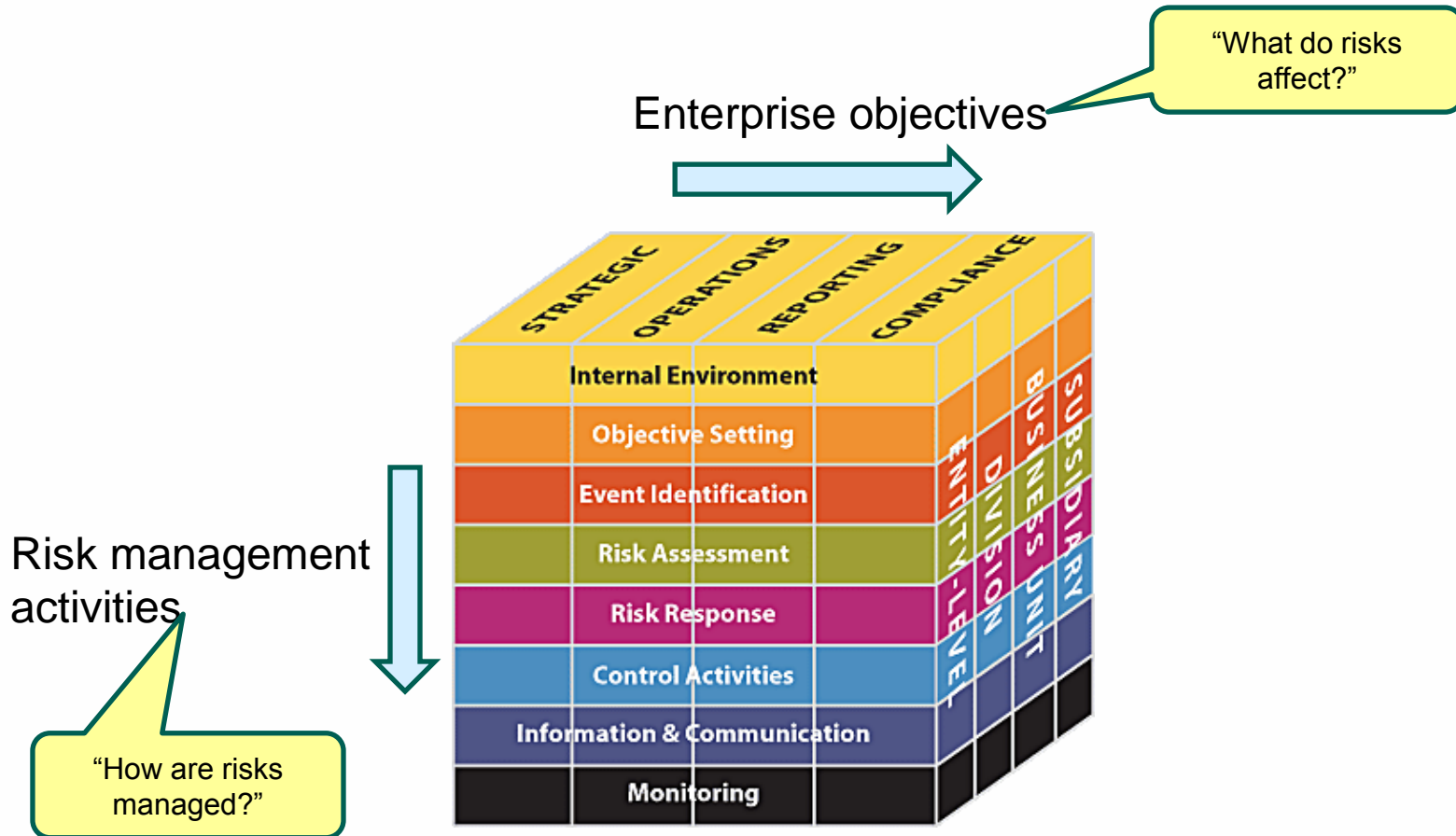
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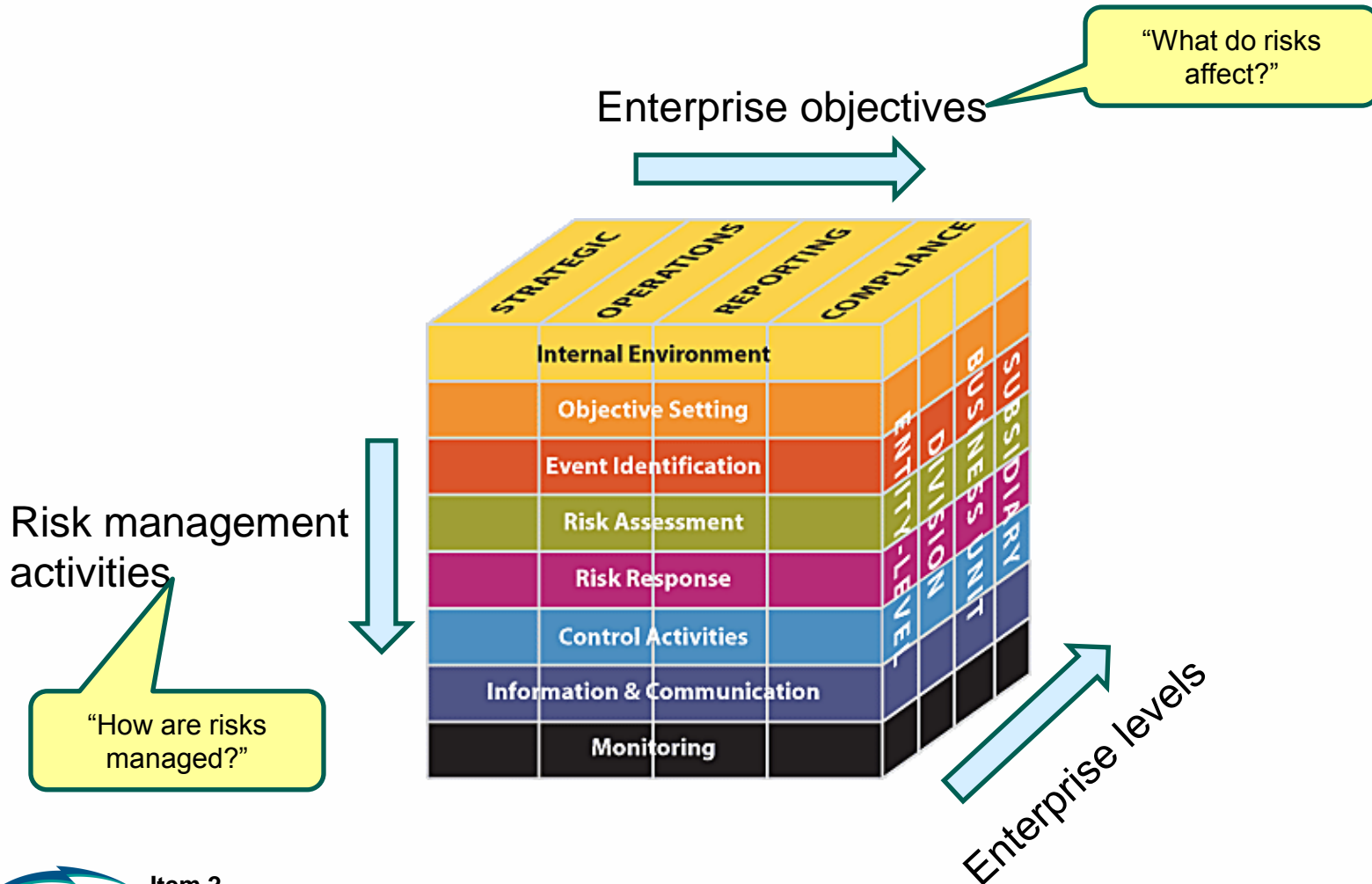
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