

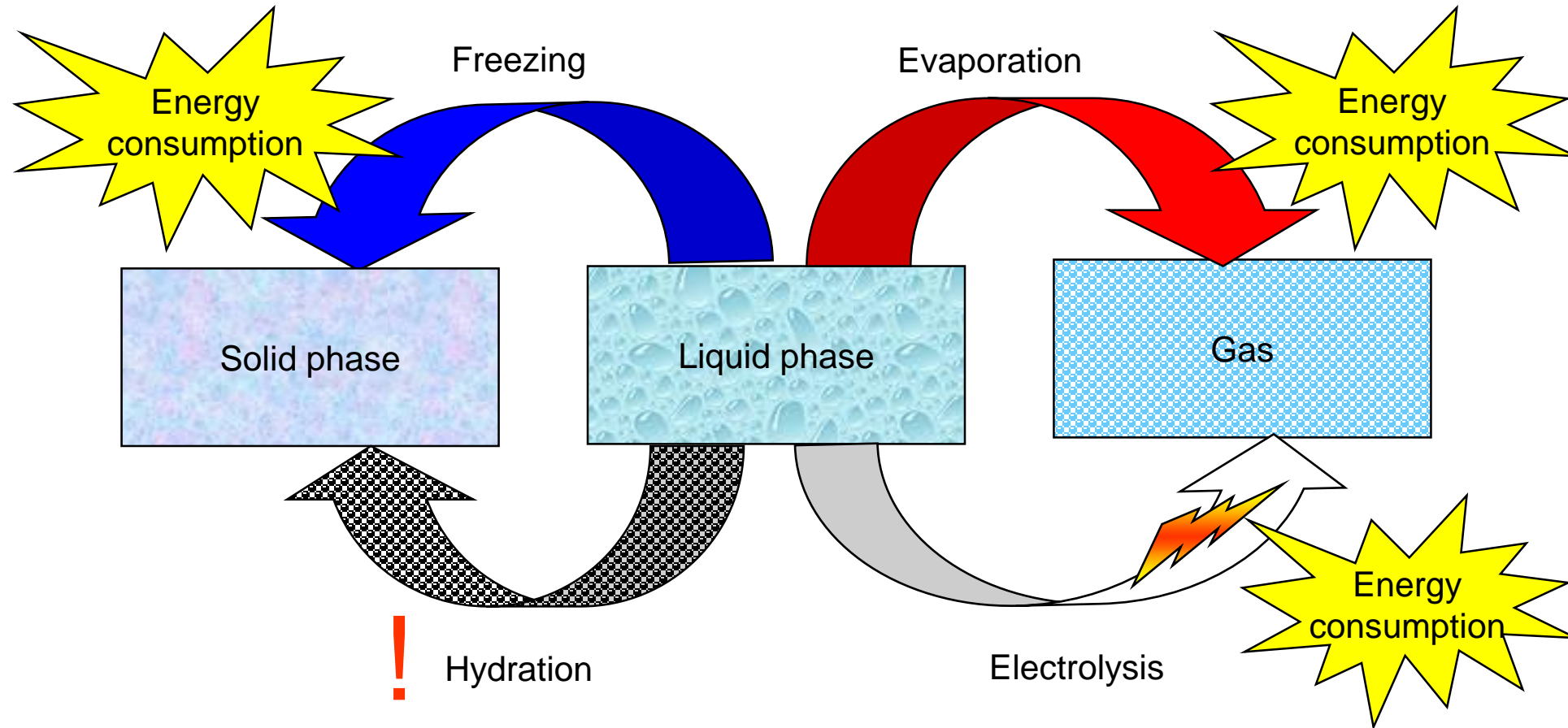
Agriculture - Fertilizer Granules Forming

