

Improving energy efficiency in frozen food industry using thermometry metrology know-how

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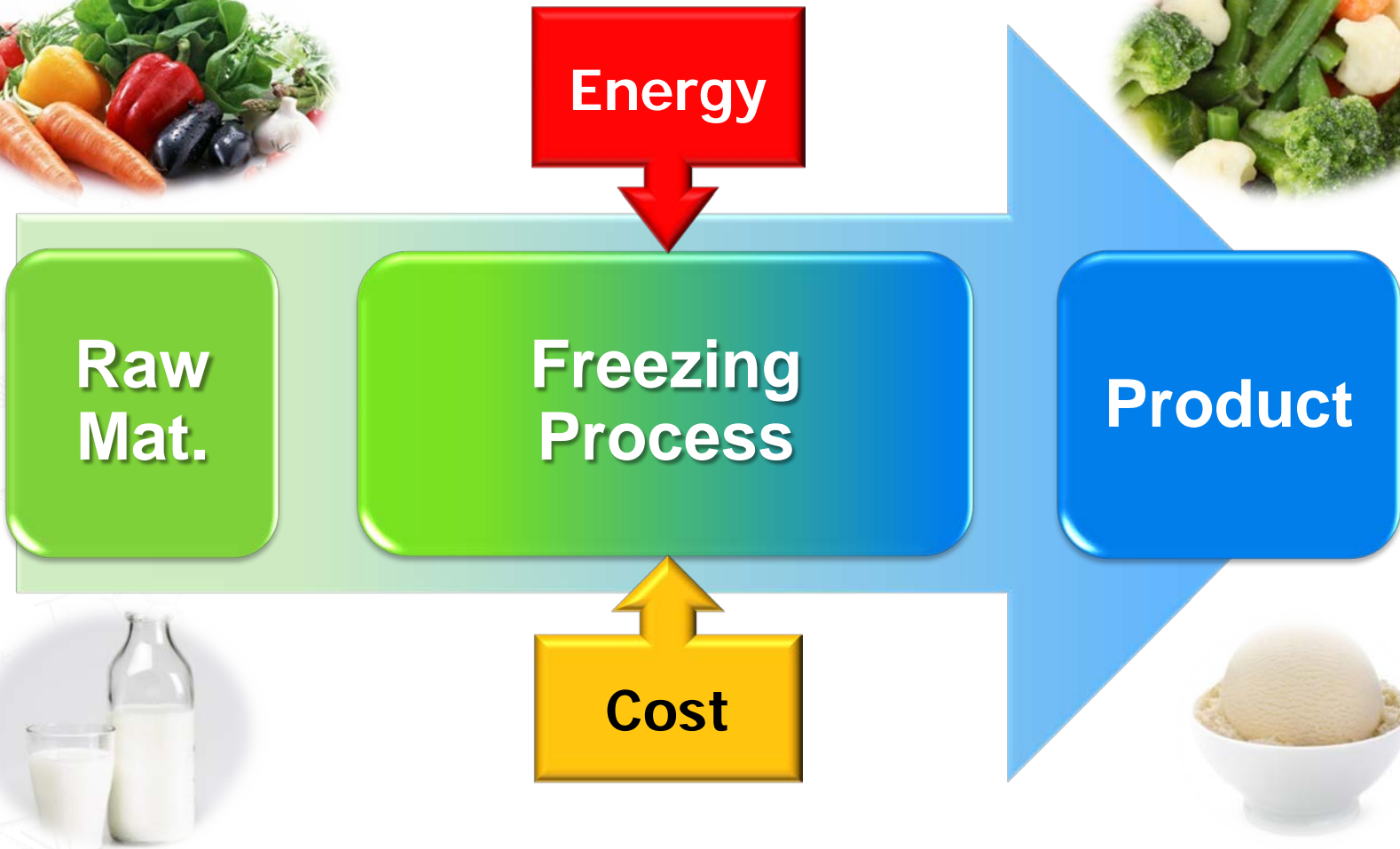


สถาบันมาตรวิทยาแห่งชาติ

National Institute of Metrology (Thailand)