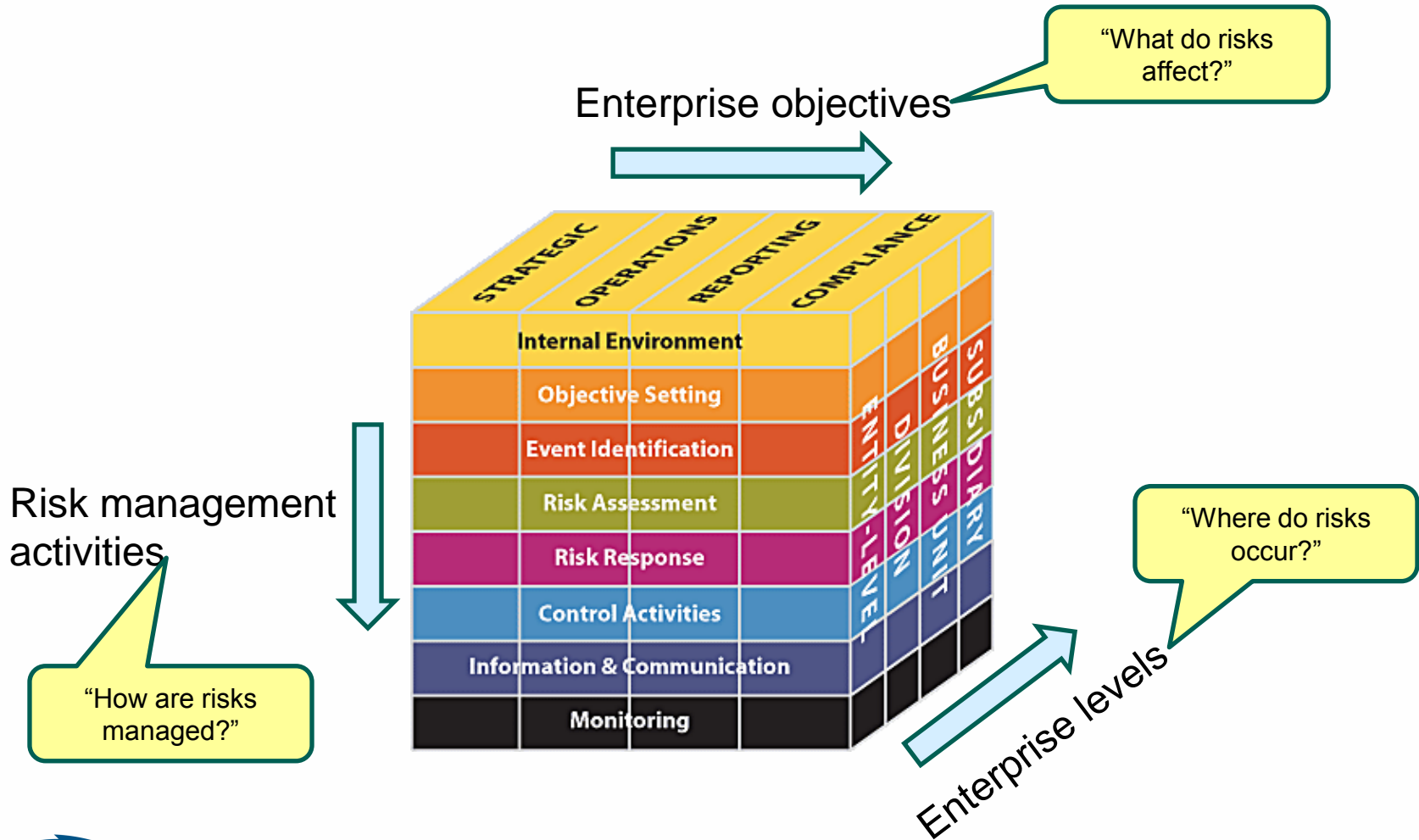
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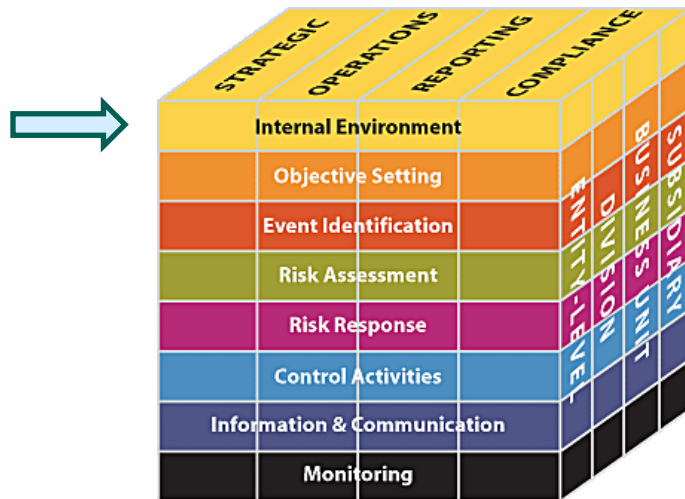
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Internal Environment

