VERILOG CODE:

```
module ElevatorController(
input wire clk,
input wire reset,
input wire up_button,
input wire down_button,
input wire door_hold_button,
input wire [3:0] desired_floor,
input wire emergency_stop,
output wire [3:0] floor,
output reg energy_saving_mode,
output reg door_hold_active,
output reg [2:0] display_panel
);
reg [3:0] current_floor;
reg elevator_stop;
always @(posedge clk or posedge reset)
if (reset || emergency_stop)
current_floor <= 4'b0000;
else if (up_button && (current_floor < 4'b0110) && (current_floor != desired_floor))
current_floor <= current_floor + 1;
always @(posedge clk or posedge reset)
if (reset || emergency_stop)
current_floor <= 4'b0000;
else if (down_button && (current_floor > 4'b0000) && (current_floor != desired_floor))
current_floor <= current_floor - 1;
always @(posedge clk or posedge reset)
if (reset || emergency_stop)
elevator_stop <= 1;
else if (current_floor == desired_floor)
```

```
elevator_stop <= 1;
else
elevator_stop <= 0;
always @(posedge clk or posedge reset) begin
if (reset || emergency_stop || up_button || down_button || elevator_stop)
energy_saving_mode <= 0;
else
energy_saving_mode <= 1;
end
always @(posedge clk or posedge reset) begin
if (reset || emergency_stop || up_button || down_button)
door_hold_active <= 0;
else if (door_hold_button)
door_hold_active <= 1;
end
always @(posedge clk or posedge reset) begin
if (reset)
display_panel <= 3'b000;
else
display_panel <= current_floor;
end
endmodule.
```