Freezing Process



Pilot Project

Company #1 : Ice Cream

- SMEs
- Local Market



Company #2 : Fresh, Dried and Frozen Vegetable and Fruit Exporter

- UK
- Japan
- Middle East
- Australia



Problem



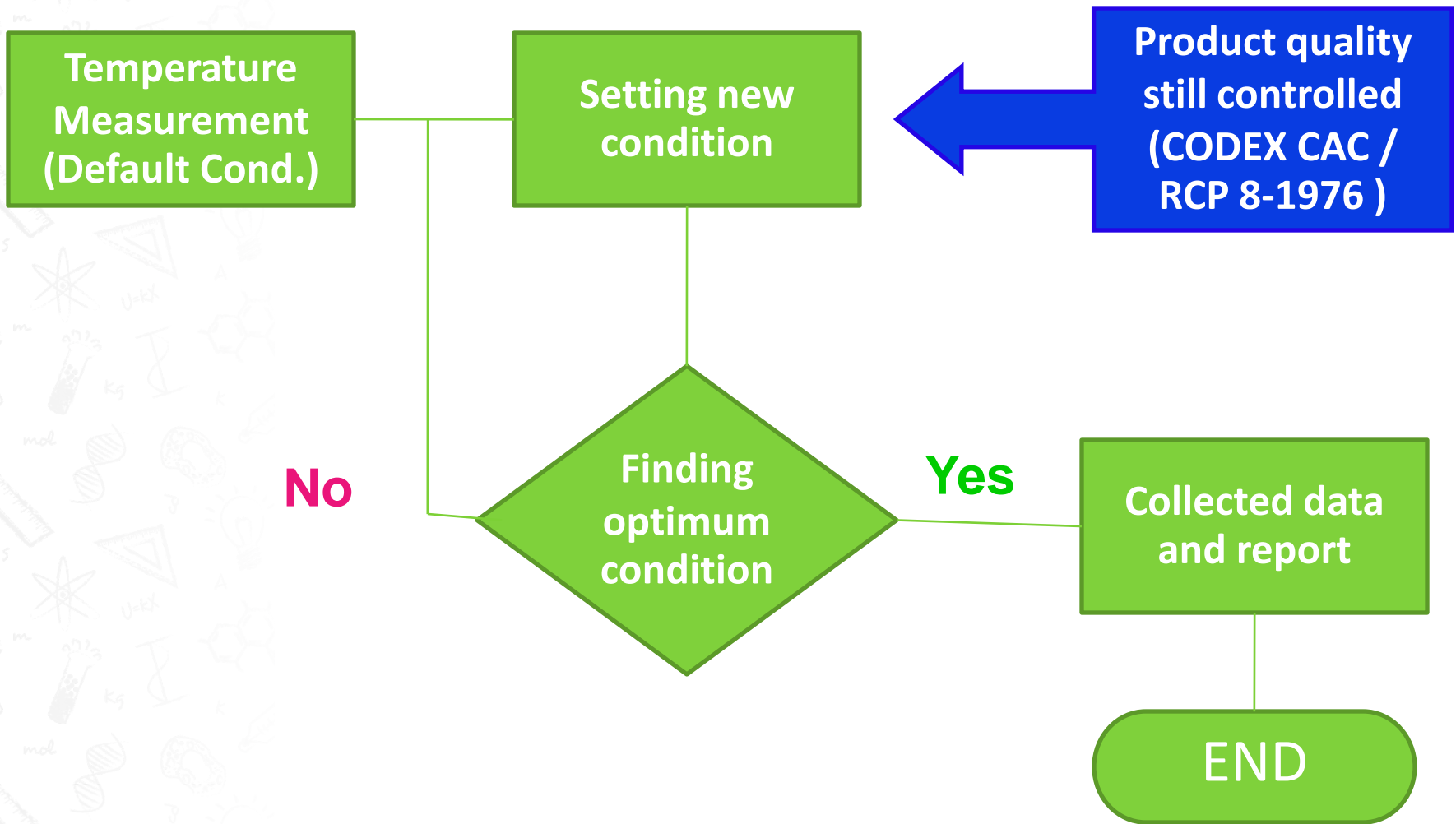
- **Lack of staff's knowledge** in order to apply metrology know-how to their production process i.e.
 - Staff can't realized **tolerance limit** of the instrument using in the production process
 - Staff can't **applied the results** from the calibration certificate properly
- The setting of the **freezing temperature** in freezing process is **too low**

Solution

- **Training staff** in the required topics (application of metrology for industrial work)
- **Measure the temperature** of product and the air during freezing process
- **Finding the optimum condition** and temperature for the freezing process which is not effect to the product quality