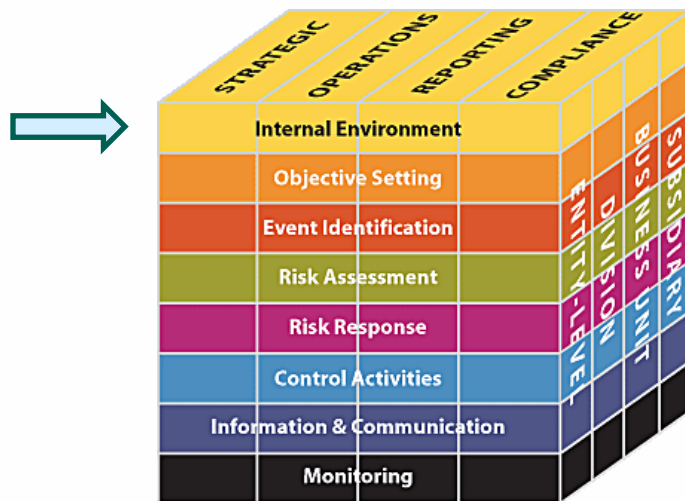
The Internal Environment layer at the top of the COSO framework is sometimes referenced as “Tone at the top”, but also encompasses:



- *Tone throughout the organization*
- *Risk management philosophy*
- *Ethical values*
- *Risk appetite*

Risk Appetite

The International Organization for Standardization defines risk appetite as “the amount of risk that an organization is willing to pursue or retain”.