GEN TRIZ Case Study

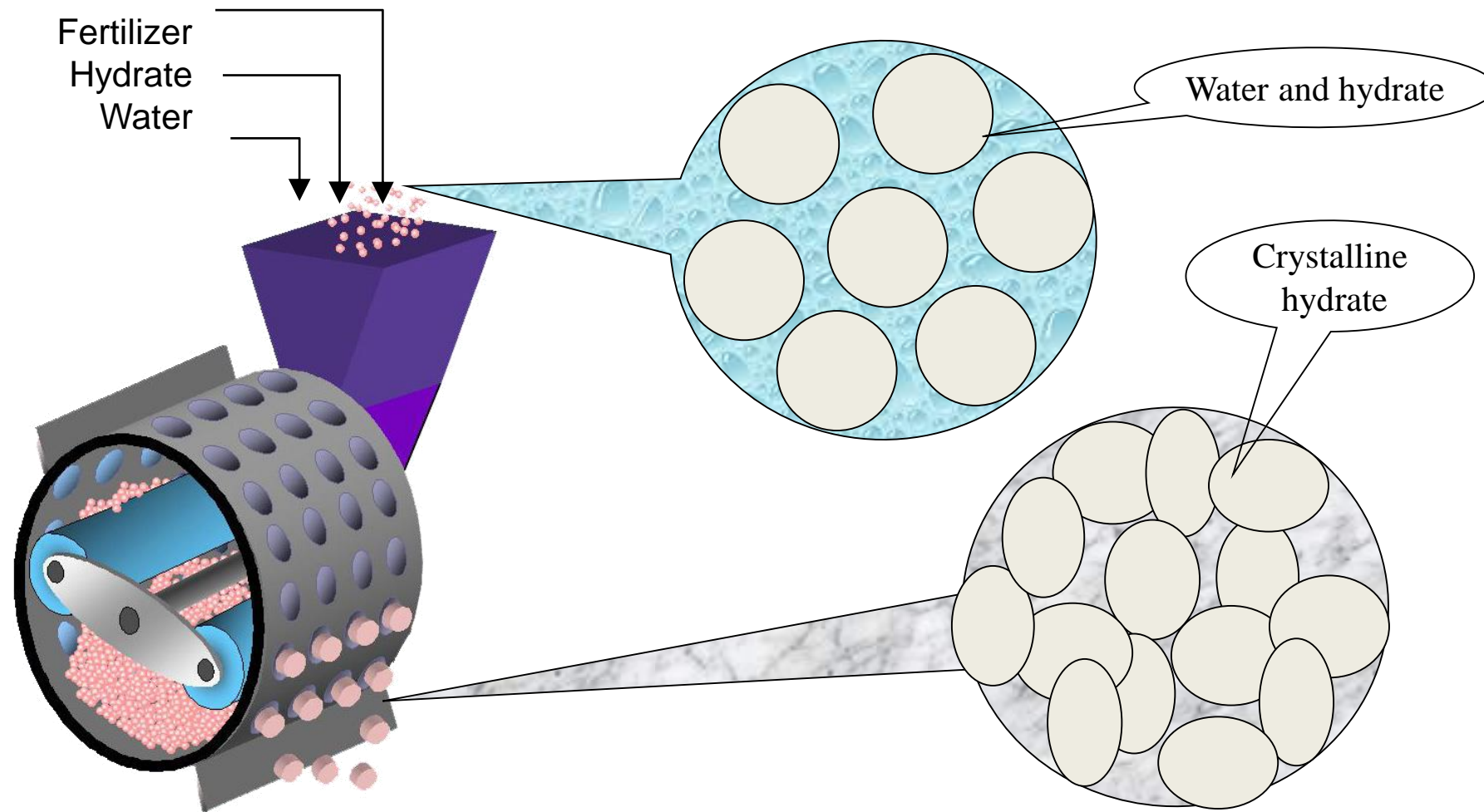
Background

- Initial composition of fertilizer includes water as a binder and plasticizer (in case of granules extrusion).
- Water is the most affordable and available substance, but should be removed during the next steps of technological process. Drying of granules is quite expensive due to excessive energy consumption
- The problem:
 - How to exclude drying from the technological process of granules manufacturing to dramatically reduce the energy consumption?
- Physical Contradiction:
 - Water should exist in the fertilizer composition to bind particles together, but it should not exist there to prevent excessive energy consumption during drying
- Inventive Principle:
 - Change the physical- or chemical properties
- Solution:
 - Application of crystalline hydrates

Phase Transition of Water



Application of Crystalline Hydrates



Results and Conclusions

Results:

- Some materials making crystalline hydrates:
 - Alabaster
 - Dolomite
 - Magnesia
 - Etc.
- Advantages:
 - High availability
 - Low cost
 - Potential source of useful additives to a soil

Business impact:

- Absence of drying allows:
 - Significantly reduce energy consumption
 - Apply thermally unstable components: ammonium nitrate, carbamide, etc.