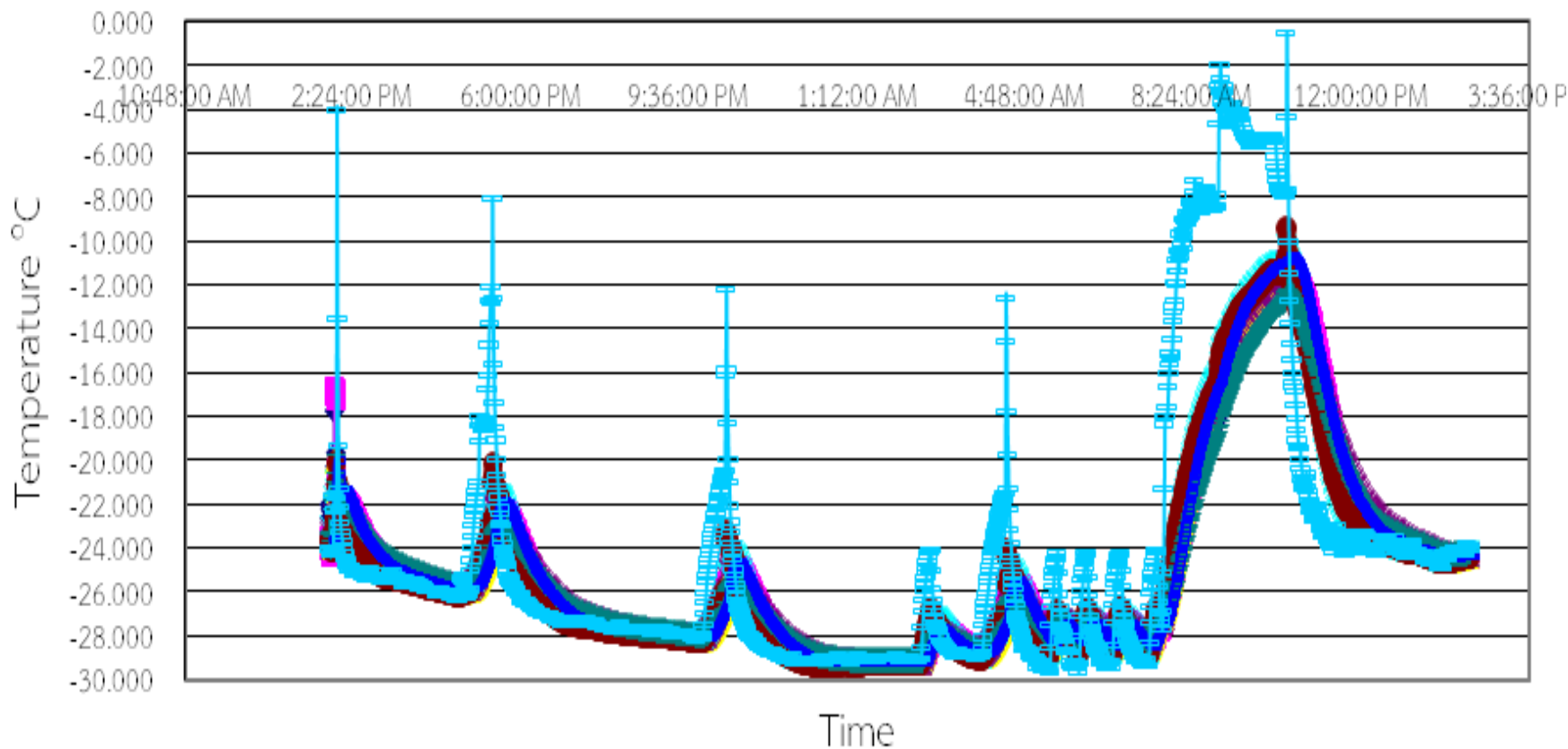


Process Approach



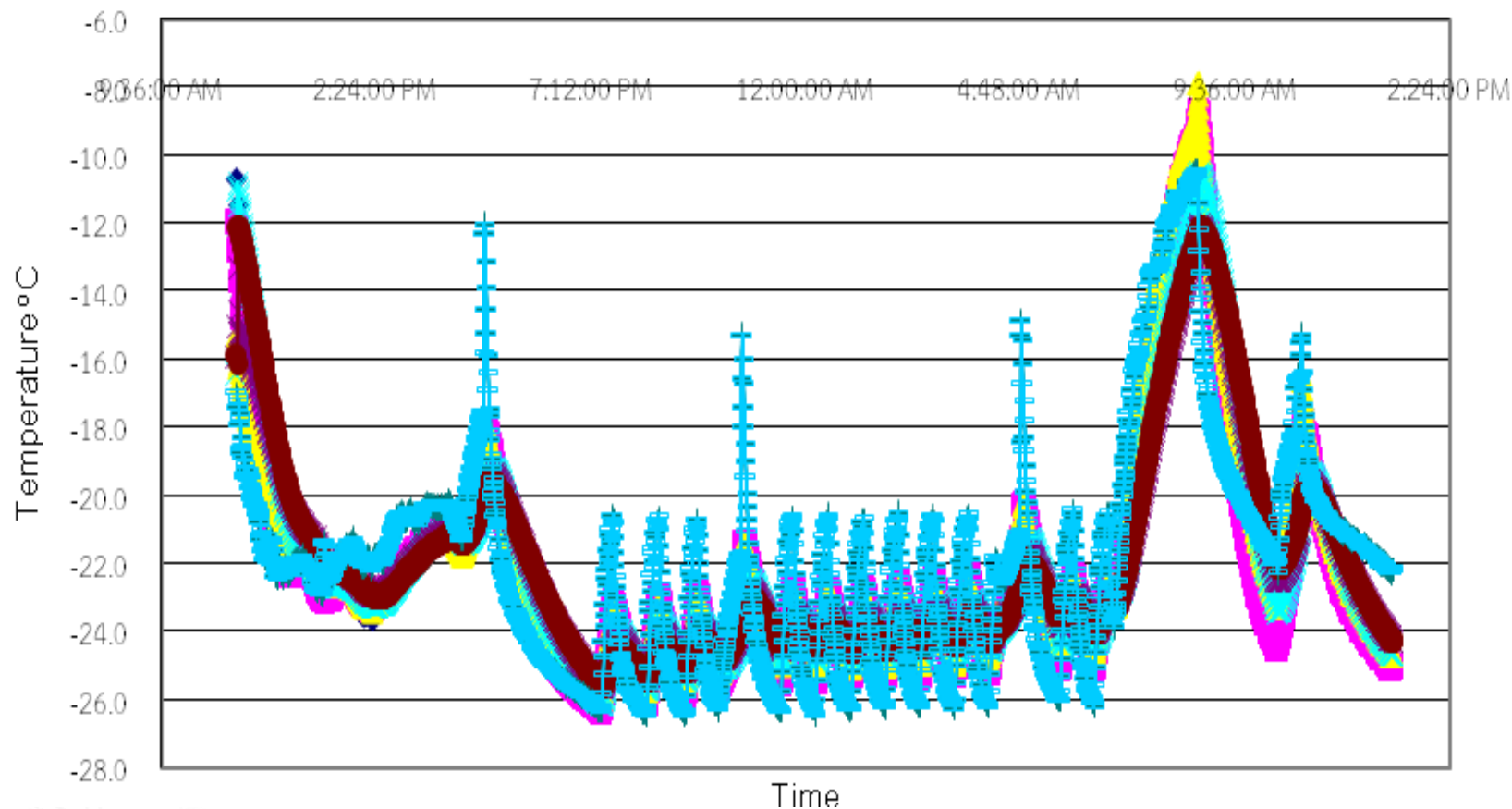
Finding optimum condition for Company # 1