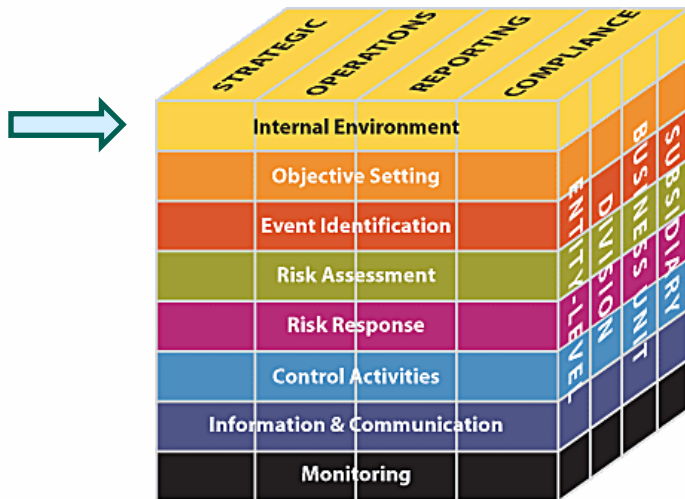


- *Understanding organizational risk appetite is necessary in defining internal controls and risk limits*

- **ERCOT has a low risk appetite for its activities**
- **ERCOT Market Participants will typically have a higher risk appetite because they must assume some amount of market risk**

Risk Tolerance

Risk tolerances are more detailed specifications of risk appetite that define the acceptable level of variation around targets

