



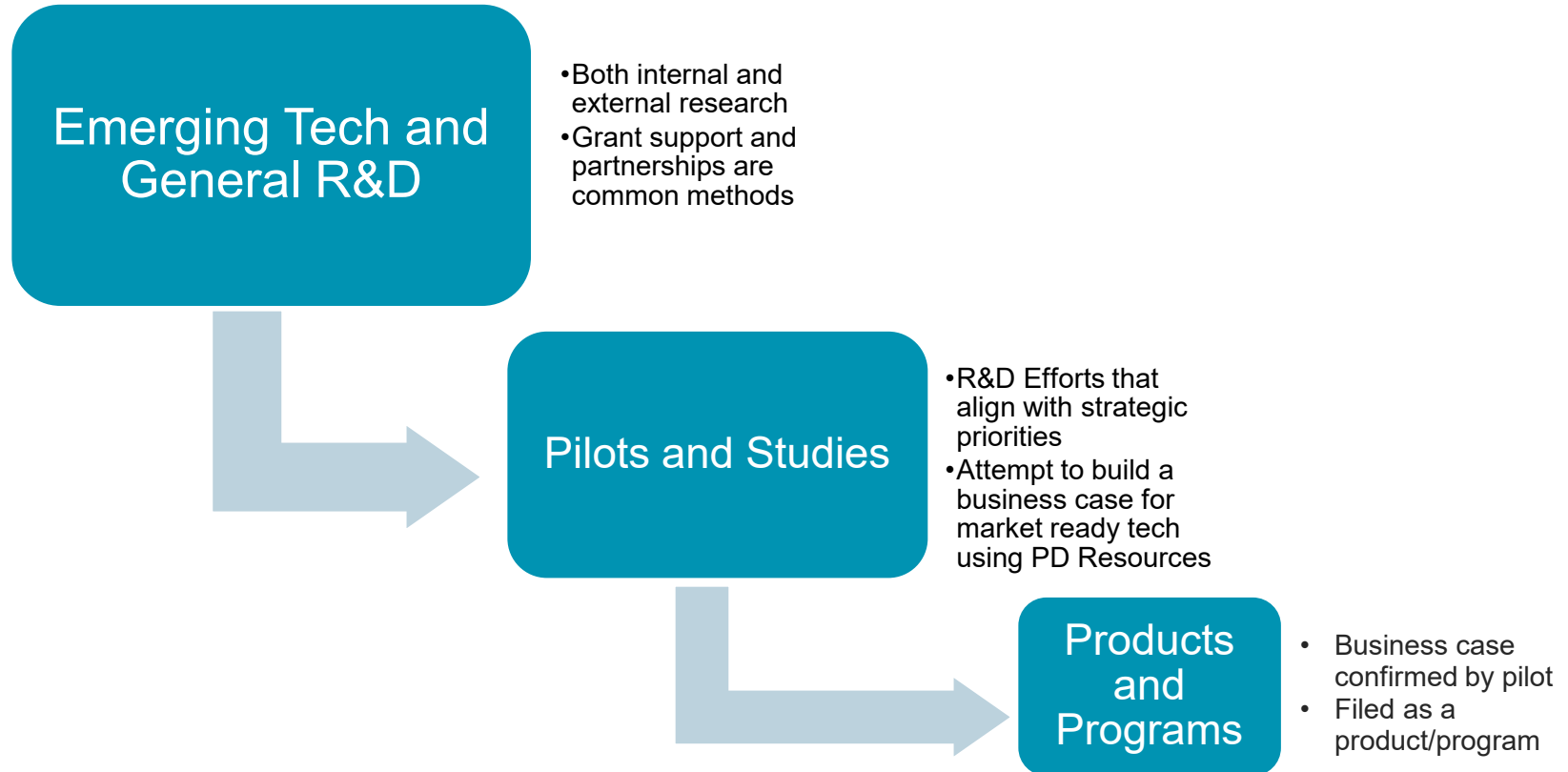
Utility R&D Lighting Round

2.24.20

Xcel Energy's R&D Overview

- Product Development Budget of roughly \$5.5M across all states (MN, CO, NM, SD, WI)
 - Used to conduct pilots and/or studies, support external research efforts, fund internal emerging tech research and develop programs
- Support research efforts of external organizations
 - Support requests for research grants
 - DOE grants and Minnesota CARD grants
 - NREL, Minnesota CEE, Slipstream are common partners

Turning R&D into Products



Thermal Energy Storage

- Phase Change Material (PCM) installed in low temperature refrigeration facilities
- Goal is to shift refrigeration load to off-peak hours
 - Paired with software to shift load with 24 hours notice (needs to recharge overnight)
- PCM is engineered to phase change at optimal temperature
 - Can be adjusted based on needs