- setting temperature of $-33.0\text{ }^{\circ}\text{C}$ (factory defaults)

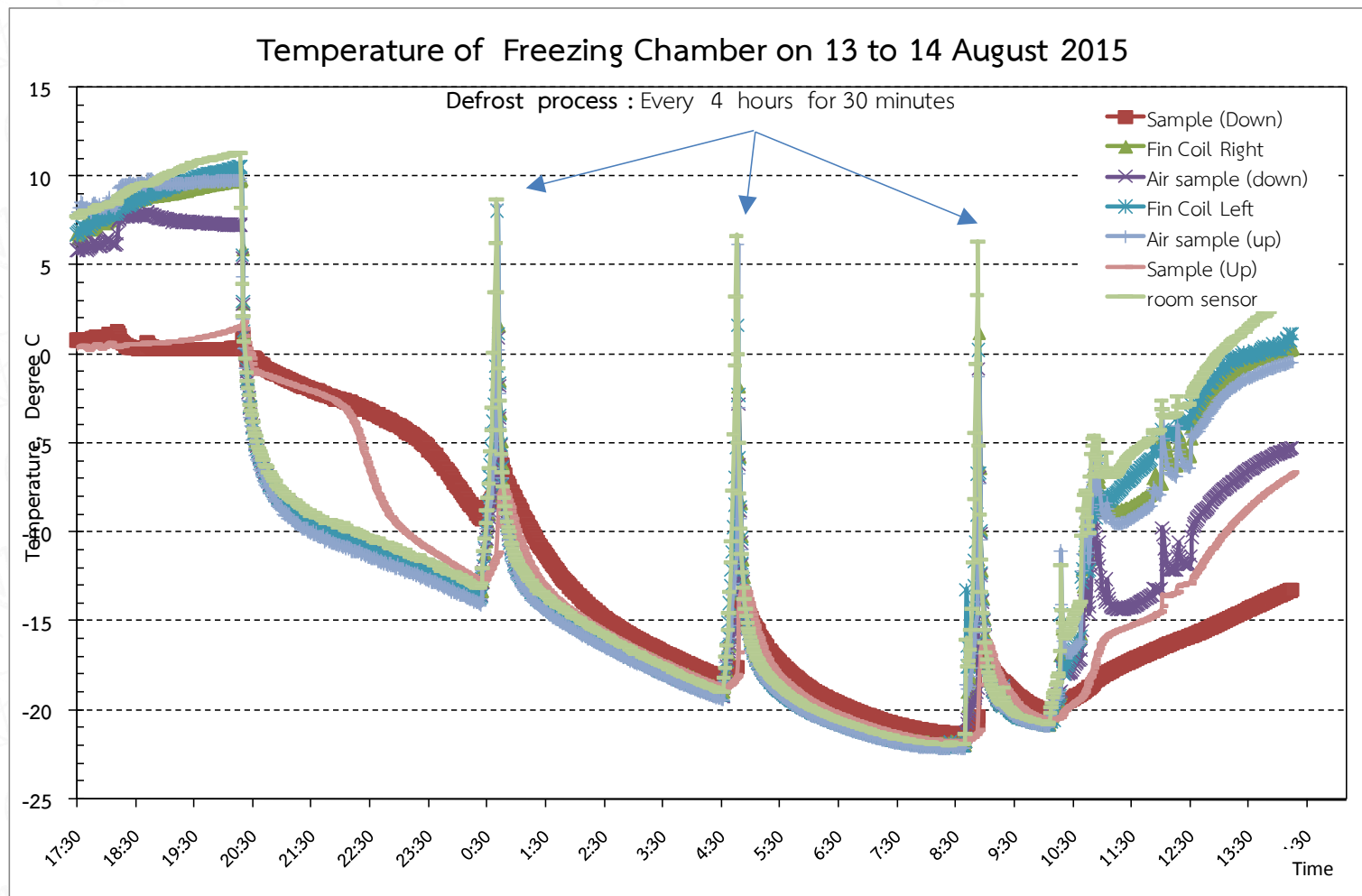