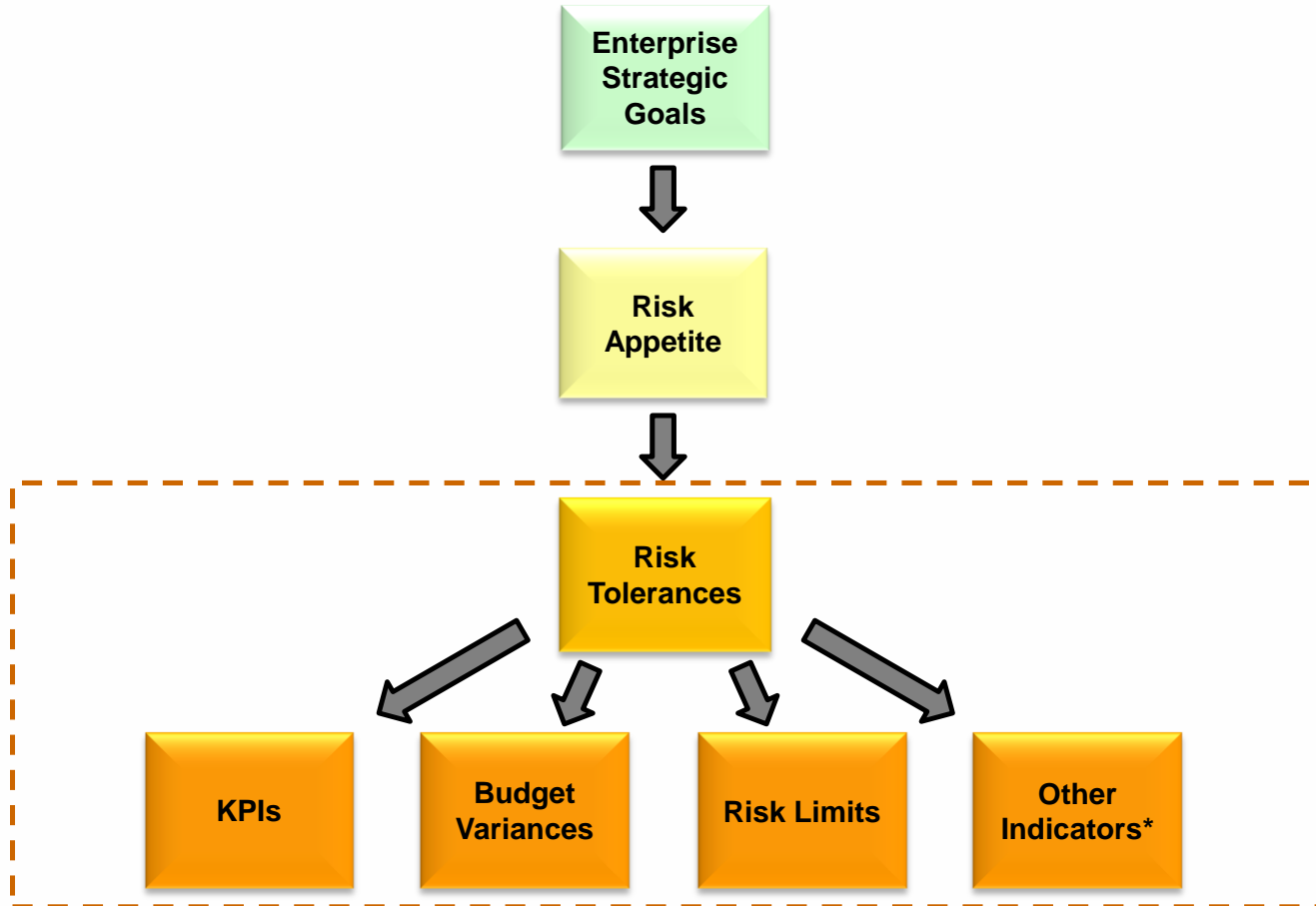


- *In the context of the COSO framework, defining risk tolerances aligns with the “Objective Setting” layer.*

For example, a risk appetite statement might specify a low level of operational errors. Allowing no more than a certain number of operational errors in a given time frame is a risk tolerance.

Risk Appetite and Risk Tolerance

Risk tolerances may be expressed by different metrics.



* Process exceptions, Internal Audit results, etc.

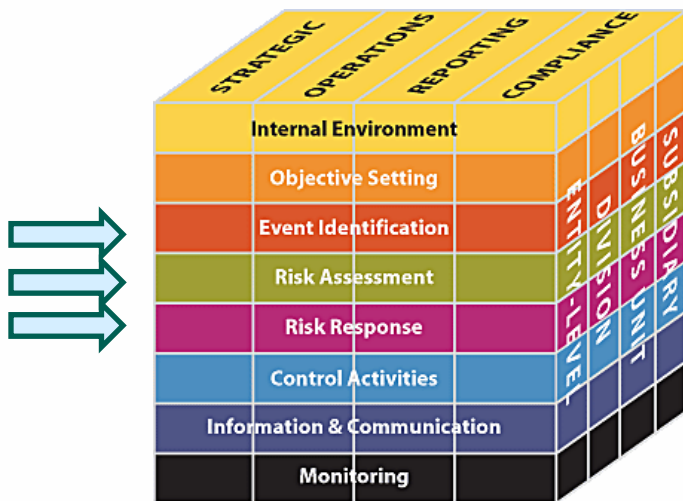
Risk Metrics

In addition to these, ERCOT Market Participants will utilize a number of metrics to measure and control market risk positions:

- **Physical (volumetric) position limits**
- **Mark-to-market limits**
- **Cumulative loss limits**
- **Value-at-Risk (VaR)**
 - **How much value might a portfolio lose –**
 - **Over a defined time period**
 - **With a defined confidence level**
- **Stress tests (how position values react to shocks to market factors)**

Risk Identification and Assessment

After risk tolerances are defined, risks are identified and assessed, and responses deployed as appropriate.



Within the COSO framework, these activities correspond to:

- *Event Identification*
- *Risk Assessment*
- *Risk Response*

- **Risks are typically identified and assessed by periodic internal surveys, management brainstorming, etc.**

