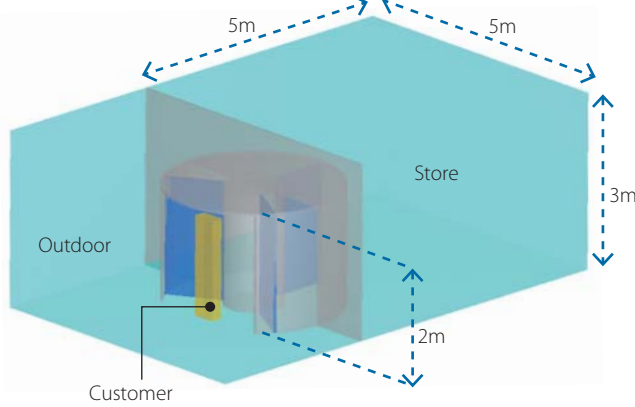


# Estimate of Heat Loss Through Revolving Doors

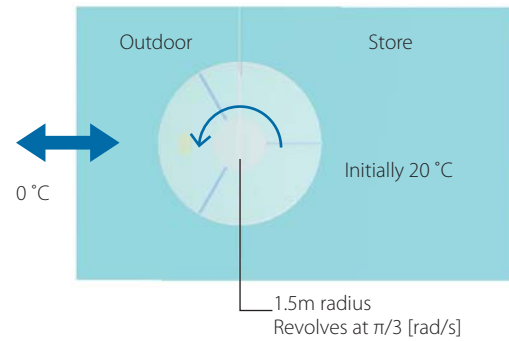
On a cold day, revolving doors can become a factor of heat loss by letting warm air escape and cold air enter. scSTREAM is used to estimate how much heat may be lost through revolving doors when a customer enters and exits a store.

## Simulation Model and Conditions

Store model with revolving doors

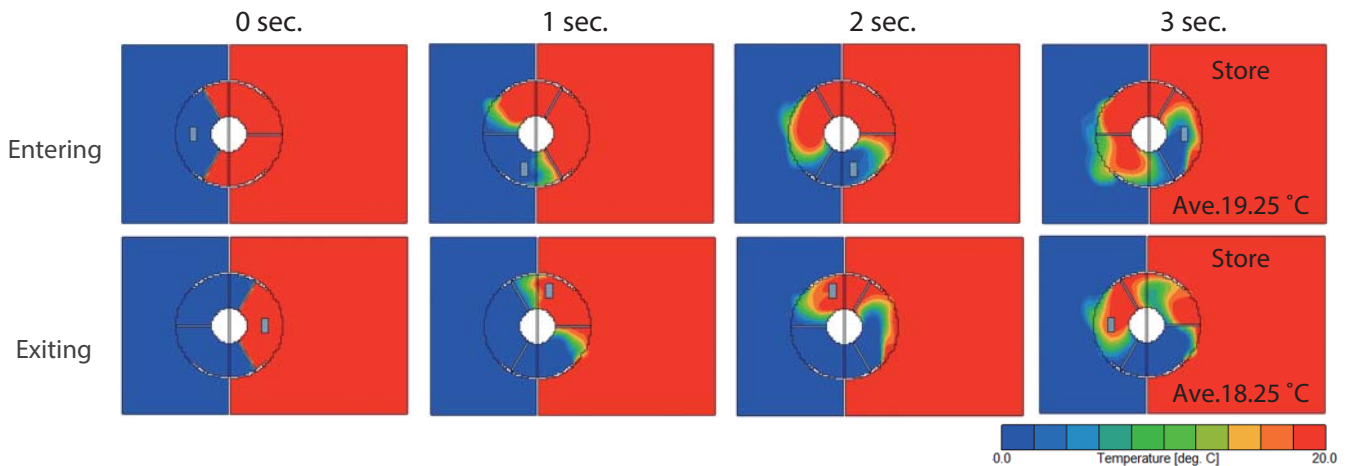


Transient analysis:  $\Delta t = 0.01$  sec.  
Analysis time: 0 to 3 sec.



## Simulation Results

### Temperature contour at 1.5m from floor



### Estimated heat loss and CO<sub>2</sub> emission

	Heat loss from Store [kWh]			Cost [\$]	CO <sub>2</sub> emission [ton]
	1 customer	300 times/day	30 days/month	1 month	1 month
Revolving doors	0.0631	18.9	568	59	3.1 E-4
Sliding doors	0.0397	11.9	357	37	2.0 E-4

Heat loss =  $\rho V C_p \Delta T$

$\rho$ : density of air  
 $V$ : store volume  
 $C_p$ : specific heat of air  
 $\Delta T$ : difference in initial and final average indoor temperature

Electricity: 0.104 [\$/kWh]\*,  
 CO<sub>2</sub> emission: 5.5 E-7 [ton/kWh]\*

\* Based on Annual Energy Review, 2011, U.S. Energy Information Administration

## Notes

In this particular simulation setup, more heat is lost when a customer exits the store than when he/she enters the store. The estimate of heat loss for one month is roughly sixty dollars, which is about fifty percent more than a setup with sliding doors.