Finding optimum condition for Company # 1

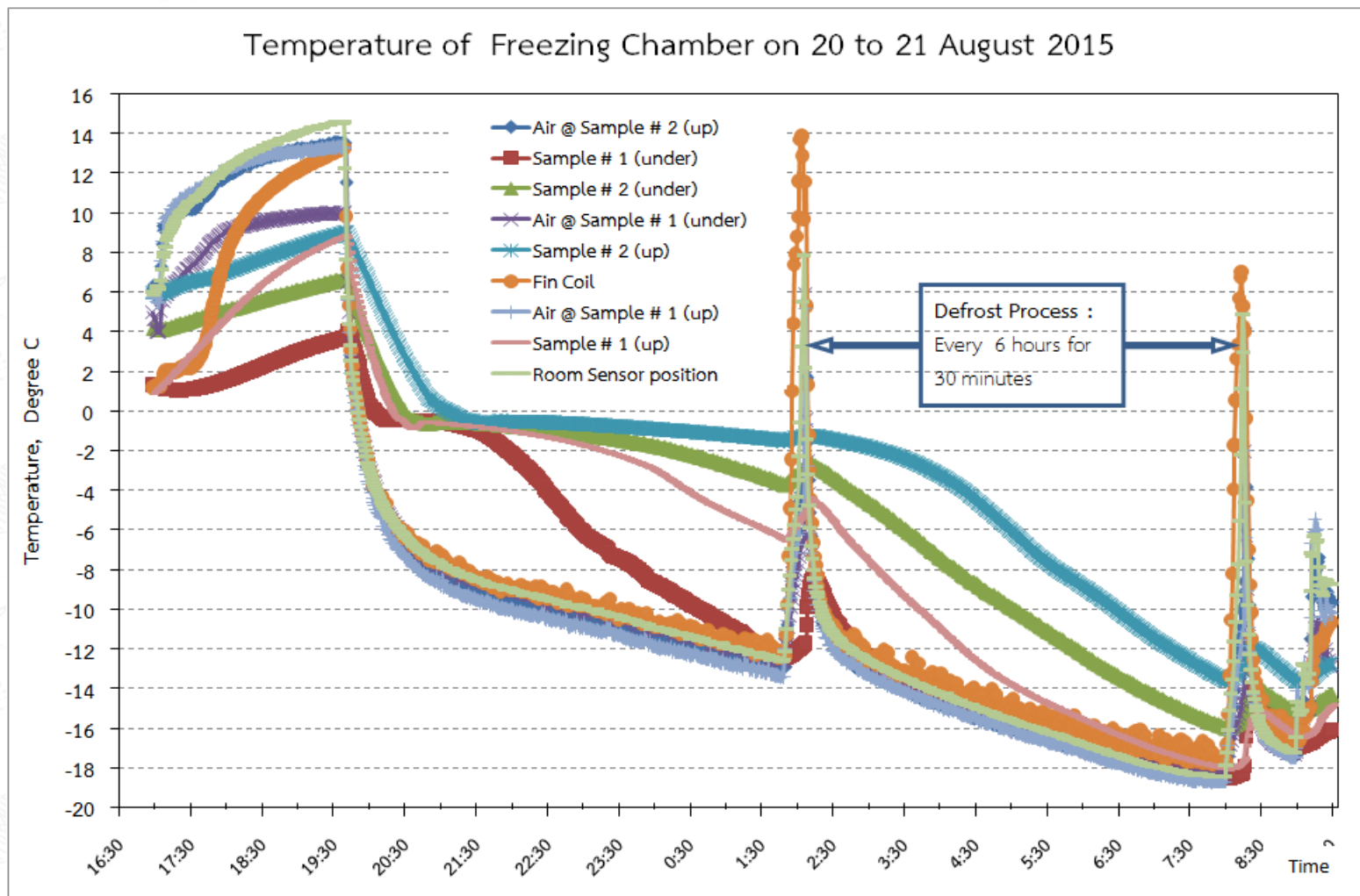
- new setting temperature to $-29.0\text{ }^{\circ}\text{C}$