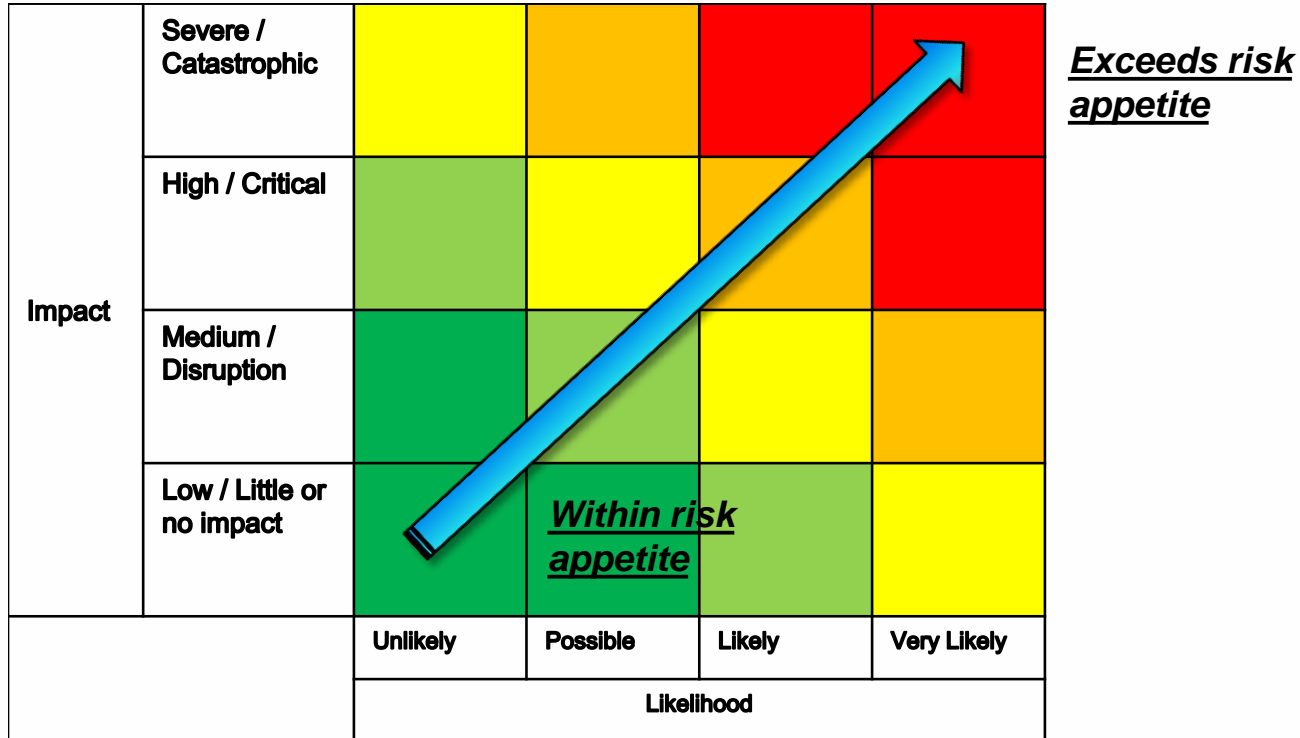
Risk Identification and Assessment

Once identified, risks are often assessed with respect to their likelihood and potential impact. The result is called a heat map.

| | | | | | |
|--------|---------------------------|-------------|-------------|-------------|-------------|
| Impact | Severe / Catastrophic | Yellow | Orange | Red | Red |
| | High / Critical | Light Green | Yellow | Orange | Red |
| | Medium / Disruption | Green | Light Green | Yellow | Orange |
| | Low / Little or no impact | Green | Green | Light Green | Yellow |
| | | Unlikely | Possible | Likely | Very Likely |
| | | Likelihood | | | |

Risk Identification and Assessment

Once identified, risks are often assessed with respect to their likelihood and potential impact. The result is called a heat map.



Risk appetite decreases as we move to the upper right corner – representing risk events that are more frequent and with a larger potential impact.

Risk Response

Risk assessments help drive appropriate strategies to control and mitigate risks.

| | | | | | | |
|--------|---------------------------|-------------|------------------------------------|-------------|-------------|-------------------------------------|
| Impact | Severe / Catastrophic | Yellow | Orange | Red | Red | <i><u>Exceeds risk appetite</u></i> |
| | High / Critical | Light Green | Yellow | Orange | Red | |
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Risk Response

Risk assessments help drive appropriate strategies to control and mitigate risks.

| | | | | | | |
|--------|---------------------------|-------------|-----------------------------|----------------------------|-------------|------------------------------|
| Impact | Severe / Catastrophic | Yellow | Orange | Control and mitigate risks | | <u>Exceeds risk appetite</u> |
| | High / Critical | Light Green | Yellow | Light Orange | Light Pink | |
| | Medium / Disruption | Green | Light Green | Yellow | Orange | |
| | Low / Little or no impact | Green | <u>Within risk appetite</u> | Light Green | Yellow | |
| | | Unlikely | Possible | Likely | Very Likely | |
| | | Likelihood | | | | |

The region in which firm risk appetite is exceeded implies active strategies to control and mitigate risks.

Risk Response

Risk assessments help drive appropriate strategies to control and mitigate risks.

| | | | | | | |
|--------|---------------------------|-----------------------------|----------|----------------------------|-------------|------------------------------|
| Impact | Severe / Catastrophic | Yellow | Orange | Control and mitigate risks | | <u>Exceeds risk appetite</u> |
| | High / Critical | Green | Yellow | Light Orange | Pink | |
| | Medium / Disruption | Accept risks | | Yellow | Orange | |
| | Low / Little or no impact | <u>Within risk appetite</u> | | Green | Yellow | |
| | | Unlikely | Possible | Likely | Very Likely | |
| | | Likelihood | | | | |

Low-impact or very unlikely risks may be acceptable

Risk Response

Risk assessments help drive appropriate strategies to control and mitigate risks.

| | | | | | |
|--------|---------------------------|-----------------------|----------------------------|-------------------------------------|------------------------------------|
| Impact | Severe / Catastrophic | Share or insure risks | Control and mitigate risks | <i><u>Exceeds risk appetite</u></i> | |
| | High / Critical | | | | |
| | Medium / Disruption | Accept risks | Control risks | | |
| | Low / Little or no impact | | | | <i><u>Within risk appetite</u></i> |
| | | Unlikely | Possible | Likely | Very Likely |
| | | Likelihood | | | |