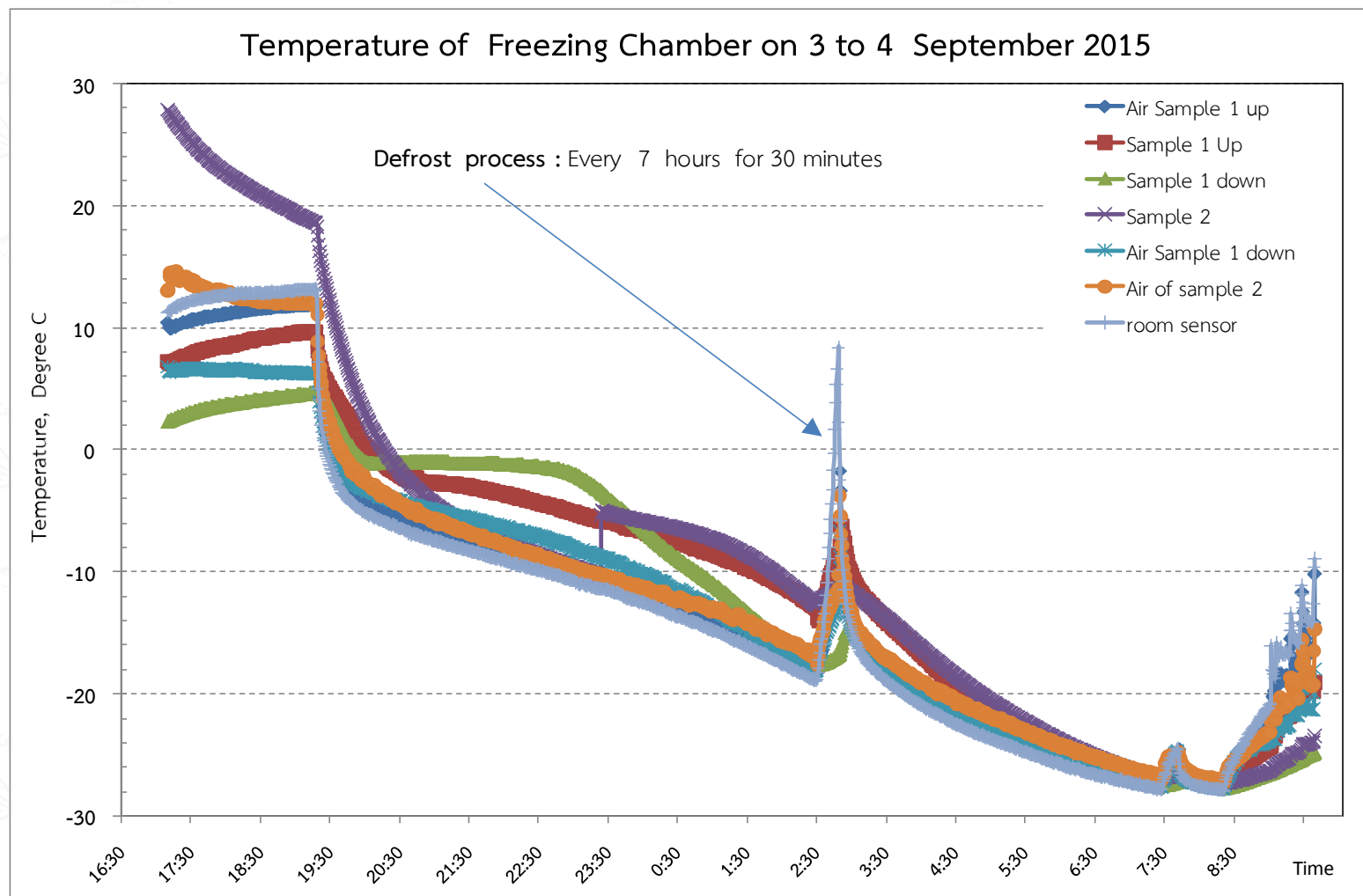
Finding optimum condition for Company # 2



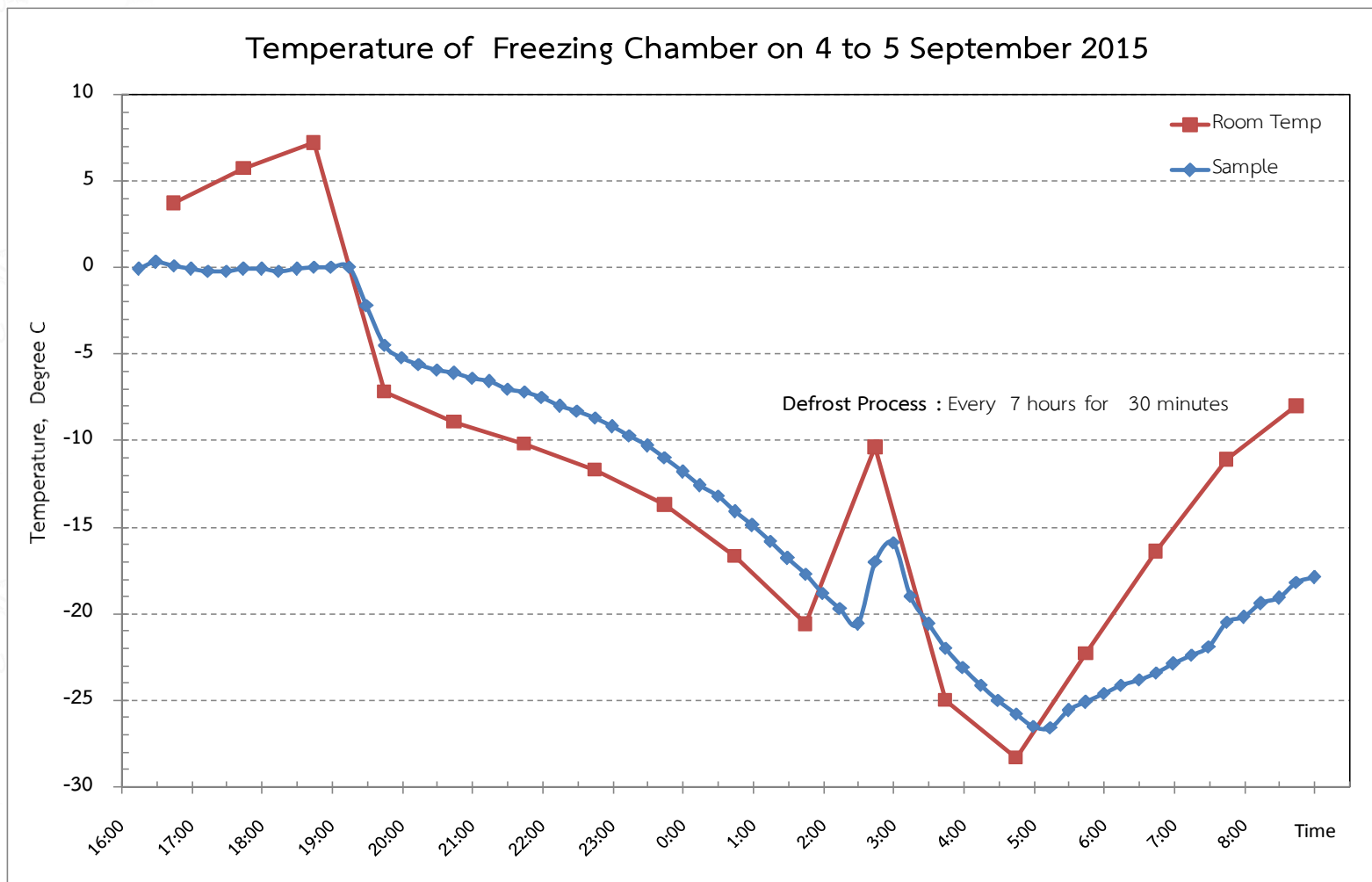
Finding optimum condition for Company # 2



Finding optimum condition for Company # 2



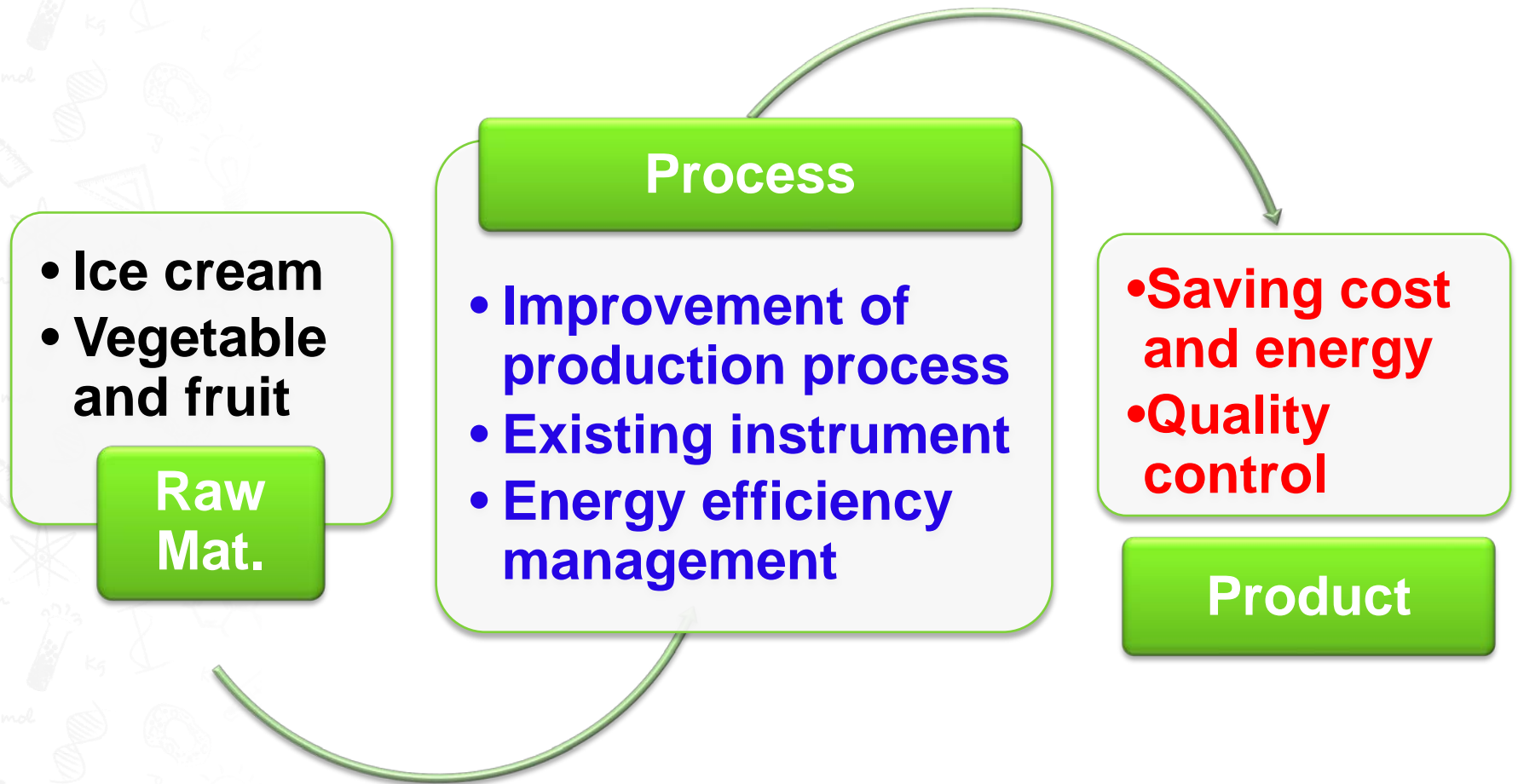
Finding optimum condition for Company # 2