Intermediate risks are addressed by implementing controls or insuring against large losses

Risk Response

ERCOT risk management tools include:

- **Insurance (property damage, crime, employment practices)**
- **Independent reviews of operations (auditors, NERC, Market Monitor)**
- **Collecting collateral from Market Participants (credit risk)**
- **Contractual limitations on liability (embedded within Standard Form Agreement)**
- **Vendor review process (fraud risk)**
- **Policies and procedures**
- **Strong internal controls**



Risk Response

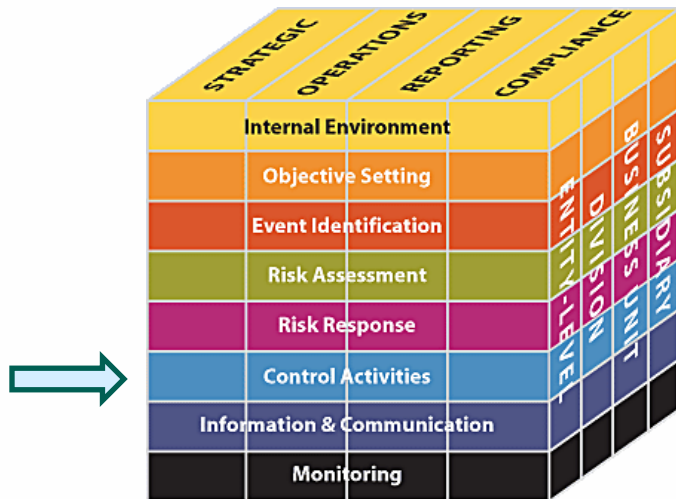
For ERCOT Market Participants, risk management tools will also include means to mitigate market risk:

- Fuel and power hedges
- Swaps and options
- Congestion Revenue Rights
- Full-requirements contracts
- Bilateral contracts
- Weather derivatives
- Retail pricing arrangements



Control Activities

At a more detailed level, we consider control activities and information & communication.

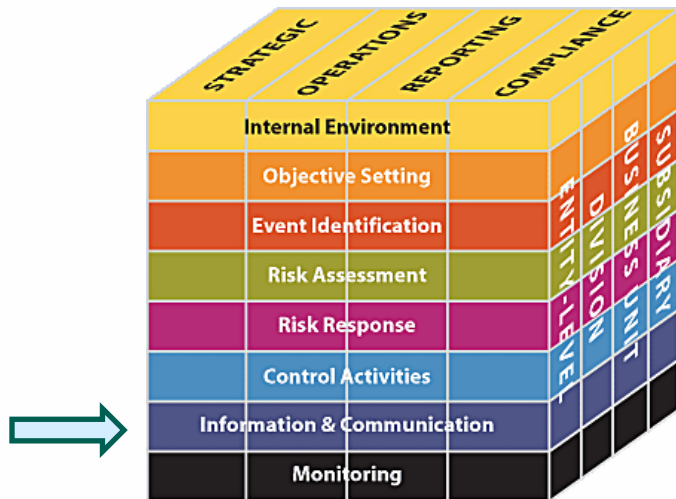


Control Activities

- *Processes designed to minimize inherent risks in business activities*
- *SSAE16 controls managed by ICMP*
- *Periodic control self-assessments*
- *Periodic testing by Internal Audit*

Information and Communication

Management is responsible for ensuring that risk information is communicated throughout the organization.