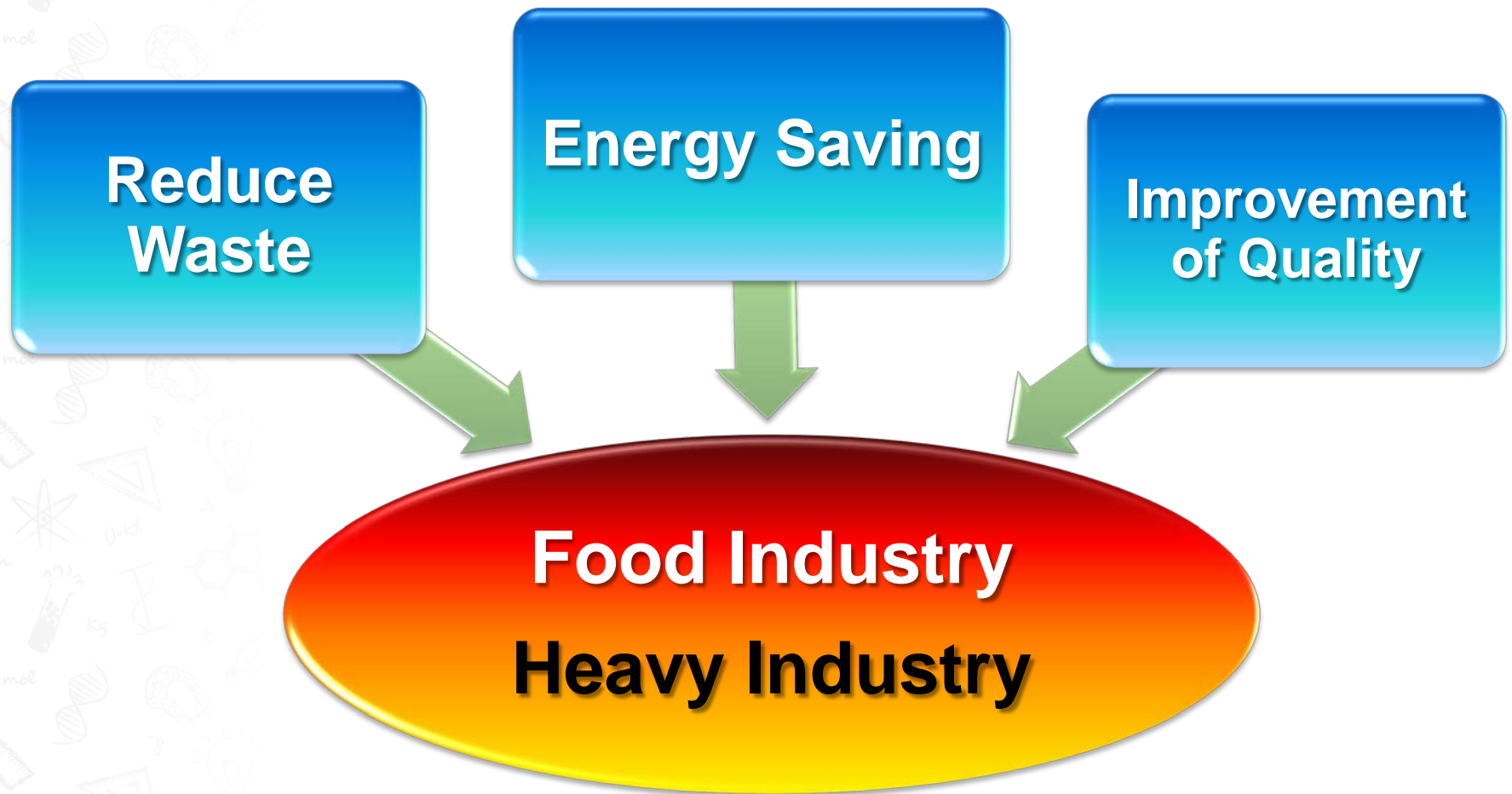
Result

- **Company #1** can **saving the energy** in the freezing process for **21%**
- **Company #2** can **saving the energy** in the freezing process for **27%**
- **Company #2** can **save cost** of freezing process for **10%**
- **Staff** can realized the tolerance limit of the instrument and can use the calibration results from the calibration certificate properly

Advantage



Potential Application



Acknowledge



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