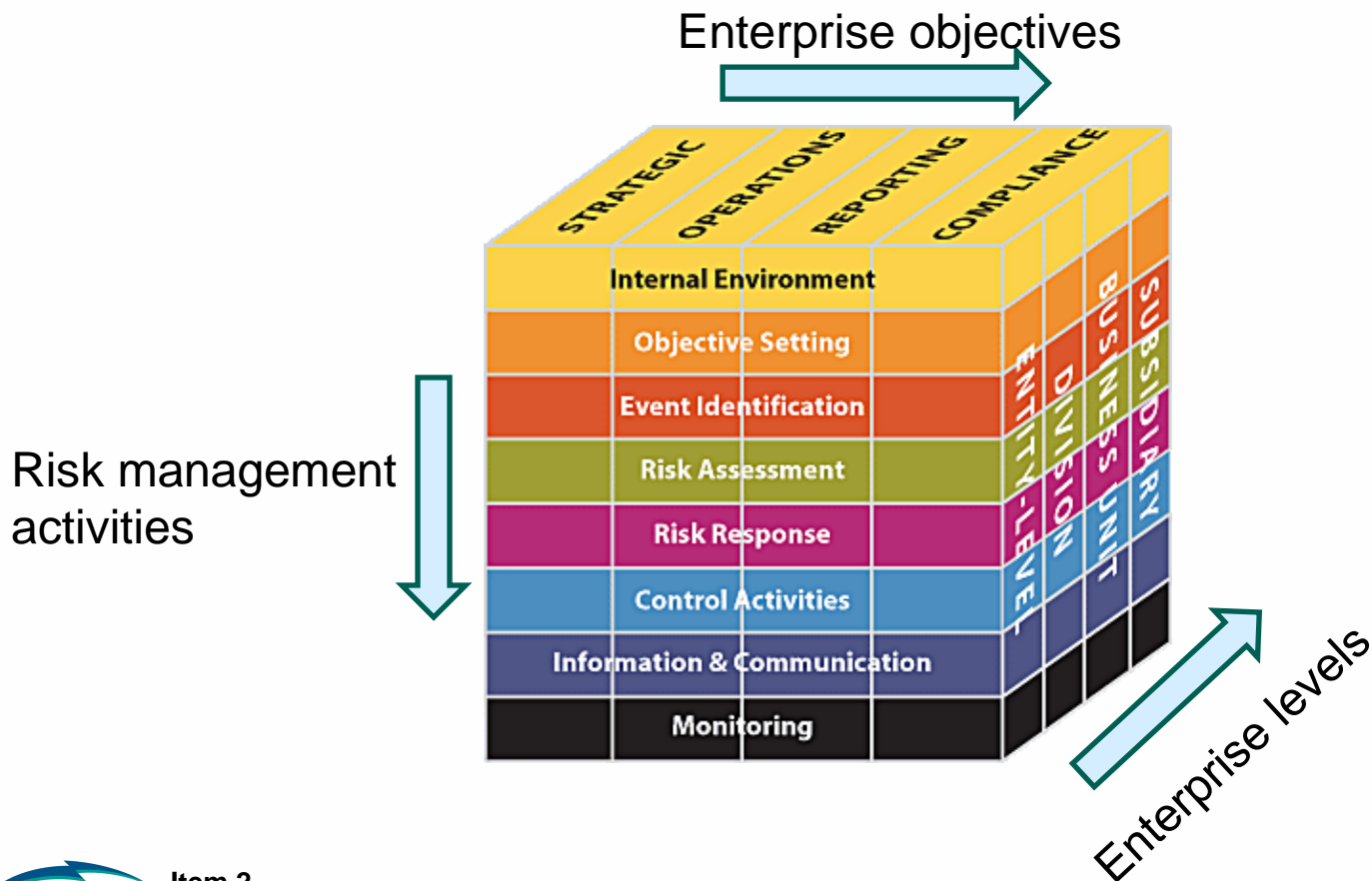


Information and Communication

- *Board and Committee reporting*
- *Internal Audit reports*
- *Ongoing communication with PUCT and other regulatory authorities*
- *Internal assessment and reporting of risks*

Risk Governance

Finally, we consider Risk Governance – the means by which the risk management activities are put in place across enterprise objectives and levels.



Risk Governance

Effective risk governance ensures that all risk management activities function effectively throughout the organization.

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Organization design

- Appropriate segregation of duties between risk-taking and risk control functions.
- Clearly defined roles and responsibilities for all employees

Risk Governance

Effective risk governance ensures that all risk management activities function effectively throughout the organization.

Risk policy

- Defines risk management roles and responsibilities
- Specifies risk reporting

Risk Governance

Effective risk governance ensures that all risk management activities function effectively throughout the organization.

Risk Committee

- “Owns” risk across the organization
- Should have a view across organization divisions
- Determines organizational risk appetite
- Ensures appropriate reporting

Risk Governance

At ERCOT, the risk governance structure is defined by CS1.3 – Enterprise Risk Management Corporate Standard.

- **Defines objectives for ERM**
- **Establishes ERM responsibilities for:**
 - **Board of Directors**
 - **CEO**
 - **Risk Management Committee (RMC)**
 - **VP Enterprise Risk**

Risk Governance

Primary ownership of ERM at ERCOT lies with the Risk Management Committee (RMC).

RMC responsibilities:

- **Implements risk management governance structure**
- **Maintains awareness of the impact of risks on ERCOT**
- **Defines long-term goals for risk management capabilities**
- **Reviews ERCOT risk assessments**
- **Recommends risk mitigation strategies**
- **Monitors risk reporting**

Risk Governance

In addition, ERCOT has established a Director-level Advisory Risk Committee (ARC).

ARC responsibilities:

- **Assists in identification of risks**
- **Reviews project/NPRR risk assessments**
- **Assists in definition of long-term risk management capabilities**
- **Reviews ERCOT risk assessments**

Risk Governance

In general, to effectively manage enterprise risk every ERCOT employee is responsible for maintaining awareness of risks and acting in accordance with internal controls and Protocols.



Questions